TransCanada Keystone Pipeline, L.P.
Keystone XL Pipeline

Federal Dredge and Fill Permit Application
U.S. Army Corps of Engineers
Omaha District

Project Number:

TAL-00050388-73

Submitted By:

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A	2020-05-27	IFU	JZ	MA	JAS	SS	TCE

Privileged Information: ***Do Not Release***

U.S. Army Corps of Engineers (USACE)

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

33 CFR 325. The proponent agency is CECW-CO-R.

Form Approved - OMB No. 0710-0003 Expires: 02-28-2022

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PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned. System of Record Notice (SORN). The information received is entered into our permit tracking database and a SORN has been completed (SORN #A1145b) and may be accessed at the following website: http://dpcld.defense.gov/Privacy/SORNsIndex/DOD-wide-SORN-Article-View/Article/570115/a1145b-ce.aspx

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required)
First - Gary Middle - Last - Salsman	First - Mike Middle - Last - Aubele
Company - TransCanada Keystone Pipeline, LP	Company - EXP
E-mail Address - gary_salsman@tcenergy.com	E-mail Address - Mike.Aubele@exp.com
6. APPLICANT'S ADDRESS:	9. AGENT'S ADDRESS:
Address- Keystone Pipeline Projects, 700 Louisiana Street	Address- 1800 West Loop; Suite 850
City - Houston State - TX Zip - 77002 Country - USA	City - Houston State - TX Zip - 77027 Country - USA
7. APPLICANT'S PHONE NOs. w/AREA CODE	10. AGENTS PHONE NOs. w/AREA CODE
a. Residence b. Business 832-320-5950 c. Fax	a. Residence b. Business 713-985-9914 c. Fax

STATEMENT OF AUTHORIZATION

11. I hereby authorize, Mike Aubele to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

Gary Salsman Digitally signed by Gary Salsman Date: 2020.05.29 10:39:51 -05'00' — SIGNATURE OF APPLICANT

05/28/2020 — DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)
Keystone XL Pipeline Project

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)
See Sections 3.0 and 4.0 and Appendix H and I of attached narrative	Address See Figure 1-1 of attached narrative
15. LOCATION OF PROJECT	
Latitude: ◦N See Figure 1-1 of Attach Longitude: ◦W	City - State- MT,SD,NE Zip-

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)

State Tax Parcel ID Municipality Multiple; See Figure 1-1 of attached narative

Section - Township - Range -

17. DIRECTIONS TO THE SITE

See Section 1.0 and Figure 1-1 of the attached narrative

18. Nature of Activity (Description of project, include all features)

Construction of the proposed Keystone XL Pipeline Project through MT, SD, and NE. See Sections 1.2 and 1.4 of the attached narrative

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

Crude oil transport. See Section 1.1 of the attached narrative.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

There will be 0.31 acres of permanent discharge and fill into waters of the U.S. due to the construction and operation of permanent access roads.All wetlands and water bodies that would be temporarily impacted by the project would be returned to original contours after construction is complete. Temporary fill would be primarily restricted to spoil material from the pipe ditch and timber mats, or similar, to aid in stabilization for equipment and to prevent topsoil mixing during construction. See Section 3 and Section 4 of the attached narrative.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
107 CY crushed stone	2,956 CY native improved material	480,740 CY excavated material

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres See Sections 3.1 and 4.1 of attached. Permanent fill to 0.13 acres of PEM wetlands and 0.18 acres of waterbodies

or

Linear Feet n/a

23. Description of Avoidance, Minimization, and Compensation (see instructions)

See Section 1.3 of the attached narrative.

24. Is Any Portion of the Work Already Complete? ☒ Yes ☐ No IF YES, DESCRIBE THE COMPLETED WORK

Keystone initiated construction of the Project in April 2020 at the U.S./Canada border crossing with the installation of approximately 1.4 miles of pipe to the first U.S. mainline valve. Construction of the border crossing was completed May 2020. The construction of this portion of the Project did not impact any waters of the U.S.

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

a. Address- See Appendix E of the attached narrative

City - State - Zip -

b. Address-

City - State - Zip -

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

26. List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
See Appendix F of	the attached narrative				

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for permit or permits to authorize the work described in this application. I certify that this information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

Gary Salsman Digitally signed by Gary Salsman Date: 2020.05.29 10:40:14 -05'00'	2020-05-29	Mike Aubele Digitally signed by Mike Aubele Date: 2020.05.28 12:44:11 -04'00'	05/28/2020
SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE

The Application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

Acronyms and Abbreviations

ABB	American burying beetle
bpd	barrels per day
BLM	U.S. Bureau of Land Management
BMP	best management practice
BA	Biological Assessment
BO	Biological Opinion
BOR	Bureau of Reclamation
CFR	Code of Federal Regulations
CMRP	Construction Mitigation and Reclamation Plan
CWA	Clean Water Act
DSEIS	Draft Supplemental Environmental Impact Statement
DOS	U.S. Department of State
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FR	Federal Register
HDD	horizontal direction drill
ITP	Incident Take Permit
Keystone	TransCanada Keystone Pipeline, LP
LB	Legislative Bill
MAR	Mainline Alternative Route
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NWP12	Nationwide Permit 12
NDEQ	Nebraska Department of Environmental Quality
NE PSC	Nebraska Public Service Commission
NOA	Notice of Availability
PA	programmatic agreement
PCN	pre-construction notification
PEM	palustrine emergent
PFO	palustrine forested
Project	Keystone XL Pipeline Project
PSS	palustrine scrub-shrub
PUC	Public Utilities Commission

ROW	right-of-way
SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Office
SPCC	Spill Prevention, Control, and Countermeasure
U.S.	United States
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WCSB	Western Canadian Sedimentary Basin

Table of Contents

Acronyms and Abbreviations ..... **iv**

Table of Contents ..... **vi**

List of Appendices ..... **viii**

List of Figures ..... **ix**

List of Tables ..... **x**

1.0 Introduction **11**
1.1 Purpose and Need 13
1.2 Project Overview 14
1.2.1 Pipeline Facilities 14
1.2.2 Auxiliary Facilities 14
1.2.3 Temporary Facilities 15
1.3 Avoidance and Minimization 16
1.4 Construction Schedule 17
1.5 Adjoining Property Owners 17
1.6 Additional Federal, State, and Local Certificates and Approvals 17

2.0 Alternative Analysis **18**

3.0 Wetland Resources **19**
3.1 Wetland Impacts 20

4.0 Surface Waters **21**
4.1 Surface Water Impacts 22

5.0 Federally Listed Species **27**

6.0 Cultural Resources **27**
6.1 Montana 28
6.2 South Dakota 28
6.3 Nebraska 29

7.0 Section 404(B)(1) Compliance **29**
7.1 Finding of Practicable Alternatives 29
7.2 Restrictions on Discharge 29
7.3 Findings of Significant Degradation 30
7.4 Findings of Appropriate and Practicable Minimization 30

7.5 Factual Determination 31
7.5.1 Physical Substrate Determinations 31
7.5.2 Water Circulation, Fluctuation, and Salinity Determinations 31
7.5.3 Suspended Particulate/Turbidity Determinations 31
7.5.4 Contaminant Determinations 31
7.5.5 Aquatic Ecosystem and Organism Determinations 32
7.5.6 Proposed Disposal Site Determinations 32
7.5.7 Determination of Cumulative Effects on the Aquatic Ecosystem 32
7.5.8 Determination of Secondary Effects on the Aquatic Ecosystem 32

8.0 Cumulative Impacts 32
8.1 Wetland Resources 33
8.2 Surface Waters 33

List of Appendices

Appendix A – Summary of the Regulatory History of the Project

Appendix B – Construction Mitigation and Reclamation Plan

Appendix C – Horizontal Directional Drill Frac-Out Contingency Plan

Appendix D – Site Specific HDD Drawings

Appendix E – Adjoining Property Owners

Appendix F – Permit Table

Appendix G – Wetland Datasheets

Appendix H – Wetland Crossing Table

Appendix I – Waterbody Crossing Table

Appendix J – Keystone XL Wetland and Waterbody Mapbooks

Appendix K – Biological Opinion

Appendix L – Amended Programmatic Agreement and Record of Consultation

Appendix M – Unanticipated Contamination Discovery Plan

Appendix N – Summary of Wetland Condition Assessment

List of Figures

Figure 1-1: Project Location Map 12

Figure 4-1: 8-Digit Hydrologic Units Crossed by the Project ROW Centerline in Montana 24

Figure 4-2: 8-Digit Hydrologic Units Crossed by the Project ROW Centerline in South Dakota 25

Figure 4-3: 8-Digit Hydrologic Units Crossed by the Project ROW Centerline in Nebraska 26

List of Tables

Table 1-1: Listing of HDD Crossings of Major Perennial Waterbodies 17

Table 3-1: Wetland Types in the Project Area 19

Table 3-2: Wetland Impacts as Result of the Construction and Operation of the Project 20

Table 3-3: Dominant Tree and Shrub Species in PFO Wetlands in Nebraska 21

Table 4-1: Waterbodies Crossings by ROW and Access Road Workspace 22

Table 6-1: Site Locations Associated with Jurisdictional Waterbodies in Montana 28

1.0 Introduction

TransCanada Keystone Pipeline, L.P. (Keystone) proposes to construct, connect, operate, and maintain a pipeline system and ancillary facilities (e.g., access roads, pump stations and construction camps) that would transport Western Canadian Sedimentary Basin (WCSB) heavy crude oil from its existing facilities in Hardisty, Alberta, Canada, and Bakken crude oil from an on-ramp in Baker, Montana, to Steele City, Nebraska (referred to as the Keystone XL Project, or Project). The proposed pipeline would connect to the existing Keystone Cushing Extension pipeline, which extends from Steele City, Nebraska, to Cushing, Oklahoma. In total, the Project will consist of approximately 1,209 miles of new, 36-inch-diameter pipeline, with approximately 327 miles of pipeline in Canada and approximately 882 miles in the United States (U.S.). The Project will cross the international border between Saskatchewan, Canada, and the U.S. near Morgan, Montana, and will include pipeline generally within a 110-foot-wide temporary construction right-of-way (ROW) and a 50-foot-wide permanent ROW in Montana, South Dakota, and Nebraska. Figure 1-1 shows the Project route through Montana, South Dakota, and Nebraska.

In 2008, Keystone filed an initial Presidential Permit application with the Secretary of State requesting authorization to construct, operate and maintain the Project at the U.S.-Canada border in Phillips County, Montana. The U.S. Department of State (DOS) prepared a Final Environmental Impact Statement (EIS) in 2011 (2011 Keystone XL Final EIS) that evaluated the Project consistent with the National Environmental Policy Act (NEPA) of 1969 (as implemented by the regulations of the Council on Environmental Quality, found at 40 *Code of Federal Regulations* (CFR) 1500–1508). The initial Presidential Permit application was followed by Project route modification, and a new Presidential Permit application was submitted in 2012 and reviewed by the DOS. In 2014, the DOS released the January 2014 Final Supplemental Environmental Impact Statement (SEIS) for the Keystone XL Project (2014 Keystone XL Final SEIS).

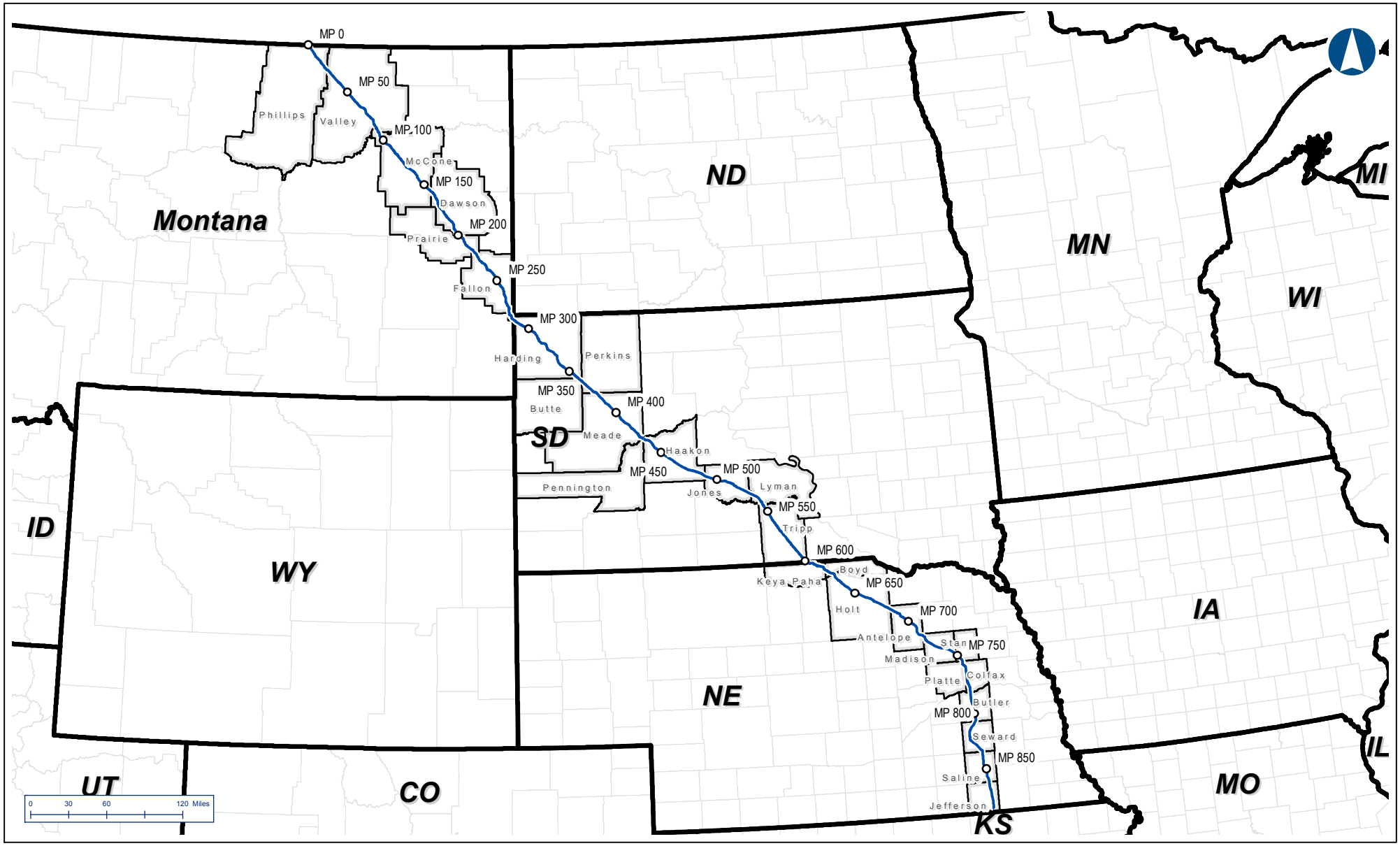
In 2018, as a result of a ruling by the U.S. District Court for the District of Montana, the DOS initiated NEPA review of the proposed Mainline Alternative Route (MAR) for the Nebraska portion of the route. In December 2019, the DOS, with several cooperating federal agencies including the U.S. Army Corps of Engineers (USACE), issued the Supplemental Final Environmental Impact Statement (2019 Keystone XL Supplemental FSEIS), which evaluated the integration of the MAR into the Preferred Route for the Project, as well as addressing additional issues identified in the court's ruling.

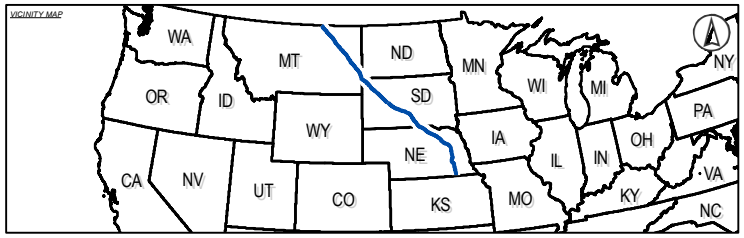
On March 29, 2019, the President issued a Presidential Permit authorizing construction, connection, maintenance and operation of the Project at the U.S.-Canada border. See Appendix A for a summary of the DOS's actions and environmental review of the Project. Keystone initiated construction of the Project in April 2020 at the U.S./Canada border crossing with the installation of approximately 1.4 miles of pipe to the first U.S. mainline valve. Construction of the border crossing segment was completed in May 2020. The construction of this portion of the Project did not impact any waters of the U.S.

To comply with Section 404 of the Clean Water Act (CWA), Keystone requested the USACE conduct review of the proposed activities in Montana and South Dakota on May 25, 2017, and for Nebraska on May 30, 2017. The USACE authorized the horizontal directional drill (HDD) installation of the Yellowstone River crossing in Montana and the Cheyenne River crossing in South Dakota on September 8, 2017, and August 4, 2017, respectively. On June 22, 2017, the USACE determined the Project did not involve a regulated discharge of dredged or fill material under Section 404 of the CWA that required verification for the state of Nebraska.

TC Energy

FIGURE 1-1 - PROJECT LOCATION MAP





Legend

- Keystone XL Milepost
- Keystone XL Centerline (2020-02-21)
- State Boundary
- Project Centerline Impact - Counties

KEYSTONE XL PROJECT
- Figure 1-1 -
Project Location Map

COUNTY:	N/A	DRAWN BY:	JC
STATE:	MT / SD / NE	CHECKED BY:	CW

REV. NO.:	REVISION	DATE
0	ISSUED FOR REVIEW.	2020-05-15

DATE: 2020-05-15 | PROJECTION: NAD83 | UTM 13/14 N

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DWG: 0801-06-018 | SHEET: FIGURE 1

The USACE requested on June 14, 2019, that Keystone withdrawal the USACE verifications for the Project under Nationwide Permit 12 (NWP12) and subsequently the USACE suspended the verifications on August 2, 2019, due to the Project's 2013 issued Biological Opinion (BO) being withdrawn by the U.S. Fish and Wildlife Service (USFWS).

On February 3, 2020, Keystone submitted a new pre-construction notification (PCN) package for the Project requesting the USACE Omaha District review for verification and authorization under NWP12. The USACE accepted the PCNs and had initiated their review and issued requests for additional information to address data gaps. On April 15, 2020, the U.S. District Court in Montana ruled that the USACE violated the Endangered Species Act (ESA) when it failed to programmatically consult with the USFWS on potential impacts to species before reissuance of NWP12 in 2017. The district court vacated NWP12 with respect to all utilities and enjoined USACE from authorizing Keystone to engage in any activities under NWP12. On May 11, 2020, the district court modified its April 15 order to limit its scope but left in place vacatur and injunction with respect to the use of NWP12 for the construction of new oil and gas pipelines. The Department of Justice, TC Energy, and other parties have appealed the district court's decision to the U.S. Court of Appeals for the Ninth Circuit. On May 29, 2020, the Ninth Circuit denied motions for a stay of the district court's orders, pending resolution of the appeals. At this time, USACE is not able to grant Keystone CWA 404 authorization under NWP12. Therefore, Keystone is submitting this Federal Dredge and Fill Permit Application for a Standard (Individual) Permit to address impacts to waters of the U.S. that will result from the construction and operation of the Project.

Keystone was granted permission, pursuant to 33 U.S.C. Section 408, for the proposed alteration, through the installation of pipeline, on USACE lands south of the Missouri River in McCone County, Montana on January 21, 2020. This USACE land is part of the federally authorized Fort Peck Civil Works project. Keystone is proposing an alteration to the USACE civil works project for the installation of the 36-inch diameter pipeline and ancillary facilities. The pipeline will be installed by HDD method under the Missouri River from private lands on the north side of the river to USACE land on the south side of the river. The pipeline will be installed by conventional methods south of this location on the USACE lands. A mainline isolation valve (260-VLLEY-04C), will be located on the federal property on the south side of the river. Keystone will maintain a 50-foot-wide permanent ROW and a permanent access road to the valve site. It should be noted that Keystone is not altering the upstream dam or spillway south of the Fort Peck Civil Works project, nor will the installation or operation of the pipeline impair the usefulness of the dam or spillway.

The Project activities within the states of South Dakota and Nebraska do not cross or impact any federal civil works project that require Section 408 permission from the USACE.

1.1 Purpose and Need

As articulated in the original EIS issued in 2011, and subsequent final and supplemental EISs, the primary purpose of the Project is to provide the infrastructure to transport up to 830,000 barrels per day (bpd) of crude oil from the WCSB in Canada and the Bakken Shale Formation in the U.S. to existing pipeline facilities near Steele City, Nebraska, for onward delivery to Cushing, Oklahoma and the U.S. Gulf Coast area.

The WCSB and the Bakken are both projected to have significant increases in production. In the WCSB, most of this increase is projected to come from the oil sands. Most of the long-term additional crude oil production in the WCSB is projected to come to the market as heavy crude oil, in the form of diluted bitumen. In the Bakken, the increased production is part of a broader development in the U.S. of increasing crude oil production from tight oil areas which produce a light crude oil. The exact mix and volumes of crude oil types that would be transported by the Project (as well as the final destination of those crude oils) would be determined by market forces but are fully analyzed in the three EISs completed for this Project (2011, 2014, 2019).

Keystone has firm, long-term contracts to transport approximately 680,000 bpd of WCSB crude oil on the Project to existing Gulf Coast area delivery points and 105,000 bpd of WCSB crude oil to Cushing,

Oklahoma. Keystone would make available up to 100,000 bpd of capacity on the proposed Project for crude oil from the Bakken, subject to commercial demand.

In order to consider the validity of the need for the proposed Project since the 2014 Keystone XL Final SEIS, the DOS re-evaluated the current market conditions in Section 1.4 of 2019 Keystone XL Supplemental FSEIS. The DOS evaluated the state of the global crude oil market, western Canadian market and infrastructure to support western Canadian market demand. Overall, the updated market analysis, similar to the market analysis sections in the 2011 Keystone XL Final EIS and 2014 Keystone XL Final SEIS, concluded that there is continued strong demand for transport of WCSB by pipeline, including by the Project, under current and projected market conditions. This market analysis considers the most recent information from the U.S. Energy Information Administration, the International Energy Agency, and the Canadian Association of Petroleum Producers.

1.2 Project Overview

The following is a summary of the Project facilities that focuses on the potential impact that the construction and operation each facility will have on waters of the U.S. A more detailed description of each facility can be found in Section 2.1 of the 2014 Keystone XL Final SEIS and Section 2.4 of the 2019 Keystone XL Supplemental FEIS.

1.2.1 Pipeline Facilities

Construction of the pipeline facilities will require trees and vegetation to be cleared from the ROW. Grading of the work area will establish a stable and safer work surface for pipe installation. Once grading is complete, a trench will be excavated to a depth sufficient to provide approximately 4 feet of soil cover over the buried pipeline in wetland and upland areas and a minimum of 5 feet of cover for waterbody crossings. Where wetland conditions permit topsoil stripping during excavation, soil conservation will be conducted through salvaging topsoil from the reduced 85-foot wide construction corridor and temporarily storing the topsoil within the ROW limits. After the welded pipeline is installed in the trench, the subsoil will be backfilled into the trench and the topsoil will be replaced on top of the subsoil. Standard industry boring techniques will be employed to cross under significant features such as specific wetlands or waterbodies, highways, and railroad crossings.

Construction across wetlands will be similar to typical conventional upland cross-country construction, with modifications to reduce the potential for effects to wetland hydrology and soil structure. The wetland crossing methods used will depend largely on the stability of the soils at the crossing location at the time of construction. The 110-foot pipeline construction corridor width will be reduced to a width of 85 feet for wetlands in Montana and Nebraska, and 75 feet for wetlands in South Dakota, unless conditions require a wider construction corridor. In instances where the wetland is supersaturated or inundated, the corridor ROW may be increased to ensure safe construction conditions. For typical wetland crossings, the width of the permanent ROW will be 50 feet in all three states. Wetland construction methodology is discussed further in Section 4.1 of this Federal Dredge and Fill Permit Application. See Appendix B, the Project's Construction Mitigation and Reclamation Plan (CMRP), for typical drawings for the proposed crossing methods.

For construction across waterbodies. Keystone will adopt the standard open-cut (wet or dry) crossing method or use the HDD crossing method depending on the regulatory requirements and the site specific environmental and engineering characteristics of each waterbody. Waterbody construction methodology is discussed further in Section 4.1 of this Federal Dredge and Fill Permit Application.

1.2.2 Auxiliary Facilities

1.2.2.1 Pump Stations

A total of 18 pump stations will be constructed adjacent to the pipeline ROW on sites that will vary from 7 to 15 acres in size. The number of pump stations in each state is as follows:

- Montana – Five pump stations (PS-09, PS-10, PS-12, PS-13, PS-14).
- South Dakota – Seven pump stations (PS-15, PS-16, PS-17,PS-18, PS-19, PS-20, PS-21).
- Nebraska – Six pump stations (PS-22, PS-23, PS-23B, PS-24, PS-25, PS-26).

Pump stations will require electrical power that will be supplied by regional power utilities suppliers. Power lines will be constructed and operated by electrical power utilities and all relevant construction and operational permits will be obtained by these utilities through their applicable approval processes. **There will be no temporary or permanent fill in waters of the U.S. for construction of pump stations.**

1.2.2.2 Valves

Pipeline valves will be located within pump station facilities and at intervals along the pipeline ROW within fenced enclosures. Valves generally will be located near existing roads to allow easy access. **There will be no temporary or permanent fill in waters of the U.S. for construction of valves.**

1.2.2.3 Permanent Access Roads

Permanent access roads will be required for pump stations and certain valve locations. Keystone currently intends to use existing roads for the permanent access roads to the extent practicable. Impacts to wetlands or waterbodies located adjacent to or crossed (either by existing bridging or culverts) by the existing roads will be avoided as practicable during construction and operation. **The construction of permanent access roads will result in temporary fill to waters of the U.S. and the construction of four of these access roads will result in permanent fill to waters of the U.S. as discussed in Sections 3.1 and 4.1.**

1.2.3 Temporary Facilities

1.2.3.1 Contractor Yards

Each pipeline construction segment (spread) will have at least one contractor yard, generally 30 acres in area. Contractor yards will be used as muster points, for equipment and personnel mobilization, equipment storage and maintenance, training, and other pipeline construction support activities. **There will be no temporary or permanent fill in waters of the U.S. for contractor yards.**

1.2.3.2 Pipe Storage Yards

Pipe storage yards will be required to stage pipe along the pipeline route to reduce haul times and facilitate efficient transport to the ROW. Pipe storage yards will be approximately 30 acres in area. **There will be no temporary or permanent fill in waters of the U.S. for pipe storage yards.**

1.2.3.3 Railroad Sidings

Several railroad sidings will be used to facilitate the unloading of pipe from railcars. **There will be no temporary or permanent fill in waters of the U.S. for railroad sidings.**

1.2.3.4 Contractor Camps

Contractor Camps may be established to minimize the effects of the pipeline work force on communities with limited housing resources. Each spread will have approximately 1,000 members in the total workforce, including contractors, inspection staff, and construction management staff. **There will be no temporary or permanent fill in waters of the U.S. for contractor camps.**

1.2.3.5 Temporary Access Roads

Temporary access roads will be necessary to provide ingress and egress for vehicles and equipment at regular intervals along the pipeline route. **The construction of temporary access roads will result in temporary impacts to waters of the U.S. as discussed in Sections 3.1 and 4.1**.

1.2.3.6 Water Appropriation Intake Devices

Keystone intends to appropriate water from waterbodies throughout the pipeline route to accommodate certain activities during construction, such as dust suppression, concrete mixing, HDD, and hydrostatic testing. Water will be appropriated in accordance with applicable state water use laws and permits.

At some locations or waterbodies, Keystone may need to temporarily disturb the bank of the waterbody to allow access to the water for the placement of the water intake device. The temporary disturbance could include vegetation clearing or the grading of steep slopes. Following the temporary water withdrawal, Keystone will restore the banks to pre-construction conditions. Keystone may also be required to excavate a small depression (less than 10 cubic yards) in the streambed to allow placement of the water intake device (typically a screened box attached to the water intake hose). The intake device will be suspended in the water column above the streambed to minimize the accrual of sediments and to prevent the device from rising above the waterline and subsequently drawing in air. Excavated sediments will be spread in an upland area adjacent to the waterbody or hauled offsite to an upland approved disposal location. Following the temporary use of the intake device, Keystone will remove the box from the streambed and sedimentation will occur naturally into the depressional area.

1.3 Avoidance and Minimization

Keystone is committed to protecting waterbodies, wetlands, and their associated resources. The pipeline route construction procedures and compliance program are designed to minimize environmental impacts during construction and restoration.

The pipeline route has been refined several times to reduce waterbody and wetland impacts through:

- Avoiding waterbody and wetland crossings where practicable;
- Minimizing the number of times that a single waterbody is crossed;
- Crossing waterbodies perpendicularly where practicable; and
- Reducing the width of the ROW to 85 feet in wetlands in Montana and Nebraska and 75 feet in South Dakota, where practicable.

During consultation with federal and state agencies and local stakeholders, additional reroutes were incorporated to avoid or minimize impacts to significant resources or identified concerns (including forested wetlands and certain waterbodies). In addition, timing windows were established in the Project schedule to protect biological resources, such as spawning fish and threatened/endangered species. Additional mitigation measures are described in the Project's CMRP (Attachment B), and include:

- Erosion and sediment controls implemented during and after construction;
- Environmental training of all Project workers and supervisors;
- Best management practices (BMPs) incorporated into the Project design and construction;
- Wetland and waterbody construction procedures designed to minimize impacts during construction and reclamation of the crossings;
- Spill prevention and clean-up procedures;
- Hazardous materials handling guidelines; and
- Clean-up, seeding, and reclamation details to ensure effective stabilization of the ROW and Project disturbances.

The Project's CMRP provides typical construction methods (including drawings) for wetland and waterbody crossings, as well as erosion and sediment control measures that will be installed during construction and stabilization/revegetation of the Project. Temporary equipment or materials installed to provide access (e.g., timber mats, timber rip-rap, and rock and flume crossing materials) will be removed from wetlands and

waterbodies at the completion of construction. Disturbances associated with temporary equipment access methods will be restored and stabilized after the bridging equipment and access materials are removed. Wetlands and waterbodies will be restored to pre-construction conditions.

Keystone will use several different construction techniques to avoid and/or minimize impacts where practicable. Keystone will minimize impacts by reducing the construction ROW width in wetlands to 85 feet in Montana and Nebraska and 75 feet in South Dakota. Keystone will also utilize trenchless HDDs and conventional boring methods to avoid impacts to some specific waterbodies and wetlands. No discharge of dredge or fill material into waters of the U.S. is anticipated at HDD or bored crossings.

In the event of inadvertent releases of drilling mud at the surface of the ground as a result of the trenchless crossing technique, Keystone will implement the measures outlined in the attached HDD Frac-Out Contingency Plan (Attachment C). Attachment D contains site specific HDD drawings for the proposed HDD crossings of perennial waterbodies listed in Table 1-1.

Table 1-1: Listing of HDD Crossings of Major Perennial Waterbodies

Milepost	State	County	Waterbody Name	Waterbody ID
25.28	Montana	Philips	Frenchman River	S106PH013
83.45	Montana	Valley	Milk River	S14VA008
89.68	Montana	Valley and McCone	Missouri River[a]	S7AMC001
198.21	Montana	Dawson	Yellowstone River[a]	S23DA001
295.09	South Dakota	Harding	Little Missouri River	S312HA001
430.17	South Dakota	Meade	Cheyenne River	exp-WB-13552
433.82	South Dakota	Haakon	Bridger Creek	S8AHK003
486.24	South Dakota	Haakon	Bad River	S8AHK008
541.59	South Dakota	Tripp	White River	S7ALY001
617.10	Nebraska	Keya Paha	Keya Paha River	S0819618KP001
626.70	Nebraska	Holt	Niobrara River	exp-WB-0235
717.23	Nebraska	Antelope	Elkhorn River	S0427703AT001
782.07	Nebraska	Colfax and Butler	Platte River	S0913702BT002
808.75	Nebraska	Seward	Big Blue River	S0509702SE001

Notes:
a: Jurisdictional water under Section 10 of the Rivers and Harbors Act

1.4 Construction Schedule

Keystone initiated construction of the Project in April 2020 at the U.S./Canada border crossing with the installation of approximately 1.4 miles of pipe to the first U.S. mainline valve. Construction of the border crossing was completed in May 2020. The construction of this portion of the Project did not impact any waters of the U.S. Keystone will commence construction of the remaining Project facilities upon receipt of all necessary authorizations and permits. Keystone anticipates that the Project will be placed into service approximately 2-3 years after receiving such authorizations. As currently planned, the Project will be constructed using 12 spreads of approximately 43 to 94 miles long. Final spread configurations and the final construction schedule may result in the use of more or fewer spreads than those indicated.

1.5 Adjoining Property Owners

The Project traverses the property of numerous property owners. A complete list of property owners adjoining the Project footprint at waters of the U.S. crossings is provided in Appendix E.

1.6 Additional Federal, State, and Local Certificates and Approvals

In addition to this Federal Dredge and Fill Permit Application for Section 10/404 authorization from the USACE, Keystone has obtained or is still seeking a number of additional federal, state, and local

authorizations, certifications, and approvals for the Project. A complete list of permits and authorizations for the Project are included in Appendix F.

2.0 Alternative Analysis

In compliance with NEPA, the DOS performed a robust alternative analysis pursuant to 40 CFR 1502.14. The analysis included the evaluation of three categories of alternatives, including the No Action Alternative, major pipeline route alternatives, and other alternatives considered but eliminated from detailed analysis. Alternatives were eliminated on the basis of the relative potential environmental, logistical, economic, safety, and engineering costs and benefits of each aspect. Due to complexity of the regulatory environment during the permitting of this Project, the DOS completed three NEPA documents, with each document evaluating new route alternatives as part of the process of identifying and evaluating the Proposed Action. A major contributing factor in evaluation and selection of the proposed route within each state, was each state's siting process and authorization. The following is brief summary of the alternative analysis conducted by the DOS. For a detailed description of the alternatives considered in the development of the current Project route refer to Section 3.14 of the 2011 Keystone XL Final EIS, Section 2.2 of 2014 Keystone Final SEIS, and Chapter 2.0 of the 2019 Keystone XL Supplemental FEIS.

The 2011 Keystone XL Final EIS evaluated the original Preferred Route and its alternatives. For this document, the proposed project included two segments, the Steele City Segment, and the Gulf Coast Segment, for a project route that extended from the Canada/U.S. border near Morgan, Montana to Nederland, Texas. The original project that was evaluated by the 2011 Keystone XL Final EIS was modified by Keystone by creating two separate projects, the Steele City segment became the basis of scope the of the current Project and Gulf Coast segment was constructed during 2012 and 2013 by TransCanada as the Gulf Coast Pipeline Project. The alternatives analysis for the Steele City segment is the basis for the current route through Montana and South Dakota. An extensive analysis of alternative modes of transporting the oil was also conducted in the 2011 Keystone XL Final EIS, including rail and truck transportation, as well as other existing pipeline systems.

The Preferred Route evaluated in the 2014 Keystone XL Final SEIS included a route in Montana and South Dakota that was largely unchanged from the route analyzed in the 2011 Keystone XL Final EIS. In Nebraska, route alternatives were evaluated and incorporated into the Preferred Route that avoided the Sand Hills Region, as identified by the Nebraska Department of Environmental Quality (NDEQ). Additionally, the Keystone XL route terminated at Steele City, Nebraska.

After the statute authorizing NDEQ review of the route was challenged in court, Keystone sought approval of a pipeline route in Nebraska through the Nebraska Public Service Commission (NE PSC). The 2019 Keystone XL Supplemental FEIS documents the analysis conducted to evaluate three routes through Nebraska, which concluded with the NE PSC selecting the MAR. The MAR is approximately 162 miles long and traverses Antelope, Madison, Stanton, Platte, Colfax, Butler, Seward, Saline and Jefferson counties. In developing the range of reasonable alternatives for the 2019 Keystone Supplemental FEIS, the DOS considered the NE PSC's review and approval of the MAR. The following criteria were used in its development:

- Site new pipeline and supporting facilities to minimize impacts to environmentally sensitive areas (e.g., surface waters, wetlands, protected species and their habitat, and heritage resources);
- Site new pipeline to maximize the use of existing ROW, access roadways and pipeline infrastructure to the greatest extent possible to minimize impacts to landowners and land uses;
- Minimize the route length and the construction of permanent aboveground facilities;
- Avoid wellhead protection areas; and
- Cross the Niobrara River at a location not designated as scenic or recreational under the National Wild and Scenic River Act of 1968.

In conjunction with each EIS, an ESA review and Section 106 of the National Historic Preservation Act (NHPA) review were conducted. The ESA review resulted in completion of a Biological Assessment (BA) in November 2019 and issuance of the BO by the USFWS in December 2019. In 2013, a Programmatic Agreement (PA) was adopted to ensure the Project's and the permitting agencies' compliance with Section 106 of the NHPA during and after the NEPA analysis was completed. A copy of the BO and PA are found in Appendix K and L, respectively.

3.0 Wetland Resources

The Project traverses several wetland types in Montana, South Dakota, and Nebraska, including herbaceous wetland meadows, depressions (potholes), marshes, scrub-shrub wetlands, forested wetlands, and riparian wetlands associated with rivers and streams. Wetland systems within the Project area are defined in Table 4-1 and are classified as palustrine based on vegetation and/or surface water cover. These types of wetlands are characterized by a dominance of trees, shrubs, persistent emergent herbaceous vegetation, or open water. Palustrine wetland types occur in various locations in the landscape, including along streams or rivers, adjacent to open water ponds or lakes, on slopes, or within depressions. Subsystems of the jurisdictional palustrine wetland types within the Project area include palustrine emergent (PEM), palustrine scrub-shrub (PSS), and palustrine forested (PFO). Datasheets for all the jurisdictional wetlands located within the Project footprint are in Appendix G. For all wetland delineation datasheets dated before 2017, a review was conducted by WESTECH Environmental to confirm that the field conditions described for the original delineated wetlands still reflected the current conditions of the wetlands to ensure compliance with USACE Regulatory Guidance Letter No. 05-02. WESTECH Environmental compared historical aerial photographs from the year of the original delineation to Project-specific high-resolution aerial imagery from 2018, as well existing wetland delineation data for the Project, and field notes from other surveys proximal to the delineated features. The results of the analysis concluded that the conditions of the wetlands documented in the original field delineation surveys are representative of the current field conditions. Appendix N contains a table of the wetlands that were evaluated and the finding of the analysis.

Table 3-1: Wetland Types in the Project Area

Wetland Type	Wetland Code	Description
Palustrine emergent wetland	PEM	Emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. All water regimes are included except those irregularly exposed. In areas with relatively stable climatic conditions, emergent wetlands maintain the same appearance year after year. In other areas, such as the prairies of the central U.S., climatic fluctuations cause them to revert to an open water phase in some years. Emergent wetlands are known by many names, including marsh, wet meadow, fen, prairie pothole, and slough.
Palustrine scrub-shrub wetland	PSS	Scrub-shrub wetlands include areas dominated by woody vegetation less than 6 meters tall. Vegetation forms found in this wetland type include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions. Scrub-shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable communities. Scrub-shrub wetlands are often associated with riparian areas within the Project area, but occur in non-riparian areas as well.
Palustrine forested wetland	PFO	Forested wetlands are characterized by woody vegetation that is 6 meters tall or taller. Forested wetlands are most common in the eastern U.S. and in those sections of the West where moisture is relatively abundant, particularly along rivers and in the mountains. Forested wetlands normally possess an overstory of trees, an understory of young trees or shrubs, and an herbaceous layer. Forested wetlands are most often associated with riparian areas within the Project area.

3.1 Wetland Impacts

Construction of the pipeline will result in temporary impacts to wetlands from vegetation clearing, grading, excavation, and filling. Construction-related impacts will occur within the 110-foot construction ROW as a result of proposed pipeline installation activities. The 110-foot construction corridor width will be reduced to 85 feet for wetlands in Montana and Nebraska, and 75 feet for wetlands in South Dakota, unless conditions require a wider construction corridor.

Operations-related wetland impacts are those that are expected to occur within the footprints of the permanent ROW and access roads. Within wetlands, Keystone will maintain a 50-foot wide permanent operations ROW, except for in PFO wetlands where only a 30 foot wide corridor will be maintained within the 50-foot wide permanent easement.

Pipeline construction will cross wetlands with one of the following crossing methods:

- Standard Wetland Crossing Method (DTL 9);
- Push/Pull Wetland Crossing Method (DTL 10);
- Typical HDD Crossing Method (DTL 15); or
- Typical Uncased Bore Crossing Method (DTL 21).

A description of the construction methodology and a typical construction drawing for of each of these crossing methods can found in Section 6 of the Project's CMRP (Appendix B). The use of the HDD crossing method will result in the avoidance of impacts to some wetlands.

The construction of the Project will result in a total of 32.70 acres of temporary impacts to PEM wetlands and 0.12 acres of PFO wetlands across the approximately 882 miles of pipeline and approximately 17,668 acres of disturbance in Montana, South Dakota, and Nebraska. The operation of the Project will result in the permanent loss of 0.13 acres of PEM wetlands (less than 1% of the PEM wetland impacts) for installation of three access roads (CAR-128, CAR-163, and VAR-46G) and the permanent functional conversion of 0.09 acres of PFO wetlands from PFO to PEM wetlands. Table 4-2 provides a summary of the wetland impacts by state as result of the construction and operation of the Project. See Appendix H for a complete list of all wetland crossings by the Project and the proposed crossing method and subsequent impact total for each wetland. Mapbooks for each state that contain figures providing the location of wetlands crossed by the Project are provided in Appendix I.

The construction of pump stations, valves, contractor yards, pipe storage yards, railroad sidings, and contractor camps will not result in any temporary or permanent impacts to wetlands. Two jurisdictional PEM wetlands have been delineated within the boundary of Contractor Yard 09 Site 4B in South Dakota. The two wetlands are exp-WL-0219 (0.03 acres) and exp-WL-018 (0.36 acres), both features were identified via desktop analysis. Keystone will configure the use of this contractor yard to avoid any impact to these wetlands through either fencing or reconfiguring the boundary of the site to avoid the wetland features.

Table 3-2: Wetland Impacts as Result of the Construction and Operation of the Project

	PEM Wetlands		PFO Wetlands	
Project Component	**Temporary Impacts**	**Permanent Impacts**	**Temporary Impacts**	**Permanent Impacts**
Montana				
Pipeline ROW	1.65	0.00	0.00	0.00
Temporary Access Road	0.03	0.00	0.00	0.00
Permanent Access Road	0.06	0.06	0.00	0.00
Total for Montana	1.74	0.06	0.00	0.00
South Dakota				
Pipeline ROW	2.95	0.00	0.00	0.00

Table 3-2: Wetland Impacts as Result of the Construction and Operation of the Project

	PEM Wetlands		PFO Wetlands	
Project Component	**Temporary Impacts**	**Permanent Impacts**	**Temporary Impacts**	**Permanent Impacts**
Temporary Access Road	1.13	0.00	0.00	0.00
Permanent Access Road	0.06	0.06	0.00	0.00
Total for South Dakota	4.14	0.06	0.00	0.00
Nebraska				
Pipeline ROW	26.64	0.00	0.21	0.00
Temporary Access Road	0.18	0.00	0.00	0.00
Permanent Access Road	0.00	0.01	0.00	0.00
Total for Nebraska	26.82	0.01	0.21	0.00
Project Total	**32.70**	**0.13**	**0.21[1]**	**0.00**

Notes:
[1]The temporary disturbance of the 0.21 acres of PFO wetlands will result in the permanent conversion of 0.09 acres of PFO wetlands from PFO to PEM
Key:
PEM – palustrine emergent
PFO – palustrine forested

Of the 0.21 acres of PFO wetlands that will be disturbed during construction, 0.12 acres of the PFO wetlands will be allowed to restore to pre-construction condition. The operation of the Project will result in the permanent cover class conversion of the remaining 0.09 acres of PFO wetlands from PFO to PEM due to maintaining a 30-foot corridor centered on the pipeline centerline in herbaceous cover for inspection and aerial patrol during operations.

Keystone will restore the 0.12 acres of PFO wetlands to pre-construction conditions through the planting of tree and shrub species based on the dominant woody species observed in the PFO wetlands during wetland delineation field surveys. Keystone anticipates the planting of 1 to 3-inch saplings on 10 to 15-foot centers within the restored workspace. The below table identifies the tree and shrub species that were observed in each of these PFO wetlands during the field surveys.

Table 3-3: Dominant Tree and Shrub Species in PFO Wetlands in Nebraska

Wetland Name	Milepost	Dominant Woody Species Observed within the Wetland
W306HT003	679.91	*Salix amygdaloides*
W0502702MA002	744.34	*Fraxinus pennsylvanica* *Salix amygdaloides*
W0502703PL004	759.36	*Salix amygdaloides*
W0511702SA002	835.93	*Acer saccharinum* *Ulmus americana*

4.0 Surface Waters

The Project will cross various surface water types in Montana, South Dakota, and Nebraska. Surface waters crossed by the Project include streams, rivers, ponds, and man-made features. Streams and rivers were classified by flow rate, ephemeral, intermittent, or perennial. The Project's crossings of the Missouri River

(milepost 88.7) and the Yellowstone River (milepost 197.9) in Montana are regulated under Section 10 of the Rivers and Harbors Act. Figure 4-1 through 4-3 depicts the 8-digit hydrologic units crossed by the Project centerline for Montana, South Dakota, and Nebraska.

4.1 Surface Water Impacts

There are 526 crossings of waters of the U.S. by the workspace of the pipeline ROW and access roads, of which 104 are perennial streams, 185 are intermittent streams, 220 are ephemeral streams, and 17 are man-made waterbodies (i.e., canals or ponds). Table 5-1 provides a summary of the waterbodies crossed by state. The construction of three access roads (CAR-004A, CAR-128, and CAR-163) will result in 0.18 acres of permanent impacts to waterbodies comprised by 0.02 acres of ephemeral waterbodies, 0.14 acres of intermittent waterbodies, and 0.01 acres of perennial waterbodies. All other Project impacts to waterbodies will be temporary in nature. See Appendix J for a complete list of all waterbody crossings by the Project and the proposed crossing method and subsequent impact total for each waterbody. Mapbooks for each state that contain figures providing the location of waterbodies crossed by the Project are in Appendix I.

Table 4-1: Waterbodies Crossings by ROW and Access Road Workspace

Project Component	Waterbody Type			
	Ephemeral Stream	Intermittent Stream	Perennial Stream	Man-made Waterbody
Montana				
Pipeline ROW[1,2]	119	47	17	0
Temporary Access Road[2]	2	5	2	6
Permanent Access Road[2]	3	0	2	0
Total Number of Crossings for Montana	124	52	21	6
South Dakota				
Pipeline ROW	71	64	22	0
Temporary Access Road	3	5	6	7
Permanent Access Road	0	1	0	0
Total Number of Crossings for South Dakota	74	70	28	7
Nebraska				
Pipeline ROW	19	62	55	4
Temporary Access Road	3	1	0	0
Permanent Access Road	0	0	0	0
Total Number of Crossings for Nebraska	22	63	55	4
Project Total	**220**	**185**	**104**	**17**

Notes:
[1] The number of crossings of the waterbody includes the crossing of waterbodies by HDD. The use of HDD/Bore crossing method will not result in impacts to the waterbody
[2] A waterbody crossing was recorded each time the ROW or access road workspace crossed the waterbody

Construction of the pipeline will result in temporary impacts to waterbodies from vegetation clearing, grading, excavation, and filling. To install pipelines under waterbodies, Keystone will adopt the standard open-cut (wet or dry) crossing method or use the HDD crossing method. The following are the waterbody crossing methods that will be used:

- Typical open cut in non-flowing waterbody (DTL 11);

- Typical open cut in flowing waterbody (DTL 12);
- Typical Dry Flume Crossing Method (DTL 13);
- Typical Dam and Pump Crossing Method (DTL 14);
- Typical HDD (DTL 15) or Bore Crossing Methods (DTL 158 or DTL 21); or
- Conveyance Crossing Method (DTL 161).

Use of trenchless crossing methods including HDD or boring will not involve any permanent or temporary dredge or fill impacts to waters of the U.S. The conventional pipeline crossing technique for each location will be determined based on the presence of water at the time of construction. During open-cut crossing installation, material excavated from the trench line at waterbody crossings less than 30 feet wide will be stored on the banks of the waterbodies. For waterbodies greater than 30 feet in width (width is based on ordinary high water mark), excavated trench materials may be temporarily side cast in-stream while the trench is being excavated and the pipeline carried into place and installed in the trench. Immediately following installation of the pipeline at waterbody crossings, the trench will be backfilled, and original waterbody contours will be restored to pre-construction condition.

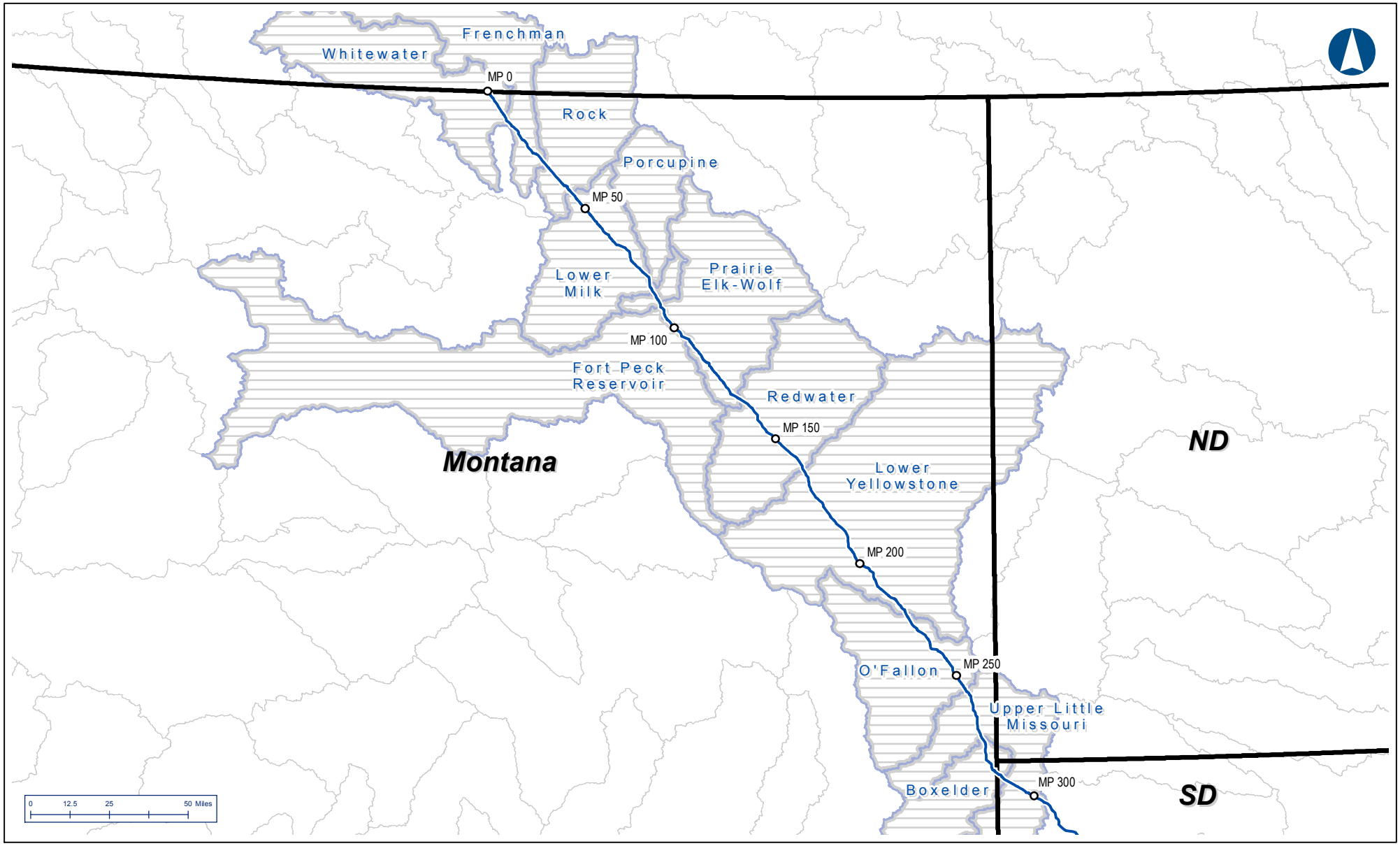
The open cut, dry crossing methods involve two different approaches dependent upon waterbody specifications and volume of flow at the time of crossing. The dam and flume dry crossing method involve diverting the flow of water across the trenching area through one or more flume pipes placed in the waterbody. The dam and pump dry method is like the dam and flume dry method except that pumps and hoses would be used instead of flume pipes to move water around the construction work area. Once backfilling is completed, the waterbody banks are restored and stabilized as detailed in Appendix B and the dam materials and flume pipes or pump hoses are removed. No permanent fill within waters of the U.S. will be required for the installation of the pipeline.

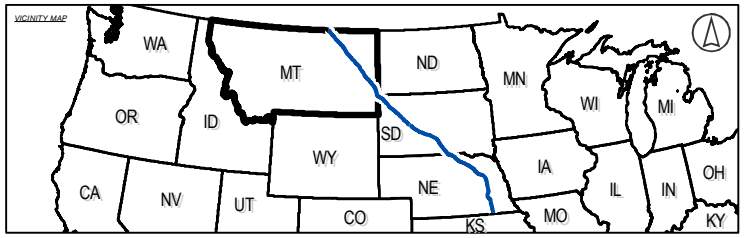
The construction of temporary and permanent access roads will result in some temporary impacts to waterbodies, see Appendix I for impact totals for each access road. The construction and operation of three permanent access roads (CAR-004A, CAR-128, and CAR-163) will result in 0.18 acres of permanent impact to waterbodies.

The construction of pump stations, valves, contractor yards, pipe storage yards, railroad sidings, and contractor camps will not result in any temporary or permanent impacts to waters of the U.S. Two jurisdictional open water features (exp-WB-0477 and exp-WB-0478) have been delineated with the boundary of Contractor Yard 09 Site 4B in South Dakota and one ephemeral stream (S0821620SE001) was delineated with the boundary of Mud Disposal Site MDS-191 in Nebraska. Keystone will configure the use of this contractor yard and the mud disposal site to avoid any impacts to these waterbodies through either fencing or reconfiguring the boundaries of the site to avoid these waterbodies. Therefore, the construction of the Contractor Yard 09 Site 4B and Mud Disposal Site MDS-191 will not result in any impacts to waters of the U.S.

TC Energy

FIGURE 4-1 - MONTANA 8-DIGIT HYDROLOGIC UNIT BOUNDARY MAP





Legend

- Keystone XL Milepost
- Keystone XL Centerline (2020-02-21)
- State Boundary
- Project Impact - Subbasin

Data source: http://nhd.usgs.gov

KEYSTONE XL PROJECT
- Figure 4-1 -
MT 8-Digit Hydrologic Unit Boundary Map

COUNTY:	N/A	DRAWN BY:	JC
STATE:	MONTANA	CHECKED BY:	CW

REV. NO.:	REVISION	DATE
0	ISSUED FOR REVIEW.	2020-05-15

DATE:	2020-05-15	PROJECTION:	NAD83 | UTM13 N

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DWG:	0801-06-018	SHEET:	FIGURE 4-1

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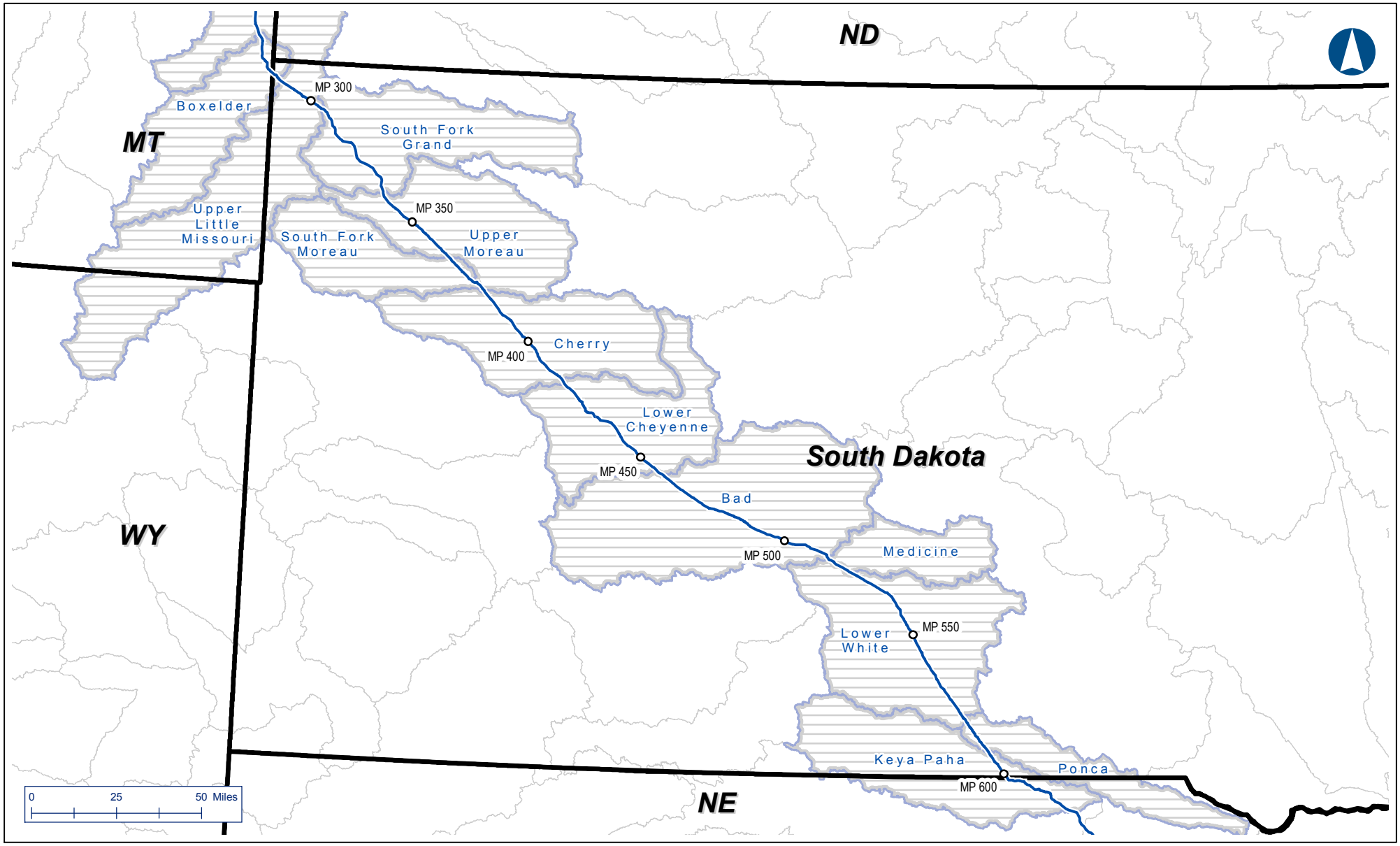
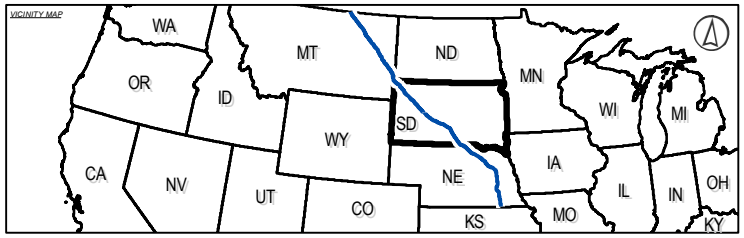
FIGURE 4-2 - SOUTH DAKOTA 8-DIGIT HYDROLOGIC UNIT BOUNDARY MAP





Legend

- Keystone XL Milepost
- Keystone XL Centerline (2020-02-21)
- State Boundary
- Project Impact - Subbasin

Data source: http://nhd.usgs.gov

KEYSTONE XL PROJECT
- Figure 4-2 -
SD 8-Digit Hydrologic Unit Boundary Map

COUNTY:	N/A	DRAWN BY:	JC
STATE:	SOUTH DAKOTA	CHECKED BY:	CW

REV. NO.:	REVISION	DATE
0	ISSUED FOR REVIEW.	2020-05-15

DATE:	2020-05-15	PROJECTION:	NAD83 | UTM14 N

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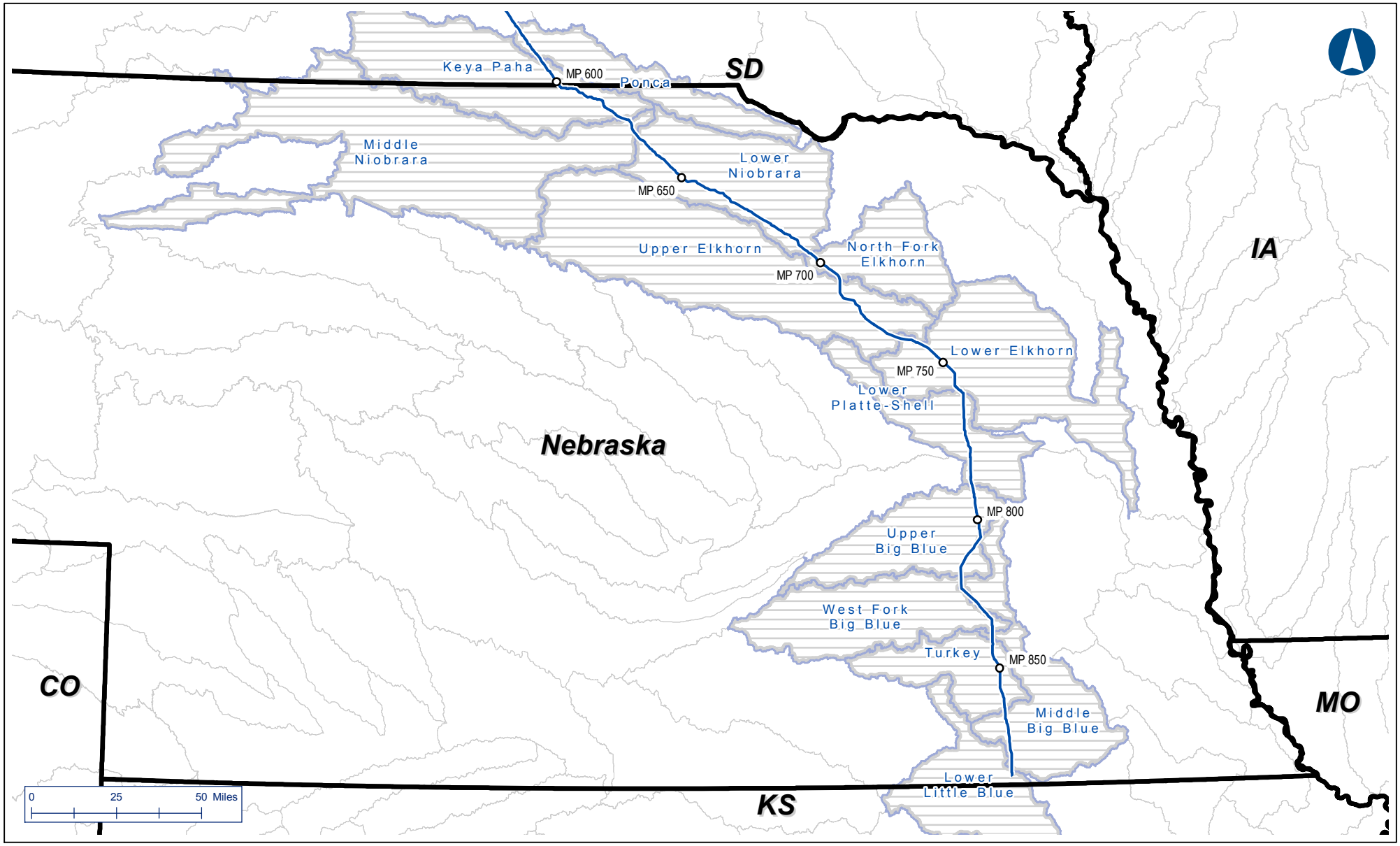
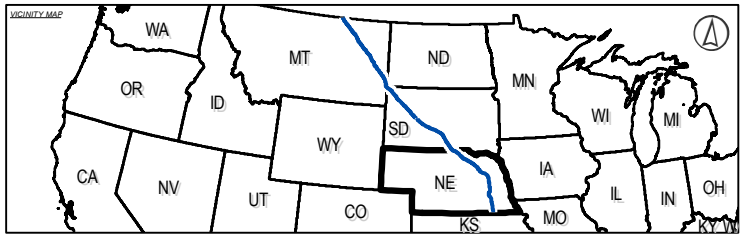
FIGURE 4-3 - NEBRASKA 8-DIGIT HYDROLOGIC UNIT BOUNDARY MAP





Legend

- Keystone XL Milepost
- Keystone XL Centerline (2020-02-21)
- State Boundary
- Project Impact - Subbasin

Data source: http://nhd.usgs.gov

KEYSTONE XL PROJECT
- Figure 4-3 -
NE 8-Digit Hydrologic Unit Boundary Map

COUNTY:	N/A	DRAWN BY:	JC
STATE:	NEBRASKA	CHECKED BY:	CW

REV. NO.:	REVISION	DATE
0	ISSUED FOR REVIEW.	2020-05-15

DATE:	2020-05-15	PROJECTION:	NAD83 | UTM14 N

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5.0 Federally Listed Species

The information provided below applies to the entire Project including all three states and is not specific to individual states. Some federally listed species may not be applicable to certain states. This section provides the summary of the consultation letter and BO issued by USFWS on December 23, 2019, that applies to the entire Project area in Montana, South Dakota, and Nebraska.

Within the jurisdiction of the USACE Omaha District, Keystone and the federal agencies considered the Project effects on ten different species afforded protection pursuant to the ESA. The November 26, 2019, amended BA prepared by the Bureau of Land Management (BLM) and DOS in coordination with other federal agencies, including the USACE, determined the Project effects on these species. In a consultation letter dated December 23, 2019, the USFWS concurred with the federal agencies determination of "*may effect, not likely to adversely affect*" for eight species including the endangered black-footed ferret (*Mustela nigripes*), interior least tern (*Sterna antillarum*), whooping crane (*Grus americana*), pallid sturgeon (*Scaphyrhynchus albus*), and Topeka shiner (*Notropis topeka*); and the threatened piping plover (*Charadrius melodus*), rufa red knot (*Calidris canutus rufa*), and western prairie fringed orchid (*Platanthera praeclara*). Additionally, the federal agencies determined that the Project may affect the threatened northern long-eared bat (*Myotis septentrionalis*) but relied on the USFWS' Programmatic BO in Final 4(d) Rule for the northern long-eared bat and Activities Exempted from Take Prohibitions to fulfill the Section 7 consultation requirement. Additionally, the federal agencies made a determination of "*may effect, likely to adversely affect*" for Project effects on the federally endangered American burying beetle (ABB) (*Nicrophorus americanus*). A description of the assessment of the Project effects on the ABB is presented in the BA and in the USFWS' December 23, 2019, Biological Opinion on the Effects of the Proposed Keystone XL Pipeline to the Federally Endangered American Burying Beetle. The BO discusses the possible Project effects to ABB within the USACE's federal area of control and responsibility.

The ESA consultation requirements have already been completed between the BLM (in coordination with the USACE) and the USFWS for the Project, including all areas within waters of the U.S and the USACE's area of control and responsibility in the USFWS's December 23, 2019, Keystone XL consultation letter and BO. See Appendix K for a copy of the consultation letter and BO. Additionally, Keystone has requested an Incidental Take Permit from the USFWS for the ABB on private lands outside of the USACE's scope of analysis.

6.0 Cultural Resources

A PA was developed by the DOS, the Advisory Council on Historic Preservation, the State Historic Preservation Officers (SHPOs), and other cooperating parties, including USACE, to ensure Project and agency compliance with Section 106 of the NHPA during and after the NEPA analysis was completed. See Appendix L of this Federal Dredge and Fill Permit Application for a copy of the PA.

Keystone has made significant attempts to avoid impacts to historic properties. In instances where historic properties were identified along the route, Keystone explored multiple options for avoiding or minimizing impacts through detailed planning and mapping efforts. Route and Project footprint modifications have avoided many of these sites. If impacts to a historic property cannot be avoided, in accordance with the PA, the DOS, along with cooperating agencies (including the USACE) and consulting Indian tribes, will coordinate with Keystone to develop a treatment plan.

The following is a discussion of the status and finding of cultural resources for each state crossed by the Project. For all portions of the Project footprint that have not been surveyed, the PA establishes an agreed-

upon process for addressing unsurvey areas which is also outlined in the required coordination plans prepared for each state.

6.1 Montana

Within the jurisdiction of the USACE Omaha District in Montana, cultural resource surveys have been performed along 285.58 miles of the current Project ROW, 77.34 miles of access roads, and 899.48 acres of auxiliary facility sites (e.g., pump stations). Less than one percent of the Project area within Montana still requires cultural resource investigation.

Four historic properties within the current Project footprint in Montana are man-made jurisdictional waterbodies (Table 6-1). These include one historic reservoir and three segments of historic irrigation canals.

The Project will use Frenchman Reservoir, an eligible historic resource (24PH3613), as a water source for the Project. The Project will withdraw water from a point of diversion at the south end of the reservoir on the east end of the dam. At this location, a suction hose will be used to extract water from the diversion point and the water will be piped through two temporary waterlines. No ground disturbance will occur within the site boundary; therefore, the Project will have no adverse effect.

The two segments of the Vandalia South Canal (24VL1194) are part of the larger Milk River Project irrigation system and are eligible for listing on the National Register of Historic Places. A treatment plan was prepared and approved by the DOS and the Montana SHPO (Witt et al. 2012). Both segments of the canal will be bored to avoid all Project impacts and will follow the directives outlined in the 2013 Bureau of Reclamation (BOR) required crossing criteria for reclamation facilities that has been approved for the Project (BOR 2013). The ROW will be fenced to protect the resource and construction will be monitored by an archaeologist. The Project will have no adverse effect on the canal segments.

The segment of 24DW0289 identified as a jurisdictional waterbody is a lateral portion of the main Buffalo Rapids canal system. Although the main canal system is an eligible historic resource, the lateral is a non-contributing portion, therefore the Project will have no adverse effect on this resource.

Table 6-1: Site Locations Associated with Jurisdictional Waterbodies in Montana

Milepost	Site Type	Site Number	Eligibility Determination	Project Effect	Management Recommendation	Report Reference
24.81	Historic Reservoir and Dam– Frenchman Reservoir	24PH3613	Eligible	No Adverse Effect	No Further Work	Ethnoscience 2020
84.99	Canal	24VL1194	Eligible	No Adverse Effect	Fence and Monitor	Berg et al. 2008 and Witt et al. 2012
85.53	Canal	24VL1194	Eligible	No Adverse Effect	Fence and Monitor	Berg et al. 2008 and Witt et al. 2012
197.34	Canal (Lateral 4.7)	24DW0289	Eligible, Non-Contributing	No Adverse Effect	No Further Work	Crossland et al. 2010

6.2 South Dakota

Within the jurisdiction of the USACE Omaha District in South Dakota, cultural resource surveys have been performed along 315.59 miles of the current Project ROW, 70.20 miles of access roads, and 1,151.69 acres of auxiliary facility sites (e.g., pump stations). No historic or cultural properties were identified within the current Project footprint associated with any waters of the U.S. within the state of South Dakota.

Less than one percent of the Project area within South Dakota still requires cultural resource investigation. While these areas have yet to be surveyed by Keystone, primarily due to lack of landowner permissions, cultural investigations based on previous surveys and a literature review have been completed.

6.3 Nebraska

Within the jurisdiction of the USACE Omaha District in Nebraska, cultural resource surveys have been performed along 244.58 miles of the current Project ROW, 13.63 miles of access roads, and 682.10 acres of auxiliary facility sites (e.g., pump stations). No historic or cultural properties were identified within the current Project footprint associated with any waters of the U.S. within the state of Nebraska.

Approximately 526 acres of land within Nebraska still require cultural resource investigation. While these areas have yet to be surveyed by Keystone, primarily due to lack of landowner permissions, cultural investigations based on previous surveys and a literature review have been completed.

7.0 Section 404(B)(1) Compliance

Keystone presents the following Section 404(B)(1) compliance evaluation due to expected impacts to water of the U.S.

7.1 Finding of Practicable Alternatives

The DOS conducted a robust alternatives analysis as part of the Project's NEPA review pursuant to 40 CFR 1502.14. Section 2.0 of this Federal Dredge and Fill Permit Application provides a summary of the alternative analysis and the complete analysis can be found in Section 3.14 of the 2011 Keystone XL Final EIS, Section 2.2 of 2014 Keystone Final SEIS, and Chapter 2.0 of the 2019 Keystone Supplemental FEIS. The results of alternatives analysis conducted concluded that there are no practicable alternatives to the proposed Project that would meet the site selection criteria necessary to meet the purpose and need of the Project.

7.2 Restrictions on Discharge

The Project will result in only 0.13 acres of permanent fill into PEM wetlands and 0.18 acres of permanent fill into waterbodies due to the construction of four permanent access roads to access valve sites and a pump station. The construction of the pipeline ROW, temporary roads, pump stations, temporary storage and contractor yards will not result in the permanent fill in waters of the U.S. Keystone will not discharge any temporary fill material that would:

- Cause or contribute, after consideration of disposal site dilution and dispersion, to violations of any applicable state water quality standards;
- Violate any applicable toxic effluent standard or prohibition under Section 307 of the CWA;
- Jeopardize the continued existence of species listed as endangered or threatened under the ESA, as amended, or results in the likelihood of the destruction or adverse modification of a habitat that is determined by the Secretary of Interior or Commerce, as appropriate, to be a critical habitat under the ESA, as amended; or
- Violate any requirement imposed by the Secretary of Commerce to protect any marine sanctuary designated under Title III of the Marine Protection, Research, and Sanctuaries Act of 1972.

Keystone will follow the Project's CMRP (Appendix B), Spill Prevention, Control, and Countermeasure (SPCC) Plan, and in the USFWS's December 23, 2019, Keystone XL consultation letter and BO (Appendix K) to prevent impacts to waters of the U.S. due to stormwater runoff or inadvertent releases. Keystone will also secure Section 401 Water Quality Certification and all other applicable state permits related to water withdrawal or water discharge permits, as applicable, prior to the start of construction within waters of U.S. See Appendix F for a list of environmental permits and authorizations required in each state and the status of the permit or authorization.

The construction and operation of the Project will not jeopardize the continued existence of any federal listed species under the ESA. The ESA consultation requirements for the Project have already been

completed between the BLM (in coordination with the USACE) and the USFWS for all areas within waters of the U.S and the USACE's area of control and responsibility in the USFWS's December 23, 2019, Keystone XL consultation letter and BO. See Appendix K for a copy of the consultation letter and BO.

The construction and operation of the Project will not impact any marine sanctuaries designated under Title III of the Marine Protection, Research, and Sanctuaries Act of 1972.

7.3 Findings of Significant Degradation

Keystone will take steps necessary to ensure no effects contributing to significant degradation would occur, including:

- Significantly adverse effects of the discharge of pollutants on human health or welfare, including, but not limited to, effects on municipal water supplies, plankton, fish, shellfish, wildlife, and special aquatic sites;
- Significantly adverse effects of the discharge of pollutants on life stages of aquatic life and other wildlife dependent on aquatic ecosystems, including the transfer, concentration, and spread of pollutants or their byproducts outside of the disposal site through biological, physical, and chemical processes;
- Significantly adverse effects of the discharge of pollutants on aquatic ecosystem diversity, productivity, and stability (Note: Such effects may include, but are not limited to, loss of fish and wildlife habitat or loss of a wetland to assimilate nutrients, purify water, or reduce wave energy.); or
- Significantly adverse effects of discharge of pollutants on recreational, aesthetic, and economical values.

During construction, Keystone will follow the Project's CMRP (Appendix B), SPCC Plan, the USFWS's December 23, 2019, Keystone XL consultation letter and BO (Appendix K) and will comply with applicable state discharge permits to minimize, to the extent practical, migration of sediment from work areas into waters of the U.S. and to prevent contaminants associated with construction materials from entering waters of the U.S.

7.4 Findings of Appropriate and Practicable Minimization

As detailed in Section 2, "Alternatives Analysis," Section 4.1, "Wetland Impacts," and Section 5.1, "Surface Waters Impacts," of this Federal Dredge and Fill Permit Application, Keystone has evaluated impacts to wetlands and waterbodies, as well as other environmental impacts, throughout the route selection process. Project design incorporated routing selection and construction techniques to avoid and minimize impacts to wetlands, to the maximum extent practical. Major and minor route alternatives along the proposed route were evaluated to minimize impacts to wetlands and other sensitive environmental resources. Where practical, Keystone has reduced workspace (e.g., reduced construction ROW width) within waters of the U.S. to further minimize impacts to wetlands and waterbodies. Keystone has also added HDD and typical bore crossing to eliminate all impacts to PSS wetlands and to greatly reduce impacts to PFO and PEM wetlands. Across the 882 miles of pipeline and facility construction including a total of approximately 17,668 acres of impact, only 0.13 acres of permanent loss of PEM wetlands and 0.18 acres of waterbodies will be required for the Project. Additional measures that Keystone will implement to minimize impacts to water of the U.S. can be found in Section 1.3 of this Federal Dredge and Fill Permit Application.

The construction and operation of the Project will not jeopardize the continued existence of species afforded protection pursuant to the ESA. Section 7 consultation under the ESA has been completed for the Project and USFWS published the BO for the Project on December 23, 2019. See Section 5.0 of this Federal Dredge and Fill Permit Application for description of the Project's potential impacts to federally listed species and Appendix K for a copy of the BO. Additionally, Keystone is seeking an Incidental Take Permit for the ABB on private lands outside of the USACE's federal control and responsibility pursuant to Section 10 of the ESA.

7.5 Factual Determination

7.5.1 Physical Substrate Determinations

The Project will traverse a wide variety of substrates. A detailed description and analysis of the soils within the Project footprint can be found in Sections 3.2 and 4.2 of the 2014 Keystone XL Final SEIS and Sections 3.3. and 4.3 of the 2019 Keystone XL Supplemental FEIS. Fill material in wetlands during installation of the pipeline will be native material and will generally be restricted to spoil removed from the pipeline trench and, if unsaturated, segregated topsoil. The presence/absence of saturated soils within a wetland feature will depend on the field conditions present during the time of construction. Based on field condition of the wetland as determined by the Environmental Inspector, any portion of the topsoil up to 12 inches that is stackable will be segregated. Topsoil segregation will not occur if the soil is flooded or inundated and the topsoil and subsoil will not stack. Therefore, Keystone will strip and store the topsoil down to the point of saturation, depending on topsoil depth and site-specific water table conditions. The maximum depth that topsoil will be segregated is 12 inches, even in a scenario where more than 12 inches is present. Environmental Inspectors will provide guidance to the construction contractor when and how much topsoil should be segregated within a wetland based on the conditions observed in the field. This determination process for topsoil segregation for wetland construction will be applied to all wetlands features identified in Appendix J that are assigned with a Detail 9 crossing method and will be documented in the Environmental Inspectors reporting documentation. Once installation is complete, the trench spoil will be placed back into the trench. Excess material will be deposited in nearby uplands. Contours will be restored to match pre-construction contours. The construction of the Project will result in 0.13 acres of permanent fill to PEM wetlands due to the construction of permanent access roads to access mainline valve sites and a pump station.

Keystone will follow the Project CMRP (Appendix B) and Construction/Reclamation Plan and Documentation (Appendix R of the 2014 Keystone XL Final SEIS) to minimize soil layer mixing and compaction within wetlands. Keystone does not anticipate a significant impact to the composition of the substrates within waters of the U.S. that are traversed by the Project.

7.5.2 Water Circulation, Fluctuation, and Salinity Determinations

The Project has the potential to impact water circulation and fluctuation of wetlands and waterbodies within the construction footprint. However, these impacts will be temporary in nature and limited to construction of the Project. Keystone will follow the Project's CMRP (Appendix B) during construction. The measures outlined in the CMRP are designed to minimize impacts to wetlands and waterbodies. Operation of the Project will not affect the water circulation, fluctuation, or salinity of the wetlands and waterbodies within the construction footprint.

7.5.3 Suspended Particulate/Turbidity Determinations

Construction of the Project has the potential to temporarily increase the suspended particulates in wetlands and waterbodies traversed by the Project, as well as in adjacent wetlands and waterbodies; however, these impacts will be temporary in nature. Temporary increases in turbidity due to construction activities will be minimized, to the maximum extent practical, by following the Project's CMRP (Appendix B). Once construction is finished and restoration is complete, impacts due to suspended particulates/turbidity within wetlands and waterbodies traversed by the Project and wetlands and waterbodies adjacent to the Project will be insignificant.

7.5.4 Contaminant Determinations

The Project is not anticipated to cross or impact any potentially contaminated sites. In the event that substances that could potentially be considered waste and/or contaminated soils, as defined in applicable federal, state, and local regulations and guidelines are encountered during construction of the Project, Keystone will implement the measures in the Project's Unanticipated Contamination Discovery Plan (Appendix L) to prevent the spread of contamination.

7.5.5 Aquatic Ecosystem and Organism Determinations

Direct impacts to the aquatic ecosystems and organisms will occur during construction and operation of the Project. Impacts resulting from construction within wetlands and waterbodies will be localized, and construction activities will be largely temporary. Construction and operation of the Project will result in 0.13 acres of permanent fill to PEM wetlands due the construction of two permanent access roads to mainline valve sites. Indirect impacts could result from erosion and sedimentation, as well as impacts due to increased activity associated with construction. These impacts will be temporary and of only a very short duration. To minimize these impacts, Keystone will follow the Project's CMRP (Appendix B) and SPCC Plan. Secondary and indirect impacts are not anticipated as a result of the operation of the Project.

7.5.6 Proposed Disposal Site Determinations

No dredging activities that will require dredge material disposal are proposed for the construction and operation of the Project; therefore, no proposed disposals sites have been identified.

7.5.7 Determination of Cumulative Effects on the Aquatic Ecosystem

A summary of the cumulative effects analysis for wetland resources and surface waters is presented in Section 8.0 of this Federal Dredge and Fill Permit Application. A more detailed analysis is presented in Section 4.15 of the 2014 Keystone XL Project Final SEIS and Section 7.0 of the 2019 Keystone XL Project Supplemental FEIS.

7.5.8 Determination of Secondary Effects on the Aquatic Ecosystem

Secondary effects will include impacts as a result of stormwater runoff, wind erosion, and impacts to wildlife due to increased activity from construction and operation of the Project. During construction, Keystone will implement BMPs measures outlined in the Project's CMRP (Appendix B) and SPCC Plan to minimize impacts to adjacent aquatic resources as a result of stormwater runoff and wind erosion. Impacts to wildlife are addressed in the Sections 3.6 through 3.8 of the 2014 Keystone XL Project Final SEIS and Section 3.7 of the 2019 Keystone XL Supplemental FEIS as well as USFWS's December 23, 2019 consultation letter to the BLM (Appendix M) summarizing the conservation measures for listed species.

8.0 Cumulative Impacts

Cumulative impacts are the result of the incremental impacts of an action that, when added to the impacts of other past, present, and reasonably foreseeable future actions, would affect the same resources, regardless of what agency or person undertakes those actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time (40 CFR 1508.7). Compliance with NEPA requires an analysis of these cumulative impacts (40 CFR 1508.25(a)(2) and 40 CFR 1508.25(c)(3)).

As a component of the NEPA review of the Project, the DOS evaluated cumulative impacts of a reasonably foreseeable action as one that has a realistic probability of occurring. The DOS focused the analysis on numerous existing, under construction, and planned major capital public and private projects, including oil and gas well fields, major product pipelines, water distribution lines, energy development projects (including wind farms), electric transmission lines project, mining projects, and transportation projects (including highways and rail lines). Key factors in controlling the extent and duration of cumulative effects are mitigation measures designed to reduce or offset effects and/or restore resources impacted by these projects to at or near pre-construction conditions. A more detailed analysis is presented in Section 4.15 of the 2014 Keystone XL Final SEIS and Section 7.0 of the 2019 Keystone XL Supplemental FEIS. The follow is a summary of the cumulative impacts for wetlands and waterbodies.

8.1 Wetland Resources

The construction and operation of the Project will result in some temporary and very limited permanent impacts to wetlands as described in Section 3.1 of this Federal Dredge and Fill Permit Application. The potential for the contribution of the Project's wetland resources impacts to cumulative impacts presume that the CMRP (Appendix B) is successful and near pre-construction conditions are restored and maintained within the anticipated timeframes.

In respect to wetland resources, the primary impact concern with respect to potential cumulative effects is the conversion of forested wetlands to emergent wetlands and the general degradation of wetland functions and values for all wetland types (e.g., wildlife habitat, water quality, erosion control, etc.). These impacts represent the primary area for cumulative impacts to occur with other past, present, and reasonably foreseeable future projects. As described above, the Project will mitigate for wetland losses per local, state, and federal requirements, as well as the CMRP (Appendix B). However, it is noted that there is a greater potential for cumulative impacts to forested wetlands, because forested wetlands are a limited resource in the Project area.

Historical activities and past projects are linked to wetland losses. Approximately 53 percent of the wetlands in the conterminous United States were lost between the 1780s and the 1980s (USACE 2012). Since the mid-1970s the rate of loss has decreased dramatically, primarily through the implementation and enforcement of wetland protection measures, public outreach/education, and restoration programs (EPA 2012). Currently, it is estimated that only 40 to 50 percent of the original Prairie Pothole wetlands remain undrained today, and only about 10 percent of the original Rainwater Basin wetlands remain. Farming and placement of drainage tiles have removed many of these features from today's landscape. In Montana (particularly in north-central and eastern Montana), South Dakota (notably in the prairie pothole region), and Nebraska, wetlands conversion to agricultural use (assumed to include livestock grazing) accounts for most historic wetland losses (U.S. Geological Survey 1996); other development activities and urbanization follow in significance.

Even with the proposed mitigation measures that will be used to avoid and minimize wetland impacts (see Sections 1.3 and 3.1 of this Federal Dredge and Fill Permit Application), the wetland impacts resulting from the construction and operation of the Project have the potential to contribute to cumulative wetland impacts, particularly in southeastern Nebraska and east/southeastern Montana regions that are considered candidate areas for cumulative impacts associated with past projects, including this Project.

Current projects such as water delivery systems and highway maintenance and repair in Montana, South Dakota, and Nebraska would be required to avoid, minimize, and mitigate for wetland impacts according to local, state, and federal regulations. Enforcement of these regulations would likely limit the contribution of those projects to cumulative impacts.

Future projects that could potentially contribute to cumulative impacts to wetland resources such as electrical transmission lines, wind power projects, and oil and gas mining activities may also contribute to cumulative impacts where projects could overlap geographically with the Project in east/southeastern Montana and southeastern Nebraska. However, similar to those described above, future projects would be required to implement avoidance and mitigation measures designed to minimize potential impacts to wetland resources, which would likely limit the contribution of those projects to cumulative impacts.

Overall, with respect to the Project in combination with the past, present, and foreseeable future projects, long-term and permanent changes to wetland resources within the pipeline ROW have the potential to contribute to cumulative wetland impacts. Development projects would be required to comply with Section 404 of the CWA to avoid or mitigate impacts to wetlands. However, non-federally protected isolated wetlands may experience a cumulative loss if these resources are not avoided.

8.2 Surface Waters

The construction and operation of the Project will result in temporary and very limited permanent impacts to surface waters as described in Section 4.1 of this Federal Dredge and Fill Permit Application. The

potential for the contribution of the Project's surface water impacts to cumulative impacts presume that the CMRP (Appendix B) is successful and near pre-construction conditions are restored and maintained within the anticipated timeframes.

In summary, with respect to surface water resources, permanent impacts are not expected. In the short term, bank and channel impacts from construction that would not regain full stability or equilibrium in the construction period would be expected to do so in 1 to 3 years post-construction. Operational impacts would be from maintenance activities such as f pipe repair, but could also occur in previously impacted areas that are susceptible to the effects of large storm/runoff events. The introduction and transportation of invasive aquatic and plant species is the primary long-term impact concern and there is the potential for cumulative impacts to occur with other past, present, and reasonably foreseeable future projects. Past projects would concurrently affect invasive species to the extent that there is a high density of activity in a geographic area having a similar impact. Southern and eastern Nebraska and the east/southeastern region of Montana are candidate areas for cumulative impacts associated with concurrent projects, including the Project. Although existing projects are not noted to have had long-term impacts to surface water with respect to invasive species, mitigation and restoration measures are available to address these concerns within the context of all of these project activities; thus the overall significance to cumulative impacts is low.

Other current projects such as water delivery systems and highway maintenance and repair are also not expected to result in long-term impacts with respect to invasive species. Therefore, current projects would not contribute to cumulative impacts to surface water resources.

Future projects such as electrical transmission lines, wind power projects, and oil and gas development and mining activities may also contribute to cumulative impacts where projects could overlap geographically with the Project in east/southeastern Montana and southeastern Nebraska. However, similar to those described above, mitigation and restoration measures are available to address these concerns.

Overall, with respect to the Project in combination with the past, present, and foreseeable future projects, permanent changes to surface water resources within the pipeline ROW are considered negligible assuming effective mitigation and restoration efforts with the Project and other projects throughout the Project route.

Appendix A –
Summary of the Regulatory History of the Project

Table A-1 Summary of the Regulatory Actions Related to the Keystone XL Pipeline

Date	Summary of the Regulatory Action
September 19, 2008	Keystone filed an application with the Department of State (DOS) for a Presidential Permit authorizing the construction and operation of the proposed Project at the US–Canada border crossing in Montana. At that time, the Project included three segments: i. the Steele City Segment, extending from an oil supply hub near Hardisty, Alberta, Canada, to Steele City, Nebraska, where it connected with the existing Keystone Cushing Extension pipeline; ii. the Gulf Coast Pipeline, extending from Cushing, Oklahoma, south to Nederland, Texas; and iii. the Houston Lateral, extending from Liberty County, Texas, to Moore Junction, Harris County, Texas.
April 16, 2010	The DOS published the Draft Environmental Impact Statement (DEIS) reaching the conclusion that the Project could be built with minimal environmental impacts.
June 29, 2010	South Dakota Public Utilities Commission (PUC) issued amended final decision and order granting Keystone a permit to construct the portion of the proposed Project in the State, pursuant to the South Dakota Energy Conversion and Transmission Facilities Act.
April 22, 2011	DOS published the Supplemental Draft Environmental Impact Statement (SDEIS) with new information that became available after the DEIS was issued. The DOS concluded that the Project could be built with minimal environmental impacts.
August 16, 2011	The DOS published the Final Environmental Impact Statement (FEIS) reaching the conclusion that the Project could be built with minimal environmental impacts.
November 10, 2011	The DOS determined that additional information regarding potential alternative routes in Nebraska was required before it could make a National Interest Determination.
November 22, 2011	Nebraska Legislature passed Legislative Bill (LB) 1 and LB 4, which were both signed and approved by the Governor. LB 1 adopted the Major Oil Pipeline Siting Act, and LB 4 provided for state participation in a federal supplemental EIS review process.
December 23, 2011	Congress adopted a provision of the Temporary Payroll Tax Cut Continuation Act that required the President to make a decision on Keystone's Presidential Permit application within 60 days.
January 18, 2012	The President determined, based upon the DOS's recommendation, that the proposed Project, as presented and analyzed at that time, would not serve the national interest. This determination was based solely on the Administration's inability to complete its review within the time provided by the 2011 legislation; it was not a determination based on the merits of the Project.
February 27, 2012	Keystone advised the DOS that it considered the Gulf Coast Pipeline portion of the proposed Project as having its own independent utility and that it intended to commence construction of that segment as soon as other required permits were obtained.
March 22, 2012	President Obama announced his intent to expedite permitting of the Gulf Coast Pipeline project.
April 11, 2012	Nebraska Legislature passed LB 1161, which clarified its direction to Nebraska Department of Environmental Quality (NDEQ) to evaluate pipelines in that state. This legislation was signed by the Nebraska Governor on April 17, 2012.
May 4, 2012	Keystone filed a new application for a Presidential Permit requesting authorization to construct, connect, operate, and maintain the border crossing facility requested in connection with construction and operation of the proposed Project, including only the Steele City Segment and excluding the Gulf Coast Pipeline and the Houston Lateral.
May 24, 2012	The NDEQ entered into a Memorandum of Understanding with the DOS to provide a framework for a timely and collaborative environmental analysis of alternative pipeline routes within Nebraska.
September 2012	Keystone submitted an ER in support of its Presidential Permit application that provided additional information about the revised route in Nebraska.
January 3, 2013	after a year-long public review process, NDEQ submitted its Final Evaluation Report on the proposed pipeline reroute to the Nebraska Governor for his review.
January 22, 2013	The Nebraska Governor approved the proposed Project route in that State under the Nebraska Major Oil Pipeline Siting Act, certifying the design, location, construction, operation, maintenance, and decommissioning of the Nebraska portion of the proposed Project.

Table A-1 Summary of the Regulatory Actions Related to the Keystone XL Pipeline

Date	Summary of the Regulatory Action
March 1, 2013	The DOS published a Draft Supplemental Environmental Impact Statement (DSEIS) for the proposed Project.
January 2014	The DOS published the Final Supplemental Environmental Impact Statement (FSEIS) for the proposed Project. The FSEIS again concluded that the project would have minimal effects on the environment. The FSEIS included a Biological Opinion (BO) from the U.S. Fish and Wildlife Service (USFWS), which was withdrawn and later superseded by a December 2019 BO.
August 27, 2015,	USFWS concurred with the DOS determination that the Project may affect but is not likely to adversely affect the rufa red knot.
October 5, 2015	Due to legal challenges to the statute authorizing the Governor's 2013 approval, Keystone filed an application with the Nebraska Public Service Commission (PSC) for approval of the same route, pursuant to the Nebraska Major Oil Pipeline Siting Act.
November 3, 2015	Secretary of State Kerry signed a Record of Decision and National Interest Determination recommending denial of Keystone's requested Presidential Permit based on the premise that approval would undermine U.S. climate leadership in the international arena.
November 6, 2015	President Obama and Secretary of State Kerry announced the denial of Keystone's Presidential Permit for the reason noted above.
November 18, 2015	Keystone filed a request with the Nebraska PSC that its Major Oil Pipeline Siting Act application filed on October 5, 2015, be dismissed, without prejudice. The Nebraska PSC granted Keystone's request on November 23, 2015.
January 21, 2016	South Dakota PUC issued order accepting Keystone's certification of its 2010 permit.
February 12, 2016	in consultation with the Bureau of Land Management (BLM), Keystone withdrew its application for a Grant of Right-of-Way and Temporary Use Permit, without prejudice to a future re-filing. The BLM did not act on that request.
January 26, 2017	Keystone submitted an updated Presidential Permit Application for the Project. The application included minor route revisions due to changes in the right-of-way and easement agreements with property owners, but the Project remained within the area previously analyzed in the 2014 FSEIS.
February 8, 2017	Keystone rescinded its pending request to withdraw the ROW Grant application, which had not been acted upon.
February 16, 2017	Keystone filed a new application with the Nebraska PSC for a 275.2-mile-long pipeline that would start at the Nebraska-South Dakota border in Keya Paha County, Nebraska and terminate at Steele City in Jefferson County, Nebraska. Keystone also included the Mainline Alternative Route (MAR) in its application as one of two potential pipeline route alternatives.
March 16, 2017	USFWS completed consultation on northern long-eared bat.
March 23, 2017	The DOS determined that the Project would serve the national interest and issued a Presidential Permit, acting pursuant to delegated Presidential authority.
November 20, 2017	following review of the application and the evidence presented, the Nebraska PSC approved the MAR, finding that it was in the public interest of Nebraska.
July 2018	The DOS issued the Draft Environmental Assessment for Keystone XL Mainline Alternative Route Project.
August 15, 2018	U.S. District Court for the District of Montana ordered the 2014 Keystone XL Final SEIS be supplemented to consider the potential impacts of the MAR and related facilities.
November 8, 2018	U.S. District Court for the District of Montana found that the 2014 Keystone XL Final SEIS largely complied with NEPA but ordered that it be supplemented to account for new information that has become available since its publication, specifically including an updated market analysis, post-2014 cultural resource surveys and studies, revised greenhouse gas emissions modeling, and updates to the accidental release analysis based on post-2014 information.
March 29, 2019	President Trump issued a new Presidential Permit allowing construction, connections, maintenance, and operation of the Project at the US – Canada border. This Presidential Permit revokes the permit issued on March 23, 2017.

Table A-1 Summary of the Regulatory Actions Related to the Keystone XL Pipeline

Date	Summary of the Regulatory Action
October 1, 2019	The DOS published a Notice of Availability (NOA) in the Federal Register (FR) regarding availability of the 2019 Keystone XL Draft SEIS, to solicit comments on the Draft SEIS over a 45-day public comment period.
December 20, 2019	The DOS published an NOA in the FR regarding availability of the 2019 Keystone XL Final SEIS.
December 23, 2019	The USFWS issued the BO.

Key:

BO: Biological Opinion
BLM: Bureau of Land Management
DEIS: Draft Environmental Impact Statement
DOS: U.S. Department of State
EIS: Environmental Impact Statement
FEIS: Final Environmental Statement
LB: Legislative Bill
NDEQ: Nebraska Department of Environmental Quality
FR: *Federal Register*
NOA: Notice of Availability
NOI: Notice of Intent
PSC: Public Service Commission
PUC: Public Utilities Commission
SDEIS: Supplemental Draft Environmental Statement
USFWS: U.S. Fish and Wildlife Service

Appendix B –
Construction Mitigation and Reclamation Plan

KEYSTONE XL PROJECT

CONSTRUCTION, MITIGATION, AND RECLAMATION PLAN

April 2012
Rev. 4

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1.0 INTRODUCTION

2.0 GENERAL CONDITIONS
- 2.1 Training
- 2.2 Environmental Inspection
- 2.3 Advance Notice of Access to Property Prior to Construction
- 2.4 Other Notifications
- 2.5 Damages to Private Property
- 2.6 Appearance of Worksite
- 2.7 Access
- 2.8 Aboveground Facilities
- 2.9 Minimum Depth of Cover
- 2.10 Non-Hazardous Waste Disposal
- 2.11 Hazardous Wastes
- 2.12 Noise Control
- 2.13 Weed Control
- 2.14 Dust Control
- 2.15 Off Road Vehicle Control
- 2.16 Fire Prevention and Control
- 2.17 Road and Railroad Crossings
- 2.18 Adverse Weather
- 2.19 Cultural Resources

3.0 SPILL PREVENTION AND CONTAINMENT
- 3.1 Spill Prevention
  - 3.1.1 Staging Area
  - 3.1.2 Construction Right of Way
- 3.2 Contingency Plans
- 3.3 Equipment
- 3.4 Emergency Notification
- 3.5 Spill Containment and Countermeasures

4.0 UPLANDS (AGRICULTURAL, FOREST, PASTURE, RANGE AND GRASS LANDS)
- 4.1 Interference with Irrigation Systems
- 4.2 Clearing
- 4.3 Topsoil Removal and Storage
- 4.4 Grading
- 4.5 Temporary Erosion and Sediment Control
  - 4.5.1 General
  - 4.5.2 Sediment Barriers
  - 4.5.3 Trench Plugs
  - 4.5.4 Temporary Slope Breakers (Water Bars)
  - 4.5.5 Drainage Channels or Ditches
  - 4.5.6 Temporary Mulching
  - 4.5.7 Tackifier
- 4.6 Stringing

4.7 Trenching
4.7.1 Trench Dewater/Well Points
4.8 Welding, Field Joint Coating, and Lowering In
4.9 Padding and Backfilling
4.10 Clean Up
4.11 Reclamation and Revegetation
4.11.1 Relieving Compaction
4.11.2 Rock Removal
4.11.3 Soil Additives
4.11.4 Seeding
4.11.5 Permanent Erosion and Sediment Control
4.11.6 Fences
4.11.7 Farm Terraces
4.11.8 Right-of-Way and Pipeline Markers
4.12 Pasture and Range Lands
4.13 Forested Lands
4.14 Residential and Commercial/Industrial Areas
4.14.1 Residential and Commercial Areas
4.14.2 Site – Specific Plans
4.14.3 Landowner Complaint Resolution Procedure
4.15 Fragile Soil Clean Up and Reclamation/Revegetation
4.15.1 General
4.15.2 Right-of-Way Construction
4.15.3 Right-of-Way Reclamation
4.15.4 Post - Construction
4.16 Operations and Maintenance

5.0 DRAIN TILE SYSTEMS
5.1 General
5.2 Identification and Classification of Drain Tile Systems
5.2.1 Publicly Owned Drain Tiles
5.2.2 Privately Owned Drain Tiles
5.3 Mitigation of Damage to Drain Tile Systems
5.3.1 Non-interference with Drain Tile
5.3.2 Non-disturbance of Drain Tile Mains
5.3.3 Relocation or Replacement of Existing Drain Tiles Prior to Construction
5.3.4 Future Drain Tiles/Systems
5.3.5 Other Mitigation Measures
5.4 Responsibility for Repair of Drain Tile Systems
5.4.1 Local Drain Tile Contractor Repair
5.4.2 Pipeline Contractor Repair
5.4.3 Landowner/Tenant Repair
5.5 Drain Tile Repairs
5.5.1 Temporary Repairs During Construction
5.5.2 Permanent Repairs
5.6 Inspection/Acceptance of Drain Tile Repairs

6.0 WETLAND CROSSINGS
- 6.1 General
- 6.2 Easement and Workspace
- 6.3 Vehicle Access and Equipment Crossing
- 6.4 Temporary Erosion and Sediment Control
- 6.5 Wetland Crossing Procedures
  - 6.5.1 Dry Wetland Crossing Method
  - 6.5.2 Standard Wetland Crossing Method
  - 6.5.3 Flooded Push/Pull Wetland Crossing Method
- 6.6 Restoration and Reclamation

7.0 WATERBODIES AND RIPARIAN LANDS
- 7.1 General
- 7.2 Easement and Workspace
- 7.3 Vehicle Access and Equipment Crossings
- 7.4 Waterbody Crossing Methods
  - 7.4.1 Non-flowing Open Cut Crossing Method
  - 7.4.2 Flowing Open Cut Crossing Method of Minor, Intermediate, and Major Waterbodies
  - 7.4.3 Flowing Stream Crossing – Dry Flume Method
  - 7.4.4 Flowing Stream Crossing – Dry Dam and Pump Method
  - 7.4.5 Horizontal Directional Drill Crossings
  - 7.4.6 Horizontal Bore Crossings
- 7.5 Clearing
- 7.6 Grading
- 7.7 Temporary Erosion and Sediment Control
- 7.8 Trenching
- 7.9 Pipe Installation
- 7.10 Backfilling
- 7.11 Stabilization and Restoration of Stream Banks and Slopes

8.0 HYDROSTATIC TESTING
- 8.1 Testing Equipment Location
- 8.2 Test Water Source and Discharge Locations
- 8.3 Filling the Pipeline
- 8.4 Dewatering the Pipeline
  - 8.4.1 Splash Pup
  - 8.4.2 Splash Plate
  - 8.4.3 Plastic Liner
  - 8.4.4 Straw Bale Dewatering Structure

9.0 DRAWINGS AND FIGURES

Detail 1	Typical Silt Fence Barrier
Detail 2	Typical Straw or Hay Bale Barrier
Detail 3	Temporary/Permanent Slope Breaker Detail (Water Bars)
Detail 4	Erosion Control Matting Installation
Detail 5	Typical Dewatering Filter Bag
Detail 6	Typical Straw Bale Dewatering Structure
Detail 7	Typical Permanent Trench Breaker
Detail 8	”Dry” Wetland Crossing Method
Detail 9	Standard Wetland Crossing Method
Detail 10	Push/Pull Wetland Crossing Method
Detail 11	Typical Open Cut Wet Crossing Method Non-Flowing Waterbody
Detail 12	Typical Open Cut Wet Crossing Method Flowing Waterbody
Detail 13	Typical Dry Flume Crossing Method
Detail 13a	Typical Dry Flume Crossing Method (Procedures)
Detail 14	Typical Dam and Pump Crossing
Detail 14a	Typical Dam and Pump Crossing (Procedures)
Detail 15	Typical Horizontal Drill (HDD) Site Plan & Profile
Detail 16	Typical Temporary Bridge Crossing
Detail 17	Typical Flume Bridge Crossing
Detail 18	Typical Railcar Bridge Crossing
Detail 19	Flexible Channel Liner Installation
Detail 20	Typical Rock Rip-Rap
Detail 21	Typical Uncased/Railroad Crossing Bore Detail
Deail 22	(Omitted)
Detail 23	Streambank Reclamation – Log Wall
Detail 24	Streambank Reclamation – Vegetated Geotextile Installation
Detail 25	Typical ROW Layout/Soil Handling 110’ Construction ROW 50’ Easement Drain Tile Crossing
Detail 26	Header/Main Crossovers of Pipeline
Detail 27	Relocate/Replace Drainage Header/Main
Detail 28	Drainage and Irrigation Temporary Drain Tile Repair
Detail 29	Drainage and Irrigation Permanent Drain Tile Repair
Detail 30	Equipment Cleaning Station Detail
Detail 31	Equipment Wash Station Detail
Detail 67/67A	Topsoil Conservation—Triple Ditch

1.0 INTRODUCTION

The construction, mitigation, and reclamation requirements described in this Plan apply to work on all of TransCanada Keystone Pipeline, L.P.'s (Keystone's) Keystone XL Project (Project) lands, including the following;

- uplands, including agricultural (cultivated or capable of being cultivated) lands, pasture lands; range lands; grass lands; forested lands; lands in residential, commercial, or industrial areas; lands in public rights of way; and lands in private rights-of-way;
- wetlands; and
- waterbodies and riparian areas.

Keystone, during the construction, operation, and maintenance of the Project, shall implement the construction, mitigation, and reclamation actions contained in this Plan to the extent that they do not conflict with the requirements of any applicable federal, state, or local rules and regulations, or other permits or approvals that are applicable to the Project. Additionally, Keystone may deviate from specific requirements of this Plan on specific private lands as agreed to by landowners or as required to suit actual site conditions as determined and directed by Keystone. All work must be in compliance with federal, state, and local permits.

The Project will be designed, constructed, operated and maintained in a manner that meets or exceeds applicable industry standards and regulatory requirements. Keystone's Integrity Management Plan and Emergency Response Plan outlines the preventative maintenance, inspection, line patrol, leak detection systems, SCADA, and other pipeline integrity management procedures to be implemented during operation of the Project.

2.0 GENERAL CONDITIONS

2.1 Training

Experienced, well-trained personnel are essential for the successful implementation of this Plan. Keystone and its Contractors shall undergo prevention and response, as well as safety training. The program shall be designed to improve awareness of safety requirements, pollution control laws and procedures, and proper operation and maintenance of equipment.

The construction contractor (Contractor), and all of his subcontractors shall ensure that persons engaged in Project construction are informed of the construction issues and concerns and that they attend and receive training regarding these requirements as well as all laws, rules and regulations applicable to the work. Prior to construction, all Project personnel will be trained on environmental permit requirements and environmental specifications, including fuel handling and storage, cultural resource protection methods, stream and wetland crossing requirements, and sensitive species protection measures.

Different levels of training shall be required for different groups of Contractor personnel. Contractor supervisors, managers, field foremen, and other Contractor personnel designated by Keystone shall attend a comprehensive environmental training session. All other Contractor personnel shall attend a training session before the beginning of construction and during construction as environmental issues and incidents warrant. Additional training sessions shall be held for newly assigned personnel prior to commencing work on the Project.

All Contractor personnel shall attend the training session prior to entering the construction right-of-way. All Contractor personnel shall sign an acknowledgement of having attended the appropriate level of training and shall display a hard hat sticker that signifies attendance at environmental training. In order to ensure successful compliance, Contractor personnel shall attend repeat or supplemental training if compliance is not satisfactory or as new, significant new issues arise.

All visitors and any other personnel without specific work assignments shall be required to attend a safety and environmental awareness orientation.

2.2 Environmental Inspection

Keystone will use Environmental Inspectors on each construction spread. The Environmental Inspectors will review the Project activities daily for compliance with state, federal and local regulatory requirements. The Environmental Inspectors will have the authority to stop specific tasks as approved by the Chief Inspector. They can also order corrective action in the event that construction activities violate the provisions of this Plan, landowner requirements, or any applicable permit requirements.

2.3 Advance Notice of Access to Property Prior to Construction

Prior to initially accessing landowners' property, Keystone shall provide the landowner or tenant with a minimum of 24 hours prior notice unless otherwise negotiated with the landowner and as described in the Project line list). Additionally, the landowner or tenant shall be provided with Keystone contact information. Landowners may utilize contact information to inform Keystone of any concerns related to construction.

Prior notice shall consist of a personal contact, a telephone contact, or delivery of written notice to the landowner to inform the landowner of whereby the landowner or tenant is informed of Keystone's intent to initially access the land. The landowner or tenant need not acknowledge receipt of written notice before Keystone can enter the landowner's property.

Keystone will coordinate with managers of public lands to reduce conflicts between construction activities and recreational uses. Keystone will consult with land managers on state and federal lands regarding any necessary construction and maintenance restrictions consistent with management and use of such lands. Damages from disruption of recreational uses of private lands will be the subject of compensation negotiations with individual landowners.

If pipeline activities occur during the winter season Keystone will consult with the appropriate regulatory agencies to establish the appropriate protective measures to avoid or mitigate wildlife seasonal, timing or migration concerns.

2.4 Other Notifications

The Contractor shall notify, in writing, both Keystone and the authority having jurisdiction over any road, railroad, canal, drainage ditch, river, foreign pipeline, or other utility to be crossed by the pipeline at least 48 hours (excluding Saturdays, Sundays, and statutory holidays), or as specified on the applicable permit(s), prior to commencement of pipeline construction, in order that the said authority may appoint an inspector to ensure that the crossing is constructed in a satisfactory manner.

The Contractor shall notify Keystone immediately of any spill of a potentially hazardous substance that creates a sheen on a wetland or waterbody, as well as any existing soil contamination discovered during construction.

The Contractor shall immediately notify Keystone of the discovery of previously unreported historic property, other significant cultural materials, or suspected human remains uncovered during pipeline construction.

The Contractor shall immediately notify Keystone of a Project-related injury to or mortality of a threatened or endangered animal.

2.5 Damages to Private Property

Pipeline construction activities shall be confined to the construction right-of-way, temporary work space, additional temporary work space, and approved access routes.

Keystone shall reasonably compensate landowners for any construction-related damages caused by Keystone which occur on or off of the established pipeline construction right-of-way.

Keystone shall reasonably compensate landowners for damages to private property caused by Keystone beyond the initial construction and reclamation of the pipeline, to include those damages caused by Keystone during future construction, operation, maintenance, and repairs relating to the pipeline.

2.6 Appearance of Worksite

The construction right-of-way shall be maintained in a clean, neat condition at all times. At no time shall litter be allowed to accumulate at any location on the construction right-of-way. The Contractor shall provide a daily garbage detail with each major construction crew to keep the construction right-of-way clear of trash, pipe banding and spacers, waste from coating products, welding rods, timber skids, defective materials and all construction and other debris immediately behind construction operations unless otherwise approved by Keystone. Paper from wrapping or coating products or lightweight items shall not be permitted to be scattered by the wind.

The traveled surfaces of roads, streets, highways, etc. (and railroads when applicable) shall be cleaned free of mud, dirt, or any debris deposited by equipment traversing these roads or exiting from the construction right-of-way.

2.7 Access

Prior to the pipeline's installation, Keystone and the landowner shall reach a mutually acceptable agreement on the route that shall be utilized by the Contractor for entering and exiting the pipeline construction right-of-way should access to the construction right-of-way not be practicable or feasible from adjacent segments of the pipeline construction right-of-way, public road, or railroad right-of-way.

All construction vehicles and equipment traffic shall be confined to the public roads, private roads acquired for use by Keystone, and the construction right-of-way. If temporary private access roads are constructed, they shall be designed to maintain proper drainage and shall be built to minimize soil erosion.

Sufficiently sized gaps shall be left in all spoil and topsoil wind rows and a hard or soft plug shall be left in the trench at all temporary private access roads and obvious livestock or wildlife trails unless the landowner agrees prior to construction that these access points can be blocked during construction.

All construction-related private roads and access points to the right-of-way shall be marked with signs. Any private roads not to be utilized during construction shall also be marked.

2.8 Aboveground Facilities

Locations for aboveground facilities shall be selected in a manner so as to be as unobtrusive as reasonably possible to ongoing agricultural or other landowner activities occurring on the lands adjacent to the facilities. If it is not feasible, to avoid interference, such activities shall be located so as to incur the least hindrance to the adjacent agricultural operations (i.e., located in field corners or areas where at least one side is not used for cropping purposes) provided the location is consistent with the design constraints of the pipeline. Aboveground facilities shall avoid floodplains and wetlands to the maximum extent possible. Additionally, they shall be located to avoid existing drain tile systems to the extent possible. To further reduce visual impacts from aboveground pipeline facilities and structures, Keystone will comply with standard industry painting practices with respect to aboveground facilities. Keystone will address any visual aesthetics issues with landowners in individual consultations.

2.9 Minimum Depth of Cover

The pipeline shall be installed so that the top of the pipe and coating is a minimum depth of 5 feet below the bottom of waterbodies including rivers, creeks, streams, ditches, and drains. This depth shall normally be maintained

over a distance of 15 feet on each side of the waterbody measured from the top of the defined stream channel. If concrete weights or concrete coated pipe is utilized for negative buoyancy of the pipeline, the minimum depth of cover shall be measured from the top of the concrete to the original ground contour. The following table indicates standard depths that would apply to pipeline construction.

Location	Normal Excavation (inches)	For Rock Excavation (inches
Most areas	48	36
All waterbodies	60	36
Dry creeks, ditches, drains, washes, gullies, etc.	60	36
Drainage ditches at public roads and railroads	60	48

Depth of cover requirements may be modified by Keystone based on site-specific conditions. However, all depths shall be in compliance with all established codes.

2.10 Non-Hazardous Waste Disposal

Non-hazardous pipeline construction wastes include human waste, trash, pipe banding and spacers, waste from coating products, welding rods, timber skids, cleared vegetation, stumps, and rock.

All waste which contains (or at any time contained) oil, grease, solvents, or other petroleum products falls within the scope of the oil and hazardous substances control, cleanup, and disposal procedures. This material shall be segregated for handling and disposal as hazardous wastes.

The Contractor shall be responsible for ensuring that human wastes are handled and disposed of exclusively by means of portable, self-contained toilets during all construction operations. Wastes from these units shall be collected by a licensed contractor for disposal only at licensed and approved facilities.

The Contractor shall remove all trash from the construction right-of-way on a daily basis unless otherwise approved or directed by Keystone.

The Contractor shall dispose of HDD drill cuttings and drilling mud at a Keystone-approved location. Disposal options may include spreading over the construction right-of-way in an upland location approved by Keystone, or hauling to an approved licensed landfill or other site approved by Keystone.

The Contractor shall remove all extraneous vegetative, rock, and other natural debris from the construction right-of-way by the completion of cleanup

The Contractor shall remove all trash and wastes from Contractor yards, and Pipe Stockpipe Sites, and staging areas when work is completed at each location.

The Contractor shall dispose of all waste materials at licensed waste disposal facilities. Wastes shall not be disposed of in any other fashion such as un-permitted burying or burning.

2.11 Hazardous Wastes

The Contractor shall ensure that all hazardous and potentially hazardous materials are transported, stored, and handled in accordance with all applicable legislation. Workers exposed to or required to handle dangerous materials shall be trained in accordance with the applicable regulator and the manufacturer's recommendations.

The Contractor shall dispose of all hazardous materials at licensed waste disposal facilities. Hazardous wastes shall not be disposed of in any other fashion such as un-permitted burying or burning.

All transporters of oil, hazardous substances, and hazardous wastes shall be licensed and certified according to the applicable state vehicle code. Incidents on public highways shall be reported to the appropriate agencies.

All hazardous wastes being transported off-site shall be manifested. The manifest shall conform to requirements of the appropriate state agency. The transporter shall be licensed and certified to handle hazardous wastes on the public highways. The vehicles as well as the drivers must conform to all applicable vehicle codes for transporting hazardous wastes. The manifest shall conform to 49 CFR Parts 172.101, 172.202, and 172.203.

If toxic or hazardous waste materials or containers are encountered during construction, the Contractor shall stop work immediately to prevent disturbing or further disturbing the waste material and shall immediately notify Keystone. The Contractor shall not restart work until clearance is granted by Keystone.

2.12 Noise Control

The Contractor shall minimize noise during non-daylight hours and within 1 mile of residences or other noise-sensitive areas such as hospitals, motels or campgrounds. Keystone shall abide by all applicable noise regulations regarding noise near residential and commercial/industrial areas. The Contractor shall provide notice to Keystone if noise levels are expected to exceed bylaws for a short duration. Keystone will give advanced notice to landowners within 500 feet of right-of-way prior to construction, limit the hours during which construction activities with high-decibel noise levels are conducted, coordinate work schedules, and ensure that construction proceeds quickly through such areas. The Contractor shall minimize noise in the immediate vicinity of herds of livestock or poultry operations, which are particularly sensitive to noise.

Keystone will set up a toll-free telephone line for landowners to report any construction noise-related issues.

2.13 Weed Control

Keystone will prepare a weed management plan for each state crossed by the project, as required. In general, these plans will consider the following measures listed below.

Prior to mobilization for the Project, the Contractor shall thoroughly clean all construction equipment, including timber mats, prior to moving the equipment to the job site to limit the potential for the spread of noxious weeds, insects and soil-borne pests. The Contractor shall clean the equipment with high-pressure washing equipment.

Prior to construction, Keystone will mark all areas of the right-of-way which contain infestations of noxious, invasive species or soil-borne pests. Such marking will clearly indicate the limits of the infestation along the right-of-way. During construction, the Contractor shall clean the tracks, tires, and blades of equipment by hand (track shovel) or compressed air to remove excess soil prior to movement of equipment out of weed or soil-borne pest infested areas, or utilize cleaning stations to remove vegetative materials using water under high pressure (see detail Drawings 30 and 31).

In areas of isolated weed populations, the Contractor shall strip topsoil from the full width of the construction right-of-way and store the topsoil separately from other topsoil and subsoil. The Environmental Inspectors will identify these locations in the field prior to grading activities.

The Contractor shall use mulch and straw or hay bales that are free of noxious weeds for temporary erosion and sediment control.

The Contractor shall implement pre-construction treatments such as mowing prior to seed development or herbicide application to areas of noxious weed infestation prior to other clearing, grading, trenching, or other soil disturbing work at locations identified in the construction drawings.

Keystone will implement Best Management Practices (BMPs) for conducting vegetation control where necessary before and after construction. Typical agricultural herbicides, developed in consultation with county or state regulatory agencies, will be used. Herbicide types will be determined based on the weed species requiring control. The Contractor shall apply herbicides, where required, within one week, or as deemed necessary for optimum mortality success, prior to disturbing the area by clearing, grading, trenching, or other soil disturbing work. Herbicides shall be applied by applicators appropriately licensed or certified by the state in which the work is conducted. All herbicides applied prior to construction shall be non-residual or shall have a significant residual effect no longer than 30 days. Herbicides applied during construction shall be non-residual. Keystone will implement BMPs in the use of pesticides and herbicides along the pipeline corridor to reduce potential impacts to avian and wildlife species.

The Contractor shall not use herbicides in or within 100 feet of a wetland or waterbody.

After pipeline construction, on any construction right-of-way over which Keystone will retain control over the surface use of the land after construction (i.e., valve sites, metering stations, pump stations, etc.), Keystone shall provide for weed control to limit the potential for the spread of weeds onto adjacent lands used for agricultural purposes. Any weed control spraying performed by Keystone shall be done by a state-licensed pesticide applicator.

Keystone shall be responsible for reimbursing all reasonable costs incurred by owners of land adjacent to aboveground facilities when the landowners must control weeds on their land which can be reasonably determined to have spread from land occupied by Keystone's aboveground facilities.

2.14 Dust Control

The Contractor shall at all-time control airborne dust levels during construction activities to levels acceptable to Keystone. The Contractor shall employ water trucks, sprinklers or calcium chloride as necessary to reduce dust to acceptable levels. Utilization of calcium chloride is limited to roads.

Dust shall be strictly controlled where the work approaches dwellings, farm buildings, and other areas occupied by people and when the pipeline parallels an existing road or highway. This shall also apply to access roads where dust raised by construction vehicles may irritate or inconvenience local residents. The speed of all Contractor vehicles shall be controlled in these areas. Emissions from construction equipment combustion, open burning, and temporary fuel transfer systems and associated tanks will be controlled to the extent required by state and local agencies through the permit process.

The Contractor shall take appropriate precautions to prevent fugitive emissions caused by sand blasting from reaching any residence or public building. The Contractor shall place curtains of suitable material, as necessary, to prevent wind-blown particles from sand blasting operations from reaching any residence or public building.

Additional measures may be required by state regulations or local ordinances. The Contractor will comply with all applicable state regulations and local ordinances with respect to truck transportation and fugitive dust emissions.

2.15 Off Road Vehicle Control

Keystone shall offer to landowners or managers of forested lands to install and maintain measures to control unauthorized vehicle access to the construction right-of-way where appropriate. These measures may include the following unless otherwise approved or directed by Keystone based on site specific conditions or circumstances:

- signs;
- fences with locking gates;
- slash and timber barriers, pipe barriers, or boulders lined across the

construction right-of-way; and

- conifers or other appropriate trees or shrubs across the construction right-of-way.

2.16 Fire Prevention and Control

The Contractor shall comply with all federal, state, county and local fire regulations pertaining to burning permits and the prevention of uncontrolled fires. The following mitigative measures shall be implemented to prevent fire hazards and control of fires:

- A list of relevant fire authorities and their designated representative to contact shall be maintained on site by construction personnel.
- Adequate firefighting equipment shall be available on site in accordance with the applicable regulatory requirements shall be available on site.
- The level of forest fire hazard shall be posted at the construction office (where visible for workers) and workers shall be made aware of the hazard level and related implications.
- The Contractor shall provide equipment to handle any possible fire emergency. This shall include, although not be limited to, water trucks; portable water pumps; chemical fire extinguishers; hand tools such as shovels, axes, and chain saws; and heavy equipment adequate for the construction of fire breaks when needed.
- Specifically, the Contractor shall supply and maintain in working order an adequate supply of fire extinguishers for each crew engaged in potentially combustible work such as welding, cutting, grinding, and burning of brush or vegetative debris.
- In the event of a fire, the Contractor shall immediately use resources necessary to contain the fire. The Contractor shall then notify local emergency response personnel.
- All tree clearing activities are to be carried out in accordance with local rules and regulations for the prevention of forest fires.
- Burning shall be done in compliance with state, county, or local applicable regulations.
- Any burning will be done within the right-of-way. Only small piles shall be burned to avoid overheating or damage to trees or other structures along the right-of-way.
- Flammable wastes shall be removed from the construction site on a regular basis.
- Flammable materials kept on the construction site must be stored in approved containers away from ignition sources.
- Smoking shall be prohibited around flammable materials.
- Smoking shall be prohibited on the entire construction site when the fire hazard is high.

2.17 Road and Railroad Crossings

Construction across paved roads, highways, and railroads will be in accordance with the requirements of the road and railroad crossing permits and approvals obtained by Keystone. In general, all major paved roads, all primary gravel roads, highways, and railroads will be crossed by boring beneath the road or railroad. Detail drawing 21 illustrates a typical bored road or railroad crossing. Boring requires the excavation of a pit on each side of the feature, the placement of boring equipment in the pit, and boring a hole under the road at least equal to the diameter of the pipe. For long crossings, sections can be welded onto the pipe string just before being pulled through the borehole. Boring will result in minimal or no disruption to traffic at road or railroad crossings. Each boring will be expected to take 1 to 2 days for most roads and railroads and up to 10 days for long crossings such as interstate or four-lane highways.

Most smaller, unpaved roads and driveways will be crossed using the open-cut method where permitted by local authorities or private owners. The open-cut method will require temporary closure of the road to traffic and establishment of detours. If no reasonable detour is feasible, at least one lane of traffic will be kept open, except during brief periods when it is essential to close the road to install the pipeline. Most open-cut road crossings can be finished and the road resurfaced in 1 or 2 days. Keystone will take measures, such as posting signs at open-cut road crossings, to ensure safety and minimize traffic disruptions.

2.18 Adverse Weather

The Contractor shall restrict certain construction activities and work in cultivated agricultural areas in excessively wet soil conditions to minimize rutting and soil compaction. In determining when or where construction activities should be restricted or suspended during wet conditions, the Contractor shall consider the following factors:

- the extent that rutting may cause mixing of topsoil with subsoil layers or damage to tile drains;
- excessive buildup of mud on tires and cleats;
- excessive ponding of water at the soil surface; and
- the potential for excessive soil compaction.

The Contractor shall implement mitigative measures as directed by Keystone in order to minimize rutting and soil compaction in excessively wet soil conditions which may include:

- restricting work to areas on the spread where conditions allow;
- using low ground weight, wide-track equipment, or other low impact construction techniques;
- limiting work to areas that have adequately drained soils or have a cover of vegetation ,such as sod, crops or crop residues, sufficient to prevent mixing of topsoil with subsoil layers or damage to drain tiles; and

- installing geotextile material or construction mats in problem areas.

"Stop work" authority will be designated to the chief inspector but will be implemented when recommended by the Environmental Inspector.

2.19 Cultural Resources

Keystone intends to avoid cultural resources to the extent practicable by rerouting the pipeline corridor and related appurtenances, avoiding construction activities on properties listed in or eligible for listing in the National Register of Historic Places (NRHP), as well as boring or using HDD through culturally sterile soils.

The Contractor shall implement the measures outlined in any unanticipated discovery plan or any Programmatic Agreement that is adopted to minimize disturbance to cultural sites and shall take immediate action as outlined in the Programmatic Agreement if any unanticipated cultural discovery is encountered during construction.

The preferred treatment of any historical property or culturally significant site is avoidance. Where required, Keystone will monitor the construction spread using a cultural resource monitor working under the direction of a professional who meets the standards of the *Secretary of the Interior's Historic Preservation Professional Qualification Standards* (48 FR 44716, September 29, 1983).

Prior to commencing construction, Keystone also will provide an appropriate level of training to all construction personnel so that the requirements of any unanticipated discovery plan or Programmatic Agreement are understood and unanticipated discoveries quickly identified.

In the event an unanticipated cultural discovery is made, the Contractor will immediately halt all construction activities within a 100-foot radius, including traffic; notify the Keystone Environmental Inspector; and implement interim measures to protect the discovery from looting or vandalism. The appropriate federal, state, local, or tribal authorities will be notified of discovery within 48 hours of the initial find. Construction will not proceed within the 100-foot radius of discovery site until all mitigation measures defined in the Programmatic Agreement are concluded and Keystone receives approval from the appropriate agencies that construction may resume. No work or activity within the 100-foot buffer area may take place until approvals are communicated at the spread level by the lead Environmental Inspector.

3.0 SPILL PREVENTION AND CONTAINMENT

Spill prevention and containment applies to the use and management of hazardous materials on the construction right-of-way and all ancillary areas during construction. This includes the refueling or servicing of all equipment with diesel fuel, gasoline, lubricating oils, grease, and hydraulic and other fluids during normal upland applications and special applications within 100 feet of perennial streams or wetlands.

Keystone will prepare a project-specific Spill Prevention Containment and Countermeasure (SPCC) Plan. The Contractor shall provide additional information to complete the SPCC Plan for each construction spread, and shall provide site-specific data that meets the requirements of 40 CFR Part 112 for every location used for staging fuel or oil storage tanks and for every location used for bulk fuel or oil transfer. Each SPCC Plan will be prepared prior to introducing the subject fuel, oil, or hazardous material to the subject location.

3.1 Spill Prevention

3.1.1 Staging Areas

Staging areas (including Contractor yards and pipe stockpile sites) shall be set up for each construction spread. Bulk fuel and storage tanks will be placed only at Contractor yards. No bulk fuel and storage tanks will be placed in the construction ROW. Hazardous materials at staging areas shall be stored in compliance with federal and state laws. The following spill prevention measures shall be implemented by the Contractor:

- Contractor fuel trucks shall be loaded at existing bulk fuel dealerships or from bulk tanks set up for that purpose at the staging area. In the former case, the bulk dealer is responsible for preventing and controlling spills.
- The Environmental Inspector shall inspect the tank site for compliance with the 100-foot setback requirement and approve the tank site prior to installing bulk fuel or storage tanks on the construction yard.
- Fuels and lubricants shall be stored only at designated staging areas. Storage of fuel and lubricants in the staging area shall be at least 100 feet away from the water's edge. Refueling and lubrication of equipment shall be restricted to upland areas at least 100 feet away from streams and wetlands.
- Contractors shall be required to perform all routine equipment maintenance at the staging area and recover and dispose of wastes in an appropriate manner.
- Fixed fuel dispensing locations will be provided with secondary containment to capture fuel from leaks, drips, and overfills.
- Temporary liners, berms, or dikes (secondary containment) shall be constructed around the aboveground bulk tanks, providing 110 percent containment volume of the largest storage tank or trailer within the containment structure, so that potential spill materials shall be contained and collected in specified areas. Tanks shall not be placed in areas subject to periodic flooding or washout.
- Drivers of tank trucks are responsible for safety and spill prevention during tank truck unloading. Procedures for loading and unloading tank trucks shall meet the minimum requirements established by the Department of Transportation.

- Drivers of tank trucks are responsible for setting brakes and chocking wheels prior to off loading. Warning signs requiring drivers to set brakes and chock wheels shall be displayed at all tanks. Proper grounding of equipment shall be undertaken during fuel transfer operations. Drivers shall observe and control the fueling operations at all times to prevent overfilling the temporary tank.
- Prior to departure of any tank truck, all vehicle outlets shall be examined closely by the driver for leakage, tightened, adjusted or replaced to prevent leakage while in transit.
- A supply of sorbent and barrier materials sufficient to allow the rapid containment and recovery of spills shall be maintained at each construction staging area. Sorbent and barrier materials shall also be utilized to contain runoff from contaminated areas.
- Shovels and drums shall be kept at each of the individual staging areas. In the event that small quantities of soil become contaminated, shovels shall be utilized to collect the soil and the material shall be stored in 55-gallon drums. Large quantities of contaminated soil may be bio-remediated on site or disposed in an approved landfill, subject to government approval, or collected utilizing heavy equipment, and stored in drums or other suitable containers prior to disposal. Should contamination occur adjacent to staging areas as a result of runoff, shovels or heavy equipment shall be utilized to collect the contaminated material. Contaminated soil shall be disposed of in accordance with state and federal regulations.
- Temporary aboveground tanks shall be subject to visual inspection on a monthly basis and when the tank is refilled. Inspection records shall be maintained. Operators shall routinely keep tanks under close surveillance and potential leaks or spills shall be quickly detected.
- Visible fuel leaks shall be reported to the Contractors' designated representative and corrected as soon as conditions warrant. Keystone's designated representative shall be informed.
- Drain valves on temporary tanks shall be locked to prevent accidental or unauthorized discharges from the tank.
- Oil and other hazardous materials stored in 350-gallon totes, 55-gallon drums, 5-gallon pails, smaller retail-size containers or other portable containers will be staged or stored in areas with a secondary temporary containment structure. Secondary containment structures may consist of temporary earthen berms with a chemical resistant liner, or a portable containment system constructed of steel, PVC, or other suitable material. The secondary containment structure will be capable of containing 110 percent of the volume of material stored in these areas.

Keystone may allow modification of the above specifications as necessary to accommodate specific situations or procedures. Any modifications must comply with all applicable regulations and permits.

3.1.2 Construction Right-of-Way

The Contractor will ensure that all equipment is free of leaks prior to use on the Project and prior to entering or working in or near waterbodies or wetlands. Throughout construction, the Contractor will conduct regular maintenance and inspections of the equipment to reduce the potential for spills or leaks.

Rubber-tired vehicles (pickup trucks, buses) normally shall refuel at the construction staging areas or commercial gas stations. Tracked machinery (backhoes, bulldozers) shall be refueled and lubricated on the construction right-of-way. Equipment maintenance shall be conducted in staging areas when practical. When impractical, repairs to equipment can be made on the construction right-of-way when approved by Keystone's representative.

Each fuel truck that transports and dispenses fuel to construction equipment or Project vehicles along the construction ROW or within equipment staging and material areas shall carry an oil spill response kit and spill response equipment onboard at all times. In the event that response materials are depleted through use or their condition is deteriorated through age, the materials will be replenished prior to placing the fueling vehicle back into service.

The following preventive measures apply to refueling and lubricating activities on the construction right-of-way:

- Construction activities shall be conducted to allow for prompt and effective cleanup of spills of fuel and other hazardous materials. Each construction crew, including cleanup crews shall have on hand sufficient tools and material to stop leaks and supplies of absorbent and barrier materials to allow rapid containment and recovery of spilled materials. Crew members must know and follow the procedure for reporting spills.
- Refueling and lubricating of construction equipment shall be restricted to upland areas at least 100 feet away from streams and wetlands. Where this is not possible (e.g., trench dewatering pumps), the equipment shall be fueled by designated personnel with special training in refueling, spill containment, and cleanup. The Environmental Inspector shall ensure that signs are installed identifying restricted areas.
- No fuel, oil or hazardous material storage, staging, or transfer other than refueling will occur within 100 feet of any storm drain, drop inlet, or high consequence area (HCA).
- Spent oils, lubricants, filters, etc. shall be collected and disposed of at an approved location in accordance with state and federal regulations.
- Equipment shall not be washed in streams.
- Stationary equipment will be placed within a secondary containment if it will be operated or require refueling within 100 feet of a wetland or waterbody boundary.

Keystone may allow modification of the above specifications as necessary to accommodate specific situations or procedures. Any modifications must comply with all applicable regulations and permits.

3.2 Contingency Plans

The Contractor shall develop emergency response procedures for all incidents (e.g., spills, leaks, fires) involving hazardous materials which could pose a threat to human health or the environment. The procedures shall address activities in all work areas, as well as during transport to and from the construction right-of-way and to any disposal or recycling facility.

3.3 Equipment

The Contractor shall retain emergency response equipment in all areas where hazardous materials are handled or stored. This equipment shall be readily available to respond to a hazardous material emergency. Such equipment shall include, but not be limited to, the following:

- first aid supplies;
- phone or communications radio;
- protective clothing (Tyvek suit, gloves, goggles, boots);
- hand-held fire equipment;
- absorbent material and storage containers;
- non-sparking bung wrench and shovel; and
- brooms and dust pan.

Hazardous material emergency equipment shall be carried in all mechanic and supervisor vehicles. This equipment shall include, at a minimum:

- first aid supplies;
- phone or communications radio;
- 2 sets of protective clothing (Tyvek suit, gloves, goggles, boots);
- 1 non-sparking shovel;
- 6 plastic garbage bags (20 gallon);
- 10 absorbent socks and spill pads;
- Hand-held fire extinguisher;
- barrier tape; and
- 2 orange reflector cones.

Fuel and service trucks shall carry a minimum of 20 pounds of suitable commercial sorbent material.

The Contractor shall inspect emergency equipment weekly, and service and maintain equipment regularly. Records shall be kept of all inspections and services.

3.4 Emergency Notification

Emergency notification procedures between the Contractor and Keystone shall be established in the planning stages of construction. A Keystone representative shall be identified to serve as contact in the event of a spill during construction activities. In the event of a spill meeting government reporting criteria, the Contractor immediately shall notify the Keystone representative who, in turn, shall notify the appropriate regulatory agencies.

Any material released into water that creates a sheen must be reported immediately to Keystone. The Contractor is required to notify Keystone immediately if there is any spill of oil, oil products, or hazardous materials that reaches a wetland or waterbody. Incidents on public highways shall be reported to Keystone and the appropriate agencies by Keystone.

If a spill occurs on navigable waters of the United States, Keystone shall notify the National Response Center (NRC) at 1-800-424-8802. For spills that occur on public lands, into surface waters, or into sensitive areas, the appropriate governmental agency's district office also shall be notified.

3.5 Spill Containment and Countermeasures

In the event of a spill of hazardous material, Contractor personnel shall:

- notify the appointed Keystone representative;
- identify the product hazards related to the spilled material and implement appropriate safety procedures, based on the nature of the hazard;
- control danger to the public and personnel at the site;
- implement spill contingency plans and mobilize appropriate resources and manpower;
- isolate or shutdown the source of the spill;
- block manholes or culverts to limit spill travel;
- initiate containment procedures to limit the spill to as small an area as possible to prevent damage to property or areas of environment concern (e.g., watercourses); and
- commence recovery of the spill and cleanup operations.

When notified of a spill, the Keystone representative shall immediately ensure that:

- Action is taken to control danger to the public and personnel at the site.
- Spill contingency plans are implemented and necessary equipment and manpower are mobilized.

- Measures are taken to isolate or shutdown the source of the spill.
- All resources necessary to contain, recover and clean up the spill are available.
- Any resources requested by the Contractor from Keystone are provided.
- The appropriate agencies are notified. For spills which occur on public lands, into surface waters or into sensitive areas, the appropriate federal or state managing office shall also be notified and involved in the incident.

For a land spill, berms shall be constructed with available equipment to physically contain the spill. Personnel entry and travel on contaminated soils shall be minimized. Sorbent materials shall be applied or, if necessary, heavily contaminated soils shall be removed to an approved facility. Contaminated sorbent materials and vegetation shall also be disposed of at an approved facility.

For a spill threatening a waterbody, berms or trenches shall be constructed to contain the spill prior to entry into the waterbody. Deployment of booms, skimmers, and sorbent materials shall be necessary if the spill reaches the water. The spilled product shall be recovered and the contaminated area shall be cleaned up in consultation with spill response specialists and appropriate government agencies.

4.0 UPLANDS (AGRICULTURAL, FOREST, PASTURE, RANGE AND GRASS LANDS)

4.1 Interference with Irrigation Systems

If existing irrigation systems (flood irrigation, ditch irrigation, pivot, wheel, or other type of spray irrigation systems), irrigation ditches, or sheet flow irrigation shall be impacted by the construction of the pipeline, the following mitigative measures shall be implemented unless otherwise approved or directed by Keystone:

- If it is feasible and mutually acceptable to Keystone and the landowner or landowner's designate, temporary measures shall be implemented to allow an irrigation system to continue to operate across land on which the pipeline is being constructed.
- If the pipeline or temporary work areas intersect an operational (or soon to be operational) pivot or other spray irrigation system, Keystone shall establish with the landowner or landowner's designate an acceptable amount of time the irrigation system may be out of service. If an irrigation system interruption results in crop damages, either on the pipeline construction right-of-way or off the construction right-of-way, the landowner shall be compensated reasonably for all such crop damages.
- If the pipeline or temporary work areas intersect an operational sheet flow irrigation system, Keystone shall establish with the landowner or landowner's designate an acceptable amount of time the irrigation system may be out of service. If an irrigation system interruption results in crop

damages, either on the pipeline construction right-of-way or off the construction right-of-way, the landowner shall be compensated reasonably for all such crop damages.

- Irrigation ditches that are active at the time of construction shall not be stopped or obstructed except for the length of time to install the pipeline beneath the ditch (typically, one day or less) unless otherwise approved or directed by Keystone.

4.2 Clearing

The objective of clearing is to provide a clear and unobstructed right-of-way for safe and efficient construction of the pipeline. The following mitigable measures shall be implemented:

- Construction traffic shall be restricted to the construction right-of-way, existing public roads, and approved private roads.
- Construction right-of-way boundaries including pre-approved temporary workspace shall be clearly staked to prevent disturbance to unauthorized areas.
- If crops are present, they shall be mowed or disced to ground level unless an agreement is made for the landowner to remove.
- Burning is prohibited on cultivated land.
- Construction right-of-way at timber shelterbelts in agricultural areas shall be reduced to the minimum necessary to construct the pipeline.

4.3 Topsoil Removal and Storage

The objective of topsoil handling is to maintain topsoil capability by conserving topsoil for future replacement and reclamation and to minimize the degradation of topsoil from compaction, rutting, loss of organic matter, or soil mixing so that successful reclamation of the right-of-way can occur. The following mitigative measures shall be implemented during topsoil removal and storage unless otherwise approved or directed by Keystone based on site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- In areas designated for topsoil segregation, the actual depth of the topsoil, to a maximum depth of 12 inches, will be stripped from:
    - The area excavated above the pipeline; or
    - The area above the pipeline plus the spoil storage; or
    - The area above the pipeline plus the working side; or
    - Entire ROW

  as required by applicable permit agreements with the landowner or as dictated by site-specific conditions.

- Stripped topsoil is to be stockpiled in a windrow along the edge of the right-of-way. The Contractor shall perform work in a manner to minimize the potential for subsoil and topsoil to be mixed.
- Under no circumstances shall the Contractor use topsoil to fill a low area.
- If required due to excessively windy conditions, topsoil piles shall be tackified using either water or a suitable tackifier (liquid mulch binder).
- Gaps in the rows of topsoil will be left in order to allow drainage and prevent ponding of water adjacent to or on the right-of-way.
- Topsoil shall not be utilized to construct ramps at road or waterbody crossings.
- In areas with defined saline or sodic soil concerns, a triple-ditch method will be used to segregate problem soils as indicated in Detail 67 and 67A.
- If frozen topsoil conditions are encountered during winter construction, specialized construction equipment (i.e. ripping, frozen topsoil cutter, road reclaimer, etc) may be required to adequately segregate and conserve topsoil resources.

4.4 Grading

The objective of grading is to develop a right-of-way that allows the safe passage of equipment and meets the bending limitations of the pipe. The following mitigative measures shall be implemented during grading unless otherwise approved or directed by Keystone based on site-specific conditions or circumstances. However, all work shall be conducted in accordance with applicable permits.

- All grading shall be undertaken with the understanding that original contours and drainage patterns shall be re-established to the extent practicable..
- Agricultural areas that have terraces shall be surveyed to establish pre-construction contours to be utilized for restoration of the terraces after construction.
- On steep slopes, or wherever erosion potential is high, temporary erosion control measures shall be implemented.
- Bar ditches adjacent to existing roadways to be crossed during construction shall be adequately ramped with grade or ditch spoil to prevent damage to the road shoulder and ditch.
- Where the construction surface remains inadequate to support equipment travel, timber mats, timber riprap, or other method shall be used to stabilize surface conditions.

The Contractor shall limit the interruption of the surface drain network in the vicinity of the right-of-way using the appropriate methods:

- providing gaps in the rows of subsoil and topsoil in order to prevent any accumulation of water on the land;

- preventing obstructions in furrows, furrow drains, and ditches;
- installing flumes and ramps in furrows, furrow drains, and ditches to facilitate water flow across the construction right-of-way and allow for construction equipment traffic; and
- installing flumes over the trench for any watercourse where flow is continuous during construction.

4.5 Temporary Erosion and Sediment Control

4.5.1 General

Temporary erosion and sediment control measures shall be installed immediately after initial disturbance of the soil, maintained throughout construction (on a daily basis), and reinstalled as necessary until replaced by permanent erosion control structures or restoration of the construction right-of-way is complete.

Specifications and configurations for erosion and sediment control measures may be modified by Keystone as necessary to suit actual site conditions. However, all work shall be conducted in accordance with applicable permits.

The Contractor shall inspect all temporary erosion control measures at least daily in areas of active construction or equipment operation, weekly in areas with no construction or equipment operation, and within 24 hours of each significant rainfall event of 0.5 inches or greater. The Contractor shall repair all ineffective temporary erosion control measures as expediently as practicable.

4.5.2 Sediment Barriers

Sediment barriers shall be constructed of silt fence, staked hay or straw bales, compacted earth (e.g., drivable berms across travel lanes), sand bags, or other appropriate materials.

The Contractor shall install sediment barriers in accordance with Details 1 and 2 or as otherwise approved or directed by Keystone. The Contractor is responsible for properly installing, maintaining, and replacing temporary and permanent erosion controls throughout construction and cleanup. In wetland or riparian zones, the Contractor will install sediment control structures along the construction right-of-way edges prior to vegetation removal where practicable. The aforementioned sediment barriers may be used interchangeably or together depending on site-specific conditions. In most cases, silt fence shall be utilized where longer sediment barriers are required.

Sediment barriers shall be installed below disturbed areas where there is hazard of offsite sedimentation. These areas include:

- the base of slopes adjacent to road crossings;

- the edge of the construction right-of-way adjacent to and upgradient of a roadway, flowing stream, spring, wetland, or impoundment;
- trench or test water discharge locations where required;
- where waterbodies or wetlands are adjacent to the construction right-of-way; (the Contractor shall install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil and sediment within the construction right-of-way)
- across the entire construction right-of-way at flowing waterbody crossings;
- right-of-way immediately upslope of the wetland boundary at all standard (saturated or standing water) wetland crossings as necessary to prevent sediment flow into the wetland; (Sediment control barriers are not required at “dry” wetlands.)
- along the edge of the construction right-of-way within standard (saturated or standing water) wetland boundaries as necessary to contain spoil and sediment within the construction right-of-way. Sediment control barriers are not required at “dry” wetlands (Detail 8).

Sediment barriers placed at the toe of a slope shall be set a sufficient distance from the toe of the slope, if possible, in order to increase ponding volume.

Sediment control barriers shall be placed so as not to hinder construction operations. If silt fence or straw bale sediment barriers (in lieu of drivable berms) are placed across the entire construction right-of-way at waterbodies, wetlands, or upslope of roads, a provision shall be made for temporary traffic flow through a gap for vehicles and equipment to pass within the structure. Immediately following each day’s shutdown of construction activities, a row of straw bales or a section of silt fence shall be placed across the up gradient side of the gap with sufficient overlap at each end of the barrier gap to eliminate sediment bypass flow, followed by bales tightly fitted to fill the gap. Following completion of the equipment crossing, the gap shall be closed using silt fence or straw bale sediment barrier.

The Contractor shall maintain straw bale and silt fence sediment barriers by removing collected sediment and replacing damaged bales. Sediment shall be removed and placed where it shall not reenter the barrier when sediment loading is greater than 40 percent or if directed by Keystone. If straw bale filters cannot be cleaned out due to access problems, the Contractor shall place a new row of sediment barriers upslope.

The Contractor shall use mulch and straw bales that are free of noxious weeds. Mulch or straw bales that contain evidence of noxious weeds or other undesirable species shall be rejected by the Contractor.

The Contractor shall remove sediment barriers, except those needed for permanent erosion and sediment control, during cleanup of the construction right-of-way.

4.5.3 Trench Plugs

The Contractor shall use trench plugs at waterbody and wetland crossings at the direction of the Environmental Inspector to prevent diversion of water into upland portions of the pipeline trench and to keep any accumulated trench water out of the waterbody. Trench plugs shall be of sufficient size to withstand upslope water pressure.

4.5.4 Temporary Slope Breakers (Water Bars)

The Contractor shall install temporary slope breakers on slopes greater than 5% on all disturbed lands at the following recommended spacing:

Slope (%)	Spacing (feet)
5 - 15	300
>15 - 30	200
>30	100

The gradient of each slope breaker shall be 2 to 4 percent.

If so directed by the landowner, the Contractor may not install temporary slope breakers (water bars) in cultivated land.

Temporary slope breakers shall be constructed of soil, silt fence, staked straw bales, sand bags, or similar materials authorized by Keystone.

The Contractor shall direct the outfall of each temporary slope breaker to a stable, well-vegetated area or construct an energy-dissipating device at the end of the slope breaker and off the construction right-of-way as permitted in the landowner agreement as shown in Detail 3. The outfall of each temporary slope breaker shall be installed to prevent sediment discharge into wetlands, waterbodies, or other sensitive resources.

Specifications and configurations for temporary slope breakers may be modified by Keystone as necessary to suit actual site conditions. However, all work shall be conducted in accordance with applicable permits.

4.5.5 Drainage Channels or Ditches

Drainage channels or ditches shall be used on a limited basis to provide drainage along the construction right-of-way and toe of cut slopes as well as to direct surface runoff across the construction right-of-way or away from disturbances and onto natural undisturbed ground. Channels or ditches shall be constructed by the Contractor during grading operations. Where there is inadequate vegetation at the channel or ditch outlet,

sediment barriers, check berms, or other appropriate measures shall be used to control erosion.

4.5.6 Temporary Mulching and Cover Crops

Unless otherwise directed by Keystone, the Contractor shall apply temporary seed and/or mulch on disturbed construction work areas that have been inactive for one month or are expected to be inactive for a month or more. The Contractor shall not apply temporary mulch in cultivated areas unless specifically requested by the landowner or in areas particularly prone to erosion. The Contractor shall not apply mulch within wetland boundaries.

Temporary mulch of straw or equivalent applied on slopes shall be spread uniformly to cover at least 75 percent of the ground surface at an approximate rate of 2 tons per acre of straw or its equivalent. Mulch application on slopes within 100 feet of waterbodies and wetlands shall be increased to an approximate rate of 3 tons per acre.

All seed that is used as a temporary cover crop will be approved and/or provided by Keystone.

4.5.7 Tackifier

When wetting topsoil piles with water does not prevent wind erosion, the Contractor shall temporarily suspend topsoil handling operations and apply a tackifier to topsoil stockpiles at the rate recommended by the manufacturer. The type of Tackifier will be approved by Keystone.

Should construction traffic, cattle grazing, heavy rains, or other related construction activity disturb the tackified topsoil piles and create a potential for wind erosion, additional tackifier shall be applied by the Contractor.

4.6 Stringing

The objective of stringing is to place the line pipe along the construction right-of-way for bending and welding in an expedient and efficient manner.

The Contractor shall utilize one or more of the following mitigative measures as applicable and when necessary to reduce compaction on the working side of the right-of-way or as directed by Keystone. However, all work shall be conducted in accordance with applicable permits.

- prohibiting access by certain vehicles;
- using only machinery possessing low ground pressure (tracks or extra-wide tires);
- limiting access and thus minimizing the frequency of all vehicle traffic;
- digging ditches to improve surface drainage;

- using timber riprap, matting, or geotextile fabric overlain with soil; and
- stopping construction for a period of time.

4.7 Trenching

The objective of trenching is to provide a ditch of sufficient depth and width with a bottom to continuously support the pipeline. During trenching operations, the following mitigative measures shall be implemented unless otherwise approved or directed by Keystone based on site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- Where required, subsoil shall be segregated from topsoil in separate, distinct rows with a separation that shall limit any admixing of topsoil and subsoil during handling.
- Triple ditch soil handling will be completed at sites identified by Keystone according to Detail 67 and 67A to prevent soil degradation.
- Gaps must be left in the spoil piles that coincide with breaks in the strung pipe to facilitate natural drainage patterns and to allow the passage of livestock or wildlife.
- Trenching operations shall be followed as closely as practicable by lower in and backfill operations to minimize the length of time the ditch is open.
- Construction debris (e.g., welding debris) and other garbage shall not be deposited in the ditch.
- If trenching, pipe installation and backfill operations take place during frozen soil conditions, final clean-`up (including additional trench compaction, subsoil feathering, final contouring and topsoil replacement) will be delayed until the subsoil and topsoil thaw completely the following spring/summer. A pronounced subsoil berm will be left over the trench line until final clean-up takes place to account for settlement of thawing backfill. Gaps will be left in the berm to maintain cross-ROW drainage

The Contractor shall prepare a blasting plan that is applicable to any locations where blasting will be necessary adjacent to existing high pressure pipelines, overhead or underground utilities, farm operations, or public crossings. The Contractor and its blasting supervisor shall be thoroughly familiar with and comply with the rules and regulations of Occupational Safety and Health Administration (OSHA) and all federal, state, county and local regulations governing blasting operations. Keystone will file the blasting plan with applicable state or local jurisdictions, where required. Excavation and blasting along the ROW may uncover paleontological resources of scientific value. Keystone will consult with the appropriate regulatory agencies in each state on the applicability and requirements for Paleontological Resource Protection Plans. Keystone will prepare and file plans addressing vertebrate fossils with any respective states, as required.

Should blasting be necessary for removal of rock, the following mitigative measures may be implemented:

- The Contractor shall use non-electric initiation systems for all blasting operations. If required by the blasting plan, blasting will be monitored for vibration levels and peak particle velocity. This work shall be performed by a third-party vibration monitoring consultant hired by and reporting to the Constructor Representative. The Contractor shall arrange for detonations to be carried out in cooperation with this consultant.
- Prior to using explosives, the Contractor shall advise residents of the immediate area, in order to prevent any risk of accidents or undue disturbances.
- No blasting shall be done without approval of the Constructor Representative. Prior to any detonation of explosives in the vicinity of a loaded line, dwelling, structure, overhead or underground utility, farm operation, or public crossings, a minimum of 48 hour's notice shall be given to the Constructor Representative, in order that the appropriate people can be notified and the upstream and downstream mainline valves can be staffed.
- The Contractor shall obtain all necessary permits and shall comply with all legal requirements in connection with the use, storage, and transportation of explosives.
- Blasting mats or subsoil may be piled over the trench line to prevent rock from being blown outside the construction right-of-way.
- Each blasting location shall be cleared and cleaned up before and after all blasting operations.
- Blasting shall be carried out during regular, daylight working hours.
- The Contractor shall at all times protect his workers and the public from any injury or harm that might arise from drilling dust and the use of explosives.
- Only workers thoroughly experienced in handling explosives shall be permitted to supervise, handle, haul, load or shoot explosives. In those jurisdictions where the licensing of blasters is mandatory, the Contractor shall provide the Constructor Representative with proof of the required certification for every person so required.
- The drilling pattern shall be set in a manner to achieve smaller rock fragmentation (maximum 1 foot in diameter) in order to use as much as possible of the blasted rock as backfill material after the pipe has been padded in accordance with the specifications.
- Blasting testing of surface-water resources and water wells within 150 feet of the centerline will be performed in compliance with all applicable permits.

4.7.1 Trench Dewatering/Well Points

The Contractor shall make all reasonable efforts to discharge trench water in a manner that avoids damage to adjacent agricultural land, crops, and pasture. Damage includes, but is not limited to, the inundation of crops for more than 24 hours, deposition of sediment in ditches, and the deposition of gravel in fields or pastures.

If trench dewatering is necessary in an area where salt damage to adjacent crops is evident, the Environmental Inspector shall conduct a field conductivity test on the trench water before it is discharged. If the conductivity of the trench water is determined to potentially affect soil quality, it shall not be discharged to areas where salt damage to crops is evident, but shall be directed as feasible so that water flows over a well vegetated, non-cropland area or through an energy dissipater and sediment barrier.

When pumping water from the trench for any reason, the Contractor shall ensure that adequate pumping capacity and sufficient hose is available to permit dewatering as follows:

- No heavily silt-laden trench water shall be allowed to enter a waterbody or wetland directly but shall instead be diverted through a well vegetated area, a geotextile filter bag, or a permeable berm (straw bale or Keystone approved equivalent).
- Trench water shall not be disposed of in a manner which could damage crops or interfere with the functioning of underground drainage systems.

The Contractor shall screen the intake hose and keep the hose either one foot off the bottom of the trench or in a container to minimize entrainment of sediment.

4.8 Welding, Field Joint Coating, and Lowering In

The objectives of welding, field joint coating, and lowering in are to provide continuous segments of pipeline, to provide corrosion protection to the weld areas of the pipeline, and to place the pipeline in the center of the trench, without stress, at the required depth of cover. The following mitigative measures shall be followed during pipe welding, field joint coating, and lowering in, unless otherwise specified by Keystone in response to site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- Shavings produced during beveling of the line pipe are to be removed immediately following this operation to ensure that livestock and wildlife do not ingest this material. When welding operations create a continuous line of pipe that may be left in the right-of-way for an extended period of time due to construction or weather constraints, a gap in the welded pipe shall be provided to allow for access at farm road crossings and for passage of livestock and wildlife.
- Prior to the application of epoxy powder, urethane epoxy, or other approved pipe coatings, a tarp shall be placed underneath the pipe in wetlands to collect any overspray of epoxy powder and liquid drippings. Excess powder, liquid, or other hazardous materials (e.g. brushes, rollers, gloves) shall be continuously collected and removed from the construction right-of-way and disposed of in a manner appropriate for these materials.

4.9 Padding and Backfilling

The objective of padding and backfilling is to cover the pipe with material that is not detrimental to the pipeline and pipeline coating. The following mitigative measures shall be utilized during backfilling, unless otherwise approved or directed by Keystone based on site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- Excessive water accumulated in the trench shall be eliminated prior to backfilling.
- In the event it becomes necessary to pump water from open trenches, the Contractor shall pump the water and discharge it in accordance with the requirements of the Stormwater Pollution Prevention Plan (SWPPP) in order to avoid damaging adjacent areas. Detail 5 and Detail 6 provide typical examples of dewatering structures.
- If it is impossible to avoid water-related damages (including inundation of crops for more than 24 hours, deposition of sediment in ditches and other water courses, and the deposition of gravel in fields, pastures, and any water courses), Keystone shall reasonably compensate the landowners for the damage and/or shall correct the damage so as to restore the land, crops, pasture, water courses, etc. to their pre-construction condition.
- All pumping of water shall comply with existing drainage laws and local ordinances relating to such activities and provisions of the Clean Water Act.
- Prior to backfilling, all drain tile shall be permanently repaired, inspected, and the repair documented as described in Section 5.5.
- Prior to backfilling, trench breakers shall be installed on slopes where necessary to minimize the potential for water movement down the ditch and potential subsequent erosion.
- During backfill, the stockpiled subsoil shall be placed back into the trench before replacing the topsoil.
- Topsoil shall not be utilized for padding the pipe.
- Backfill shall be compacted to a minimum of 90% of pre-existing conditions where the trench line crosses tracks of wheel irrigation systems (pivots).
- To reduce the potential for ditch line subsidence, spoil shall be replaced and compacted by backhoe bucket or by the wheels or tracks of equipment traversing down the trench.
- The lesser of 4 feet or the actual depth of topsoil cover, shall not be backfilled with soil containing rocks of any greater concentration or size than existed prior to pipeline construction in the pipeline trench, bore pits, or other excavations.

4.10 Cleanup

The objective of cleanup activities shall be to prepare the right-of-way and other disturbed areas to approximate pre-activity ground contours where appropriate and to replace spoil and stockpiled material in a manner which preserves soil

capability and quality to a degree reasonably equivalent to the original or that of representative undisturbed land. The following mitigative measures shall be utilized during cleanup, unless otherwise approved or directed by Keystone based on specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- Cleanup shall occur immediately following backfilling operations when weather or seasonal conditions allow.
- All garbage and construction debris (e.g., lathing, ribbon, welding rods, pipe bevel shavings, pipe spacer ropes, end caps, pipe skids) shall be collected and disposed of at approved disposal sites.
- The right-of-way shall be re-contoured with spoil material to approximate pre-construction contours and as necessary to limit erosion and subsidence. Loading of slopes with unconsolidated spoil material shall be avoided during slope re-contouring. Topsoil shall be replaced after re-contouring of the grade with subsoil. The topsoil shall be replaced on the subsoil storage area and over the trench so that after settling occurs, the topsoil's approximate original depth and contour (with an allowance for settling) shall be achieved.
- Where topsoil has been segregated, subsoil shall not be permanently placed on top of topsoil.
- Surface drainage shall be restored and re-contoured to conform to the adjacent land drainage system.
- Erosion control structures such as permanent slope breakers and cross ditches shall be installed on steep slopes where necessary to control erosion by diverting surface run-off from the right-of-way to stable and vegetated off right-of-way areas.
- During cleanup, temporary sediment barriers such as silt fence and hay bale diversions will be removed; accumulated sediment will re-contoured with the rest of the ROW; and permanent erosion controls will be installed as necessary.
- After construction, all temporary access shall be returned to prior construction conditions unless specifically agreed with the landowner or otherwise specified by Keystone.
- Warning signs, aerial markers, and cathodic protection test leads shall be installed in locations in compliance with U.S. Federal code and in locations that shall not impair farming operations where practicable.
- All bridges, fences and culverts existing prior to construction shall be restored to meet or exceed approximate pre-construction conditions. Caution shall be utilized when re-establishing culverts to ensure that drainage is not improved to a point that would be detrimental to existing waterbodies and wetlands.
- All temporary gates installed during construction shall be replaced with permanent fence unless otherwise requested by the landowner.

4.11 Reclamation and Revegetation

The objectives of reclamation and revegetation are to return the disturbed areas to approximately pre-construction use and capability. This involves the treatment of soil as necessary to preserve approximate pre-construction capability and the stabilization of the work surface in a manner consistent with the initial land use.

The following mitigative measures will be utilized unless otherwise approved or directed by Keystone based on site specific conditions or circumstances. However, all work shall be conducted in accordance with applicable permits.

4.11.1 Relieving Compaction

Compaction will typically be relieved in subsoils that have received substantial construction traffic, as determined by Keystone, prior to replacing and respreading topsoil. Compaction will typically not be relieved in topsoils that have been left in place and that have not been driven on. Any rock that is brought to the surface during decompaction activities will be removed until the quantity, size, and distribution of rock is equivalent to that found on adjacent land as determined by the Environmental Inspector. Compaction will typically be relieved as follows:

- Compacted cropland compacted shall be ripped a minimum of 3 passes at least 18 inches deep and all pasture shall be ripped or chiseled a minimum of three passes at least 12 inches deep before replacing topsoil.
- Areas of the construction right-of-way that were stripped for topsoil salvage shall be ripped a minimum of 3 passes (in cross patterns, as practical) prior to topsoil replacement. The approximate depth of ripping shall be 18 inches (or a lesser depth if damage may occur to existing drain tile systems). After ripping, the subsoil surface shall be graded smooth and any subsoil clumps broken up (disc and harrow) in an effort to avoid topsoil mixing.
- The de-compacted construction right-of-way shall be tested by the Contractor at regular intervals for compaction in agricultural and residential areas. Tests shall be conducted on the same soil type under similar moisture conditions in undisturbed areas immediately adjacent to the right-of-way to approximate pre-construction conditions. Penetrometers or other appropriate devices shall be used to conduct tests
- Topsoil shall be replaced to pre-existing depths once ripping and discing of subsoil is complete up to a maximum of 12 inches. Topsoil compaction on cultivated fields shall be alleviated with cultivation methods by the contractor.
- If there is any dispute between the landowner and Keystone as to what areas need to be ripped or chiseled, the depth at which compacted areas should be ripped or chiseled, or the necessity or

rates of lime and fertilizer application, the appropriate NRCS shall be consulted by Keystone and the landowner.

Plowing under of organic matter including wood chips and manure, or planting of a green crop such as alfalfa to decrease soil bulk density and improve soil structure or any other measures in consultation with the Natural Resource Conservation Service (NCRS) shall be considered if mechanical relief of compaction is deemed not satisfactory.

In the first year after construction, Keystone will inspect the ROW to identify areas of erosion or settling. Subsequently, Keystone will monitor erosion and settling through aerial patrols, which are part of Keystone's Integrity Management Plan, and through landowner reporting. Landowner reporting will be facilitated through use of Keystone's toll-free telephone number, which will be made available to all landowners on the ROW. Landowner reporting also may be facilitated through contact with Keystone's field offices.

Keystone plans to minimize impacts on soil productivity that may result from construction activities, but recognizes that some short- to long-term decreases in agricultural productivity are possible. Keystone recognizes its responsibility to restore agricultural productivity on the pipeline ROW and to compensate landowners for demonstrated decreases in productivity that may result from any degradation of agricultural soils along the ROW.

4.11.2 Rock Removal

- Rocks that are exposed on the surface due to construction activity shall be removed from the right-of-way prior to and after topsoil replacement This effort will result in an equivalent quantity, size and distribution of rocks to that found on adjacent lands, as determined by the Environmental Inspectors.
- Clearing of rocks may be carried out with a mechanical rock picker or by manual means, provided that preservation of topsoil is assured. Rock removed from the right-of-way shall be hauled off the landowner's premises or disposed of on the landowner's premises at a location that is mutually acceptable to the landowner and to Keystone.

4.11.3 Soil Additives

If site-specific conditions warrant and if agreed to by the landowner, the Contractor shall apply amendments (fertilizer and soil pH modifier materials and formulations) commonly used for agricultural soils in the area and in accordance with written recommendations from the local soil conservation authority, land management agencies, or landowner. Amendments shall be incorporated into the normal plow layer as soon as possible after application.

4.11.4 Seeding

- The final seed mix shall be based on input from the local Natural Resource Conservation Service and the availability of seed at the time of reclamation. The landowner may request specific seeding requirements during easement negotiations.
- Certificates of seed analysis are required for all seed mixes to limit the introduction of noxious weeds.
- Seed not utilized within 12 months of seed testing shall be approved by Keystone prior to use. Seeding shall follow cleanup and topsoil replacement as closely as possible. Seed shall be applied to all disturbed surfaces (except cultivated fields unless requested by the landowner) as indicated on the construction drawings
- If mulch was applied prior to seeding for temporary erosion control, the Contractor shall remove and dispose of the excess mulch prior to seedbed preparation to ensure that seedbed preparation equipment and seed drills do not become plugged with excess mulch; and to support an adequate seedbed; and to ensure that seed incorporation or soil packing equipment can operate without becoming plugged with mulch.
- Identified seeding areas shall be seeded as specified by Keystone. Seeding rates shall be based on pure live seed.
- Weather conditions, construction right-of-way constraints, site access, topography and soil type shall influence the seeding method to be used (i.e., drill seeding versus broadcast seeding).
- The Contractor shall delay seeding as directed by Keystone until the soil is in the appropriate condition for seeding.
- The Contractor shall use a Truax brand or Keystone approved equivalent-type drill seeder equipped with a cultipacker designed and equipped to apply grass and grass-legume seed mixtures with mechanisms such as seed box agitators to allow even distribution of all species in each seed mix, with an adjustable metering mechanism to accurately deliver the specified seeding rate and with a mechanism such as depth bands to accurately place the seed at the specified depth.
- The Contractor shall operate drill seeders at an appropriate speed so the specified seeding rate and depth is maintained, as directed by Keystone.
- The Contractor shall calibrate drill seeders so that the specified seeding rate is planted. The row spacing on drill seeders shall not exceed 8 inches.
- The Contractor shall plant seed at depths consistent with the local or regional agricultural practices.

- Broadcast or hydro seeding, used in lieu of drilling, shall utilize NRCS-recommended seeding rates. Where seed is broadcast, the Contractor shall use a harrow, cultipacker, or other equipment immediately following broadcasting to incorporate the seed to the specified depth and to firm the seedbed.
- The Contractor shall delay broadcast seeding during high wind conditions if even distribution of seed is impeded.
- The Contractor shall hand rake all areas that are too steep or otherwise cannot be safely harrowed or cultipacked in order to incorporate the broadcast seed to the specified depth.
- Hydro seeding may be used, on a limited basis, where the slope is too steep or soil conditions do not warrant conventional seeding methods. Fertilizer, where specified, may be included in the seed, virgin wood fiber, tackifier, and water mixture. When hydro-seeding, virgin wood fiber shall be applied at the rate of approximately 3,000 pounds per acre on an air-dry weight basis as necessary to provide at least 75% ground cover. Tackifier shall consist of biodegradable, vegetable-based material and shall be applied at the rate recommended by the manufacturer. The seed, mulch, and tackifier slurry shall be applied so that it forms a uniform, mat-like covering of the ground.
- Keystone shall work with landowners to discourage intense livestock grazing of the construction right-of-way during the first growing season by utilization of temporary fencing or deferred grazing, or increased grazing rotation frequency.

4.11.5 Permanent Erosion and Sediment Control

The Contractor shall restore all existing landowner soil conservation improvements and structures disturbed by pipeline construction to the approximate pre-construction line and grade. Soil conservation improvements and structures include, but are not limited to, grassed waterways, toe walls, drop inlets, grade control works, terraces, levees, and farm ponds.

4.11.5.1 Trench Breakers

The Contractor shall install trench breakers in steep terrain where necessary to limit the potential for trench line erosion and at the base of slopes adjacent to waterbodies and wetlands.

Trench breakers shall be constructed of materials such as sand bags, sand/cement bags, bentonite bags, or other suitable materials by the Contractor (Detail 7). The Contractor shall not use topsoil in trench breakers.

4.11.5.2 Permanent Slope Breakers (Water Bars)

Permanent slope breakers (water bars) shall be constructed of soil or, in some instances, sand bags.

The Contractor shall construct permanent slope breakers on the construction right-of-way where necessary to limit erosion, except in cultivated and residential areas. Slope breakers shall divert surface runoff to adjacent stable vegetated areas or to energy-dissipating devices as shown on Detail 3. In general, permanent slope breakers should be installed immediately downslope of all trench breakers. Permanent slope breakers shall be installed as specified on the construction drawings or generally with a minimum spacing as shown on the following table:

Slope (%)	Spacing (feet)
5 - 15	300
>15 – 30	200
>30	100

The gradient (fall) for each slope breaker shall be two percent to four percent unless otherwise approved by Keystone based on site-specific conditions.

The Contractor shall construct slope breakers to divert surface flow to a stable, well-vegetated area. In the absence of a stable area, the Contractor shall construct appropriate energy-dissipating devices at the end of the slope breaker and beyond the area disturbed by construction.

4.11.5.3 Mulching

The Contractor shall apply mulch on all areas with high erosion potential and on slopes greater than 8 percent unless otherwise approved by Keystone based on site-specific conditions or circumstances. The Contractor shall spread mulch uniformly over the area to cover at least 75 percent of the ground surface at an approximate rate of 2 tons per acre of straw or its equivalent. The Environmental Inspector may reduce the application rate or forego mulching an area altogether if there is an adequate cover of rock or organic debris to protect the slope from erosion, or if annual companion crops have stabilized the soil.

Mulch application includes straw mulch, hydro mulch and tackifier or other materials as approved by Keystone.

The Contractor shall use mulch that is free of noxious weeds.

The Contractor shall apply mulch immediately following seeding. The Contractor shall not apply mulch in wetlands.

If a mulch blower is used, the majority of strands of the mulching material shall not be shredded to less than 8 inches in length to allow anchoring. The Contractor shall anchor mulch immediately after application to minimize loss by wind and water.

When anchoring (straw crimping) by mechanical means, the Contractor shall use a tool specifically designed for mulch anchoring with flat, notched disks to properly crimp the mulch to a depth of 2 to 3 inches. A regular farm disk shall not be used to crimp mulch. The crimping of mulch shall be performed across the slope of the ground, not parallel to it. In addition, in areas of steep terrain, tracked vehicles may be used as a means of crimping mulch (equipment running up and down the hill to leave crimps perpendicular to the slope), provided they leave adequate coverage of mulch.

In soils possessing high erosion potential, the Contractor may be required to make two passes with the mulch-crimping tool; passes must be as perpendicular to the others as possible.

When anchoring with liquid mulch binders (tackifiers), the Contractor shall use a biodegradable tackifier derived from a vegetable-based, organic source. The Contractor shall apply mulch binders at rates recommended by the manufacturer.

The Contractor shall limit the use of tackifiers for anchoring straw and the use of hydromulch and tackifier to areas that are too steep or rocky to safely or effectively operate mechanical mulch-anchoring tools. No asphalt-based tackifiers shall be used on the Project.

4.11.5.4 Erosion Control Matting

Erosion control matting shall be applied where shown on the construction drawings as shown on Detail 4. The Contractor shall anchor the erosion control matting with staples or other approved devices.

The Contractor shall use erosion control matting made of biodegradable, natural fiber such as straw or coir (coconut fiber).

The Contractor shall prepare the soil surface and install the erosion control matting to ensure it is stable and the matting makes uniform contact with the soil of the slope face or stream bank with no bridging of rills, gullies, or other low areas.

4.11.5.5 Riprap and Stream Bank Stabilization

Disturbed banks of streambeds and waterbodies shall be restored to their approximate original contours unless otherwise directed. Erosion protection shall be applied as specified in the construction drawings.

Most restored banks will be protected through the use of flexible channel liners installed as specified in Detail 19.

If the original stream bank is excessively steep and unstable and/or flow conditions are severe, a more stable final contour may be specified and alternate stabilization measures may be installed.

Alternate stabilization measures may consist of rock riprap, bio-stabilization, or engineered structures such as brush layering, logwalls, cribwalls, or vegetated geo-grids. See Details 20, 23, and 24.

Stream bank riprap structures shall consist of a layer of stone underlain with approved filter fabric or a gravel filter blanket. Riprap shall extend from the stabilized streambed to the top of the stream bank. Native rock shall be utilized wherever practicable.

4.11.6 Fences

Upon completion of all backfilling, cleanup, and restoration, including mulching and seeding of the construction right-of-way, permanent repairs shall be made to all fences by using either the original material or good quality new material similar to existing fences.

Historic fences shall be carefully reassembled by hand from the original material. Where the original material has deteriorated to a state that makes it unsalvageable, replacement material similar to the original shall be used if possible.

4.11.7 Farm Terraces

Keystone will work with landowners and farm service agencies to ensure restoration of farm terraces to their pre-construction function. Keystone may elect to negotiate a fair settlement with the landowner to employ a local land leveling contractor to restore the terrace.

Before any groundwork is performed in areas with farm terraces, Keystone will conduct a civil survey to document the location and contours of each terrace. Both the channel contour and the terrace berm will be surveyed within the construction right-of-way and up to 100 feet on either side of the ROW boundaries. The pre-construction survey will

provide a baseline to ensure the proper restoration of the terrace following construction.

The Contractor will maintain the pre-disturbance drainage of water along the terrace channel and will install temporary flume pipe for this purpose. As necessary, temporary erosion control measures such as water bars and sediment barriers will be installed and maintained throughout construction to reduce the potential for soil erosion along or off the construction ROW.

Following installation of the pipe, the trench will be backfilled, and the Contractor will restore the terrace contours as agreed to with the landowner.

Should the landowner agree to have a local contractor restore the terraces, the Contractor will backfill the trench and restore the terrace using typical compaction methods for pipeline construction with the understanding that the landowner's contractor will re-excavate the location and re-install the terrace utilizing land levelling equipment and special compaction methods.

Should the landowner desire the Contractor to restore the terraces, the pipeline contractor will compact the trench before the terrace berm is replaced. Following restoration of the terraces, final contours and grades will be re-surveyed and documented with survey notes. Keystone will perform post-construction monitoring and inspection with the landowner's concurrence. Should the terraces require further work, Keystone will either compensate the landowner to perform the work or arrange for a local contractor to perform the work.

4.11.8 Right-of-Way and Pipeline Markers

Upon completion of all backfilling, cleanup and restoration, including mulching and seeding of the construction right-of-way, and during the time when the Contractor is making permanent repairs to fences, the Contractor shall install pipeline markers on each side of all roads, railroads, fence lines, stream crossings, and other areas where the pipeline markers do not conflict with intended land use.

4.12 Pasture and Range Lands

The following mitigative measures shall be implemented in addition to the requirements previously stated in Sections 4.1 thru 4.11 unless otherwise approved by Keystone based on site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- Access across the right-of-way during construction shall be provided at locations requested by landowners, if practicable.
- Shavings produced during pipe bevel operations are to be removed immediately to ensure that livestock and wildlife do not ingest this material.

- Litter and garbage shall be collected and removed from the construction site at the end of the day's activities.
- Temporary gates shall be installed at fence lines for access to the construction right-of-way. These gates shall remain closed at all times. Upon completion of construction, the temporary gates shall be removed and the permanent fence replaced.
- Feeding or harassment of livestock or wildlife is prohibited.
- Construction personnel shall not be permitted to have firearms or pets on the construction right-of-way.
- All food and wastes shall be stored and secured in vehicles or appropriate facilities.
- Areas of disturbance in native range shall be seeded with a native seed mix after topsoil replacement.
- Improved pasture shall be seeded with a seed mix approved by individual landowners.

4.13 Forested Lands

Mitigation measures are required to ensure that pipeline construction activities have a minimal impact on forested lands.

Clearing, grubbing, and grading of trees, brush, and stumps shall be performed in accordance with the following mitigative measures in addition to the requirements previously stated in Sections 4.1 thru 4.11 unless otherwise approved or directed by Keystone based on site-specific conditions or circumstances. Keystone will address mitigation, reclamation and remediation measures with individual landowners and comply with any applicable state requirements. These measures include non-vegetative remediation to reverse impacts on windbreaks, shelterbelts, and living snow fences. Where the pipeline follows an existing ROW in forested areas, Keystone attempted to route the pipeline as close as practical to the existing ROW. All work shall be conducted in accordance with applicable permits.

- Prior to the start of clearing activity, right-of-way boundaries, including pre-approved temporary workspaces, shall be clearly staked to prevent disturbance of unauthorized areas.
- If trees are to be removed from the construction right-of-way, Keystone shall consult with the landowner or landowner's designate to see if there are trees of commercial or other value to the landowner. Timber shall be salvaged as per landowner request.
- If there are trees of commercial or other value to the landowner, Keystone shall allow the landowner the right to retain ownership of the trees with the disposition of the trees to be negotiated prior to the commencement of land clearing and included in the easement agreement.
- If not performed by the landowner, the construction right-of-way Contractor may salvage all marketable timber from designated areas.

- Tree stumps shall be grubbed to a maximum of 5 feet on either side of the trench line and where necessary for grading a level surface for pipeline construction equipment to operate safely.
- Keystone shall follow the landowner's or landowner designee's desires as stated in the easement agreement regarding the disposal of trees, brush, and stumps of no value to the landowner by burning, burial, etc., or complete removal from any affected property.
- Timber salvage operations shall use cut-off-type saw equipment. Felling shall be undertaken in a manner that minimizes butt shatter, breakage, and off ROW disturbance. Skidders or alternate equipment shall be used to transport salvaged logs to stacking sites.
- Trees shall be felled to fall toward the center line of the right-of-way to avoid breaking trees and branches off ROW. Leaners (felled trees that inadvertently fall into adjacent undisturbed vegetation) shall be salvaged.
- Trees and slash falling outside the right-of-way shall be recovered and disposed..
- Salvaged logs shall be limbed and topped before removal from the construction right-of-way. Log decks (if required) shall be oriented to best facilitate loading by picker trucks and be located adjacent to the working side of the right-of-way, where possible.
- The Contractor shall not be allowed to dispose of woody debris in wooded areas along the pipeline right-of-way.
- Pruning of branches hanging over the right-of-way shall be done only when necessary for construction. Any branch that is broken or seriously damaged should be cut off near its fork and the collar of the branch preserved.
- All tree wastes, stumps, tree crowns, brushes, branches, and other forest debris shall be either burned, chipped (using a mobile chipper), or removed from the right-of-way according to Keystone instructions contained in the specific mitigation measures. Burial of this waste material on the site by the Contractor shall require the landowner’s authorization. Chips must not be spread over cultivated land. However, they may be spread and incorporated with mineral soil over the forest floor at a density that shall not prevent revegetation of grass.
- Stump removal and brush clearing shall be done with bulldozers equipped with brush rakes to preserve organic matter.
- Decking sites shall be established: (1) approximately 2000 feet apart in timbered areas; (2) on sites located on approved temporary workspace in existing cleared areas; (3) in non-merchantable stands of timber; or (4) if no other options are available, in merchantable timber stands. Deck sites shall be appropriately sized to accommodate the loading equipment.
- If the landowner does not want the timber, the Contractor shall remove decked timber from the construction right-of-way and transport it to a designated all-weather access point or mill

4.14 Residential and Commercial/Industrial Areas

4.14.1 Residential and Commercial Areas

The principal measures that shall be used to mitigate impacts on existing residential and commercial areas include the following unless otherwise directed or approved by Keystone based on site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- notifying landowners prior to construction;
- posting warning signs as appropriate;
- reducing the width of construction right-of-way, if practicable, by eliminating the construction equipment passing lane, reducing the size of work crews, or utilizing the “stove pipe” or “drag section” construction techniques;
- removing fences, sheds, and other improvements as necessary for protection from construction activities;
- to the extent possible, preserving mature trees and landscaping while ensuring the safe operation of construction equipment;
- fencing the edge of the construction work area that is within 25 feet to a residence for a distance of 100 feet on either side of the residence to ensure that construction equipment and materials, including the spoil pile, remain within the construction work area;
- limiting the hours during which operations with high-decibel noise levels (i.e., drilling and boring) can be conducted;
- limiting dust impact through prearranged work hours and by utilizing dust minimization techniques;
- ensuring that construction proceeds quickly through such areas, thus minimizing exposure to nuisance effects such as noise and dust;
- maintaining access and traffic flow during construction activities, particularly for emergency vehicles;
- cleaning up construction trash and debris daily;
- fencing or plating open ditches during non-construction activities;
- if the pipeline centerline is within 25 feet of a residence, ensuring that the trench is not excavated until the pipe is ready for installation and that the trench shall be backfilled immediately after pipe installation; and
- immediately after backfilling the trench, restoring all lawn areas, shrubs, specialized landscaping, fences, and other structures within the construction work area to its pre-construction appearance or the requirements of the landowner. Restoration work shall be done by personnel familiar with local horticultural and turf establishment practices.
- to the extent possible, preserving mature trees and landscaping while ensuring the safe operation of construction equipment;

4.14.2 Site-Specific Plans

For any residence or commercial/industrial building closer than 25 feet to the construction work area, Keystone shall prepare a site-specific construction plan. The plan shall include:

- a description of construction techniques to be used;
- a dimensioned site plan that shows, at a minimum:
  - the location of the residence or commercial/industrial area in relation to the new pipeline;
  - the edge of the construction work area;
  - the edge of the new permanent construction right-of-way; and
  - other nearby topographical obstacles including landscaping, trees, structures, roads, parking areas, ditches, and streams; and
- a description of how Keystone would ensure that the trench is not excavated until the pipe is ready for installation and that the trench is backfilled immediately after pipe installation.

4.14.3 Landowner Complaint Resolution Procedure

Keystone shall implement a landowner complaint procedure as follows:

- Landowners should first contact the construction spread office to express their concern over restoration or mitigation of environmental damages on their property. The Construction Manager or his designated representative shall respond to the landowner within 24 hours of receipt of the phone call.
- If the landowner has not received a response or is not satisfied with the response, he can contact Keystone's representative at 1-877-880-4881. The landowner should expect a response within 48 hours.

4.15 Fragile Soil Clean-up and Reclamation/Revegetation

4.15.1 General

Fragile soil types are a result of the high percentage of sand content that exists within the surficial soil. Theses soil types exist within regions found in southern South Dakota and central Nebraska and fragile due to their inherent high wind and water erosion potential, low water holding capacity and arid nature of the region, rolling to steep terrain and usually consists of predominantly native prairie landscapes and supports a variety of uses such as livestock grazing, wildlife habitat and recreational opportunities.

4.15.2 Right-of-way Construction

- KXL will educate construction personnel regarding these areas and the necessity to strictly adhere to Project Best Management Practices (BMPs) designed to minimize impacts.

- Minor route re-alignments will be incorporated through these areas to avoid particularly erosion-prone locations, such as ridge tops and existing blowouts as much as practicable.
- KXL will avoid highly saturated areas, such as wetland, to the maximum extent possible.
- Construction soil handling procedures will strive to reduce the width of disturbance to the native prairie landscape by adopting "Trench-line or Blade-width stripping procedures where practicable.
- Topsoil conservation will be conducted on all areas where excavation occurs.
- Topsoil piles will be protected from erosion through matting, mulching, watering or tackifying as deemed practicable.
- Traffic management limitations will be employed on specific areas possessing high erosion potential or sensitive habitat.

4.15.3 Right-of-Way Reclamation

- Native seed mixes will be developed with input from the local NRCS offices and through collaboration with regional experts. All seed will be certified noxious weed-free and will be calculated on a pure live seed (PLS) basis.
- Straw or native prairie hay may be used as mulch, applied to the right-of-way and crimped into the soil to prevent wind erosion. All mulch will be documented as noxious weed-free.
- Land imprinting may be employed to create impressions in the soil, thereby reducing erosion, improving moisture retention and creating micro-sites for seed germination.
- Sediment logs or straw wattles will be used in place of slope breakers (short terraces) that are constructed of soil. Using sediment logs will result in less soil disturbance to the right-of-way.
- Photodegradable matting will be applied on steep slopes or areas prone to extreme wind exposure such as north- or west-facing slopes and ridge tops. Biodegradable pins will be used in place of metal staples to hold the matting in place.
- Keystone will work with landowners to evaluate fencing the right-of-way from livestock, or alternatively, provide compensation to rest a pasture until vegetation can become established. Management concerns such as livestock access to water or movement within a pasture would be incorporated as necessary.

4.15.4 Post-Construction

Keystone is committed to post-construction monitoring and repair and will monitor reclamation on the right-of-way for several years and repair

erosion and reseed poorly revegetated areas as necessary. During monitoring, landowners are informed of our efforts and intentions.

A noxious weed management plan will be established on these lands pending consultation with state and county experts

4.16 Operations and Maintenance

Operations and maintenance programs, such as vegetation management, pipeline maintenance, integrity surveys, and hydrostatic testing, may have an impact on the final reclamation of the right-of-way. To ensure the integrity of the facility and land surface reclamation of the right-of-way is maintained after completion of construction and that regulatory requirements are adhered to during operations, the following measures shall be implemented unless otherwise directed by Keystone in response to site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- Keystone shall monitor the pipeline right-of-way and all stream crossings for erosion or other potential problems that could affect the integrity of the pipeline. Any erosion identified shall be reclaimed as expediently as practicable by Keystone or by compensating to the landowner to reclaim the area.
- Trench depressions on ditch line that may interfere with natural drainage, vegetation establishment, or land use shall be repaired as expediently as practicable by Keystone or by compensating the landowner to repair the area.
- Post-construction monitoring inspections shall be conducted after the first growing season to determine the success of revegetation, unless otherwise required by permit. Areas which have not been successfully re-established shall be revegetated by Keystone or by compensation of the landowner to reseed the area. If, after the first growing season, revegetation is successful, no additional monitoring shall be conducted unless otherwise required by permit.
- In non-agricultural areas, revegetation shall be considered successful if, upon visual survey, the density and cover of non-nuisance vegetation are similar in density and cover to adjacent undisturbed lands, unless otherwise required by permit.
- In agricultural areas, revegetation shall be considered successful if crop yields are similar to adjacent undisturbed portions of the same field.
- Restoration shall be considered successful if the surface condition is similar to adjacent undisturbed lands, construction debris is removed (unless requested otherwise by the landowner or land managing agency), revegetation is successful, and drainage has been restored.
- Weed control measures shall be implemented as required by any applicable plan and in conjunction with the landowner.
- Keystone shall be responsible for correcting tile line or irrigation system

repairs that fail, provided those repairs were made by Keystone. Keystone shall not be responsible for tile line or irrigation system repairs which Keystone compensated the landowner to perform.

- When requested by owners in cultivated land, Keystone shall monitor the yield of land impacted by construction with the help of agricultural specialists. If yield deficiencies are indicated compared to yields on unaffected land, Keystone will compensate the landowner for reduced yields and shall implement procedures to return the land to equivalent capability.
- In residential areas, landowners may use the right-of-way provided they do not interfere with the rights granted to Keystone. Trees, bushes, structures, including houses, tool sheds, garages, poles, guy wires, catch basins, swimming pools, trailers, leaching fields, septic tanks, and any other objects not easily removable, shall not be permitted on the permanent construction right-of-way without the written permission of Keystone, because they could impair access for maintenance of the pipeline.
- Keystone shall maintain communication with the landowner and tenant throughout the operating life of the pipeline to allow expedient communication of issues and problems as they occur. Keystone shall provide the landowner with corporate contact information for these purposes. Keystone shall work with landowners to prevent excessive erosion on lands disturbed by construction. Reasonable methods shall be implemented to control erosion. These may not be implemented if the property across which the pipeline is constructed is bare cropland which the landowner intends to leave bare until the next crop is planted.
- If the landowner and Keystone cannot agree upon a reasonable method to control erosion on the landowner's property, the recommendations of the appropriate NRCS office shall be considered by Keystone and the landowner.

5.0 DRAIN TILE SYSTEMS

5.1 General

If underground drainage tile is damaged by the pipeline installation, it shall be repaired in a manner that ensures the tile line's proper operating condition at the point of repair. Keystone may elect to negotiate a fair settlement with the affected county or landowner for repair of the damaged drain tile. In the event the landowner chooses to have the damaged tile repaired by Keystone, the Contractor shall follow these guidelines and procedures to identify the location of drain tiles, to mitigate damages to drain tiles prior to and during construction, to repair drain tiles damaged during installation of the pipeline, to inspect the proper repair of drain tiles, and to provide post-construction monitoring to determine any impacts caused by repair of drain tiles. Since all public and private drain tile systems are unique, i.e., varying age, depth of cover, type of material, geometry on the land, etc., it is not possible to develop a standard procedure for resolving each county’s or landowner’s drain tile issues. These guidelines provide a basis on which to develop site specific methodology to mitigate damage and to repair drain tiles affected by construction of the Project. A typical right-of-way layout and typical orientation for crossing drain tiles is provided in Detail 25. Typical header and main

crossovers are provided in Details 26 and 27. Actual measures will be developed based on site-specific information unique to specific installations. However, all work will be conducted in accordance with applicable permits.

5.2 Identification and Classification of Drain Tile Systems

Personnel shall attempt to identify and classify existing drain tile systems by meeting with local public officials and county engineers, and individual private landowners and tenants.

5.2.1 Publicly Owned Drain Tiles

Personnel shall identify and meet with the responsible county or local authority responsible for publicly owned drain tiles. Publicly owned drain tiles shall be identified and documented on the Project's 1" = 2000' USGS quad strip maps and additional data collected for input into an electronic spreadsheet by county, township, range, and section; responsible agency; and size, type, and depth of cover (if known). This data shall be cross-referenced to the centerline survey to be completed by Keystone. Additionally, any public records including maps or easement instruments on the drain tiles shall be acquired as well as any requirements of the local authority for installation of the pipeline.

5.2.2 Privately Owned Drain Tiles

Right-of-way agents shall meet with landowners and tenants of privately owned land along the route. As a minimum, the right-of-way agents shall ascertain the data concerning drain tiles outlined in a landowner questionnaire. The questionnaire requests data concerning: type of drain tile system; size, type of material, and depth of cover; preference for repair of drain tiles; and identification of local drain tile contractors. These data shall be collected into an electronic spreadsheet for utilization by right-of-way personnel in negotiating payments for easements and damages and by engineering or construction personnel for inclusion in specifications for the construction Contractor.

5.3 Mitigation of Damage to Drain Tile Systems

Keystone shall undertake mitigation measures to reduce damage to publicly and privately owned drain tile systems prior to and during installation of the pipeline.

5.3.1 Non-interference with Drain Tile

The Project shall be installed at a depth of cover and elevation so as not to interfere with the elevation and grade of existing drain tiles where practicable. Where not practicable, Keystone shall pursue alternative mitigation measures mutually acceptable to the landowner and jurisdictional agencies. Typically, the pipeline shall be installed below the elevation of drain tiles with a minimum clearance of 12 inches. Detail 25, Typical Right-of-Way Layout/Soil Handling, represents a typical drain tile crossing by the

pipeline with additional temporary work space to facilitate handling of topsoil and trench spoil created by the additional depth of cover for the pipeline.

5.3.2 Non-disturbance of Drain Tile Mains

Publicly owned and privately owned drain tile mains shall be identified through the processes identified in Section 5.2. Drain tile mains are essential to the overall drainage system of a land area and if disturbed, may require excessive pumping/dewatering of the pipe trench unless temporarily repaired and maintained until permanently repaired.

Keystone shall review drain tile mains and consider their size, flow rate, type of material, depth of cover, and geographic location. If determined to be practicable and reasonable for construction, the drain tile main shall not be cut and repaired during mainline installation (a pipe section shall be left out and installed by a tie-in crew without damaging the drain tile main).

5.3.3 Relocation or Replacement of Existing Drain Tiles Prior to Construction

In many instances, drain tile systems that have been installed after the installation of adjacent existing pipelines were installed with “headers” parallel to the existing pipeline with periodic jump overs as depicted on Detail 26, Header/Main Crossovers of Keystone XL Pipeline. The distance of these headers from the existing pipeline may vary.

Some of these drain tile headers may be most effectively relocated and/or replaced to the east of the Project. The existing header will be capped and made into a single drain tile as depicted on Detail 27, Relocate/Replace Drainage Header/Main. This could reduce the number of drain tile crossings on a particular landowner’s property by a significant quantity, thereby reducing the risk that repairs will fail.

5.3.4 Future Drain Tiles/Systems

Keystone shall attempt to determine where public agencies and private landowners or tenants are proposing to install drain tile systems in the future. These locations shall be input into an electronic spreadsheet by county, township, range, and section; landowner or responsible public agency; and proposed size and depth of cover. Keystone shall endeavor to construct the pipeline at a depth and elevation to accommodate the future installation of the proposed drain tile systems.

5.3.5 Other Mitigation Measures

Other mitigation measures that may be implemented during installation of the pipeline are as follows:

- not removing topsoil from the working side of the construction right-of-way to prevent crushing of drain tile by heavy equipment;
- spreading ditch and spoil side topsoil (not subsoil) over the working side to provide additional soil depth to protect existing drain tiles;

- restricting the work of the pipe lower in crew if ground conditions are too wet to adequately support the heavy equipment;
- limiting travel of heavy equipment the working lane of the construction right-of-way where possible;
- limiting travel of heavy equipment to one pass over the drain tile per work crew where possible; and
- removing and replacing topsoil during drain tile replacement should tile be crushed on the working side of the right-of-way.

5.4 Responsibility for Repair of Drain Tile Systems

Temporary and permanent drain tile repairs shall be the responsibility of the Contractor. The physical repairs shall be made by qualified and experienced drain tile repair personnel.

5.4.1 Local Drain Tile Contractor Repair

Keystone shall identify and qualify local drain tile contractors in the geographical area of the pipeline route from interviews with local public officials, landowners, tenants, and drain tile contractors. The preferred responsibility for permanent repair of drain tiles shall be for the pipeline Contractor to subcontract the supervision and repair to local reputable drain tile contractors acceptable to the landowners and tenants.

5.4.2 Pipeline Contractor Repair

In the event local drain tile contractors are not available to subcontract the supervision and repair, permanent repair shall be made with the Contractor's supervision, equipment, and labor.

5.4.3 Landowner/Tenant Repair

The landowner or tenant may agree to take responsibility for the permanent repair of his drain tiles if not precluded by regulatory agency. The landowner or tenant shall be requested to ensure his ability to coordinate and complete the drain tile repair in a timely manner to allow the pipeline Contractor to completely backfill the damaged drain tile for repair by landowner/tenant in the immediate future. Keystone shall require that its representative be present to ensure the permanent drain tile repairs are made in accordance with the minimum requirements of this manual.

5.5 Drain Tile Repairs

The Contractor shall endeavour to locate all tile lines within the construction right-of-way prior to and during installation so repairs can be made if necessary.

5.5.1 Temporary Repairs During Construction

Drain tiles damaged or cut during the excavation of the trench shall be marked with a lath and ribbon in the spoil bank. Care shall be taken to

locate markers where the chance of disturbance shall be minimized and a written record maintained of each drain tile crossing. A work crew following the pipeline trench crew shall complete a temporary repair to allow continuing flow. Detail 28, Temporary Drain Tile Repair, depicts the materials and installation procedure to complete the temporary repair. If a drain tile line shall not be temporarily repaired, the open ends of the drain tile shall be screened to prevent entry of foreign materials and small animals.

5.5.2 Permanent Repairs

Permanent repairs shall be made for all drain tiles damaged by installation of the pipeline.

5.5.2.1 Ditch Line Only Repairs

If water is flowing through a damaged tile line, the tile line shall be immediately and temporarily repaired until such time that permanent repairs can be made. If tile lines are dry and water is not flowing, temporary repairs are not required if the permanent repair is made within 7 days of the time damage

occurred. The temporary repair shall be removed just prior to lowering in the pipeline.

Drain tiles must be permanently repaired before the pipeline trench is backfilled and within 14 days of construction completion, weather and soil conditions permitting. All tile lines shall be repaired with materials of the same or better quality as that which was damaged. The drain tile marker shall not be removed until the tile repairs have been inspected, approved, and accepted by Keystone's inspectors, the county inspectors, where applicable, and the landowner or tenant. Detail 29, Permanent Repair Method of Drain Tiles, depicts the minimum materials and installation procedure to complete a permanent repair.

5.5.2.2 Ditch Line and Temporary Work Space Repairs

Prior to making the permanent drain tile repair, the Contractor shall probe a segmented sewer rod with a plug that is not more than 15% smaller than the internal diameter of the drain tile to determine if additional damage has occurred to the drain tile. If the probe does not freely insert into the drain tile across the temporary workspace of pipeline construction, the Contractor shall excavate, expose, and repair the damaged drain tile to its original or better condition.

5.6 Inspection/Acceptance of Drain Tile Repairs

Drain tile repairs shall be inspected by Keystone construction inspectors, county inspectors, as applicable, and the landowner or tenant or his representative.

Keystone shall designate inspector(s) for the sole purpose and responsibility for inspection of all repairs of drain tiles. These inspectors shall be, if possible, employed from local drain tile installation contractors, local farmers with extensive drain tile experience, or previously employed or retired employees of local jurisdictions familiar with drain tile installation and repair. In the event that a sufficient quantity of inspectors from these sources is not available, Keystone shall conduct in-the-field training seminars on drain tile repair for additional inspection personnel.

Inspection personnel shall observe the permanent repair of all drain tiles to ensure the replacement drain tile is: (1) the proper size and type; (2) installed at the proper grade; (3) properly supported and backfill beneath the drain tile is properly placed and compacted; and (4) properly tied into the existing drain tile. The inspection shall be documented on the Drain Tile Inspection Report Form.

A drain tile repair shall not be accepted until Keystone's construction inspector and the landowner or tenant or designated representative approves the inspection form.

6.0 WETLAND CROSSINGS

6.1 General

Wetland boundaries shall be clearly marked in the field with signs and/or highly visible flagging during construction.

In the event a waterbody crossing is located within or adjacent to a wetland crossing, the measures of both Section 6 - Wetland Crossings and Section 7 - Waterbodies and Riparian Lands shall be implemented to the extent practicable.

A dry wetland is defined in Section 6.5.1. In these wetlands, equipment can traverse the wetland without the support of mats or timber riprap.

A standard wetland environment typically has soils that are saturated and non-cohesive. Difficult trenching conditions are likely resulting in excessively wide trenches. In these wetland environment types, supplemental support in the form of timber riprap or prefabricated equipment mats may be required for construction equipment to safely and efficiently operate.

A flooded wetland involves the presence of standing water over much of the wetland area. Equipment typically cannot traverse the wetland and must generally move around that portion of the area. Access is typically limited to marsh backhoes or equipment working from flexifloats or equivalents.

Keystone may allow modification of the following specifications as necessary to accommodate site-specific conditions or procedures. Any modifications must still comply with all applicable regulations and permits.

6.2 Easement and Workspace

The Contractor shall maintain wetland boundary markers during construction in all areas and until permanent seeding is complete in non-cultivated areas.

The width of the construction right-of-way shall be reduced to 85 feet or less in standard wetlands unless non-cohesive soil conditions require utilization of a greater width and unless the USACE or other regulatory authority authorizes a greater width.

The Contractor shall locate extra work areas (such as staging areas and additional spoil storage areas) shall be at least 10 feet away from wetland boundaries, where topographic conditions permit.

The Contractor shall limit clearing of vegetation between extra work areas and the edge of the wetland to the construction right-of-way and limit the size of extra work areas to the minimum needed to construct the wetland crossing.

6.3 Vehicle Access and Equipment Crossing

The only access roads, other than the construction right-of-way, that the Contractor shall use in wetlands are those existing public roads and private roads acquired by Keystone from the landowner shown on the construction drawings.

To the extent practicable, the Contractor's construction equipment operating in saturated wetlands or wetlands with standing water shall be limited to that needed to clear the construction right-of-way, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the construction right-of-way.

If equipment must operate within a wetland containing standing water or saturated soils, the Contractor shall use the following methods for equipment access unless otherwise approved by Keystone based on site-specific conditions:

- wide-track or balloon-tire construction equipment; and
- conventional equipment operated from timber and slash (riprap) cleared from the right-of-way, timber mats, or prefabricated equipment mats.

6.4 Temporary Erosion and Sediment Control

The Contractor shall install sediment barriers across the entire construction right-of-way immediately upslope of the wetland boundary at all standard wetland crossings, as necessary, to prevent sediment flow into the wetland. Sediment barriers must be properly maintained by the Contractor throughout construction and reinstalled as necessary. In the travel lane, these may incorporate removable sediment barriers or drivable berms. Removable sediment barriers can be removed during the construction day, but shall be re-installed after construction has stopped for the day or when heavy precipitation is imminent. The Contractor shall maintain sediment barriers until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. The Contractor shall not install sediment barriers at wetlands designated as "dry" unless otherwise specified by Keystone.

Where standard wetlands are adjacent to the construction right-of-way, the Contractor shall install sediment barriers along the edge of the construction right-of-way as necessary to prevent a sediment flow into the wetland.

6.5 Wetland Crossing Procedures

The following general mitigative procedures shall be followed by the Contractor in all wetlands unless otherwise approved or directed by Keystone based on site-specific conditions. All work shall be conducted in accordance with applicable permits.

- limit the duration of construction-related disturbance within wetlands to the extent practicable;

- use no more than two layers of timber riprap to stabilize the construction right-of-way;
- cut vegetation off at ground level leaving existing root systems in place and remove it from the wetland for disposal;
- limit pulling of tree stumps and grading activities to directly over the trench line unless safety concerns require the removal of stumps from the working-side of the construction ROW;
- segregate a maximum of 12 inches of topsoil from the area disturbed by trenching in dry wetlands, where practicable;
- restore topsoil to its approximate original stratum, after backfilling is complete;
- dewater the trench in a manner to prevent erosion and heavily silt-laden flowing directly into any wetland or waterbody;
- remove all timber riprap and prefabricated equipment mats upon completion of construction;
- locate hydrostatic test manifolds outside wetlands and riparian areas to the maximum extent practicable;
- prohibit storing hazardous materials, chemicals, fuels, lubricating oils, or perform concrete coating activities in a wetland, or within 100 feet of any wetland boundary;
- perform all equipment maintenance and repairs upland locations at least 100 feet from waterbodies and wetlands;
- avoid parking equipment overnight within 100 feet of a watercourse or wetland;
- prohibit washing equipment in streams or wetlands;
- install trench breakers and/or seal the trench to maintain the original wetland hydrology, where the pipeline trench may drain a wetland;
- attempt to refuel all construction equipment in an upland area at least 100 feet from a wetland boundary (otherwise follow the procedures outlined in Section 3); and
- avoid sand blasting in wetlands to the extent practicable. If sandblasting is performed within a wetland, the Contractor shall place a tarp or suitable material in such a way as to collect as much waste shot as possible and dispose of the collected waste. The Contractor shall clean up all visible deposits of wastes and dispose of the waste at an approved disposal facility.

Specific procedures for each type of wetland crossing method are listed below and shall be designated on the construction drawings but may be modified depending on site conditions at the time of construction. All work shall be conducted in accordance with applicable permits.

6.5.1 Dry Wetland Crossing Method

Topsoil shall be segregated. Pipe stringing and fabrication may occur within the wetland adjacent to the trench line or adjacent to the wetland in a designated extra workspace.

The dry wetland crossing procedure depicted in Detail 8 shall be used where this type of wetland is identified on the construction drawings. The following are exceptions to standard wetland crossing methods:

- The width of the construction right-of-way for upland construction is maintained through the wetland.
- Where extra work areas (such as staging areas and additional spoil storage areas) are designated on the construction drawings, they may be placed no closer than 10 feet from the wetland's edge.
- Seeding requirements for agricultural lands shall be applied to farmed wetlands.

6.5.2 Standard Wetland Crossing Method

Topsoil stripping is impracticable due to the saturated nature of the soil. Pipe stringing and fabrication may occur within the wetland adjacent to the trench line or adjacent to the wetland in a designated extra workspace. Based upon the length of a standard wetland crossing and presence of sufficient water to float the pipe, the Contractor may elect to install a standard wetland crossing utilizing the “push/pull” method.

The standard wetland crossing procedure depicted in Detail 9 shall be used where this type of wetland is identified on the construction drawings.

Procedures unique to standard wetlands include:

- limiting construction right-of-way width to a maximum of 85 feet unless site conditions warrant a wider width;
- utilizing low-ground-pressure construction equipment or support equipment on timber riprap or timber mats; and
- installing sediment barriers across the entire right-of-way where the right-of-way enters and exits the wetland.

6.5.3 Flooded Push/Pull Wetland Crossing Method

Where standing surface water or high groundwater levels make trenching difficult, trench widths up to 35 feet are common. Topsoil stripping is impossible due to the flooded conditions. Pipe stringing and fabrication is required adjacent to the wetland in a designated extra workspace. Using floatation devices, the pipe string is pushed and pulled from the extra workspace to the trench.

The Push/Pull wetland crossing procedure as depicted in Detail 10 shall be used where water is sufficient to float the pipeline in the trench and other site conditions allow.

Clean metal barrels or Styrofoam floats may be used to assist in the flotation of the pipe. Metal banding shall be used to secure the barrels or floats to the pipe. All barrels, floats, and banding shall be recovered and removed upon completion of lower in. Backfill shall not be allowed before recovery of barrels, floats, and banding.

6.6 Restoration and Reclamation

All timber riprap, timber mats, and prefabricated equipment mats and other construction debris shall be removed upon completion of construction. As much as is feasible, the Contractor shall replace topsoil and restore original contours with no crown over the trench. Any excess spoil shall be removed from the wetland. The Contractor shall stabilize wetland edges and adjacent upland areas by establishing permanent erosion control measures and revegetation, as applicable, during final clean up.

For each standard wetland crossed, the Contractor shall install a permanent slope breaker and trench breaker at the base of slopes near the boundary between the wetland and adjacent upland areas. The Contractor shall locate the trench breaker immediately upslope of the slope breaker.

The Contractor shall not use fertilizer, lime, or mulch in wetlands unless required in writing by the appropriate land management agency.

All wetland areas within conservation lands or easements will be restored to a level consistent with any additional criteria established by the relevant managing agency.

7.0 WATERBODIES AND RIPARIAN AREAS

7.1 General

The Contractor shall comply with requirements of all permits issued for the waterbody crossings by federal, state or local agencies.

Waterbody includes any areas delineated as jurisdictional natural or artificial stream, river, or drainage, and other permanent waterbodies such as ponds and lakes:

- Minor Waterbody includes all waterbodies less than or equal to 10 feet wide at the water's edge at the time of construction.
- Intermediate Waterbody includes all waterbodies greater than 10 feet wide but less than or equal to 100 feet wide at the water's edge at the time of construction.
- Major Waterbody includes all waterbodies greater than 100 feet wide at the water's edge at the time of construction.

In the event a waterbody crossing is located within or adjacent to a wetland crossing, the Contractor, to the extent practicable, shall implement the provisions of both Section 6 - Wetland Crossings and Section 7 - Waterbodies and Riparian Areas.

The Contractor shall supply and install advisory signs in a readily visible location along the construction right-of-way at a distance of approximately 100 feet on each side of the crossing and on all roads which provide direct construction access to waterbody crossing sites. Signs shall be supplied, installed, maintained, and then removed upon completion of the Project. Additionally, signs shall be supplied and installed by the Contractor on all intermediate and major waterbodies accessible to recreational boaters warning boaters of pipeline construction operations.

The Contractor shall not store hazardous materials, chemicals, fuels, lubricating oils, or perform concrete coating within 100 feet of any waterbody. The Contractor shall not refuel construction equipment within 100 feet of any waterbody. If the Contractor must refuel construction equipment within 100 feet of a waterbody, it must be done in accordance with the requirements outlined in Section 3. All equipment maintenance and repairs will be performed in upland locations at least 100 feet from waterbodies and wetlands. All equipment parked overnight shall be at least 100 feet from a watercourse or wetland, if possible. Equipment shall not be washed in streams or wetlands.

Throughout construction, the Contractor shall maintain adequate flow rates to protect aquatic life and to prevent the interruption of existing downstream uses.

Keystone may allow modification of the following specifications as necessary to accommodate specific situations or procedures. Any modifications must comply with all applicable regulations and permits. Keystone will complete site-specific

crossing plans for certain waterbody crossings if required by the applicable regulatory agencies during federal or state permitting processes.

7.2 Easement and Work Space

The permanent easement, temporary work space, additional temporary work space, and any special restrictions shall be depicted on the construction drawings. The work shall be contained within these areas and be limited in size to the minimum required to construct the waterbody crossing.

The Contractor shall locate all extra work areas (such as staging areas and additional spoil storage areas) at least 10 feet from the water's edge if practicable.

At all waterbody crossings, the Contractor shall install flagging across the construction right-of-way at least 10 feet from the water's edge prior to clearing and ensure that riparian cover is maintained where practicable during construction.

7.3 Vehicle Access and Equipment Crossings

The Contractor shall inspect equipment for fluid leaks prior to entering or crossing over waterbodies.

Equipment bridges shall be installed at all flowing waterbodies and as directed by the Keystone EI. Equipment crossings shall be constructed as described in Details 16, 17
and/or 18.

Equipment crossings shall be perpendicular to drainage bottoms wherever possible.

Erosion and sediment control barriers will be installed and maintained around vehicle access points as necessary to prevent sediment from reaching the waterway.

The Contractor shall be responsible for the installation, maintenance, and removal of all temporary access crossings including portable bridges, bridges made from timber or mats, flumes, culverts, sand bags, subsoil, coarse granular material, and riprap.

The Contractor shall ensure that culverts and flumes are sized and installed of sufficient diameter to accommodate the existing flow of water and those that may potentially be created by sudden runoffs. Flumes shall be installed with the inlet and outlet at natural grade if possible.

Where bridges, culverts or flumes are installed across the work area, the Contractor shall be responsible for maintaining them (e.g. preventing collapse, clogging or tilting). All flumes and culverts shall be removed as soon as possible upon completion of construction.

The width of the temporary access road across culverts and flumes and the design of the approaches and ramps shall be adequate for the size of vehicle and equipment access required. The ramps shall be of sufficient depth and constructed to prevent collapse of the flumes, and the approaches on both sides of the flume shall be feathered.

Where culverts are installed for access, the culvert shall be of sufficient length to convey the stream flow through the construction zone.

The Contractor shall maintain equipment bridges to prevent soil from entering the waterbody.

7.4 Waterbody Crossing Methods

Construction methods pertinent to waterbody crossings are presented below. Selection of the most appropriate method at each crossing shall be depicted on the construction drawings but may be amended or changed based on site-specific conditions (i.e., environmental sensitivity of the waterbody, depth, and rate of flow, subsurface soil conditions, and the expected time and duration of construction) at the time of crossing. Construction will involve dry-ditch techniques at crossings where the timing of construction does not adequately protect environmentally sensitive waterbodies, as determined by the appropriate regulatory authority. Where required, horizontal directional drilling (HDD) will be used at designated major and sensitive waterbodies crossings. Each waterbody crossing shall be accomplished using one of the following construction methods:

- Non-flowing Open Cut Crossing Method - (Detail 11)
- Flowing Open Cut Crossing Method – Minor, Intermediate or Major Waterbody - (Detail 12)
- Flowing Stream Crossing – Dry Flume Method - (Detail 13)
- Flowing Stream Crossing – Dry Dam-and-Pump Method - (Detail 14)
- Horizontal Directional Drill Crossing - (Detail 15)
- Horizontal Bore Crossing - (Detail 21)

In conjunction with the appropriate jurisdictional agency, Keystone will develop specific crossing plans for major water bodies that contain recreationally or commercially important fisheries, or are classified as special use. Keystone will consult with state fisheries agencies with respect to applicable construction windows for each crossing and develop specific construction and crossing methods for open cuts in conjunction with USACE permitting and USFWS consultation.

7.4.1 Non-flowing Open Cut Crossing Method

The Contractor shall utilize the Non-flowing Open Cut Crossing Method (Detail 11) for all waterbody crossings (ditches, gullies, drains, swales, etc.) with no perceptible flow at the time of construction. Should site conditions change and the waterbody is flowing at the time of

construction, the Contractor shall install the crossing utilizing the Flowing Open Cut Crossing Method (Detail 12) unless otherwise approved by Keystone.

7.4.2 Flowing Open Cut Crossing Method of Minor, Intermediate, and Major Waterbodies

For minor waterbody crossings, except where the flume method is used, the Contractor shall complete construction in the waterbody (not including blasting, if required) as shown on Detail 12 within 24 hours if practicable.

For intermediate waterbodies, the Contractor shall attempt to complete trenching and backfill work within the waterbody (not including blasting if required) within 48 hours if practicable as shown on Detail 12.

The Contractor shall construct each major waterbody crossing in accordance with a site-specific plan as shown in the construction drawings. The Contractor shall complete in-stream construction activities as expediently as practicable.

7.4.3 Flowing Stream Crossing – Dry Flume Method

Where required, the Contractor shall utilize the Flowing Open Cut Crossing – Dry Flume Method as shown on Detail 13 with the following "dry ditch" techniques:

- Flume pipe shall be installed after blasting (if necessary), but before any trenching.
- Sand bag, sand bag and plastic sheeting diversion structure, or equivalent shall be used to develop an effective seal and to divert stream flow through the flume pipe (some modifications to the stream bottom may be required in order to achieve an effective seal).
- Flume pipe(s) shall be aligned to prevent bank erosion and streambed scour.
- Flume pipe shall not be removed during trenching, pipe laying, or backfilling activities, or initial streambed restoration efforts.
- All flume pipes and dams that are not also part of the equipment bridge shall be removed as soon as final clean up of the stream bed and bank is complete.

7.4.4 Flowing Stream Crossing – Dry Dam-and-Pump Method

Where specified in the construction drawings, the Contractor shall utilize the Flowing Open Cut Crossing – Dry Dam-and-Pump Method as shown on Detail 14. The dam-and-pump crossing method shall meet the following performance criteria:

- sufficient pumps to maintain 1.5 times the flow present in the stream at the time of construction;

- at least one back up pump available on site;
- dams constructed with materials that prevent sediment and other pollutants from entering the waterbody (e.g., sandbags or clean gravel with plastic liner);
- screen pump intakes installed;
- streambed scour prevented at pump discharge; and
- dam and pumps shall be monitored to ensure proper operation throughout the waterbody crossing.

7.4.5 Horizontal Directional Drill Crossings

Where required, the horizontal directional drill method as shown on Detail 15 shall be utilized for designated major and sensitive waterbodies. The Contractor shall construct each directional drill waterbody crossing in accordance with a site specific plan as shown in the construction drawings.

Drilling fluids and additives utilized during implementation of a directional drill shall be non-toxic to the aquatic environment.

The Contractor shall develop a contingency plan to address a frac-out during a directional drill. The plan shall include instructions for monitoring during the directional drill and mitigation in the event that there is a release of drilling fluids. Additionally, the waterbody shall be monitored downstream by the Contractor for any signs of drilling fluid.

The Contractor shall dispose of all drill cuttings and drilling mud as permitted by the appropriate regulatory authority at a Keystone-approved location. Disposal options may include spreading over the construction right-of-way in an upland location approved by Keystone or hauling to an approved licensed landfill or other site approved by Keystone.

7.4.6 Horizontal Bore Crossings

Where required, the horizontal bore method as shown on Detail 21 shall be utilized for crossing waterbodies. The Contractor shall construct each horizontal bore waterbody crossing in accordance with a site specific plan as shown in the construction drawings.

7.5 Clearing

Except where rock is encountered and at non-flowing open cut crossings, all necessary equipment and materials for pipe installation must be on site and assembled prior to commencing trenching in a waterbody. All staging areas for materials and equipment shall be located at least 10 feet from the waterbody edge. The Contractor shall preserve as much vegetation as possible along the waterbody banks while allowing for safe equipment operation.

Clearing and grubbing for temporary vehicle access and equipment crossings shall be carefully controlled to minimize sediment entering the waterbody from the construction right-of-way.

Clearing and grading shall be performed on both sides of the waterbody prior to initiating any trenching work. All trees shall be felled away from watercourses.

Plant debris or soil inadvertently deposited within the high water mark of waterbodies shall be promptly removed in a manner that minimizes disturbance of the waterbody bed and bank. Excess floatable debris shall be removed above the high water mark from areas immediately above crossings.

Vegetation adjacent to waterbody crossings by horizontal directional drill or boring methods shall not be disturbed except by hand clearing as necessary for drilling operations.

7.6 Grading

The construction right-of-way adjacent to the waterbody shall be graded so that soil is pushed away from the waterbody rather than towards it whenever possible.

In order to minimize disturbance to woody riparian vegetation within extra workspaces adjacent to the construction right-of-way at waterbody crossings, the Contractor shall minimize grading and grubbing of waterbody banks. To the extent practicable, grubbing shall be limited to the ditch line plus an appropriate width to accommodate safe vehicle access and the crossing.

7.7 Temporary Erosion and Sediment Control

The Contractor shall install and maintain sediment barriers across the entire construction right-of-way at all flowing waterbody crossings.

The Contractor shall install sediment barriers immediately after initial disturbance of the waterbody or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration of adjacent upland areas is complete.

Where waterbodies are adjacent to the construction right-of-way, the Contractor shall install and maintain sediment barriers along the edge of the construction right-of-way as necessary to contain spoil and sediment within the construction right-of-way.

7.8 Trenching

The following requirements apply to all waterbody crossings except those being installed by the non-flowing open cut crossing method.

All equipment and materials shall be on site before trenching in the active channel of all minor waterbodies containing state-designated fisheries, and in

intermediate and major waterbodies. All activities shall proceed in an orderly manner without delays until the trench is backfilled and the stream banks stabilized. The Contractor shall not begin in-stream activity until the in-stream pipe section is complete and ready to be installed in the waterbody.

The Contractor shall use trench plugs at the end of the excavated trench to prevent the diversion of water into upland portions of the pipeline trench and to keep any accumulated upland trench water out of the waterbody. Trench plugs must be of sufficient size to withstand upslope water pressure.

The Contractor shall conduct as many in-stream activities as possible from the banks of the waterbodies. The Contractor shall limit the use of equipment operating in waterbodies to that needed to construct each crossing.

The Contractor shall place all spoil from minor and intermediate waterbody crossings and upland spoil from major waterbody crossings in the construction right-of-way at least 10 feet from the water's edge or in additional extra work areas. No trench spoil, including spoil from the portion of the trench across the stream channel, shall be stored within a waterbody unless the crossing cannot be reasonably completed without doing so.

The Contractor shall install and maintain sediment barriers around spoil piles to prevent the flow of spoil into the waterbody.

Spoil removed during ditching shall be used to backfill the trench usually with a backhoe, clamshell, or a dragline working from the waterbody bank. Sand, gravel, rockshield, or fill padding shall be placed around the pipe where rock is present in the channel bottom.

7.9 Pipe Installation

The following requirements apply to all waterbody crossings except those being installed by the non-flowing open cut crossing method.

A "free stress" pipe profile shall be used at all minor, intermediate, and major waterbodies with gradually sloping stream banks. The "box bend" pipe profile may be used for intermittent and major waterbodies with steep stream banks.

The trench shall be closely inspected to confirm that the specified cover and adequate bottom support can be achieved, and shall require Keystone approval prior to the pipe being installed. Such inspections shall be performed by visual inspection and/or measurement by a Keystone representative. In rock trench, the ditch shall be adequately padded with clean granular material to provide continuous support for the pipe.

The pipe shall be pulled into position or lowered into the trench and shall, where necessary, be held down by suitable negative buoyancy control, as-built recorded and backfilled immediately to prevent the pipe from floating.

The Contractor shall provide sufficient approved lifting equipment to perform the pipe installation in a safe and efficient manner. As the coated pipe is lowered in,

it shall be prevented from swinging or rubbing against the sides of the trench. Only properly manufactured slings, belts, and cradles suitable for handling coated pipe shall be used. All pipes shall be inspected for coating flaws and/or damage as it is being lowered into the trench. Any damage to the pipe or coating shall be repaired.

7.10 Backfilling

The following requirements apply to all waterbody crossings except those being installed by the non-flowing open cut crossing method.

Trench spoil excavated from waterbodies shall be used to backfill the trench across waterbodies.

After lowering in is complete, but before backfilling, the line shall be re-inspected to ensure that no skids, brush, stumps, trees, boulders, or other debris is in the trench. If discovered, such materials or debris shall be removed from the trench prior to backfilling.

For each major waterbody crossed, the Contractor shall install a trench breaker at the base of slopes near the waterbody unless otherwise directed by Keystone based on site specific conditions. The base of slopes at intermittent waterbodies shall be assessed on site and trench breakers installed only where necessary.

Slurred muck or debris shall not be used for backfill. At locations where the excavated native material is not acceptable for backfill or must be supplemented, the Contractor shall provide granular material approved by Keystone.

If specified in the construction drawings, the top of the backfill in the stream shall be armored with rock riprap or bio-stabilization materials as appropriate.

7.11 Stabilization and Restoration of Stream Banks and Slopes

The Contractor will restore the contours of the bed and banks of all waterways immediately after pipe installation and backfill, except over the travel lane. Travel lanes and bridges may stay in place until hydrostatic testing and cleanup are complete. All materials used to support construction activities will be removed from waterbodies and wetlands, including, but not limited to, flumes, mats, plastic sheeting, and sandbags.

The stream bank contour shall be re-established. All debris shall be removed from the streambed and banks. Stream banks shall be stabilized and temporary sediment barriers shall be installed within 24 hours of completing the crossing if practicable.

Approach slopes shall be graded to an acceptable slope for the particular soil type and surface run off controlled by installation of permanent slope breakers. Where considered necessary, the integrity of the slope breakers shall be ensured by lining with erosion control blankets.

Immediately following reconstruction of the stream banks, the Contractor shall install seed and flexible channel liners on waterbody banks as shown in Detail 19.

If the original stream bank is excessively steep and unstable or flow conditions are severe, or if specified on the construction drawings, the banks shall be stabilized with rock riprap, gabions, stabilizing cribs, or bio-stabilization measures to protect backfill prior to reestablishing vegetation.

Stream bank riprap structures shall consist of a layer of stone, underlain with approved filter fabric or a gravel filter blanket in accordance with Detail 20. Riprap shall extend from the stabilized streambed to the top of the stream bank. Where practicable, native rock shall be utilized.

Bio-stabilization techniques which may be considered for specific crossings are shown in Details 23 and 24.

The Contractor shall remove equipment bridges as soon as possible after final clean up.

8.0 HYDROSTATIC TESTING

8.1 Testing Equipment Location

The Contractor shall provide for the safety of all pipeline construction personnel and the general public during hydrostatic test operations by placing warning signs in populated areas.

The Contractor shall locate hydrostatic test manifolds 100 feet outside wetlands and riparian areas to the maximum extent practicable.

8.2 Test Water Source and Discharge Locations

Keystone is responsible for acquiring all permits required by federal, state and local agencies for procurement of water and for the discharge of water used in the hydrostatic testing operation. Keystone shall provide the Contractor with a copy of the appropriate withdrawal/discharge permits for hydrostatic test water. The Contractor shall keep water withdrawal/discharge permits on site at all times during testing operations.

Any water obtained or discharged shall be in compliance with permit notice requirements and with sufficient notice for Keystone's Testing Inspector to make water sample arrangements prior to obtaining or discharging water. Keystone will obtain water samples for analysis from each source before filling the pipeline. In addition, water samples will be taken prior to discharge of the water, as required by state and federal permits.

In some instances sufficient quantities of water may not be available from the permitted water sources at the time of testing. Withdrawal rates may be limited as stated by the permit. Under no circumstances shall an alternate water source be used without prior authorization from Keystone.

The Contractor shall be responsible for obtaining any required water analyses from each source to be used in sufficient time to have a lab analysis performed prior to any filling operations. The sample bottle shall be sterilized prior to filling with the water sample. The analysis shall determine the pH value and total suspended solids. Each bottle shall be marked with:

- source of water with pipeline station number;
- date taken;
- laboratory order number; and
- name of person taking sample.

Staging/work areas for filling the pipeline with water will be located a minimum of 100 feet from the waterbody or wetland boundary if topographic conditions permit. The Contractor will install temporary sediment filter devices adjacent to all streams to prevent sediments from leaving the construction site.

The Contractor shall screen the intake hose to prevent the entrainment of fish or debris. The hose shall be kept at least 1 foot off the bottom of the waterbody. Refueling of construction equipment shall be conducted a minimum distance of 100 feet from the stream or a wetland. Pumps used for hydrostatic testing within 100 feet of any waterbody or wetland shall be operated and refueled in accordance with Section 3.

During hydrostatic test water withdrawals, the Contractor will maintain adequate flow rates in the waterbody to protect aquatic life and provide for downstream uses, in compliance with regulatory and permit requirements.

The Contractor shall not use chemicals in the test water. The Contractor shall not discharge any water containing oil or other substances that are in sufficient amounts as to create a visible color film or sheen on the surface of the receiving water.

Selected road, railroad, and river crossing pipe sections may be specified to be pre-tested for a minimum of 4 hours. The water for pre-testing of any road and railroad crossings shall be hauled by a tanker truck from an approved water source. Water for pre-testing of a river crossing may be hauled or taken from the respective river if it is an approved water source. Since the volume of water utilized in these pre-tests shall be relatively small, the water shall be discharged overland along the construction right-of-way and allowed to soak into the ground utilizing erosion and sediment control mitigative measures.

Selection of final test water sources will be determined based on site conditions at the time of construction and applicable permits.

8.3 Filling the Pipeline

After final positioning of the pipe, the Contractor shall fill the pipe with water. Pipe ends shall not be restrained during the fill. The fill pump shall be set on a metal catch pan of sufficient dimensions to contain all leaking lubricants or fuel and prevent them from entering the water source. The suction inlet must be placed in a screened enclosure located at a depth that shall not allow air to be drawn in with the water. The screened enclosure shall be such that the fill water is free of organic or particulate matter.

The Contractor shall provide a filter of the back flushing or cartridge type with a means of cleaning without disconnecting the piping. The filter shall have the specifications of 100 mesh screen. If the cartridge type is used, a sufficient quantity of cartridges shall be on hand at the filter location. The Contractor shall install the filter between the fill pump and the test header. The Contractor shall be responsible for keeping the back flush valve on the filter closed during the filling operation. The Contractor shall be responsible for the proper disposal of materials back flushed from the filter or filter cartridges. The Contractor shall not be allowed to back flush the filter into the stream or other water source.

During water-filling of the pipeline, the Contractor shall employ fill pumps capable of injecting water into the pipeline at a maximum rate of approximately 0.7 to 1.0 mile per hour, except as limited by permits or the maintenance of adequate flow rates in the waterbody, as follows:

Nominal OD	Max GPM
36”	3000

The Contractor shall maintain flow rates as necessary to protect aquatic life, provide for all waterbody uses, and provide for downstream withdrawals of water by existing users.

In areas where zebra mussels are known to occur, all equipment used during the hydrostatic test withdrawal and discharge will be thoroughly cleaned before being used at subsequent hydrostatic test locations to prevent the transfer of zebra mussels or their larvae (veligers) to new locations.

8.4 Dewatering the Pipeline

The Contractor shall comply with state-issued NPDES permits for discharging test water.

The Contractor shall not discharge any water containing oil or other substances that are in sufficient amounts as to create a visible color film on the surface of the receiving water.

The Contractor shall not discharge into state-designated exceptional value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate federal, state, and local permitting agencies grant written permission.

To avoid impacts from introduced species, no inter-basin transfers (discharge) of hydrostatic test water will occur.

The discharge operation will be monitored and water samples will be taken prior to the beginning of the discharge to ensure that it complies with the Project and permit requirements. If required by state permits, additional water quality testing will be conducted during discharge, in accordance with permit conditions.

The Contractor shall calculate, record, and provide to Keystone the day, date, time, location, total volume, maximum rate, and methods of all water discharged to the ground or to surface water in association with hydrostatic testing.

The Contractor shall regulate the pig velocity discharge rate (3000 gpm maximum), use energy dissipation devices, and install sediment barriers, as necessary, to prevent erosion, streambed scour, suspension of sediments, or excessive stream flow. Water must be disposed of using good engineering judgment so that all federal, state, and local environmental standards are met. Dewatering lines shall be of sufficient strength and be securely supported and tied down at the discharge end to prevent whipping during this operation.

To reduce the velocity of the discharge, The Contractor shall utilize an energy-dissipating device described as follows:

8.4.1 Splash Pup

A splash pup consists of a piece of large diameter pipe (usually over 20" outside diameter) of variable length with both ends partially blocked that is welded perpendicularly to the discharge pipe. As the discharge hits against the inside wall of the pup, the velocity is rapidly reduced and the water is allowed to flow out either end. A variation of the splash pup concept, commonly called a diffuser, incorporates the same design, but with capped ends and numerous holes punched in the pup to diffuse the energy.

8.4.2 Splash Plate

The splash plate is a quarter section of 36-inch pipe welded to a flat plate and attached to the end of a 6-inch discharge pipe. The velocity is reduced by directing the discharge stream into the air as it exits the pipe. This device is also effective for most overland discharge.

8.4.3 Plastic Liner

In areas where highly erodible soils exist or in any low flow drainage channel, it is a common practice to use layers of Visqueen (or any of the new construction fabrics currently available) to line the receiving channel for a short distance. One anchoring method may consist of a small load of rocks to keep the fabric in place during the discharge. Additional best management practices, such as the use of plastic sheeting or other material to prevent scour, will be used as necessary to prevent excessive sedimentation during dewatering.

8.4.4 Straw Bale Dewatering Structure

Straw bale dewatering structures are designed to dissipate and remove sediment from the water being discharged. Straw bale structures are used for on land discharge of wash water and hydrostatic test water and in combination with other energy dissipating devices for high volume discharges. A straw bale dewatering structure is shown In Detail 6. A dewatering filter bags may be sued as an alternative to show bale dewatering structures. A dewatering filter bag is shown in Detail 5.

THESE ARE TYPICAL DRAWINGS; ACTUAL SITE CONDITIONS MAY VARY FROM THE SITE GRAPHICALLY REPRESENTED.

Typical Drawing Index

Detail 1	Typical Silt Fence Barrier
Detail 2	Typical Straw or Hay Bail Barrier
Detail 3	Temporary/Permanent Slope Breaker Detail (Water Bars)
Detail 4	Erosion Control Matting Installation
Detail 5	Typical Dewatering Filter Bag
Detail 6	Typical Straw Bale Dewatering Structure
Detail 7	Typical Permanent Trench Breakers
Detail 8	"Dry" Wetland Crossing Method
Detail 9	Standard Wetland Crossing Method
Detail 10	Push/Pull Wetland Crossing Method
Detail 11	Typical Open Cut Wet Crossing Method Non-Flowing Waterbody
Detail 12	Typical Open Cut Wet Crossing Method Flowing Waterbody
Detail 12a	Typical Open Cut Wet Crossing Method Flowing Waterbody - Construction Procedures
Detail 13	Typical Dry Flume Crossing Method
Detail 13a	Typical Dry Flume Crossing Method - Construction Procedures
Detail 14	Typical Dam and Pump Crossing
Detail 14a	Typical Dam and Pump Crossing - Construction Procedures
Detail 15	Typical Horizontal Drill (HDD) Site Plan & Profile
Detail 16	Typical Temporary Bridge Crossing
Detail 16a	Typical Temporary Bridge Crossing - Construction Procedures
Detail 17	Typical Flume Bridge Crossing
Detail 18	Typical Railcar Bridge Crossing
Detail 18a	Typical Railcar Bridge Crossing - Construction Procedures
Detail 19	Flexible Channel Liner Installation
Detail 20	Typical Rock Rip-Rap
Detail 21	Typical Road Bore Crossing
Detail 22	Streambank Reclamation - Brush Layer in Cross Cut Slope
Detail 23	Streambank Reclamation - Log Wall
Detail 24	Streambank Reclamation - Vegetated Geotextile Installation
Detail 25	Typical ROW Layout/Soil Handling
Detail 26	Header/Main Crossovers of Pipeline
Detail 27	Relocate/Replace Drainage Header/Main
Detail 28	Temporary Drain Tile Repair
Detail 29	Permanent Repair Method of Drain Tiles
Detail 30	Equipment Cleaning Station Detail
Detail 31	Equipment Wash Station Detail
Detail 67	Topsoil Conservation Ditch & Spoil Stripping Triple Ditch
Detail 67A	Topsoil Conservation Ditch & Spoil Stripping Triple Ditch

NOTE: **The following typical drawings are included for ease of reference.**

- Details 1 through 31 can be found in the Construction Mitigation and Reclamation Plan

REVISIONS
01 2008-11-05 REVISED TITLES, ADDED/DEL. DETAILS
02 2010-10-08 REVISED TITLES
03 2010-10-11 REVISED TITLE BLOCK

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The new identity of Trow Engineering Consultants, Inc.

DESIGNER: JMP (NAME) 2010-10-21 (DATE)

CHECKED BY: WSF

DESIGN CHECKER: RW P7100

KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL INDEX

SCALE: N.T.S. | DWG No 4359-03-ML-00-700 | REV 03

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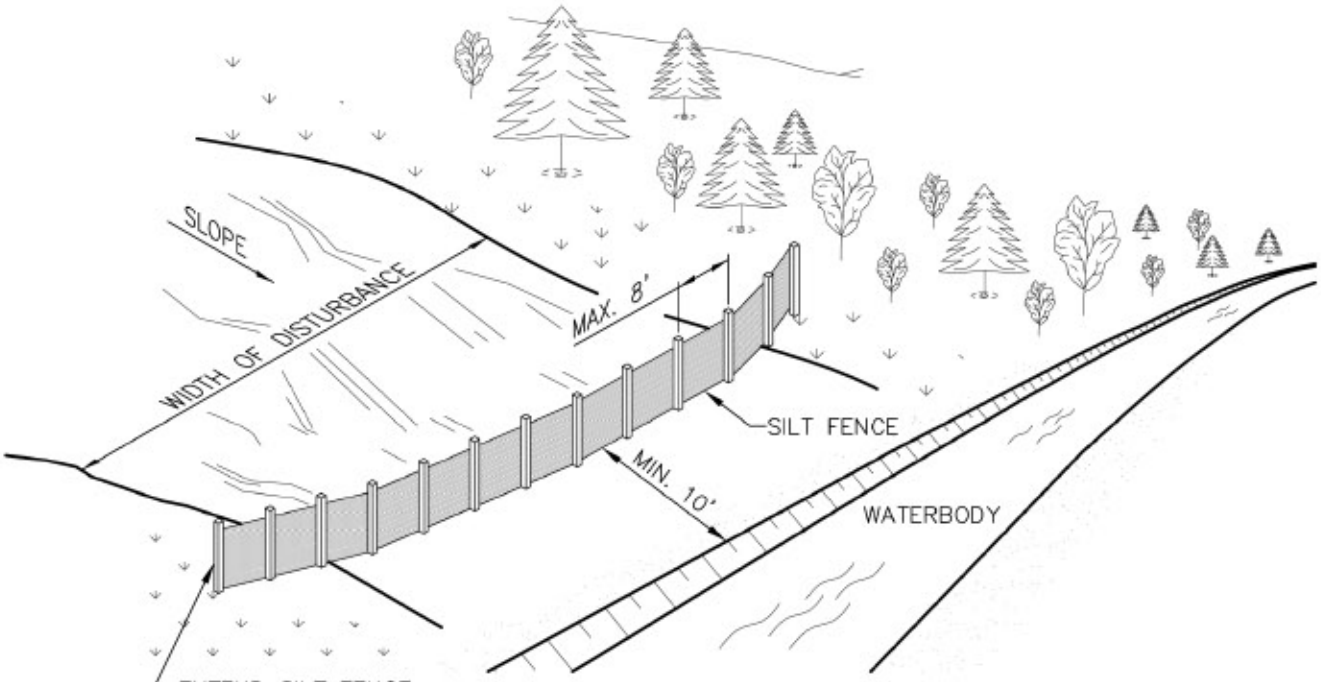
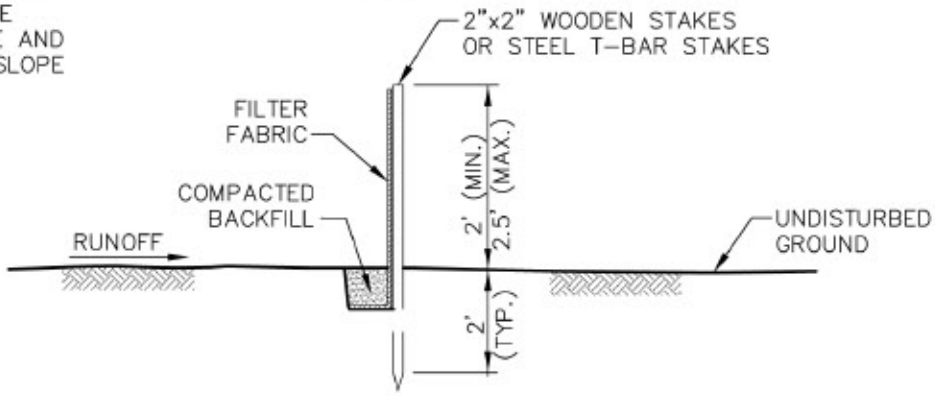


PLAN



SECTION "A–A"

NOTES:

1. MATERIAL SHOULD BE WOVEN GEOTEXTILE FABRIC SUCH AS EXXON GTF 180 OR MIRAFI 600X, OR AN APPROVED EQUIVALENT. SECONDARY REINFORCEMENT, SUCH AS A CONSTRUCTION BARRIER FENCE OR WIRE MESH CAN ALSO BE USED BEHIND THE FILTER FABRIC.
2. SILT FENCE TO BE REINFORCED WITH 2"x2" WOODEN STAKES OR STEEL T-BAR STAKES PLACED EVERY 8' OR CLOSER AS CONDITIONS REQUIRE.
3. ATTACH FILTER FABRIC AT EACH POST AT A MINIMUM OF 3 LOCATIONS.
4. THE FILTER FABRIC MINIMUM LENGTH OF 1' IS TO BE ANCHORED IN A TRENCH WITH WELL COMPACTED BACKFILL OVER THE FABRIC TO PREVENT UNDERMINING.
5. TO ELIMINATE POSSIBLE END FLOW, BOTH ENDS OF THE SILT FENCE SHALL BE TURNED AND EXTENDED UPSLOPE.
6. SILT FENCES ARE TO BE CHECKED AND MAINTAINED ON A REGULAR BASIS. REMOVE ANY BUILD-UP OF SEDIMENT. REPLACE DAMAGED OR INEFFECTIVE SILT FENCE AS SOON AS POSSIBLE.
7. WHERE ANCHORING CONDITIONS FOR THE SILT FENCE ARE POOR, PLACE STRAW BALES ON DOWNSTREAM SIDE OF THE SILT FENCE.
8. INSTALLATION TO BE MODIFIED BY THE PROJECT AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008-11-04 UPDATED DRAWING NOTES
02 2010-10-08 UPDATED DRAWING NOTES
03 2010-10-11 REVISED TITLE BLOCK

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DESIGNER:		KEYSTONE XL PROJECT		
JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 1 TYPICAL SILT FENCE BARRIER		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-05-701	REV 03

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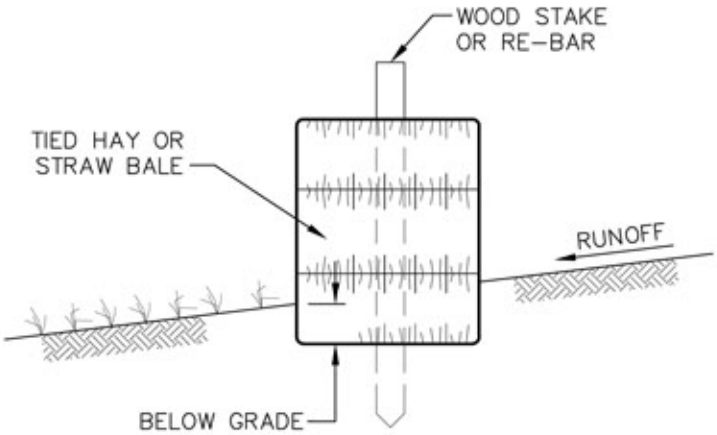

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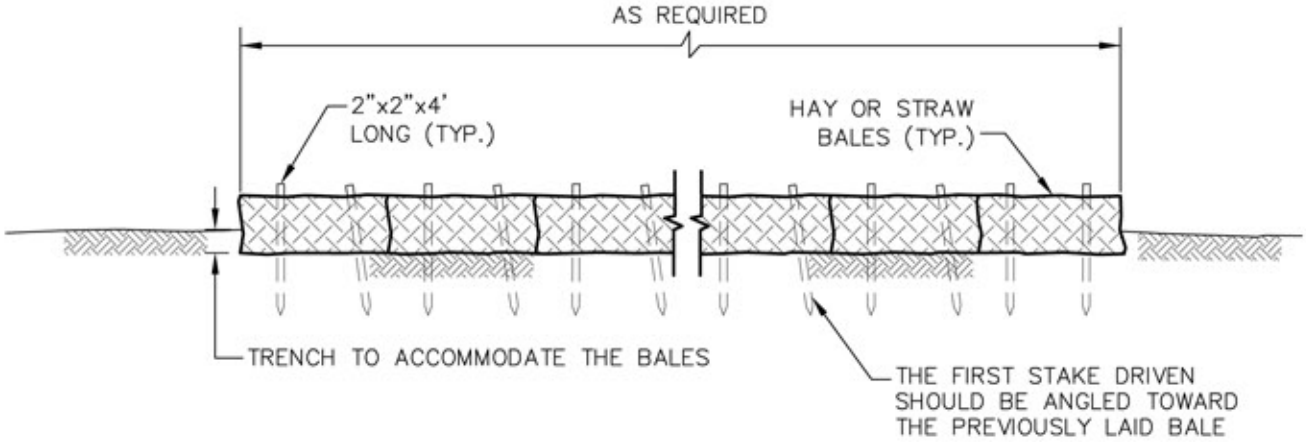

SECTION

NOTES:

1. TO ELIMINATE POSSIBLE END FLOW, BOTH ENDS OF THE STRAW BALE BARRIER SHOULD BE TURNED AND EXTENDED UPSLOPE.
2. EACH BALE SHOULD BE SECURED BY AT LEAST 2 STAKES. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE TO FORCE THE BALES TOGETHER. ANY GAPS CAN BE FILLED IN BY WEDGING LOOSE STRAW BETWEEN THE BALES. STAKES SHOULD BE DRIVEN. REBAR OR STANDARD "T" OR "U" STEEL POSTS CAN BE USED AS STAKES, BUT IT SHOULD BE NOTED THAT THEY MAY POSE A HAZARD TO EQUIPMENT IF THE BALES DISINTEGRATE.
3. COMPACT THE EXCAVATED SOIL AGAINST THE UPHILL SIDE OF THE BARRIER TO PREVENT PIPING.
4. STRAW OR HAY BALE BARRIERS REQUIRE CONTINUAL MAINTENANCE TO REMOVE COLLECTED SEDIMENT AND REPLACE DAMAGED BALES AS SOON AS POSSIBLE. PAY CLOSE ATTENTION TO THE REPAIR OF DAMAGED BALES, END RUNS AND UNDERCUTTING BENEATH BALES.
5. INSTALLATION TO BE MODIFIED BY THE PROJECT AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008-11-04 UPDATED DRAWING NOTES
02 2010-10-08 UPDATED DRAWING NOTES
03 2010-10-11 UPDATED DRAWING NOTES

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DESIGNER: JMP (NAME) 2010-10-21 (DATE)	KEYSTONE XL PROJECT		
	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 2 TYPICAL STRAW OR HAY BALE BARRIER		
CHECKED BY: WSF / DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-05-702	REV 03

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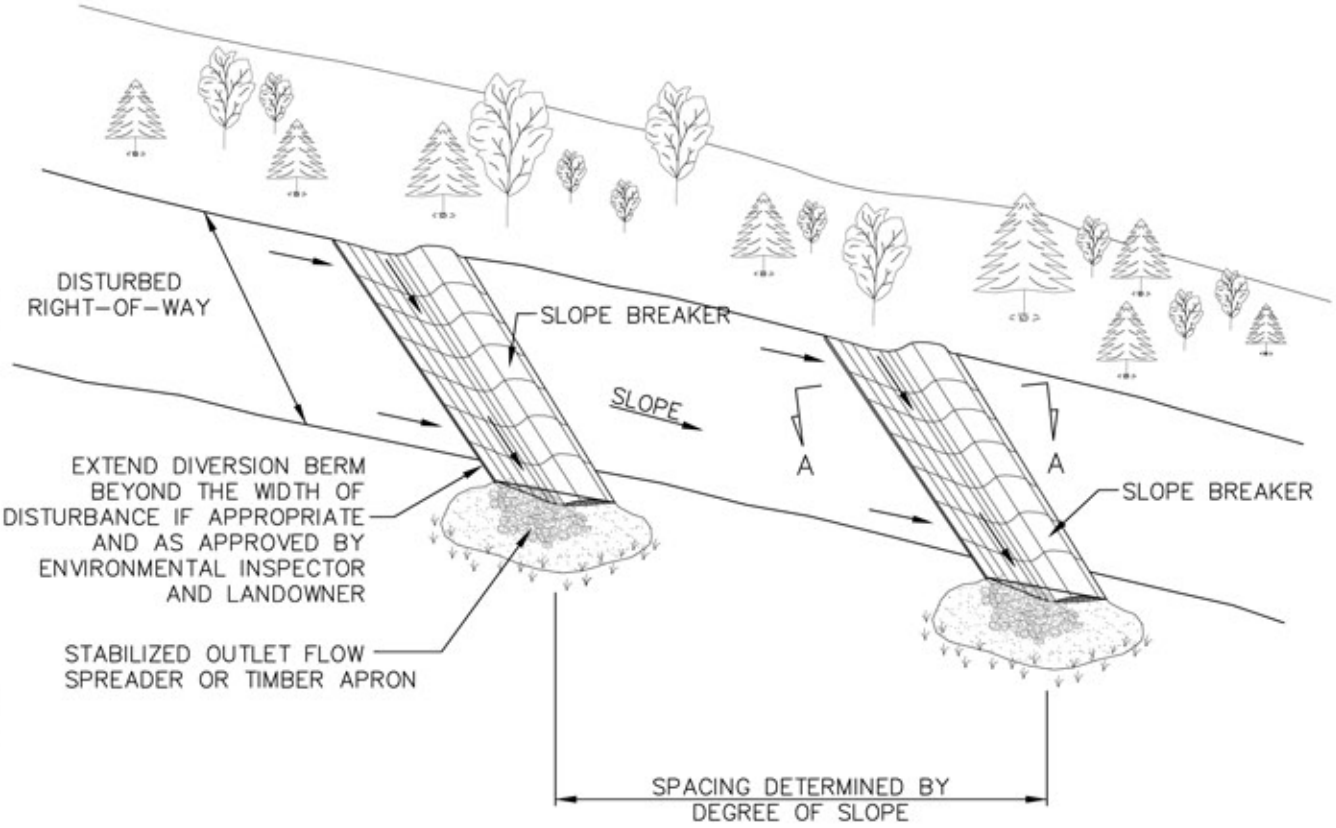

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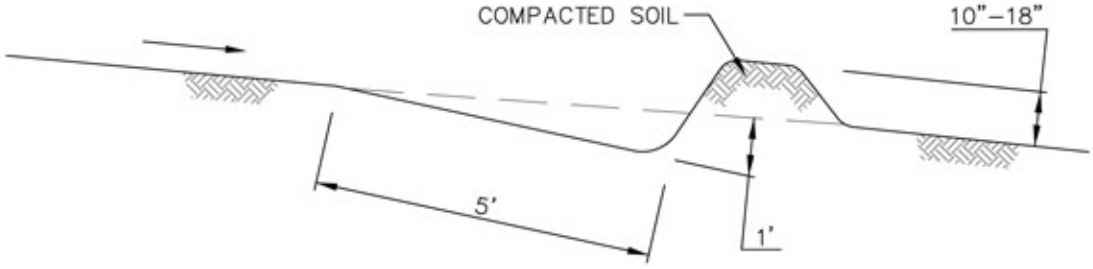

NOTES:

1. PERMANENT SLOPE BREAKERS TO PROVIDE POSITIVE DRAINAGE TO A STABILIZED OUTLET.
2. INSTALLATION SPECIFICATIONS TO BE MODIFIED BY THE PROJECT AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.
3. THE CONTRACTOR SHALL INSTALL TEMPORARY AND PERMANENT SLOPE BREAKERS ON SLOPES GREATER THAN APPROXIMATELY 5% ON ALL DISTURBED LANDS AT THE FOLLOWING RECOMMENDED SPACING:

SLOPE (%)	SPACING (FEET)
5-15	300
>15-30	200
>30	100

REVISIONS
01 2008-11-04 MODIFIED DRAWING NOTES
02 2010-10-08 UPDATED DRAWING NOTES
03 2010-10-11 REVISED TITLE BLOCK

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DESIGNER: JMP (NAME) 2010-10-21 (DATE)

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DESIGN CHECKER: RW

P7100

KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL 3
TEMPORARY/PERMANENT SLOPE BREAKER DETAIL
(WATER BARS)

SCALE: N.T.S. | DWG No: 4359-03-ML-05-703 | REV: 03

TC_A4_BR.DWG 8.5X11

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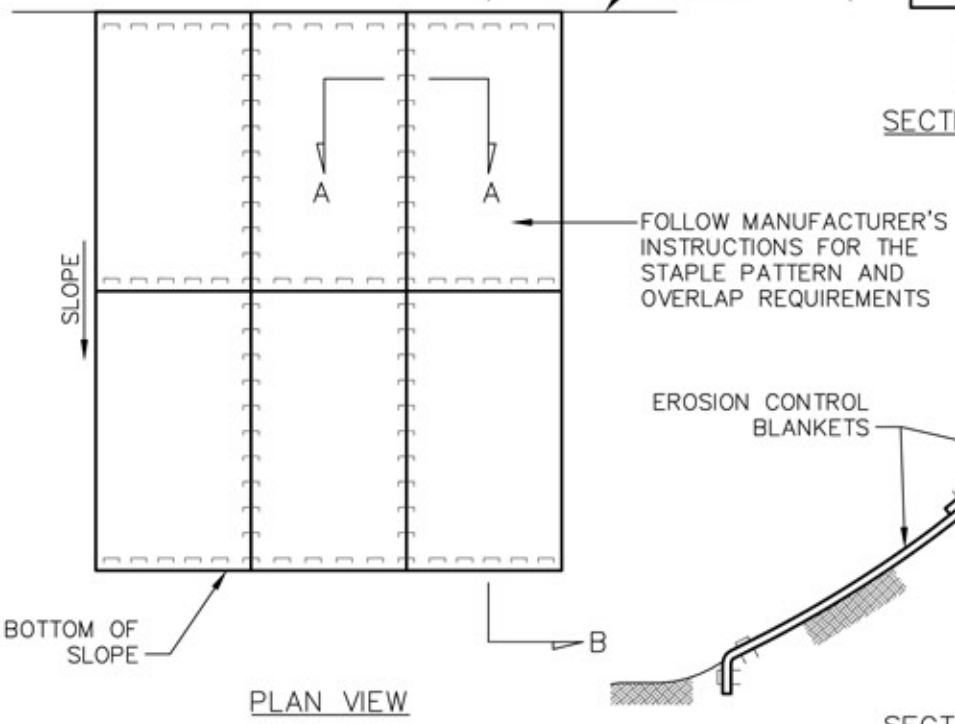
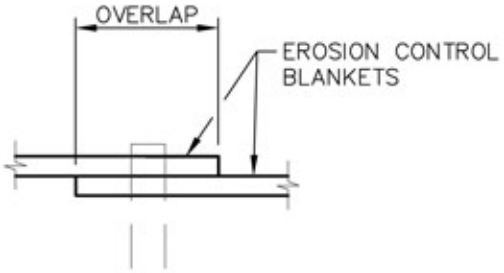
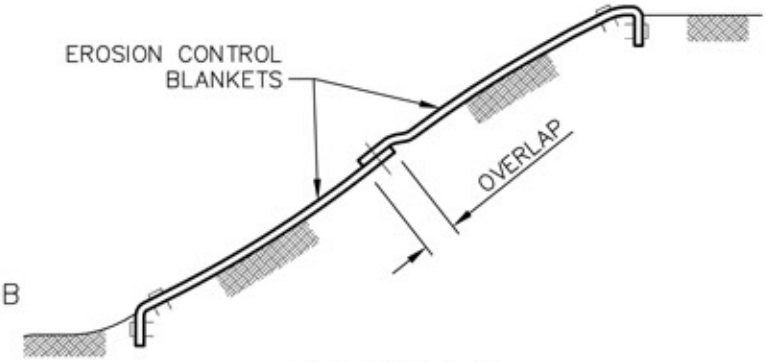


PLAN VIEW



SECTION A–A



SECTION B–B

NOTES:

1. INSTALL MATTING IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. PREPARE SOIL BEFORE INSTALLING MATTING, INCLUDING GRADING, REMOVAL OF LARGE ROCKS AND DEBRIS, AND THE APPLICATION OF SEED AND FERTILIZER IF NOT USING PRE–SEEDED MATTING.
3. EROSION CONTROL MATTING SHALL EXTEND COMPLETELY ACROSS DISTURBED AREAS TO PROTECT ERODIBLE SURFACES.
4. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE MATTING IN A TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
5. ROLL THE MATTING DOWN THE SLOPE IN THE DIRECTION OF THE WATER FLOW.
6. AS AN ALTERNATIVE TO STAPLES, WOODEN STAKES OR BIO–DEGRADEABLE PINS CAN BE USED WHERE SPECIFIED BY THE COMPANY.
7. ENSURE COMPLETE CONTACT BETWEEN THE MATTING AND THE SLOPE FACE. ADDITIONAL STAPLES CAN BE USE TO ELIMINATE GAPS.
8. INSTALLATION SPECIFICATIONS TO BE MODIFIED BY THE PROJECT AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008–11–04 MODIFIED DRAWING NOTES
02 2010–10–08 UPDATED DRAWING NOTES
03 2010–10–11 REVISED TITLE BLOCK

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DESIGNER: JMP (NAME) 2010–10–21 (DATE)	KEYSTONE XL PROJECT		
	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 4 EROSION CONTROL MATTING INSTALLATION		
CHECKED BY: WSF / DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359–03–ML–05–704	REV 03

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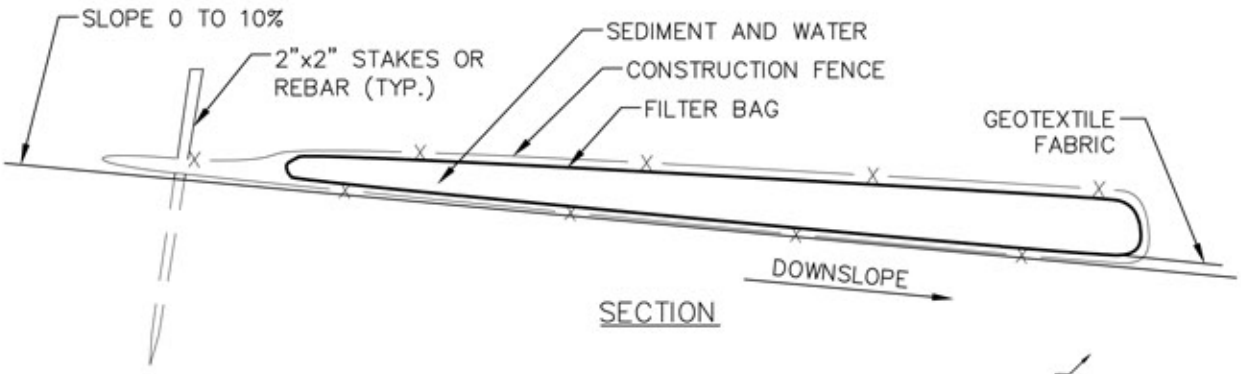
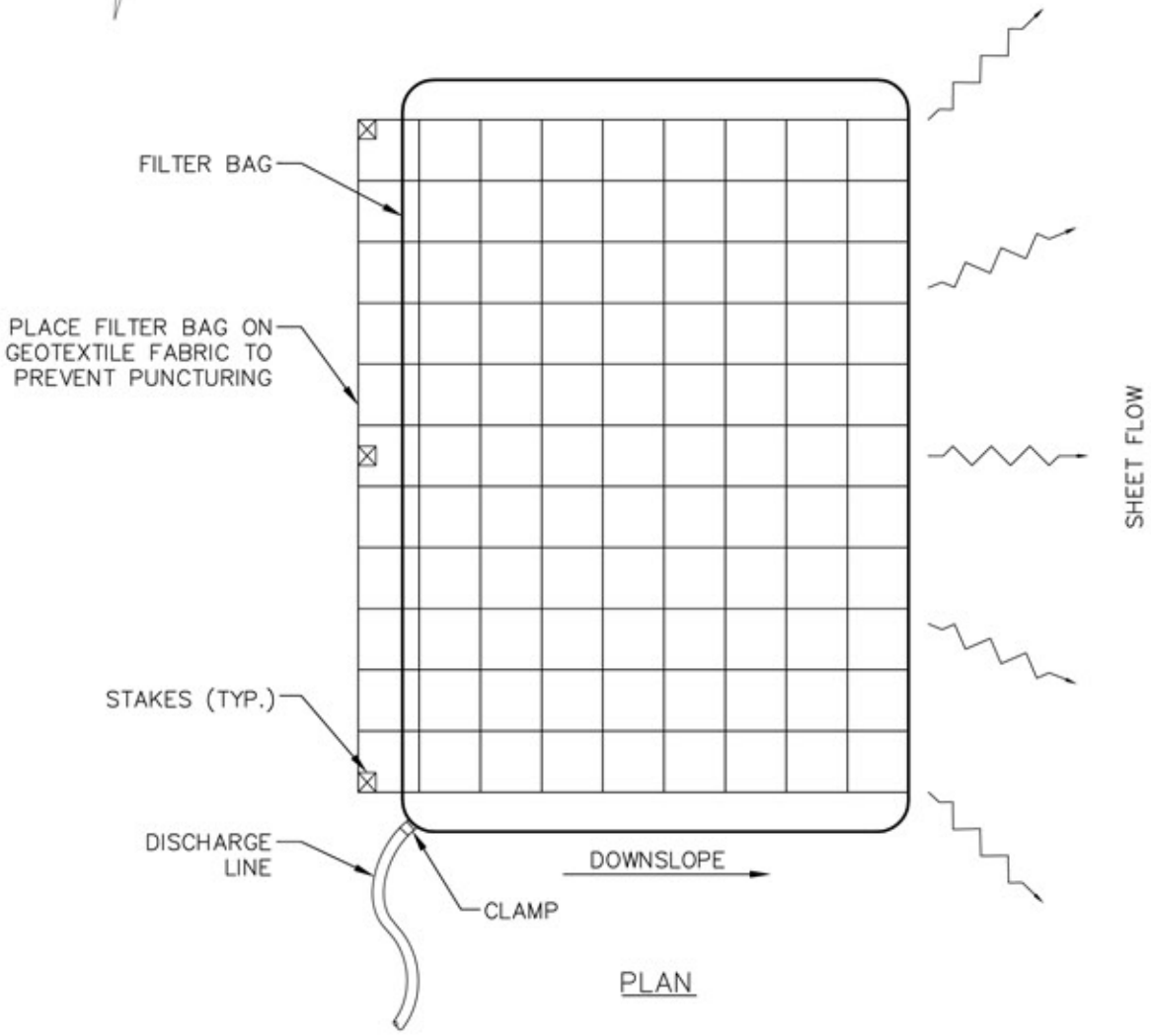


SECTION



PLAN

NOTES:

1. MANUFACTURED NONWOVEN (FELT) FILTER BAGS ARE A SUITABLE ALTERNATIVE TO STRAW BALE STRUCTURES FOR TRENCH DEWATERING. FILTER BAGS SHALL BE INSTALLED AS SPECIFIED BY THE MANUFACTURER.
2. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008-11-04 MODIFIED DRAWING NOTES
02 2010-10-11 REVISED TITLE BLOCK

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DESIGN CHECKER: RW P7100

KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE
DETAIL 5
TYPICAL DEWATERING FILTER BAG

SCALE N.T.S. | DWG No 4359-03-ML-05-705 | REV 02

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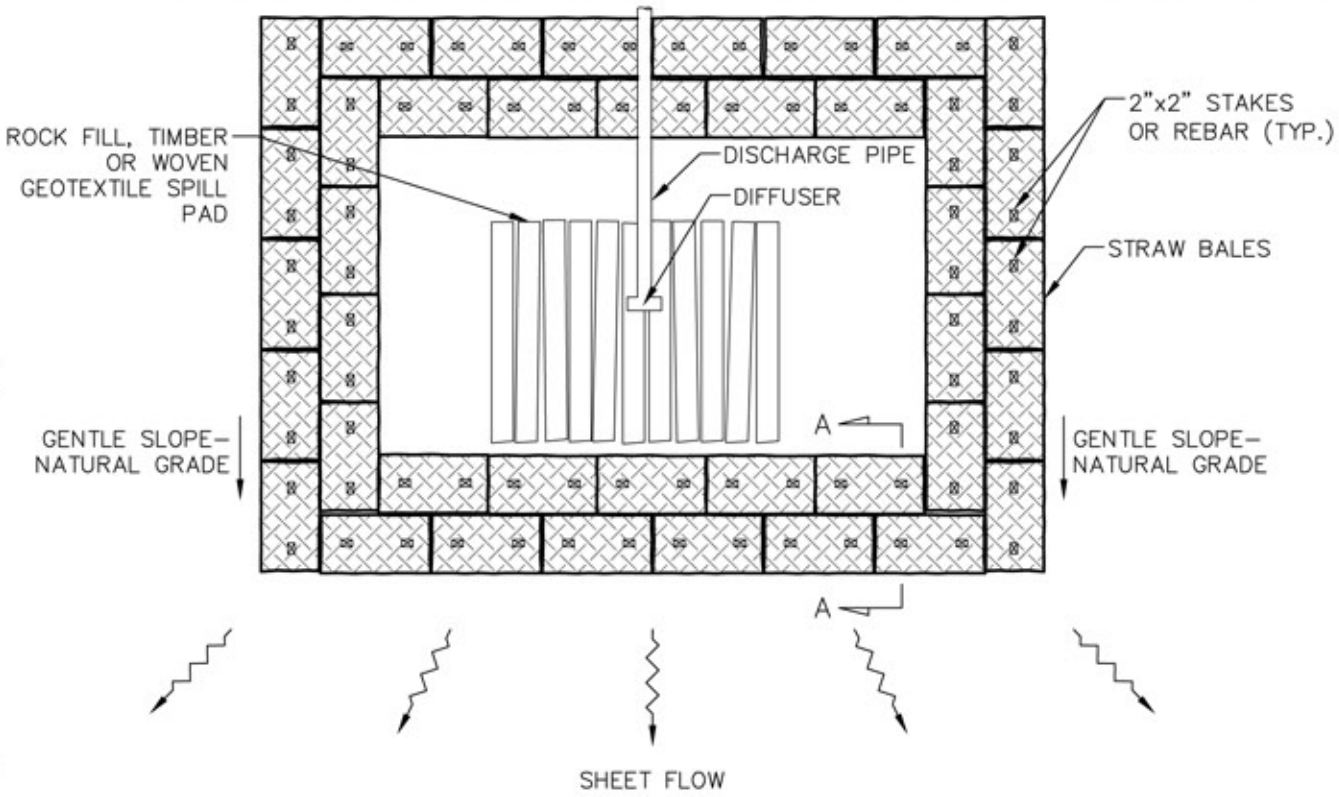
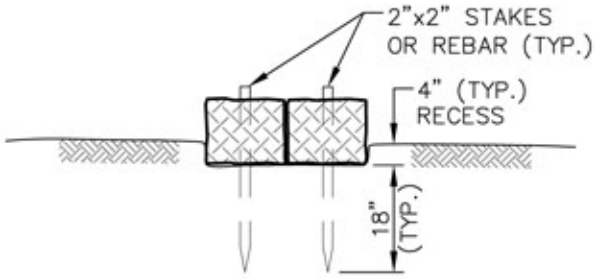


PLAN



SECTION A–A

NOTES:

1. INSTALL A STRAW BALE DEWATERING STRUCTURE WHEREVER IT IS NECESSARY AND AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR TO PREVENT THE FLOW OF HEAVILY SILT LADEN WATER INTO WATERBODIES OR WETLANDS.
2. DISCHARGE SITE SHOULD BE WELL VEGETATED AND LOCATED AT LEAST 50 FEET FROM ANY WATERBODY. THE TOPOGRAPHY OF THE SITE SHOULD BE SUCH THAT WATER WILL FLOW INTO THE DEWATERING STRUCTURE AND AWAY FROM ANY WORK AREAS. THE AREA DOWNSLOPE FROM THE DEWATERING SITE MUST BE REASONABLY FLAT OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.
3. DIRECT THE PUMPED WATER ONTO A STABLE SPILL PAD CONSTRUCTED OF ROCKFILL, WEIGHTED TIMBERS, OR A WOVEN GEOTEXTILE STAKED TO THE GROUND SURFACE, SUCH AS MIRAFI 600X, TERRAFIX 400W, OR A COMPANY APPROVED EQUIVALENT. BEYOND THE SPILL PAD FORCE THE DISCHARGE WATER INTO SHEET FLOW USING STRAW BALES AND THE NATURAL TOPOGRAPHY.
4. DISCHARGE RATES SHOULD BE SUCH THAT THE CAPACITY OF THE STRUCTURE WILL NOT BE EXCEEDED.
5. DISCHARGE WATER SHALL BE FORCED INTO SHEET FLOW IMMEDIATELY BEYOND THE SPILL PAD USING A COMBINATION OF STRAW BALES AND THE NATURAL TOPOGRAPHY. RECESS STRAW BALES. DRIVE TWO (2) STAKES OR REBAR INTO EACH BALE TO ANCHOR THEM IN PLACE.
6. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008-11-04 MODIFIED DRAWING NOTES
02 2010-10-08 UPDATED DRAWING NOTES
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DESIGNER: JMP (NAME) 2010-10-21 (DATE)	KEYSTONE XL PROJECT		
	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 6 TYPICAL STRAW BALE DEWATERING STRUCTURE		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-05-706 REV 03

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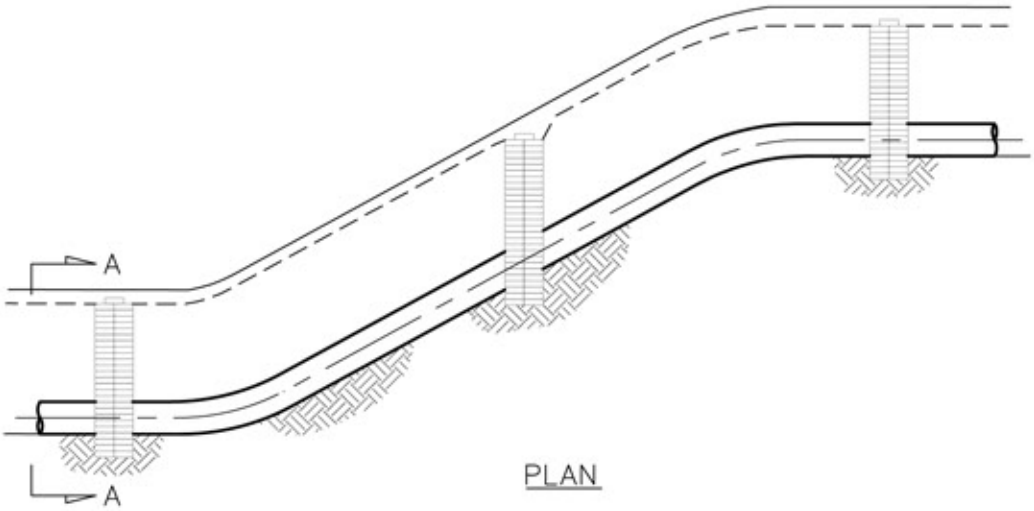
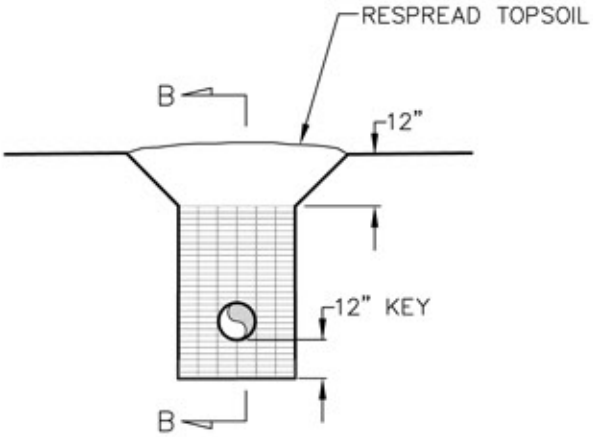
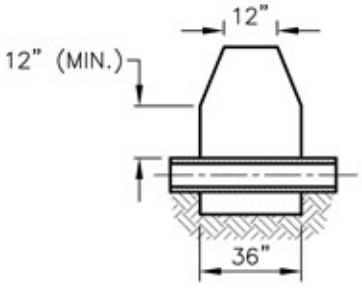


PLAN



SECTION A–A



SECTION B–B

NOTES:

1. TRENCH BREAKERS TO BE INSTALLED AS SHOWN ON THE CONSTRUCTION DRAWINGS, WHERE DESCRIBED IN THE PLAN, AND AS DIRECTED.
2. OPEN WEAVE HEMP OR JUTE SACKS SHALL BE FILLED WITH AN AVERAGE 55 LBS. MIXTURE OF:
   1) ONE (1) PART CEMENT AND SIX (6) PARTS SAND OR SUBSOIL, OR
   2) ONE (1) PART CEMENT, THREE (3) PARTS FLYASH, AND FIVE (5) PARTS SAND OR SUBSOIL
   3) SAND WITH JUST SUFFICIENT WATER TO PERMIT MIXTURE TO EXUDE AND BOND SACKS TOGETHER. TOPSOIL IS NOT TO BE USED IN SACKS.
3. KEY EACH TRENCH BREAKER A MINIMUM OF ONE (1) FT. INTO BOTTOMS AND SIDES OF TRENCH.
4. FOAM TRENCH BREAKERS MAY BE USED IN LIEU OF SAND SACK TRENCH BREAKERS.
5. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.
6. TRENCH BREAKERS SHALL BE INSTALLED SUCH THAT THE TOP OF EACH DOWNSLOPE BREAKER IS ABOVE THE BOTTOM OF THE NEXT UPSLOPE BREAKER.

REVISIONS
01 2008–11–04 UPDATED DRAWING NOTES
02 2010–10–11 UPDATED PLAN DETAIL

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CHECKED BY: WSF

DESIGN CHECKER: RW P7100

KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE
DETAIL 7
TYPICAL PERMANENT TRENCH BREAKER

SCALE N.T.S. | DWG No 4359–03–ML–05–707 | REV 02

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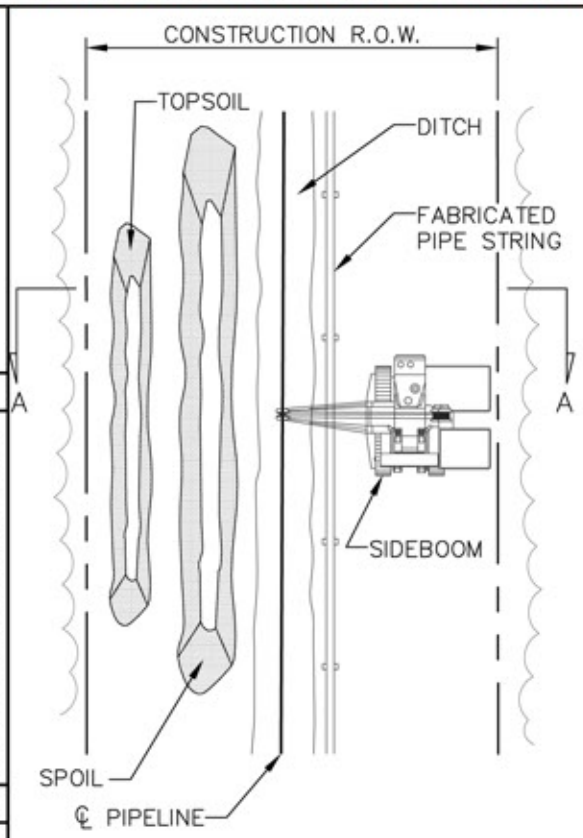
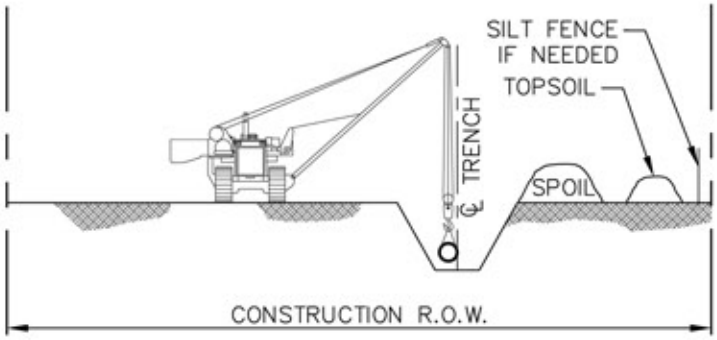


PLAN VIEW



SECTION "A–A"

CONSTRUCTION PROCEDURES:

1. IF THE WETLAND IS BEING CULTIVATED AND FARMED, NO WETLAND CONSTRUCTION PROCEDURES ARE REQUIRED.
2. FLAG WETLAND BOUNDARIES PRIOR TO CLEARING.
3. NO REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE "NO FUELING" SIGN POSTS APPROXIMATELY 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER THE PROJECT'S SPILL PREVENTION PROCEDURES.
4. INSTALL TEMPORARY SLOPE BREAKER UPSLOPE WITHIN 100 FEET OF WETLAND BOUNDARY IF DIRECTED BY THE PROJECT.
5. DO NOT TRENCH WETLAND UNTIL PIPE IS READY TO INSTALL.
6. CONSTRUCT WHEN DRY, IF POSSIBLE. IF SITE BECOMES WET AT TIME OF TRENCHING, AVOID SOIL COMPACTION BY UTILIZING TIMBER RIP–RAP OR PREFABRICATED EQUIPMENT MATS.
7. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS (STRAW BALES AND/OR SILT FENCE) AT DOWN SLOPE EDGE OF RIGHT–OF–WAY ALONG WETLAND EDGE IF NEEDED TO CONTAIN SPOIL WITHIN RIGHT–OF–WAY.
8. RESTRICT ROOT GRUBBING TO ONLY THAT AREA OVER THE DITCHLINE AND REMOVE STUMPS FROM WETLAND FOR DISPOSAL.
9. CONDUCT TRENCH LINE TOPSOIL STRIPPING (IF TOPSOIL IS NOT SATURATED). SALVAGE TOPSOIL TO ACTUAL DEPTH OR A MAXIMUM DEPTH OF 12 INCHES.
10. TRENCH THROUGH WETLANDS.
11. PIPE SECTION TO BE FABRICATED WITHIN THE WETLAND AND ADJACENT TO ALIGNMENT, OR IN STAGING AREA OUTSIDE THE WETLAND AND WALKED IN.
12. LOWER–IN PIPE. PRIOR TO BACKFILLING TRENCH, IF REQUIRED, TRENCH PLUGS SHALL BE INSTALLED AS REQUIRED. BACKFILL TRENCH.
13. RESTORE GRADE TO NEAR PRE–CONSTRUCTION TOPOGRAPHY, REPLACE TOPSOIL AND INSTALL PERMANENT EROSION CONTROL.
14. IF UTILIZED, REMOVE TIMBER MATS OR PRE–FABRICATED MATS FROM WETLANDS UPON COMPLETION.
15. IN THE ABSENCE OF A DETAILED REVEGETATION PLANS, APPLY A TEMPORARY COVER CROP AS DIRECTED BY KEYSTONE.

REVISIONS
01 REVISED NOTES 3 & 4
02 2010–10–08 UPDATED DRAWING NOTES
03 2010–10–11 UPDATED DRAWING NOTES

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KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL 8 "DRY" WETLAND CROSSING METHOD

SCALE N.T.S. | DWG No 4359–03–ML–03–701 | REV 03

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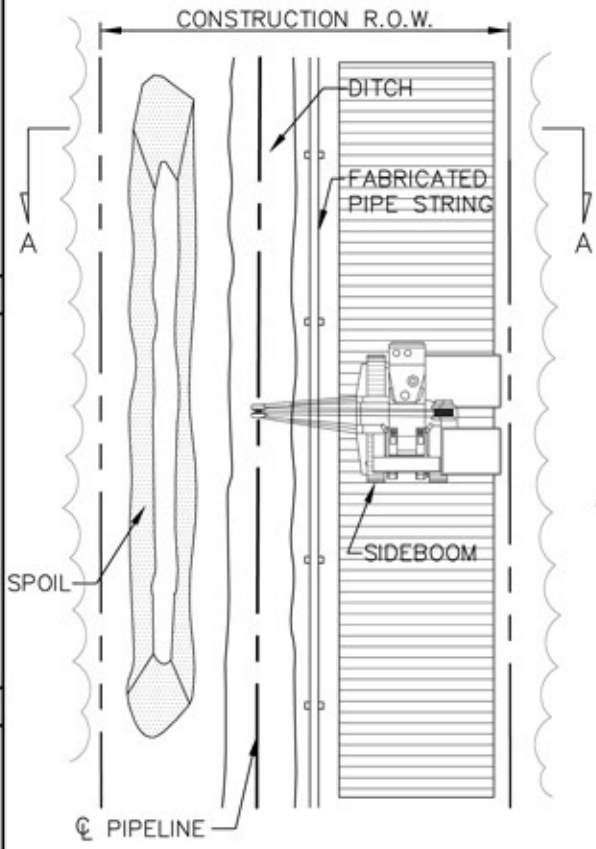
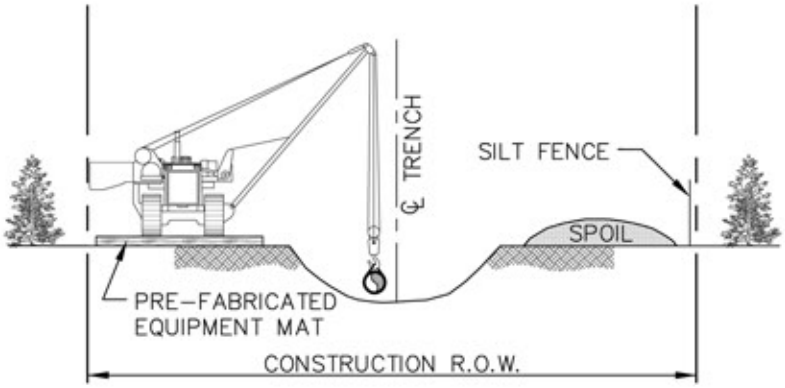


PLAN VIEW



SECTION A–A

CONSTRUCTION PROCEDURES:

1. FLAG WETLAND BOUNDARIES PRIOR TO CLEARING.
2. NO REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE "NO FUELING" SIGN POSTS 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER THE PROJECT'S SPILL PREVENTION PROCEDURES.
3. INSTALL TEMPORARY SLOPE BREAKER UPSLOPE WITHIN 100 FEET OF WETLAND BOUNDARY IF DIRECTED BY THE PROJECT.
4. INSTALL TIMBER MATS/RIPRAP THROUGH ENTIRE WETLAND AREA. EQUIPMENT NECESSARY FOR RIGHT-OF-WAY CLEARING MAY MAKE ONE (1) PASS THROUGH THE WETLAND BEFORE MATS ARE INSTALLED.
5. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS (STRAW BALES AND/OR SILT FENCE) AT DOWNSLOPE EDGE OF RIGHT-OF-WAY AND ALONG WETLAND EDGE AS REQUIRED.
6. RESTRICT ROOT GRUBBING TO ONLY THAT AREA OVER THE DITCHLINE AND DITCH SPOIL AREAS AND REMOVED FROM WETLAND FOR DISPOSAL.
7. DO NOT TRENCH WETLAND UNTIL PIPE IS READY TO INSTALL.
8. TOPSOIL STRIPPING SHALL NOT BE REQUIRED IN SATURATED SOIL CONDITIONS.
9. LEAVE HARD PLUGS AT EDGE OF WETLAND UNTIL JUST PRIOR TO TRENCHING.
10. PIPE SECTION MAY BE FABRICATED WITHIN THE WETLAND AND ADJACENT TO ALIGNMENT, OR IN STAGING AREA OUTSIDE THE WETLAND AND WALKED IN.
11. TRENCH THROUGH WETLANDS.
12. LOWER-IN PIPE, INSTALL TRENCH PLUGS AT WETLAND EDGES AS REQUIRED AND BACKFILL IMMEDIATELY.
13. REMOVE TIMBER MATS OR PRE-FABRICATED MATS FROM WETLAND UPON COMPLETION.
14. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY, REPLACE TOPSOIL IF SALVAGED AND INSTALL PERMANENT EROSION CONTROL.

REVISIONS
01 REVISED NOTES 2 & 3
02 2010-10-11 UPDATED DRAWING NOTES

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CHECKED BY: WSF

DESIGN CHECKER: RW P7100

KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL 9 STANDARD WETLAND CROSSING METHOD

SCALE N.T.S. | DWG No 4359-03-ML-03-702 | REV 02

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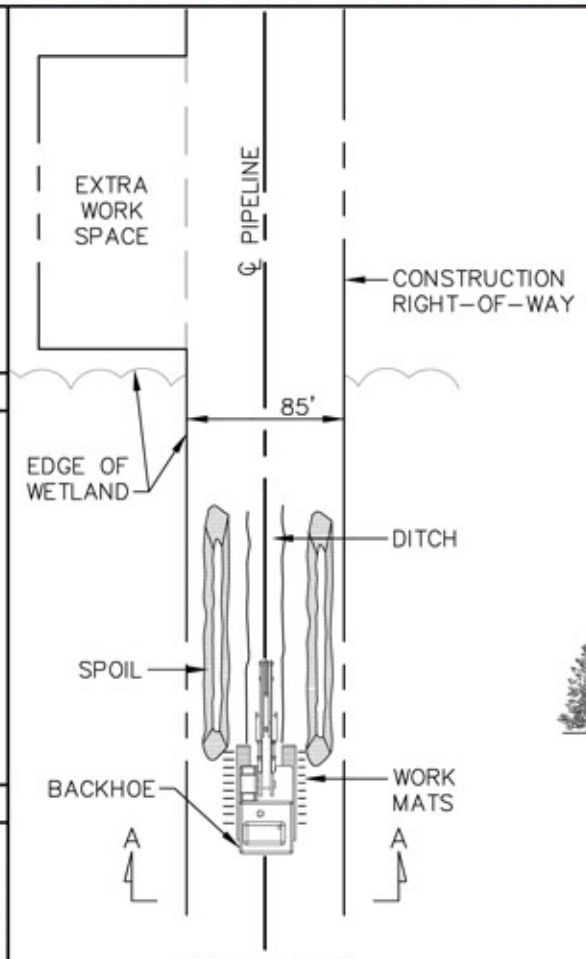
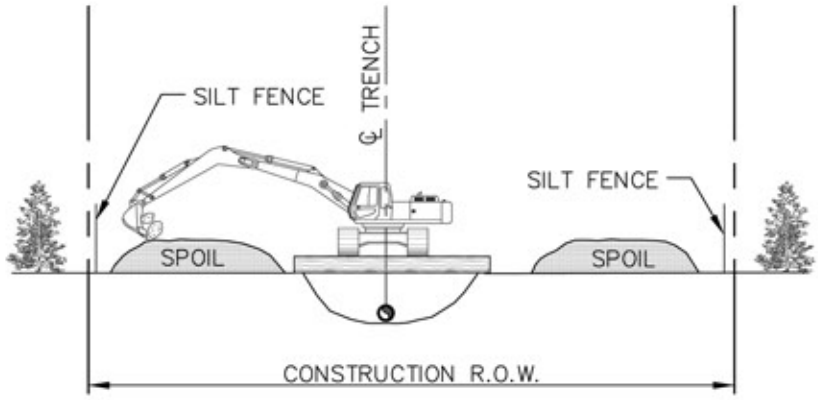


PLAN VIEW



SECTION A–A

CONSTRUCTION PROCEDURES:

1. FLAG WETLAND BOUNDARIES PRIOR TO CLEARING.
2. NO REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE "NO FUELING" SIGN POSTS 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER THE PROJECT'S SPILL PREVENTION PROCEDURES.
3. INSTALL TEMPORARY SLOPE BREAKER UPSLOPE WITHIN 100 FEET OF WETLAND BOUNDARY AS DIRECTED BY THE PROJECT.
4. RESTRICT ROOT GRUBBING TO ONLY THE AREA OVER THE DITCHLINE.
5. DO NOT TRENCH WETLAND UNTIL PIPE IS READY TO INSTALL.
6. TOPSOIL STRIPPING SHALL NOT BE REQUIRED IN SATURATED SOIL CONDITIONS.
7. UTILIZE AMPHIBIOUS EXCAVATORS (PONTOON MOUNTED BACKHOES) OR TRACKED BACKHOES SUPPORTED BY FABRICATED TIMBER MATS OR FLOATS TO EXCAVATE TRENCH. IF FABRICATED TIMBER MATS ARE USED FOR STABILIZATION, THE BACKHOE SHALL GRADUALLY MOVE ACROSS THE WETLAND BY MOVING THE MAT FROM IMMEDIATELY BEHIND TO IMMEDIATELY IN FRONT OF THE BACKHOE'S PATH.
8. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS (STRAW BALES AND/OR SILT FENCE) AT EDGE OF RIGHT-OF-WAY AND ALONG WETLAND EDGE IF PRACTICAL.
9. FABRICATE PIPE IN STAGING AREA OUTSIDE THE WETLAND IN THE EXTRA WORK SPACE AS INDICATED ON THE CONSTRUCTION DRAWINGS.
10. LEAVE HARD PLUGS AT THE EDGE OF THE WETLAND UNTIL JUST PRIOR TO PIPE PLACEMENT.
11. FLOAT PIPE IN PLACE, LOWER-IN, INSTALL TRENCH PLUGS AT WETLAND EDGES WHERE REQUIRED AND BACKFILL IMMEDIATELY.
12. REMOVE TIMBER MATS OR PRE-FABRICATED MATS OF NON-NATIVE MATERIAL FROM WETLANDS UPON COMPLETION.
13. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY AND INSTALL PERMANENT EROSION CONTROL.
14. THE CONSTRUCTION RIGHT-OF-WAY FOR THIS TYPE OF CONSTRUCTION SHALL BE 85 FEET.

REVISIONS	
01	REVISED NOTES 2, 3 & 13
02	2010-10-11 UPDATED DRAWING NOTES

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JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 10 PUSH/PULL WETLAND CROSSING METHOD		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-03-703	REV 02

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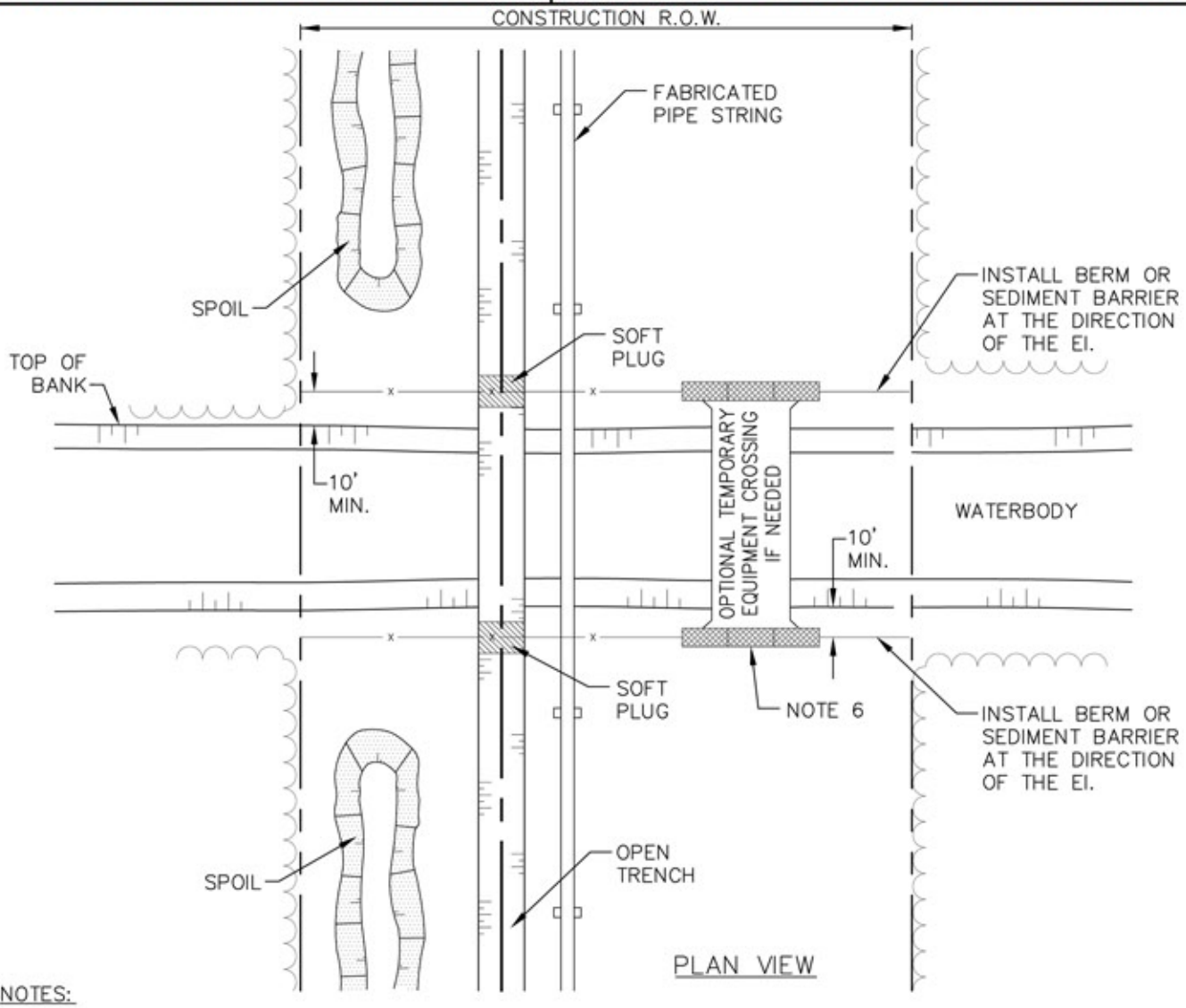

NOTES:

1. THIS METHOD APPLIES TO DRY WASHES, SWALES, INCISED DRAINAGES AND DITCHES WITH NO PERCEPTIBLE FLOW AT TIME OF CROSSING. IF FLOWS ARE PRESENT DURING CONSTRUCTION REFER TO DETAIL 12. CLEARING AND GRADING, TOPSOIL SALVAGE AND TOPSOIL STRIPPING DEPTHS SHALL BE THE SAME AS INDICATED FOR ADJACENT UPLAND UNLESS OTHERWISE DIRECTED BY KEYSTONE.
2. EI TO FLAG THE ORDINARY HIGH WATER MARK (OHWM) PRIOR TO CLEARING.
3. INSTALL SILT FENCE OR A BERM AT DIRECTION OF KEYSTONE EI TO PREVENT RUNOFF FROM ROW TO ADJACENT, UNDISTURBED DRAINAGE.
4. STOCKPILE TOPSOIL AND SPOIL SEPARATELY. TOPSOIL SHALL NOT BE STOCKPILED ACROSS THE DRAINAGE CHANNEL AND SHALL BE PLACED A MINIMUM OF 15 FEET FROM THE OHWM OR TO SUIT CONDITIONS AND PROTECT THE DRAINAGE AS DETERMINED BY KEYSTONE.
5. INSTALL TEMPORARY SLOPE BREAKERS WHERE IDENTIFIED BY THE EI.
6. TRENCH, STRING PIPE, AND BACKFILL USING STANDARD UPLAND CONSTRUCTION PROCEDURES UNLESS OTHERWISE DIRECTED BY KEYSTONE.
7. RESTORE WATERCOURSE CHANNEL AND BANKS (EXCEPT TRAVEL LANE IF USED) TO APPROXIMATE PRE-CONSTRUCTION PROFILE IMMEDIATELY AFTER PIPE IS LOWERED IN AND BACKFILLED. INSTALL PERMANENT EROSION CONTROLS WHERE DIRECTED BY KEYSTONE.
8. REMOVE ANY TEMPORARY CROSSING STRUCTURES AND/OR GRAVEL.

REVISIONS | 01 UPDATED DRAWING NOTES | 02 2010-10-08 UPDATED DRAWING NOTES | 03 2010-10-11 UPDATED DRAWING NOTES

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DESIGNER: JMP (NAME) 2010-10-21 (DATE)	KEYSTONE XL PROJECT		
	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 11 TYPICAL OPEN CUT WET CROSSING METHOD NON-FLOWING WATERBODY		
CHECKED BY: WSF / DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-03-704	REV 03

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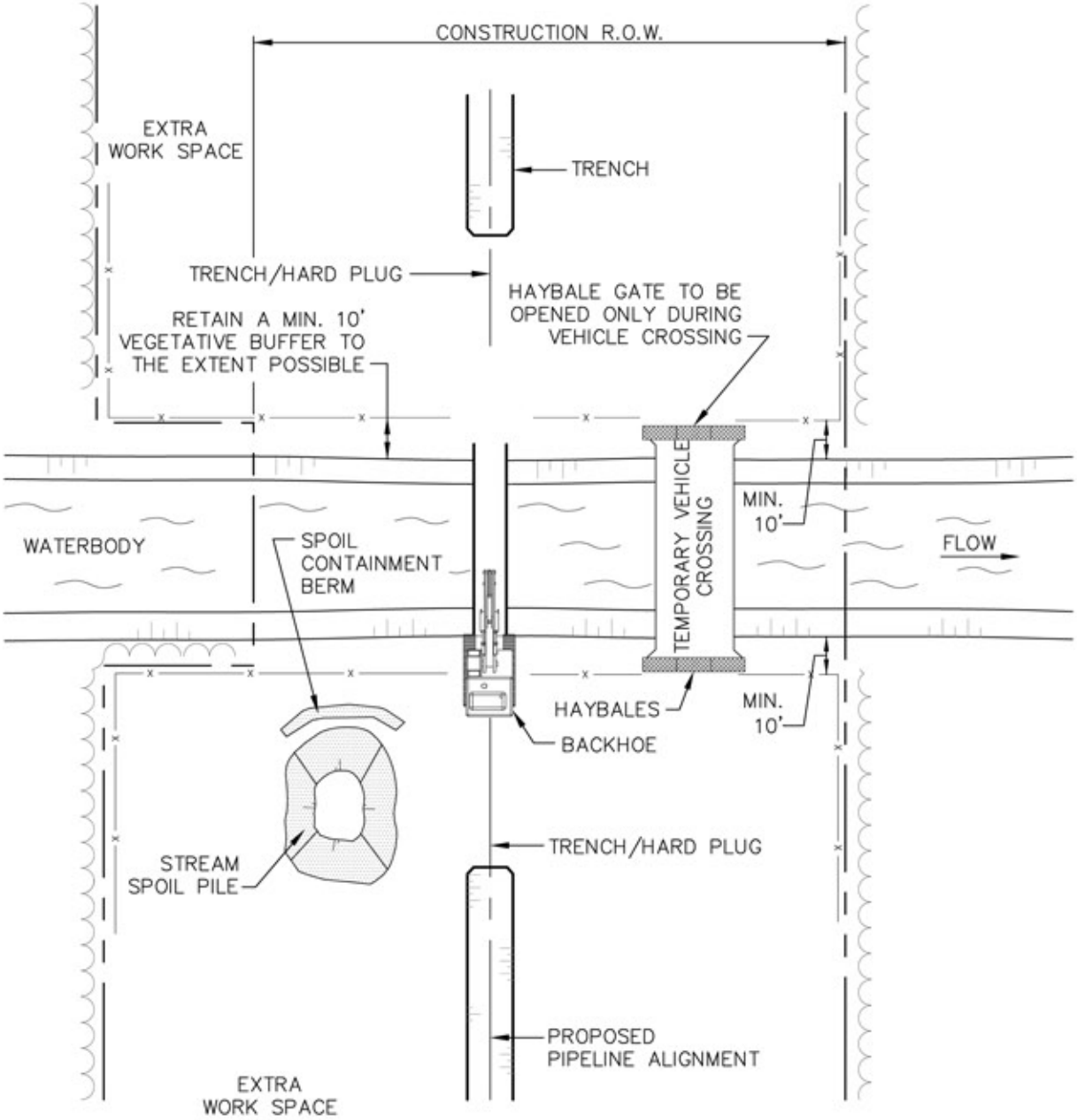

PLAN VIEW

REVISIONS | 01 UPDATED DRAWING NOTES | 02 2010-10-11 REVISED TITLE BLOCK

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DESIGNER: JMP (NAME) 2010-10-21 (DATE)	KEYSTONE XL PROJECT		
	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 12 TYPICAL OPEN CUT WET CROSSING METHOD FLOWING WATERBODY		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-03-705 REV 02

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CONSTRUCTION PROCEDURES:

1. RIGHT-OF-WAY BOUNDARIES AND WORK SPACE LIMITS SHALL BE CLEARLY DELINEATED. STAGING FOR MAKEUP SHALL BE LOCATED A MINIMUM OF 10 FEET FROM WATERBODY.

2. CLEARING LIMITS WILL BE CLEARLY DELINEATED AND 10 FOOT VEGETATIVE BUFFER STRIP BETWEEN DISTURBED AREA AND THE WATERBODY SHALL BE MAINTAINED TO THE EXTENT POSSIBLE. ALL CLEARING SHALL BE MINIMIZED TO THE EXTENT POSSIBLE AND TO ONLY THAT NECESSARY FOR CONSTRUCTION. WOODY VEGETATION SHALL BE CUT AT GROUND LEVEL AND THE STUMPS/ROOTS LEFT IN PLACE TO THE EXTENT POSSIBLE.

3. TOPSOIL SHALL BE STRIPPED FROM THE DITCH LINE IN ALL WETLANDS RIPARIAN.

4. CONTRACTOR SHALL INSTALL SIGNS APPROXIMATELY 100 FEET MINIMUM FROM EACH WATERBODY AND WETLAND TO IDENTIFY THE HAZARDOUS MATERIALS EXCLUSION AREA.

5. EROSION AND SEDIMENT CONTROL
   a. CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES, AS DEPICTED OR ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVILY SILT LADEN WATER ENTERS WATERBODY OR WETLAND.

   b. NO HEAVILY SILT LADEN WATER SHALL BE DISCHARGED DIRECTLY OR INDIRECTLY INTO THE WATERBODY. ALL EROSION AND SEDIMENT CONTROL STRUCTURE LOCATIONS AS DEPICTED ARE APPROXIMATE AND MAY BE ADJUSTED AS DIRECTED BY THE COMPANY INSPECTOR TO SUIT ACTUAL SITE CONDITIONS. SILT FENCE OR STRAW BALE INSTALLATIONS SHALL INCLUDE REMOVABLE SECTIONS TO FACILITATE ACCESS DURING CONSTRUCTION.

   c. SEDIMENT LADEN WATER FROM TRENCH DEWATERING SHALL BE DISCHARGED TO A WELL VEGETATED UPLAND AREA INTO A STRAW BALE DEWATERING STRUCTURE OR GEOTEXTILE FILTER BAG. SEDIMENT CONTROL STRUCTURES MUST BE IN PLACE AT ALL TIMES ACROSS THE DISTURBED CONSTRUCTION RIGHT-OF-WAY EXCEPT DURING EXCAVATION/INSTALLATION OF THE CROSSING PIPE.

   d. SOFT DITCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE MAINLINE DITCH FROM THE WATERBODY CROSSING UNTIL THE WATER CROSSING IS INSTALLED AND BACKFILLED.

   e. TRENCH BREAKERS ARE TO BE INSTALLED AT THE SAME SPACING AND IMMEDIATELY UPSLOPE OF PERMANENT SLOPE BREAKERS, OR AS DIRECTED BY THE COMPANY.

6. CONTRACTOR SHALL MAINTAIN HARD PLUGS IN THE DITCH AT THE WATERBODY UNTIL JUST PRIOR TO PIPE INSTALLATION. CONTRACTOR SHALL EXCAVATE TRENCH AND INSTALL PIPE AS EXPEDIENTLY AS PRACTICAL TO REDUCE THE DURATION OF WORK ACTIVITIES IN THE WATERBODY BED.

7. CONTRACTOR SHALL PLACE TRENCH SPOIL ONLY IN CERTIFICATED WORK SPACE AND A MINIMUM OF 10 FEET FROM THE WATERBODY BANKS TO PREVENT ENTRY OF SPOIL INTO THE WATERBODY. SPOIL SHALL BE CONTAINED AS NECESSARY USING EITHER A STRAW BALE BARRIER OR AN EARTH/ROCK BERM.

8. CONTRACTOR SHALL RESTORE THE WATERBODY AND BANKS TO APPROXIMATE PRE-CONSTRUCTION CONTOURS, UNLESS OTHERWISE APPROVED BY THE COMPANY. CONTRACTOR SHALL INSTALL PERMANENT EROSION AND SEDIMENT CONTROL STRUCTURES AS INDICATED. ANY MATERIALS PLACED IN THE WATERBODY TO FACILITATE CONSTRUCTION SHALL BE REMOVED DURING RESTORATION. BANKS SHALL BE STABILIZED AND TEMPORARY SEDIMENT BARRIERS INSTALLED AS SOON AS POSSIBLE AFTER CROSSING, BUT WITHIN 24 HOURS OF COMPLETING THE CROSSING. MAINTAIN A SILT FENCE OR STRAW BALE BARRIER ALONG THE WATERBODY AND WETLAND BOUNDARIES UNTIL VEGETATION IS ESTABLISHED IN ADJACENT DISTURBED AREAS.

9. VEHICLE CROSSING CAN BE CONSTRUCTED USING EITHER A FLUME CROSSING OR A TEMPORARY BRIDGE. VEHICLE CROSSING ONLY REQUIRED IF STREAM SUPPORTS A STATE DESIGNATED FISHERY.

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DESIGNER:		KEYSTONE XL PROJECT		
JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 12A TYPICAL OPEN CUT WET CROSSING METHOD FLOWING WATERBODY – CONSTRUCTION PROCEDURES		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-03-706	REV 01

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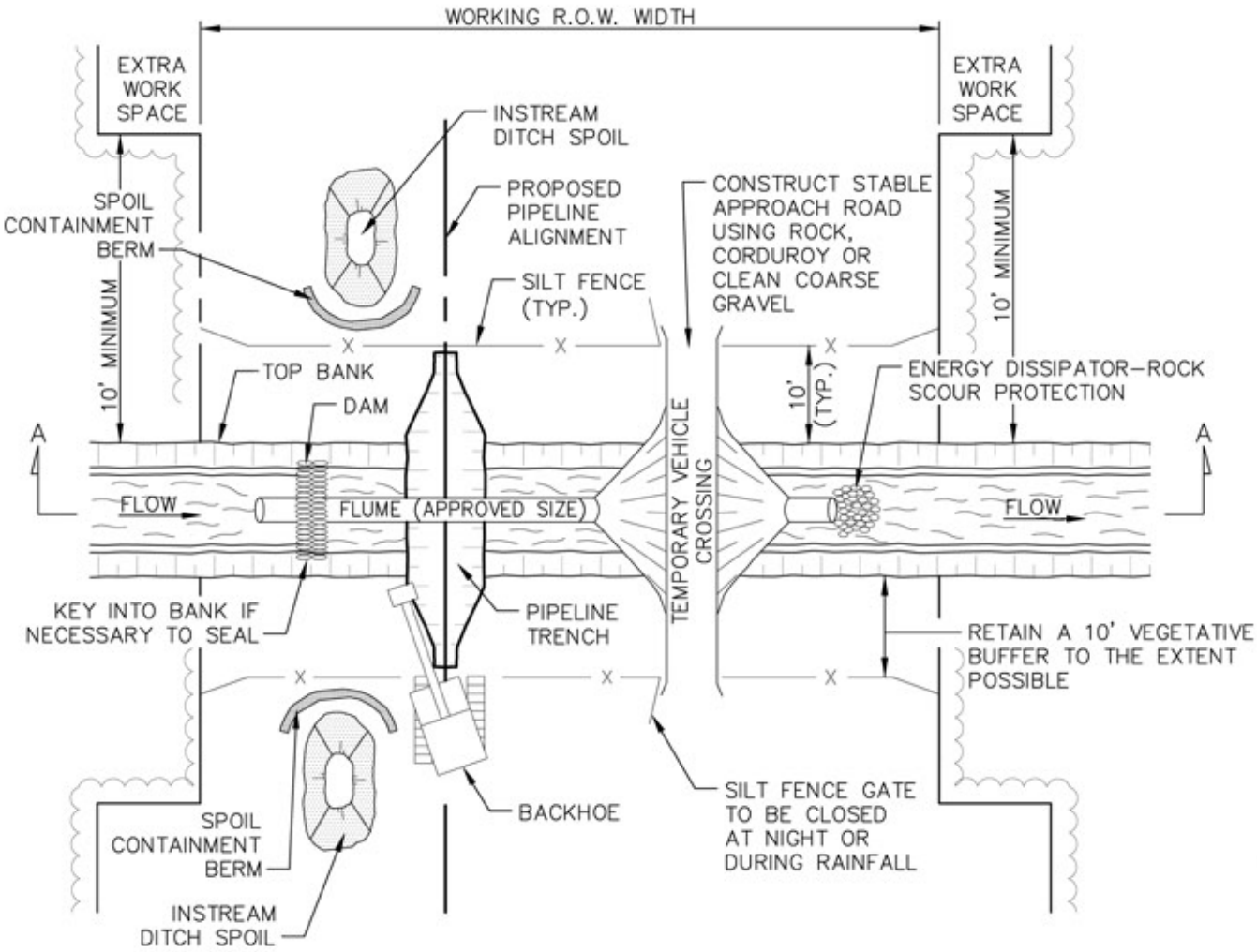
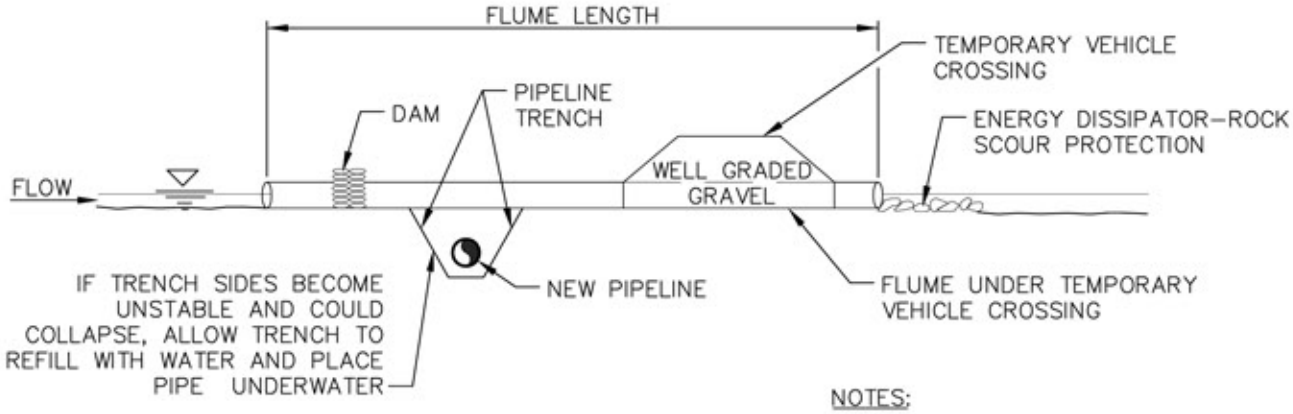


PLAN VIEW



SECTION A–A

NOTES:

1. PIPELINE PLACEMENT WITHIN RIGHT–OF–WAY CONCEPTUAL ONLY.
2. SEE DETAIL 13A FOR CONSTRUCTION PROCEDURES.

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KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE
DETAIL 13
TYPICAL DRY FLUME CROSSING METHOD

SCALE N.T.S. | DWG No 4359–03–ML–03–707 | REV 01

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CONSTRUCTION PROCEDURES:

1. MARK OUT AND MAINTAIN LIMITS OF AUTHORIZED WORK AREAS WITH FENCING OR FLAGGING TAPE TO AVOID UNNECESSARY DISTURBANCE OF VEGETATION. ENSURE EQUIPMENT OPERATORS WORKING ON THE CROSSING HAVE BEEN BRIEFED ABOUT THIS PLAN AND THE MEASURE NEEDED TO PROTECT WATER QUALITY.
2. ALL NECESSARY EQUIPMENT AND MATERIALS TO BUILD THE FLUME MUST BE ON-SITE OR READILY AVAILABLE PRIOR TO COMMENCING IN-WATER WORK.
3. TO THE EXTENT POSSIBLE, MAINTAIN A MINIMUM 10 FT. VEGETATIVE BUFFER STRIP BETWEEN DISTURBED AREAS AND THE WATERCOURSE. INSTALL AND MAINTAIN A SILT FENCE OR STRAW BALE BARRIER UPSLOPE OF THE BUFFER STRIP ON EACH SIDE OF THE WATERCOURSE.
4. CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES, AS DEPICTED OR ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVILY SILT LADEN WATER ENTERS STREAM.
   a. NO HEAVILY SILT LADEN WATER SHALL BE DISCHARGED DIRECTLY INTO THE STREAM.
   b. EROSION AND SEDIMENT CONTROL STRUCTURE LOCATIONS AS DEPICTED ARE APPROXIMATE AND MAY BE ADJUSTED AS DIRECTED BY THE COMPANY INSPECTOR TO ACTUAL SITE CONDITIONS.
   c. SILT FENCE OR STRAW BALE INSTALLATIONS SHALL INCLUDE REMOVABLE SECTIONS TO FACILITATE ACCESS DURING CONSTRUCTION. UTILIZE STRAW BALE BARRIERS ONLY IN LIEU OF A SILT FENCE WHERE FREQUENT ACCESS IS REQUIRED.
   d. SEDIMENT LADEN WATER FROM TRENCH DEWATERING SHALL BE DISCHARGED TO A WELL VEGETATED UPLAND AREA INTO A STRAW BALE DEWATERING STRUCTURE OR GEOTEXTILE FILTER BAG.
   e. SEDIMENT CONTROL STRUCTURES MUST BE IN PLACE AT ALL TIMES ACROSS THE DISTURBED PORTIONS OF THE RIGHT-OF-WAY EXCEPT DURING EXCAVATION/INSTALLATION OF THE CROSSING PIPE.
   f. SOFT DITCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE MAINLINE DITCH FROM THE RIVER CROSSING UNTIL THE RIVER CROSSING IS INSTALLED AND BACKFILLED.
5. PIPE SHALL BE STRUNG AND WELDED FOR READY INSTALLATION PRIOR TO WATERCOURSE TRENCHING.
6. FLUME CAPACITY DURING DRY CROSSING SHALL BE SUFFICIENT TO ACCOMMODATE 1.5 TIMES THE FLOW MEASURED AT THE TIME OF CONSTRUCTION PROVIDED THAT THE FLUMES WILL BE IN PLACE NOT MORE THAN 96 HOURS AND NO PRECIPITATION IS FORECAST. FLUME CAPACITY FOR VEHICLE ACCESS SHALL BE SUFFICIENT TO PASS THE 2 YEAR DESIGN FLOW OR THE FLOW REASONABLY EXPECTED TO OCCUR DURING THE INSTALLATION. EXCESS FLUMES REQUIRED FOR LONGER TERM ACCESS SHALL BE CAPPED DURING DRY CROSSING PROCEDURES.
7. ENSURE THAT THE DAMS AND VEHICLE CROSSING ARE LOCATED FAR ENOUGH APART TO ALLOW FOR A WIDE EXCAVATION.
8. FLUMES ARE TO BE SET WITH 10 PERCENT OF THEIR DIAMETER BELOW STREAMBED LEVEL WHERE SOIL CONDITIONS PERMIT (OTHERWISE INSTALLED AT STREAM GRADE AND SLOPE.)
9. PLACE IMPERVIOUS DAMS AT EACH END OF THE FLUME, UPSTREAM FIRST, THEN DOWNSTREAM. ACCEPTABLE ALTERNATIVES INCLUDE GRAVEL WITH RIP-RAP PROTECTION, SAND BAGS, STEEL PLATE AND ROCKFILL. DURING INSTALLATION, INSTALL AN IMPERVIOUS MEMBRANE, IF NECESSARY, TO LIMIT LEAKAGE. DAMS MAY NEED KEYING INTO THE BANK AND STREAMBED.
   EXCAVATE TRENCH THROUGH PLUGS AND UNDER FLUME FROM BOTH SIDES. WORK IS TO BE COMPLETED AS QUICKLY AS POSSIBLE.
   a. LOWER IN PIPE BY PASSING UNDER FLUME AND BACKFILL IMMEDIATELY WITH SPOIL MATERIAL.
   b. IT IS NOT NECESSARY TO DEWATER THE IN-STREAM TRENCH, HOWEVER, DISPLACED WATER SHALL BE PUMPED TO A STABLE UPLAND AREA TO AVOID OVERTOPPING OF DAMS DURING PIPE PLACEMENT.
   c. IF THE SPOIL MATERIAL IS NOT SUITABLE, USE IMPORTED CLEAN GRANULAR MATERIAL.
   d. IF BLASTING IS REQUIRED, USE CONTROLLED BLASTING TECHNIQUES TO PREVENT DAMAGE TO THE FLOW CONVEYANCE SYSTEM. ALTERNATIVELY, BLASTING MAY BE ACCOMPLISHED PRIOR TO THE FLUME INSTALLATION BY DRILLING THROUGH THE OVERBURDEN.
10. EXCAVATED MATERIAL MUST NOT BE STOCKPILED WITHIN 10 FT. OF THE WATERCOURSE. THIS MATERIAL SHALL BE CONTAINED TO PREVENT SATURATED SOIL FROM FLOWING BACK INTO THE WATERCOURSE.
11. DEWATERING OF THE ONLAND TRENCH SHOULD OCCUR IN A STABLE VEGETATED AREA A MINIMUM OF 50 FT. FROM ANY WATERBODY. THE PUMP DISCHARGE SHOULD BE DIRECTED ONTO A STABLE SPILL PAD CONSTRUCTED OF ROCKFILL OR TIMBERS TO PREVENT LOCALIZED EROSION. THE DISCHARGE WATER SHOULD ALSO BE FORCED INTO SHEET FLOW IMMEDIATELY BEYOND THE SPILL PAD BY USING STRAW BALES AND THE NATURAL TOPOGRAPHY.
12. FLUMES SHOULD BE REMOVED AS SOON AS POSSIBLE, WHEN NO LONGER REQUIRED FOR PIPE LAYING OR FOR ROAD ACCESS, IN THE FOLLOWING MANNER:
   a. REMOVE THE VEHICLE CROSSING RAMP. BANKS ARE TO BE RESTORED TO A STABLE ANGLE AND PROTECTED WITH EROSION RESISTANT MATERIAL COMPATIBLE WITH THE FLOW CONDITIONS (E.G., EROSION CONTROL BLANKETS, CRIBBING, ROCK RIP-RAP, ETC.) TO THE MAXIMUM EXTENT POSSIBLE BEFORE REMOVING THE DAMS.
   b. REMOVE DOWNSTREAM DAM.
   c. REMOVE UPSTREAM DAM.
   d. REMOVE FLUME.
   e. COMPLETE BANK TRIMMING AND EROSION PROTECTION. IF SANDBAGS ARE USED FOR THE DAMS, PLACE AND REMOVE BY HAND TO AVOID EQUIPMENT BREAKING BAGS.
13. RESTORE THE STREAMBED AND BANKS TO APPROXIMATE PRE-CONSTRUCTION CONTOURS, BUT NOT TO EXCEED 2 HORIZONTAL TO 1 VERTICAL.
   a. INSTALL PERMANENT EROSION AND SEDIMENT CONTROL STRUCTURES AS INDICATED ON A SITE SPECIFIC BASIS. IN THE ABSENCE OF SITE SPECIFIC INFORMATION, A FLEXIBLE CHANNEL LINER SUCH AS NAG C125 OR C350 WHICH IS CAPABLE OF WITHSTANDING ANTICIPATED FLOW SHALL BE INSTALLED. ALTERNATIVELY, ROCK RIP-RAP SHALL BE INSTALLED.
   b. ANY MATERIALS PLACED IN THE STREAM TO FACILITATE CONSTRUCTION SHALL BE REMOVED DURING RESTORATION. BANKS SHALL BE STABILIZED AND TEMPORARY SEDIMENT BARRIERS INSTALLED AS SOON AS POSSIBLE AFTER CROSSING, BUT WITHIN 24 HOURS OF COMPLETING THE CROSSING.
   c. MAINTAIN A SILT FENCE OR STRAW BALE BARRIER ALONG THE WATER COURSE UNTIL VEGETATION IS ESTABLISHED IN ADJACENT DISTURBED AREAS.

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	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 13A TYPICAL DRY FLUME CROSSING METHOD – CONSTRUCTION PROCEDURES		
CHECKED BY: WSF / DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-03-708	REV 02

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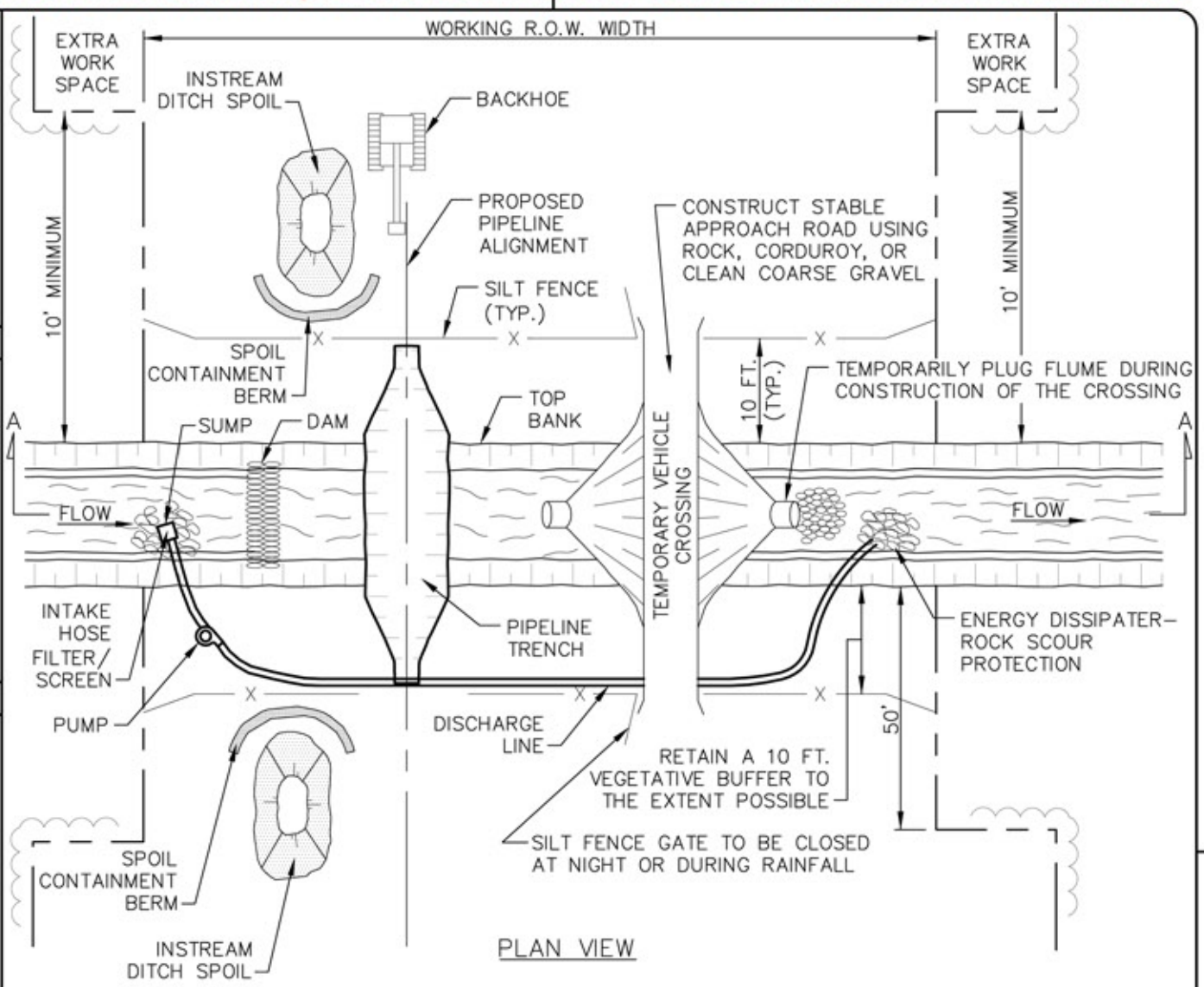
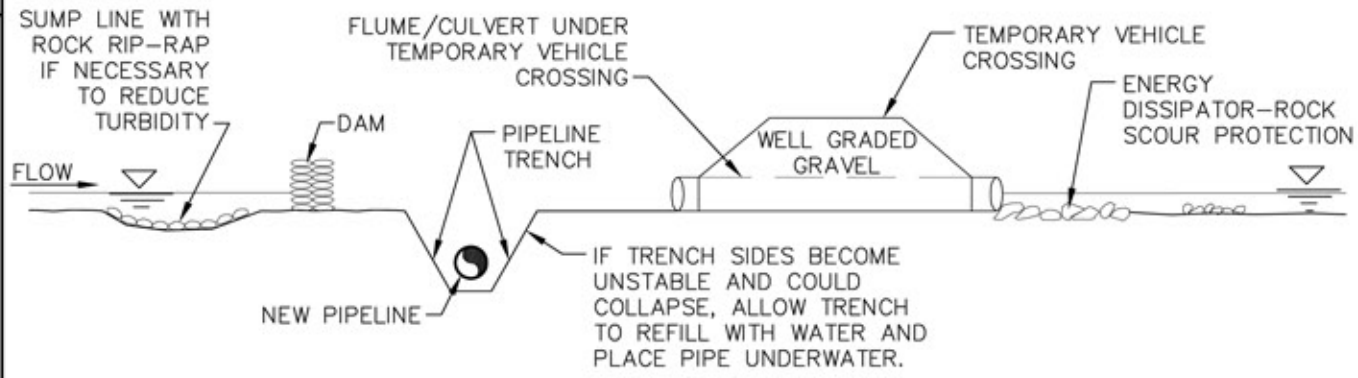


PLAN VIEW



SECTION A-A

NOTES:

1. PIPELINE PLACEMENT WITHIN RIGHT-OF-WAY CONCEPTUAL ONLY.
2. SEE DETAIL 14A FOR CONSTRUCTION PROCEDURES.

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KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE

DETAIL 14
TYPICAL DAM AND PUMP CROSSING

SCALE N.T.S. | DWG No 4359-03-ML-03-709 | REV 01

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CONSTRUCTION PROCEDURES:

1. WHERE NECESSARY, OBTAIN PRIOR APPROVAL BEFORE USING THE DAM AND PUMP METHOD.
2. IF THERE IS ANY FLOW IN THE WATERCOURSE, INSTALL PUMPS TO MAINTAIN STREAMFLOW AROUND THE BLOCKED OFF SECTIONS OF CHANNEL. THE PUMP IS TO HAVE 1.5 TIMES THE PUMPING CAPACITY OF ANTICIPATED FLOW. A SECOND STANDBY PUMP OF EQUAL CAPACITY IS TO BE READILY AVAILABLE AT ALL TIMES. AN ENERGY DISSIPATER IS TO BE BUILT TO ACCEPT PUMP DISCHARGE WITHOUT STREAMBED OR STREAMBANK EROSION. IF THE CROSSING IS PROLONGED BEYOND ONE DAY THE OPERATION NEEDS TO BE MONITORED OVERNIGHT.
3. SCHEDULE INSTREAM ACTIVITY FOR LOW FLOW PERIODS IF POSSIBLE.
4. MARK OUT AND MAINTAIN LIMITS OF AUTHORIZED WORK AREAS WITH FENCING OR FLAGGING TAPE TO AVOID UNNECESSARY DISTURBANCE OF VEGETATION. ENSURE EQUIPMENT OPERATORS WORKING ON THE CROSSING HAVE BEEN BRIEFED ABOUT THIS PLAN AND THE MEASURES NEEDED TO PROTECT WATER QUALITY. INSTALL PRE-WORK SEDIMENT CONTROL MEASURES AS SPECIFIED IN THE PLAN. ALL NECESSARY EQUIPMENT AND MATERIALS TO BUILD THE DAMS AND TO PUMP WATER MUST BE ON SITE OR READILY AVAILABLE PRIOR TO COMMENCING IN-WATER CONSTRUCTION. PIPE SHOULD BE STRUNG, WELDED AND COATED AND READY FOR INSTALLATION PRIOR TO WATERCOURSE TRENCHING.
5. CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES, AS DEPICTED AND ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVILY SILT LADEN WATER ENTERS STREAM.
   a. NO HEAVILY SILT LADEN WATER SHALL BE DISCHARGED DIRECTLY INTO THE STREAM.
   b. EROSION AND SEDIMENT CONTROL STRUCTURE LOCATIONS AS DEPICTED ARE APPROXIMATE AND MAY BE ADJUSTED AS DIRECTED BY THE COMPANY INSPECTOR TO ACTUAL SITE CONDITIONS.
   c. SILT FENCE OR STRAW BALE INSTALLATIONS SHALL INCLUDE REMOVABLE SECTIONS TO FACILITATE ACCESS DURING CONSTRUCTION. UTILIZE STRAW BALE BARRIERS ONLY IN LIEU OF A SILT FENCE WHERE FREQUENT ACCESS IS REQUIRED.
   d. SEDIMENT LADEN WATER FROM TRENCH DEWATERING SHALL BE DISCHARGED TO A WELL VEGETATED UPLAND AREA INTO A STRAW BALE DEWATERING STRUCTURE OR GEOTEXTILE FILTER BAG.
   e. SEDIMENT CONTROL STRUCTURES MUST BE IN PLACE AT ALL TIMES ACROSS THE DISTURBED PORTIONS OF THE RIGHT-OF-WAY EXCEPT DURING EXCAVATION/INSTALLATION OF THE CROSSING PIPE.
   f. SOFT DITCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE MAINLINE DITCH FROM THE RIVER CROSSING UNTIL THE RIVER CROSSING IS INSTALLED AND BACKFILLED.
6. TO THE EXTENT POSSIBLE, MAINTAIN A MINIMUM 10 FEET VEGETATIVE BUFFER STRIP BETWEEN DISTURBED AREAS AND THE WATERCOURSE. INSTALL AND MAINTAIN A SILT FENCE UPSLOPE OF THE BUFFER STRIP ON EACH SIDE OF THE WATERCOURSE. THE SILT FENCE SHOULD INCORPORATE REMOVABLE "GATES" AS REQUIRED TO ALLOW ACCESS WHILE MAINTAINING EASE OF REPLACEMENT FOR OVERNIGHT OR DURING PERIODS OF RAINFALL.
7. CONSTRUCT A TEMPORARY SUMP UPSTREAM OF THE DAM AND LINE WITH ROCKFILL IF A NATURAL POOL DOES NOT EXIST. INSTALL THE PUMP OR PUMP INTAKE IN THE POOL OR SUMP. DISCHARGE WATER ONTO AN ENERGY DISSIPATER DOWNSTREAM OF THE WORK AREA.
8. EXCAVATED MATERIAL MUST NOT BE STOCKPILED WITHIN 10 FT. OF THE WATERCOURSE. THIS MATERIAL MUST BE CONTAINED WITHIN BERM CONTAINMENT, WITH SECONDARY SILT FENCE PROTECTION TO PREVENT SATURATED SOIL FROM FLOWING BACK INTO THE WATERCOURSE.
9. CHEMICALS, FUELS, LUBRICATING OILS SHALL NOT BE STORED AND EQUIPMENT REFUELED WITHIN 100 FT. OF THE WATERBODY. PUMPS ARE TO BE REFUELED AS PER THE SPCC PLANS.
10. STAGING AREAS ARE TO BE LOCATED AT LEAST 10 FT. FROM THE WATER'S EDGE (WHERE TOPOGRAPHIC CONDITIONS PERMIT) AND SHALL BE THE MINIMUM SIZE NEEDED.
11. DAMS ARE TO BE MADE OF STEEL PLATE, INFLATABLE PLASTIC DAM, SAND BAGS, COBBLES, WELL GRADED COARSE GRAVEL FILL, OR ROCK FILL. DAMS MAY NEED KEYING INTO THE BANKS AND STREAMBED. ENSURE THAT THE DAM AND VEHICLE CROSSING ARE LOCATED FAR ENOUGH APART TO ALLOW FOR A WIDE EXCAVATION. CAP FLUMES USED UNDER VEHICLE CROSSING DURING DRY CROSSING.
12. DEWATER AREA BETWEEN DAMS IF POSSIBLE. DEWATERING SHOULD OCCUR IN A STABLE VEGETATIVE AREA A MINIMUM OF 50 FT. FROM ANY WATERBODY. THE PUMP DISCHARGE SHOULD BE DISCHARGED ONTO A STABLE SPILL PAD CONSTRUCTED OF ROCKFILL SANDBAGS, OR TIMBERS TO PREVENT LOCALIZED EROSION. THE DISCHARGE WATER SHOULD ALSO BE FORCED INTO SHEET FLOW IMMEDIATELY BEYOND THE SPILL PAD BY USING STRAW BALES AND THE NATURAL TOPOGRAPHY DISCHARGED WATER SHALL NOT BE ALLOWED TO FLOW INTO ANY WATERCOURSE OR WETLAND. IF IT IS NOT POSSIBLE TO DEWATER THE EXCAVATION DUE TO SOILS WITH A HIGH HYDRAULIC CONDUCTIVITY, THE EXCAVATION AND PIPE PLACEMENT IS TO BE CARRIED OUT IN THE STANDING WATER. PUMP ANY DISPLACED WATER AS DESCRIBED ABOVE TO PREVENT OVERTOPPING OF DAMS.
13. EXCAVATE TRENCH THROUGH PLUGS AND STREAMBED FROM BOTH SIDES, RE-POSITIONING DISCHARGE HOSE AS NECESSARY. LOWER THE PIPE IN THE TRENCH AND BACKFILL IMMEDIATELY. DURING THIS OPERATION WORK IS TO BE COMPLETED AS QUICKLY AS POSSIBLE.
14. CONTRACTOR SHALL RESTORE THE STREAM BED AND BANKS TO APPROXIMATE PRE-CONSTRUCTION CONTOURS, BUT NOT TO EXCEED 2 HORIZONTAL TO 1 VERTICAL.
   a. CONTRACTOR SHALL INSTALL PERMANENT EROSION AND SEDIMENT CONTROL STRUCTURES AS INDICATED ON A SITE SPECIFIC BASIS. IN THE ABSENCE OF SITE SPECIFIC INFORMATION, A FLEXIBLE CHANNEL LINER SUCH AS NAG C125 OR C350 WHICH IS CAPABLE OF WITHSTANDING ANTICIPATED FLOW SHALL BE INSTALLED. ALTERNATIVELY, ROCK RIP-RAP SHALL BE INSTALLED.
   b. ANY MATERIALS PLACED IN THE STREAM TO FACILITATE CONSTRUCTION SHALL BE REMOVED DURING RESTORATION. BANKS SHALL BE STABILIZED AND TEMPORARY SEDIMENT BARRIERS INSTALLED AS SOON AS POSSIBLE AFTER CROSSING, BUT WITHIN 24 HOURS OF COMPLETING THE CROSSING.
   c. MAINTAIN A SILT FENCE OR STRAW BALE BARRIER ALONG THE WATER COURSE UNTIL VEGETATION IS ESTABLISHED IN ADJACENT DISTURBED AREAS.
15. WHEN THE STREAMBED HAS BEEN RESTORED, THE CREEK BANKS ARE TO BE CONTOURED TO A STABLE ANGLE AND PROTECTED WITH EROSION RESISTANT MATERIAL COMPATIBLE WITH FLOW VELOCITY BETWEEN DAMS (E.G., EROSION CONTROL BLANKETS, CRIBBING, ROCK RIP-RAP, ETC.). THE DAMS ARE TO BE REMOVED DOWNSTREAM FIRST. KEEP PUMP RUNNING UNTIL NORMAL FLOW IS RESUMED. COMPLETE BANK TRIMMING AND EROSION PROTECTION. IF SANDBAGS ARE USED FOR THE DAMS, PLACE AND REMOVE BY HAND TO AVOID EQUIPMENT BREAKING BAGS.

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DESIGNER:		KEYSTONE XL PROJECT		
JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 14A TYPICAL DAM AND PUMP CROSSING – CONSTRUCTION PROCEDURES		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-03-710	REV 02

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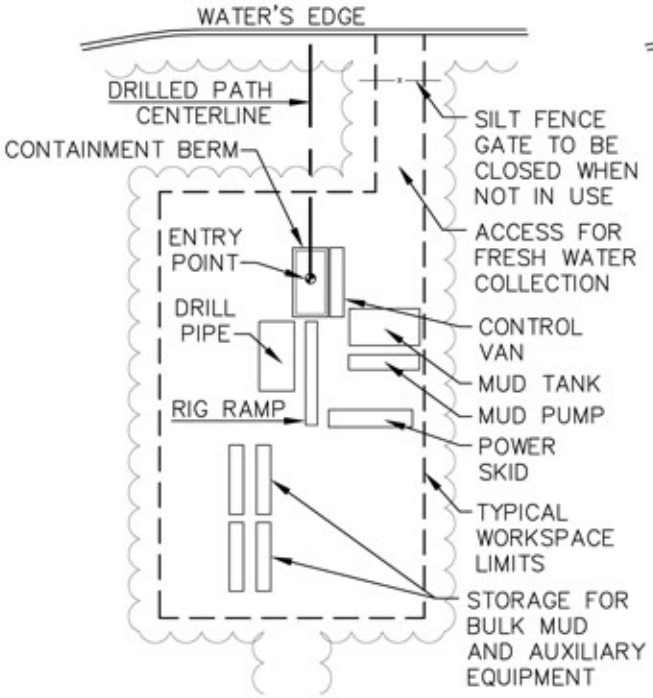
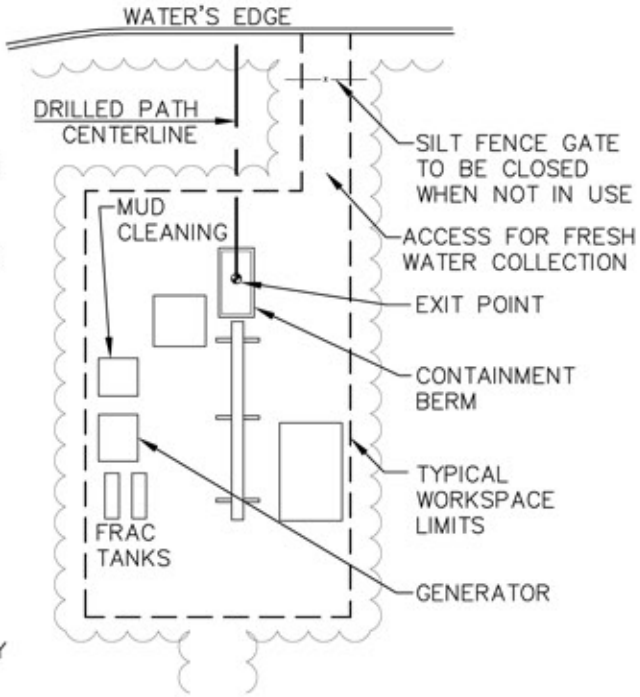


SITE PLAN
ENTRY SIDE



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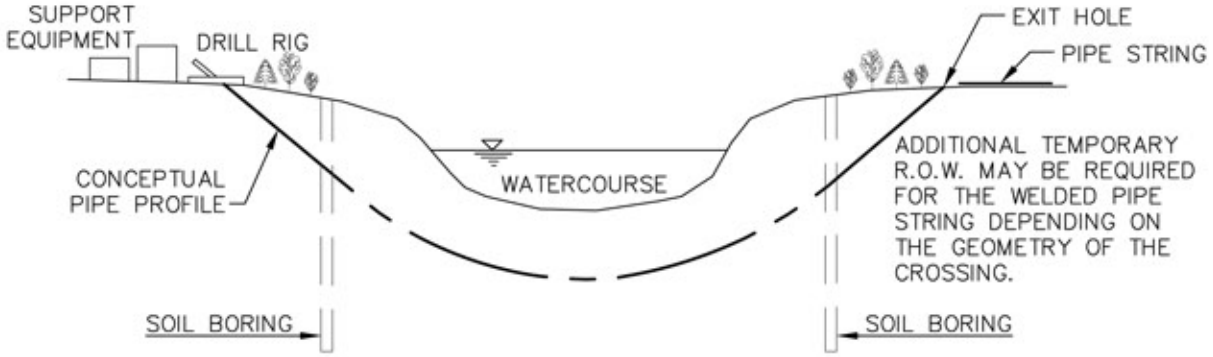

PROFILE

NOTES:

1. SET UP DRILLING EQUIPMENT A MINIMUM OF 100 FEET FROM THE EDGE OF THE WATERCOURSE. LIMIT CLEARING BETWEEN DRILL ENTRY AND EXIT POINT TO HAND CUTTING BRUSH FOR TRACKING WIRES.
2. ENSURE THAT ONLY BENTONITE-BASED DRILLING MUD IS USED.
3. INSTALL SUITABLE DRILLING MUD TANKS OR SUMPS TO PREVENT CONTAMINATION OF WATERCOURSE.
4. INSTALL BERMS DOWNSLOPE FROM THE DRILL ENTRY AND ANTICIPATED EXIT POINTS TO CONTAIN ANY RELEASE OF DRILLING MUD.
5. DISPOSE OF DRILLING MUD IN ACCORDANCE WITH THE APPROPRIATE REGULATORY AUTHORITY REQUIREMENTS.

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DESIGNER: JMP (NAME) 2010-10-21 (DATE)	KEYSTONE XL PROJECT		
	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 15 TYPICAL HORIZONTAL DRILL (HDD) SITE PLAN & PROFILE		
CHECKED BY: WSF / DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-03-711	REV 02

TC_A4_BR.DWG 8.5X11

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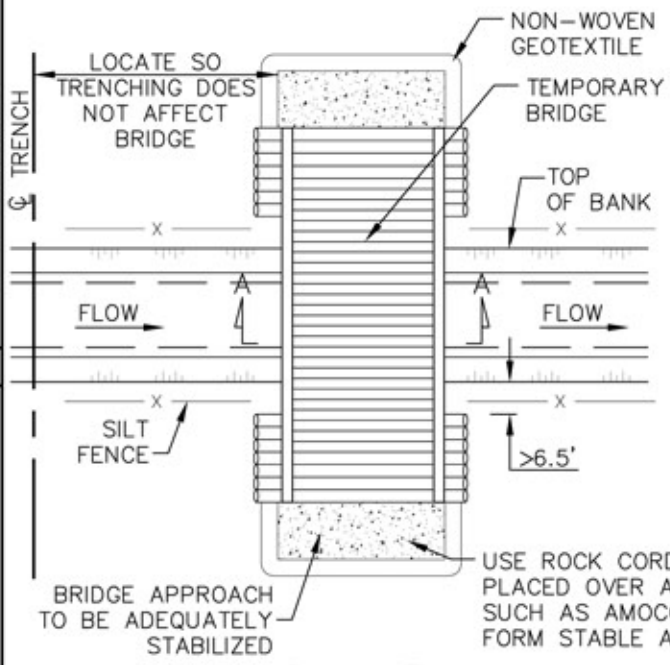
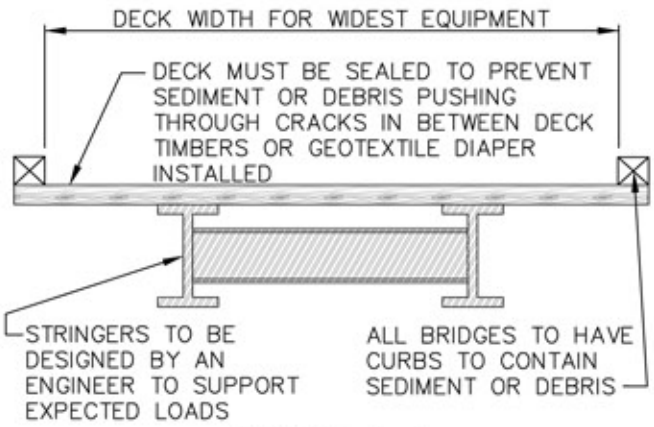
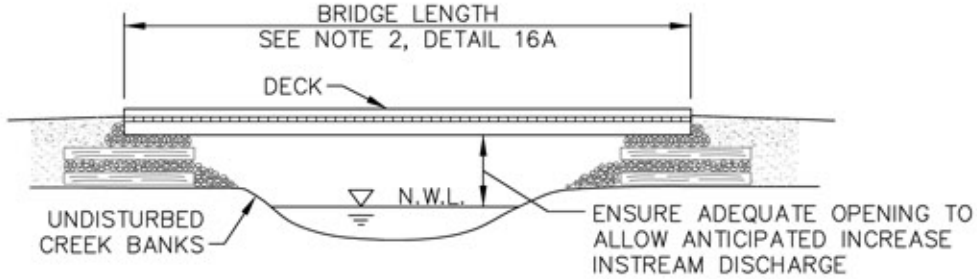


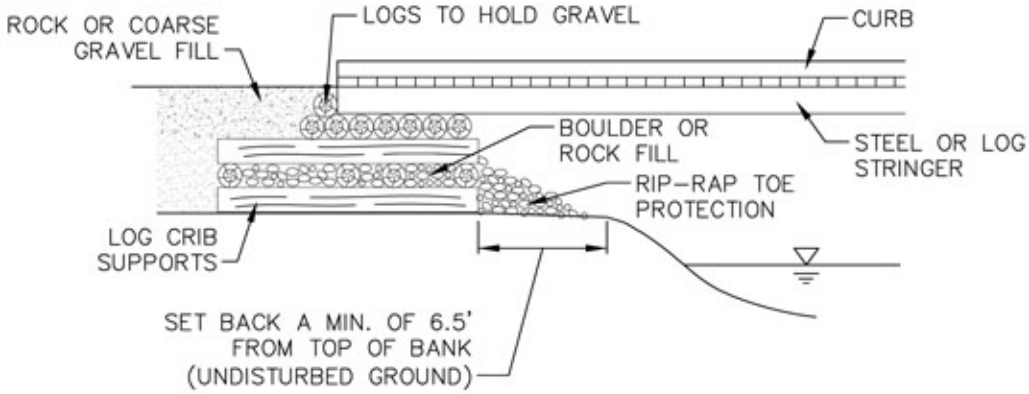
PLAN VIEW



SECTION A–A



BRIDGE PROFILE



TYPICAL TEMPORARY CRIB ABUTMENT

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KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL 16 TYPICAL TEMPORARY BRIDGE CROSSING

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CONSTRUCTION PROCEDURES:

IN GENERAL TERMS, THE FOLLOWING IS A SEQUENCE OF CONSTRUCTION PROCEDURES THAT ARE RECOMMENDED TO BE FOLLOWED FOR TEMPORARY BRIDGE CROSSINGS:

1. A PORTABLE BRIDGE, FLEXI-FLOAT OR FLUMED VEHICLE CROSSING MAY BE SUBSTITUTED FOR THE TEMPORARY BRIDGE. IT IS IMPORTANT THAT THE SIZE OF THE TOTAL OPENING BE SELECTED SO THE STRUCTURE CAN SAFELY PASS FLOOD FLOWS THAT CAN REASONABLY BE EXPECTED TO OCCUR DURING THE LIFE OF THE CROSSING.

2. DETERMINE BRIDGE LENGTH REQUIRED AND FOLLOW EITHER METHOD A) OR B) FOR DETERMINING THE OPENING SIZE. IF A) IS FOLLOWED, A MINIMUM 6.5 FT. SETBACK FROM TOP OF BANK MUST BE PRESERVED AS A "NO DISTURBANCE AREA". IF ABUTMENTS OR PIERS IN THE STREAMBED ARE REQUIRED, METHOD B) IS TO BE FOLLOWED.

3. INSTALL THE BRIDGE IN A MANNER THAT WILL MINIMIZE SEDIMENT ENTERING THE WATER. STRINGERS MUST BE DESIGNED TO SUPPORT THE LOADS EXPECTED ON THE BRIDGE. CURBS MUST BE INSTALLED ALONG THE EDGE OF THE DECK TO CONTAIN SEDIMENT AND DEBRIS ON THE BRIDGE. FASTENERS CONNECTING COMPONENTS MUST BE STRONG ENOUGH TO HOLD THEM IN POSITION DURING THE LIFE OF THE BRIDGE. CRIBS ARE TO BE FILLED WITH ROCK OR COBBLE. RIP-RAP EROSION PROTECTION IS TO BE PLACED AROUND THE CRIBS AND ON ANY FILL SLOPES PROJECTING INTO THE WATERBODY.

4. ROAD APPROACHES LEADING TO THE BRIDGE MUST BE RAISED AND STABLE SO EQUIPMENT LOADS ARE SUPPORTED A SUFFICIENT DISTANCE BACK FROM THE WATER TO REDUCE SEDIMENT AND DEBRIS ENTERING THE WATERBODY FROM EQUIPMENT TRACKS. THIS MAY REQUIRE USING MATERIALS SUCH AS GRAVEL, ROCK OR CORDUROY. DO NOT USE SOIL TO CONSTRUCT OR STABILIZE EQUIPMENT BRIDGES. IF CUTS ARE NEEDED TO OBTAIN A SATISFACTORY GRADE, THEY ARE TO BE DUG WITH SIDE DITCHES AND STABLE SLOPES. EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE INSTALLED TO KEEP SEDIMENT ON LAND (E.G., SILT FENCING, FILTER CLOTH, RIP-RAP, SEED AND MULCH, ETC.)

5. MAINTAIN A SILT FENCE ON EACH SIDE OF THE WATERBODY EXTENDING A MINIMUM OF 10 FEET BEYOND THE WIDTH OF DISTURBANCE UNTIL VEGETATION HAS BEEN ESTABLISHED IN UPSLOPE AREAS.

6. PERIODICALLY CHECK BRIDGE INSTALLATION AND REMOVE ANY BUILD-UP OF SEDIMENT OR DEBRIS ON THE BRIDGE. DISPOSE OF THIS MATERIAL IN A LOW LYING AREA AT LEAST 100 FEET FROM THE WATERBODY.

7. REMOVE TEMPORARY CROSSINGS AS SOON AS POSSIBLE AFTER FINAL CLEAN-UP. MATERIALS PLACED ALONG THE WATERBODY SHOULD BE COMPLETELY REMOVED DURING FINAL CLEAN-UP. REMOVAL SHOULD NOT OCCUR OUTSIDE THE CONSTRUCTION WINDOWS. SURPLUS GRAVEL IS TO BE SPREAD ON THE RIGHT-OF-WAY AS GRAVEL SHEETING, IF GRADATION IS SUITABLE, OR MOVED AT LEAST 100 FEET FROM TOP OF BANK FOR DISPOSAL. BRIDGE MATERIALS ARE TO BE REMOVED FROM THE CROSSING AREA. THE WATERBODY BED AND BANKS ARE TO BE RESTORED TO A STABLE ANGLE AND PROTECTED WITH EROSION RESISTANT MATERIAL COMPATIBLE WITH THE EXPECTED FLOW CONDITIONS.

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JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 16A TYPICAL TEMPORARY BRIDGE CROSSING – CONSTRUCTION PROCEDURES		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-03-713	REV 01

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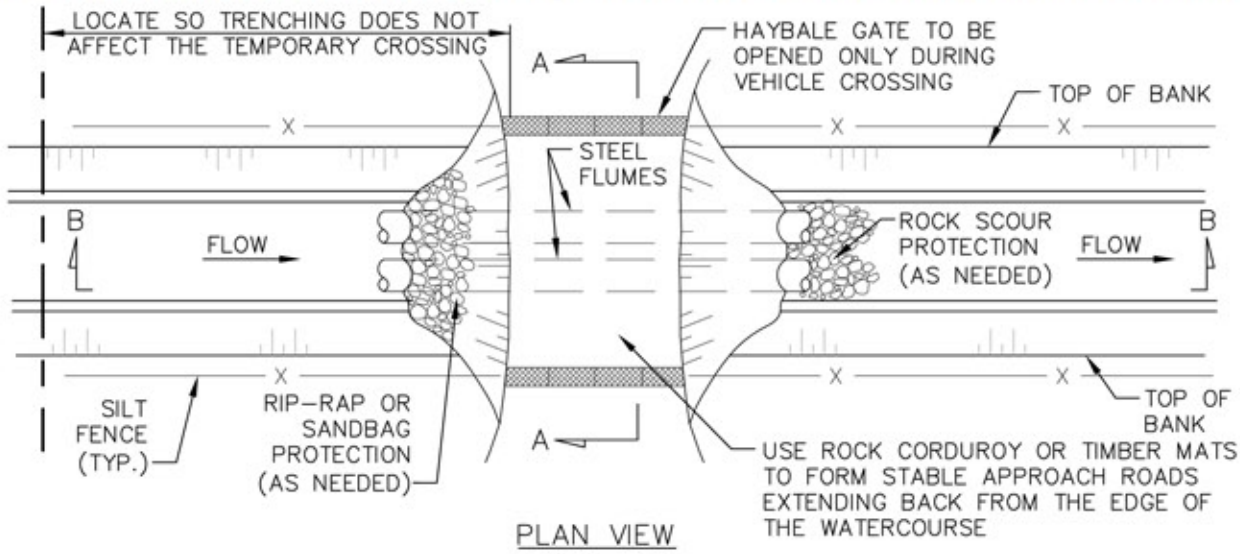
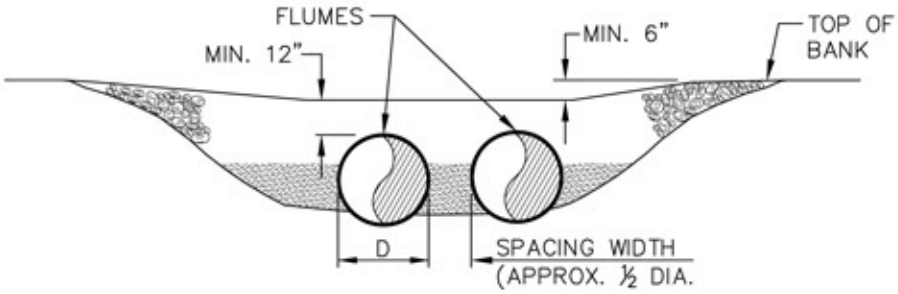
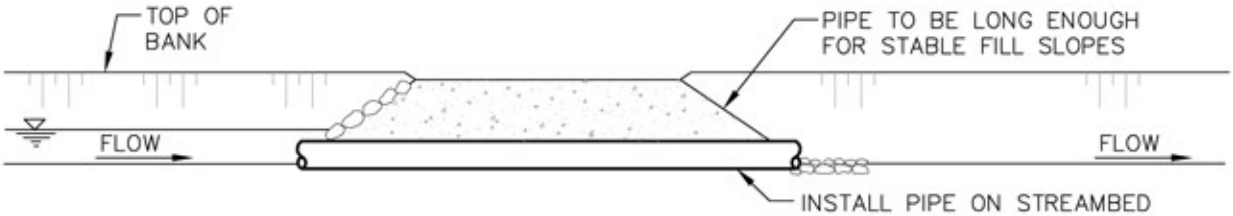


PLAN VIEW



SECTION A–A



SECTION B–B

CONSTRUCTION PROCEDURES:

THE FOLLOWING IS A SEQUENCE OF CONSTRUCTION AND PROCEDURES MEASURES TO BE FOLLOWED AT ALL TEMPORARY FLUME VEHICLE CROSSINGS.

1. A PORTABLE FLEXI–FLOAT, OR TEMPORARY BRIDGE MAY BE SUBSTITUTED FOR THE TEMPORARY FLUME CROSSING.
2. THE LENGTH OF THE FLUME SHALL BE SUFFICIENT TO SPAN THE ENTIRE AREA REQUIRED FOR VEHICULAR ACCESS, EXTENDING 4 FEET BEYOND TOE OF FILL MATERIAL, SO TRENCHING WILL NOT AFFECT THE ROAD CROSSING. A LONGER PIPE IS TO BE USED, IF NEEDED, TO MAINTAIN STABLE SIDE SLOPES. FLUME CAPACITY TO BE BASED ON THE 2–YEAR DESIGN FLOW OR MAXIMUM FLOW ANTICIPATED TO OCCUR DURING INSTALLATION, AS SPECIFIED IN CONSTRUCTION DOCUMENTS.
3. WHERE PRACTICAL, BACKFILL AROUND THE PIPES AT THE ROAD WITH CLEAN, COARSE ROCK FILL MATERIAL. IF SCOUR IS POSSIBLE, RIP–RAP IS TO BE PLACED ON THE WATERBODY BED DOWNSTREAM OF THE PIPE OUTLET EXTENDING A MINIMUM OF TWO PIPE DIAMETERS. ALTERNATIVELY, TIMBER EQUIPMENT MATS, SAND BAGS OR TIMBER CORDUROY MAY BE USED TO FORM THE TRAVEL SURFACE.
4. TO REDUCE DEBRIS ENTERING THE WATERBODY FROM EQUIPMENT TRACKS, THE APPROACH ROAD LEADING TO THE CULVERT CROSSING MUST BE RAISED AND STABLE SO EQUIPMENT LOADS ARE SUPPORTED A SUFFICIENT DISTANCE BACK FROM THE WATER. IF CUTS ARE NEEDED TO OBTAIN A SATISFACTORY GRADE, THEY ARE TO BE DUG WITH SIDE DITCHES AND STABLE SLOPES. EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE INSTALLED TO LIMIT THE POTENTIAL FOR SEDIMENT TO ENTER THE WATERBODY (E.G., CHECK DAMS, SILT FENCE, RIP–RAP, SEED AND MULCH, SEDIMENT TRAPS, ETC.).
5. PERIODICALLY CHECK THE TEMPORARY CROSSING INSTALLATION AND REMOVE ANY BUILD–UP OF SEDIMENT OR DEBRIS ON THE BRIDGE. DISPOSE OF THIS MATERIAL AT LEAST 100 FEET FROM THE WATERBODY AND ABOVE THE HIGH WATER LEVEL.
6. FOLLOWING COMPLETION OF THE CROSSING, REMOVE ROCKFILL IN/OR AROUND FLUME PIPES FROM THE WATERBODY OR WETLAND.
7. RESTORE STREAM BANKS AND WATERBODY BOTTOM.

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JMP (NAME) 2010–10–21 (DATE)		FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 17 TYPICAL FLUME BRIDGE CROSSING		
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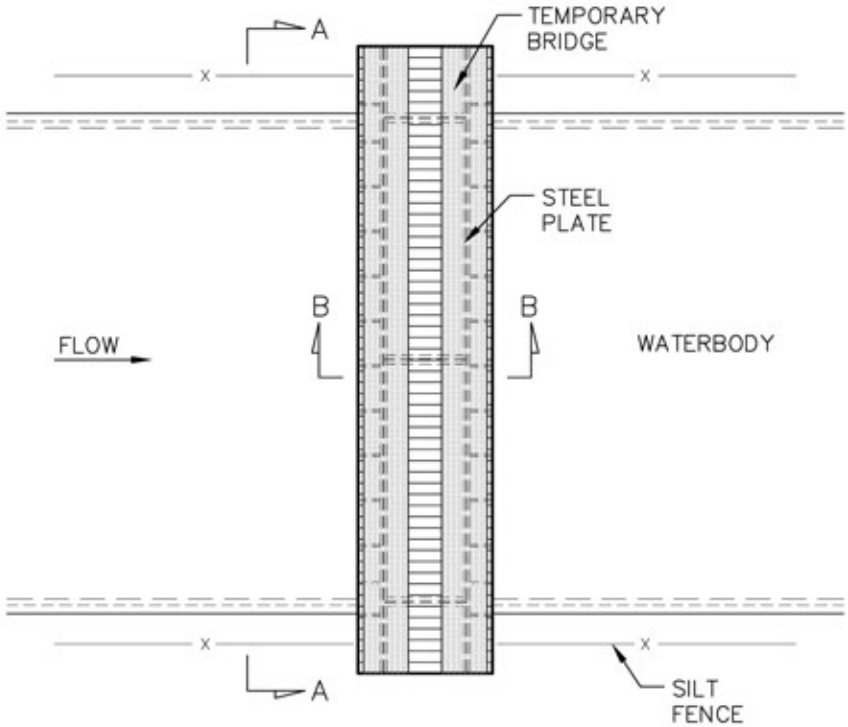
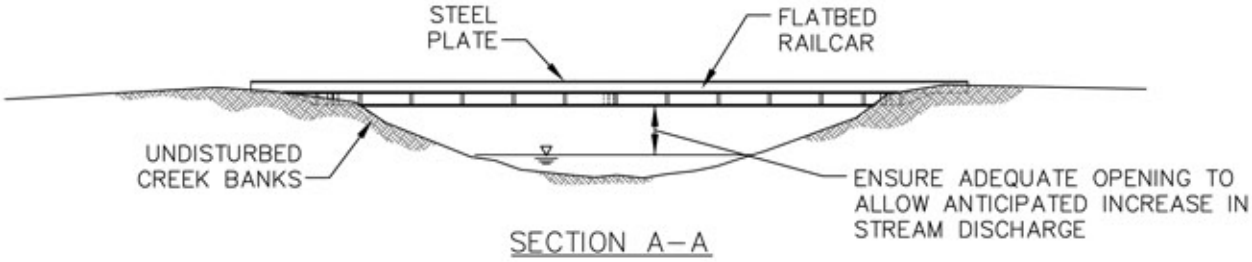
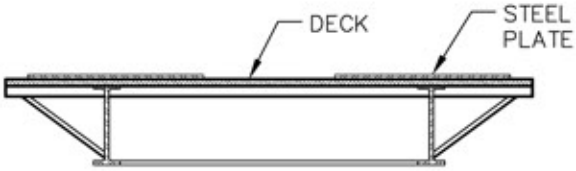


PLAN VIEW



SECTION A–A



SECTION B–B

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DESIGNER: JMP (NAME) 2010–10–21 (DATE)	KEYSTONE XL PROJECT		
	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 18 TYPICAL RAILCAR BRIDGE CROSSING		
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CONSTRUCTION PROCEDURES:

1. THIS TYPICAL DRAWING PROVIDES FOR A RAILCAR BRIDGE EQUIPMENT CROSSING.

2. BRIDGE SHOULD BE A MINIMUM OF 12 FEET LONGER THAN BANK TO BANK WIDTH.

3. BEST MANAGEMENT PRACTICES UTILIZING EROSION CONTROL DEVICES, SUCH AS HAY BALES AND SILT FENCE ARE REQUIRED TO PREVENT SEDIMENTATION OF THE STREAM. EROSION PROTECTION SHALL BE PLACED ON THE STREAM BANKS.

4. DURING FINAL CLEAN-UP, REMOVE TEMPORARY EQUIPMENT CROSSINGS AS SOON AS POSSIBLE. INSTALLED MATERIALS, SUCH AS HAY BALES AND SILT FENCE MUST BE REMOVED AND DISPOSED IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS AND REQUIREMENTS. THE STREAMBED, BANKS AND AREAS AFFECTED BY CONSTRUCTION OF THE TEMPORARY EQUIPMENT CROSSING SHOULD BE RESTORED TO A STABLE CONDITION. IF REQUIRED TO PREVENT TRANSPORT OF SEDIMENTATION TO THE STREAM, SILT FENCE SHOULD BE INSTALLED AT THE TOP OF THE BANKS.

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FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL 18A
TYPICAL RAILCAR BRIDGE CROSSING – CONSTRUCTION PROCEDURES

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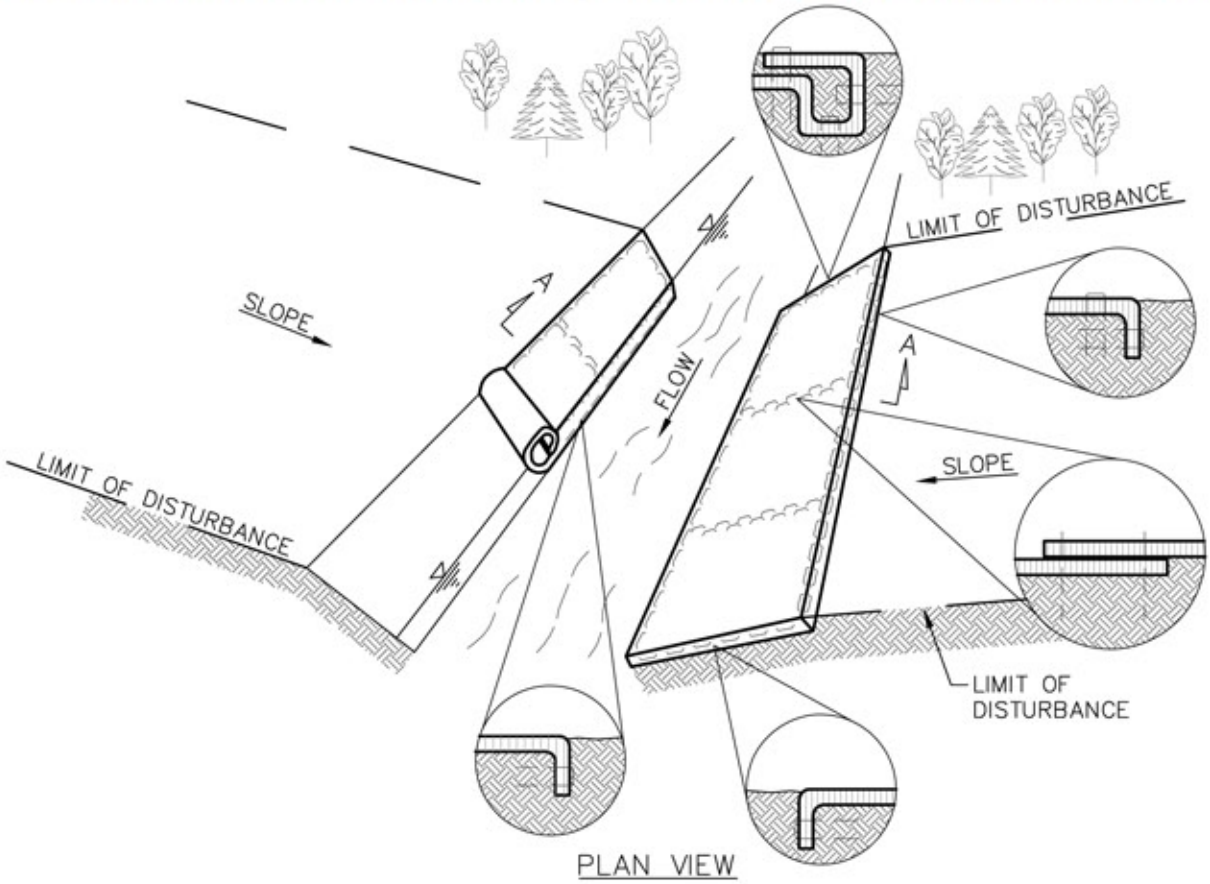

PLAN VIEW

SECTION A–A

NOTES:

1. INSTALL AND ANCHOR LINERS FOLLOWING MANUFACTURER'S INSTRUCTIONS.
2. PREPARE SOIL BEFORE INSTALLING CHANNEL LINER, INCLUDING THE APPLICATION OF
3. SEED. CHANNEL LINERS SHOULD EXTEND COMPLETELY ACROSS DISTURBED BANK AREAS TO PROTECT ERODIBLE SURFACES.
4. BEGIN AT THE END OF THE CHANNEL BY ANCHORING THE LINER IN A TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
5. ROLL LINER IN DIRECTION OF WATER FLOW.
6. INSTALL LINERS END–OVER–END (SHINGLE STYLE) WITH OVERLAP USING A DOUBLE ROW OF STAGGERED STAPLES 4 INCHES BELOW THE FIRST ROW IN A STAGGERED PATTERN.
7. IN HIGH FLOW CHANNEL APPLICATIONS, A STAPLE CHECK SLOT IS RECOMMENDED AT 30 TO 40 FEET INTERVALS. USE A ROW OF STAPLES 4 INCHES BELOW THE FIRST ROW IN A STAGGERED PATTERN.
8. INSTALL CHANNEL LINER TO THE TOP OF THE DEFINED CHANNEL SECTION. TWO OR MORE ROWS OF BLANKETS MAY BE NECESSARY, THESE LINERS MUST BE OVERLAPPED 4 INCHES AND STAPLED.
9. THE CHANNEL LINER SHOULD EXTEND TO THE BASE OF THE CHANNEL AND STAPLED. FOR CHANNELS WITH VERY LITTLE OR NO FLOW, EXTEND A MINIMUM OF 1 FOOT BELOW THE LOW WATER LEVEL AND STAPLE IN PLACE.
10. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
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		TITLE: DETAIL 19 FLEXIBLE CHANNEL LINER INSTALLATION		
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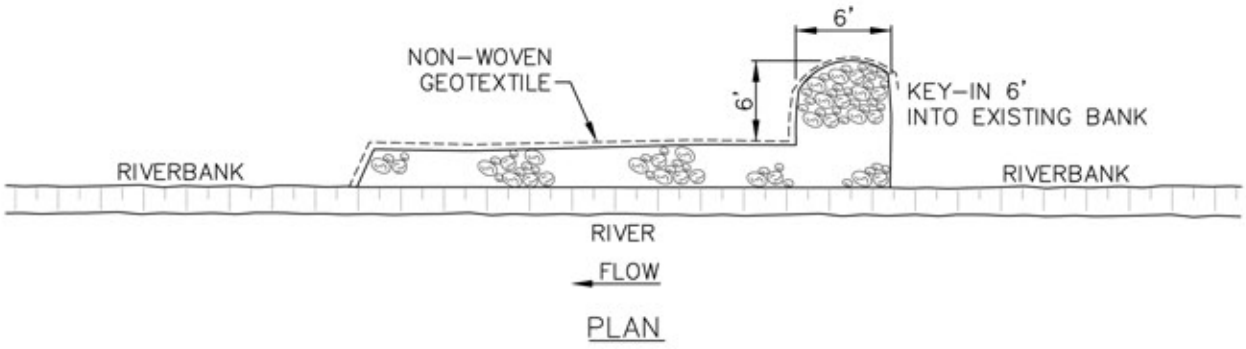
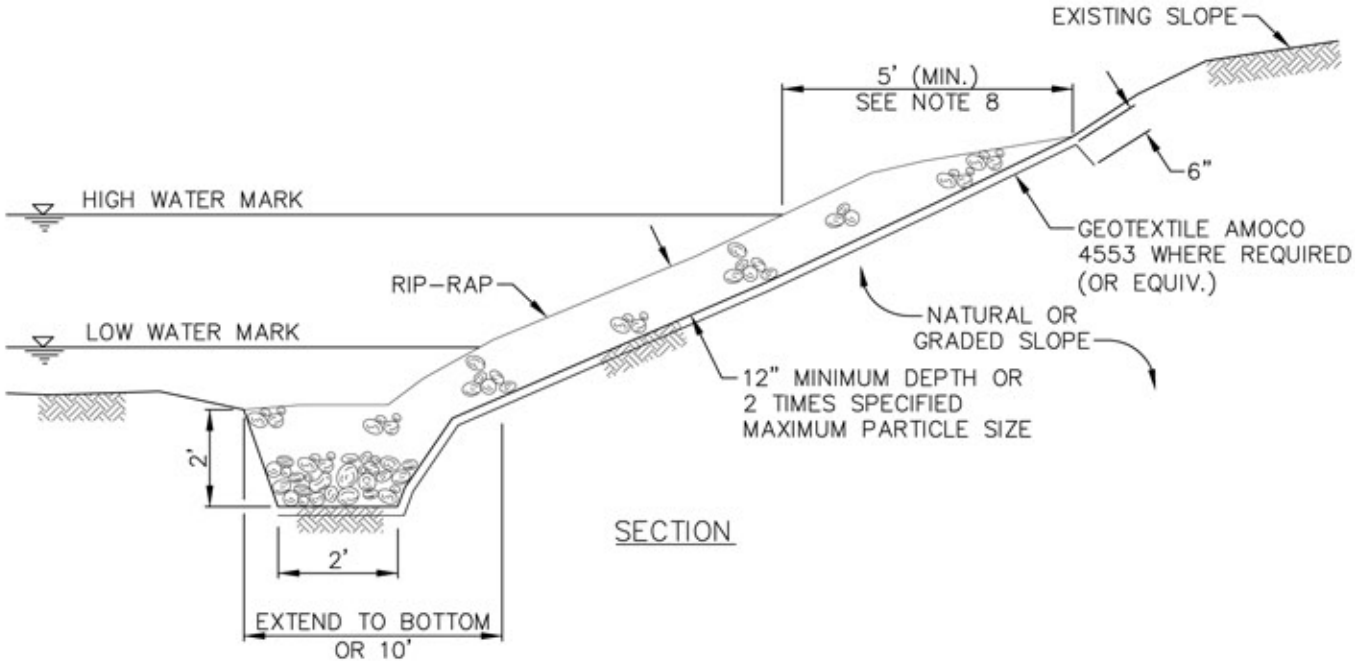


PLAN



SECTION

NOTES:

1. REMOVE ALL STUMPS, ORGANIC MATERIAL AND PREPARE BANKS TO A STABLE CONFIGURATION TO A MAXIMUM SLOPE OF 2 HORIZONTAL TO 1 VERTICAL.
2. CONSTRUCT TOE TRENCH TO KEY IN BOTTOM OF RIP-RAP PROTECTION.
3. INSTALL FILTER CLOTH (GEOTEXTILE), SUCH AS AMOCO 4553 OR EQUIVALENT, UNDER ROCK WHERE SPECIFIED OR AS DIRECTED BY THE COMPANY. ADJOINING EDGES OF CLOTH SHALL OVERLAP A MINIMUM OF 12".
4. ROCK UTILIZED FOR RIP-RAP SHALL CONSIST OF SOUND, DURABLE ROCK, AND RESISTANT TO WEATHERING. INDIVIDUAL PIECES SHOULD BE ANGULAR, BLOCK SHAPED AND HAVE A MINIMUM SPECIFIC GRAVITY OF 2.2.
5. INSTALL RIP-RAP TO A THICKNESS OF APPROXIMATELY 2 TIMES THE MAXIMUM EQUIVALENT DIAMETER OF THE RIP-RAP. EACH LOAD SHOULD BE WELL GRADED. A WELL GRADED MIXTURE IS COMPOSED 60% (MINIMUM) OF LARGER SIZES WITH 40% OF SMALLER SIZES TO FILL THE VOIDS.
6. SIZE OF RIP-RAP IS DEPENDENT UPON THE PREDICTED FLOW CONDITIONS.
7. KEY IN THE EDGES OF THE RIP-RAP AND FILTER CLOTH TO NATURAL GROUND CONTOURS SO THAT UNDERMINING DOES NOT OCCUR.
8. RIP-RAP IS TO BE INSTALLED TO 2 FEET. ABOVE THE NORMAL HIGH WATER MARK OR 5 FEET ALONG THE SLOPE, WHICHEVER IS LESS.
9. INSTALLATION SPECIFICATIONS TO BE MODIFIED TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008-11-04 UPDATED DRAWING NOTES
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FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL 20 TYPICAL ROCK RIP-RAP

SCALE: N.T.S. | DWG No: 4359-03-ML-05-709 | REV: 02

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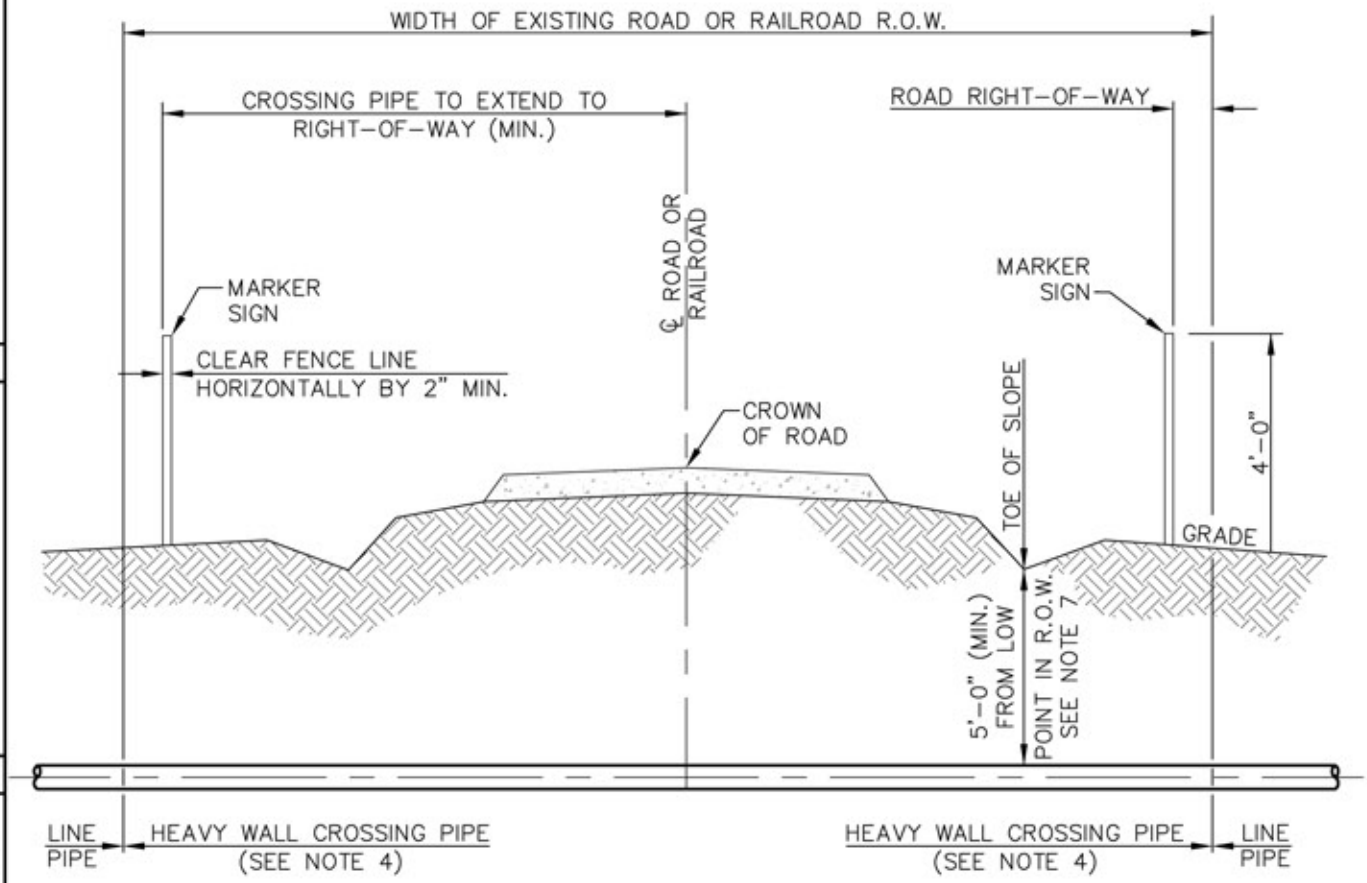

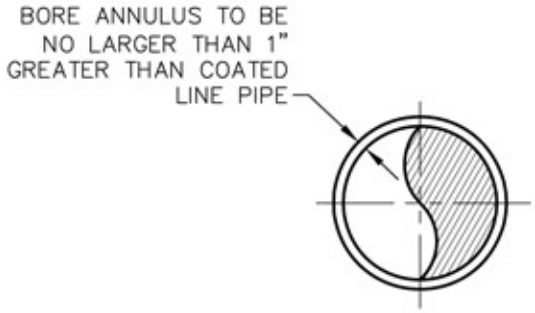

NOTES:

1. CROSSINGS SHALL BE IN ACCORDANCE WITH APPLICABLE PERMIT.
2. ROAD CROSSING PIPE SHALL EXTEND AT MINIMUM TO RIGHT-OF-WAY LINE UNLESS OTHERWISE SPECIFIED.
3. THE TYPE AND MINIMUM REQUIRED LENGTH OF PIPE FOR CROSSINGS OF ROADS SHALL BE AS SPECIFIED ON ALIGNMENT SHEETS.
4. PIPE FOR BORED CROSSINGS TO INCLUDE ABRASION-RESISTANT (ARB) COATING.
5. PIPELINE MARKER AND TEST STATIONS TO BE INSTALLED ON RIGHT-OF-WAY LINE NEXT TO FENCE IF POSSIBLE.
6. THE CROSSING PIPE SHALL BE STRAIGHT WITH NO VERTICAL OR HORIZONTAL BENDS WITHIN ROAD RIGHT-OF-WAY.
7. MINIMUM PIPELINE COVER IN DRAINAGE DITCHES AT PUBLIC ROADS IS 60 INCHES; 36 INCHES IN CONSOLIDATED ROCK.

REVISIONS
01 REVISED DIMENSION
02 2010-10-11 REVISED TITLE BLOCK

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DESIGNER: JMP (NAME) 2010-10-21 (DATE)	KEYSTONE XL PROJECT		
	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 21 TYPICAL UNCASED ROAD/RAILROAD CROSSING BORE DETAIL		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-03-717 REV 02

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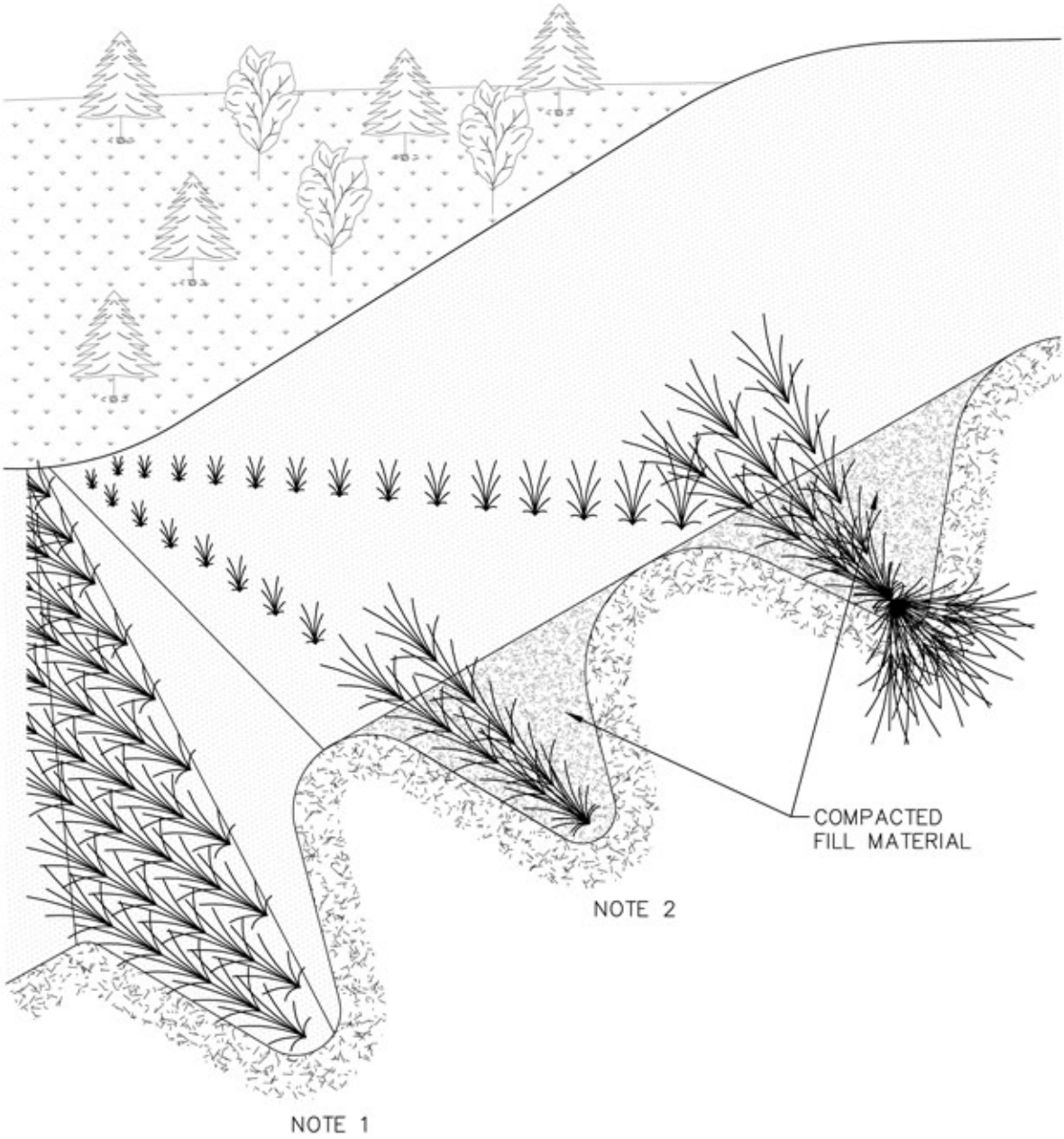

NOTES:

1. CUT TRENCH ACROSS SLOPE. FILL WITH DORMANT WOODY PLANT MATERIAL.
2. FILL IS PLACED ON TOP OF BRANCH LAYER AND COMPACTED.
3. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT SITE CONDITIONS.

REVISIONS
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FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE
DETAIL 22
STREAMBANK RECLAMATION –
BRUSH LAYER IN CROSS CUT SLOPE

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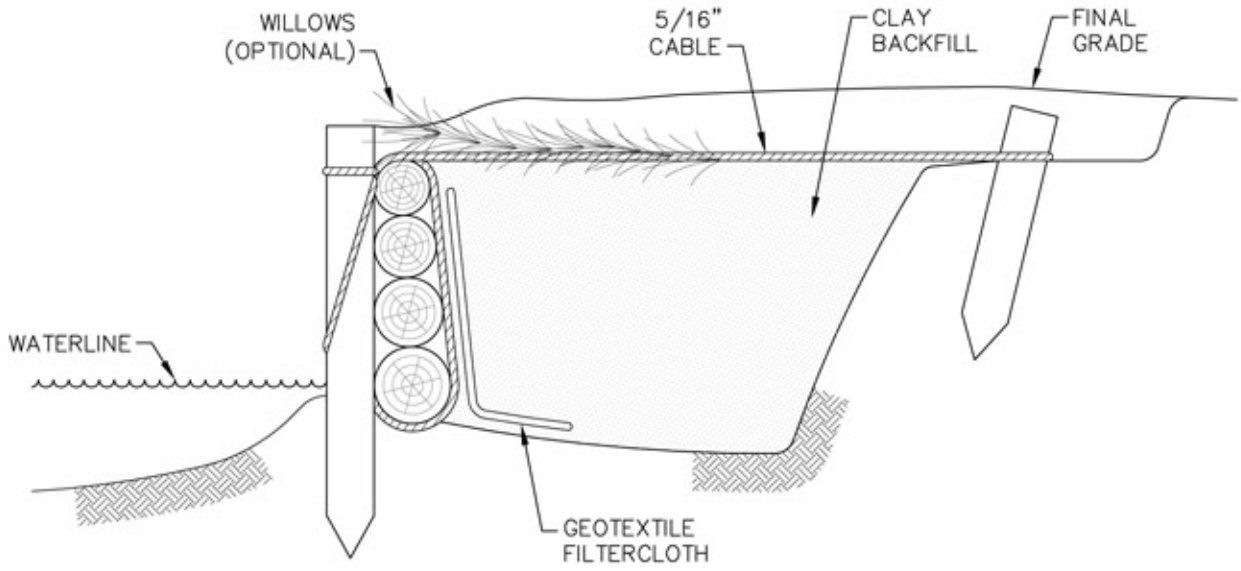

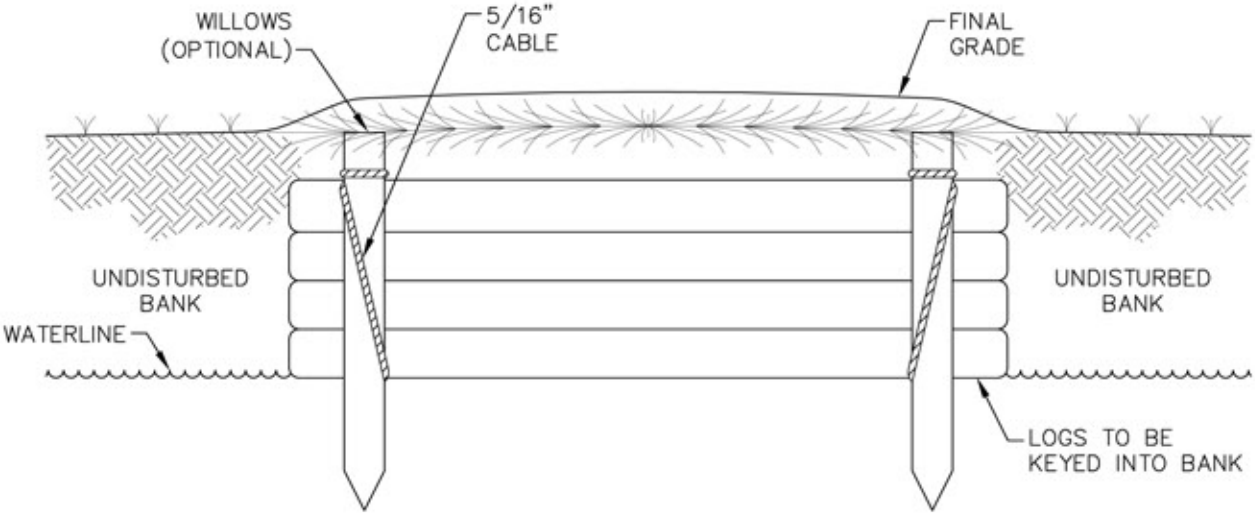

NOTES:

1. LOG WALLS TO BE CONSTRUCTED USING CONIFEROUS MATERIAL.
2. NATURE BACKFILL OR LOOSE GRADE MATERIAL SHOULD BE USED AS FILL MATERIAL.
3. ANCHOR PILINGS OR DEADMAN ANCHORS TO BE USED TO SECURE CABLE IN BANK.
4. NON-WOVEN FILTER CLOTH (NYLEX C34 OR EQUIVALENT) TO BE USED TO LINE LOG WALL.
5. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008-11-04 UPDATED DRAWING NOTES
02 2010-10-11 REVISED TITLE BLOCK

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DESIGNER: JMP (NAME) 2010-10-21 (DATE)	KEYSTONE XL PROJECT		
	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 23 STREAMBANK RECLAMATION – LOGWALL		
CHECKED BY: WSF / DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-05-711	REV 02

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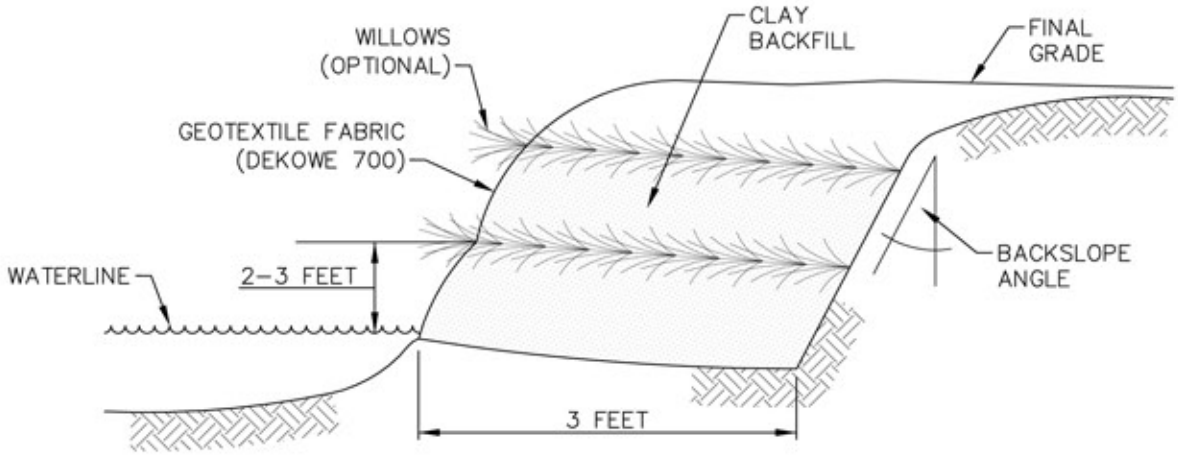

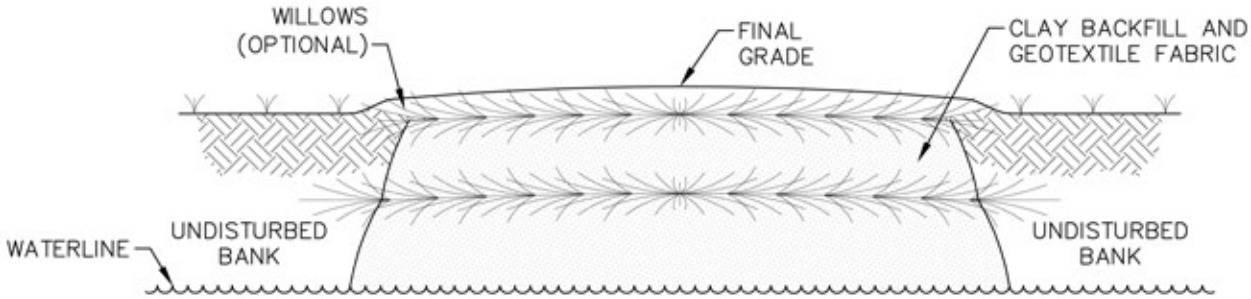

NOTES:

1. NATURE BACKFILL OR LOOSE GRADE MATERIAL SHOULD BE USED TO MINIMIZE AIR SPACES. THIS ALLOWS PROPER SOIL FABRIC CONTACT, WHICH MINIMIZES STEELING AND SCOURING DURING RUNOFF AND ENSURES SURVIVAL OF THE WILLOW CUTTINGS.
2. PLYWOOD FORMS (8'x2') MAY BE REQUIRED TO HELP RECONSTRUCT STEEP OR VERTICAL BANKS.
3. GRID LAYERS SHOULD NOT EXCEED 3 FEET IN HEIGHT WITH A MINIMUM OF 3 FEET SET IN BANK.
4. WILLOWS SHOULD BE HARVESTED AS CLOSE TO INSTALLATION AS POSSIBLE, PREFERABLY THE PREVIOUS DAY BUT NO MORE THAN 2 DAYS EARLY.
5. WILLOWS SHOULD BE 0.5 TO 1 INCH IN DIAMETER AND 2 TO 3 FEET LONG WITH NO MORE THAN 10 INCHES LEFT EXPOSED.
6. PLANTING RATE SHOULD BE APPROXIMATELY 1 STEM PER 6 INCHES.
7. INSTALLATION TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

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JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 24 STREAMBANK RECLAMATION – VEGETATED GEOTEXTILE INSTALLATION		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-05-712	REV 02

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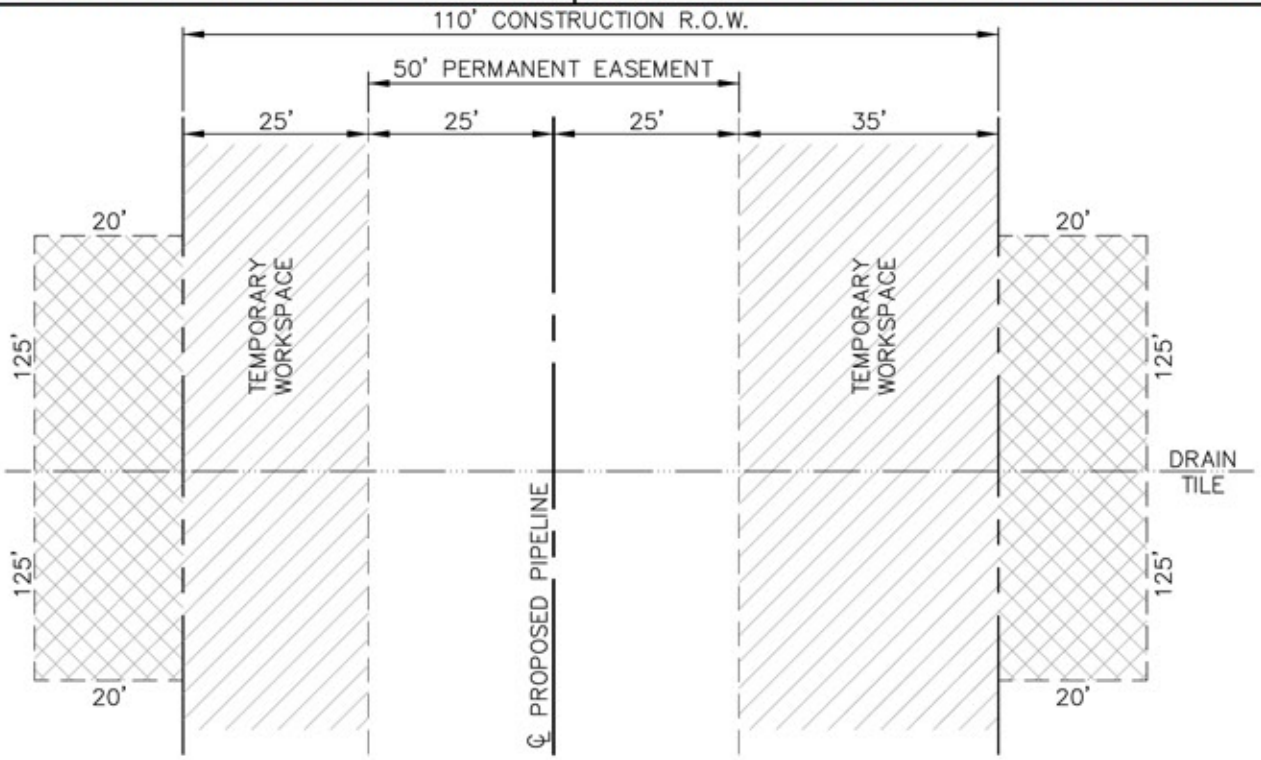
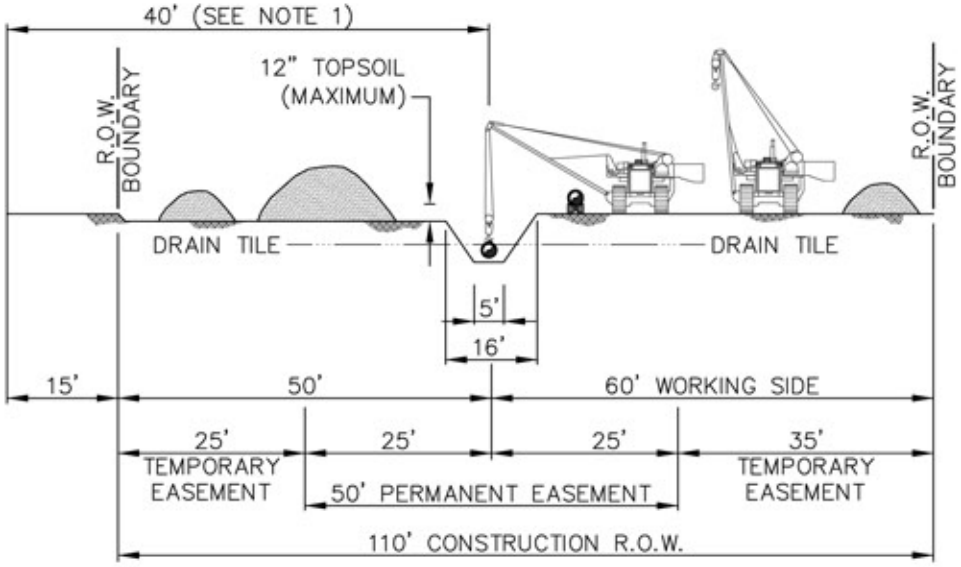


PLAN VIEW



ELEVATION

NOTES:

1. THE OFFSET FROM A FOREIGN PIPELINE, WHERE APPLICABLE, WILL BE 40' FOR MOST LOCATIONS, BUT MAY BE INCREASED OR DECREASED DEPENDING ON THE SITE SPECIFIC CONSTRUCTION REQUIREMENTS.
2. THE MINIMUM CLEARANCE BETWEEN THE TOP OF PIPE AND THE BOTTOM OF DRAIN TILE WILL BE 12 INCHES.
3. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 REVISED NOTE 3; DELETED DIMENSION
02 2010-10-11 REVISED TITLE BLOCK

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	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 25 TYPICAL R.O.W. LAYOUT/SOIL HANDLING 110' CONSTRUCTION R.O.W. 50' EASEMENT DRAIN TILE CROSSING		
CHECKED BY: WSF / DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-03-718	REV 02

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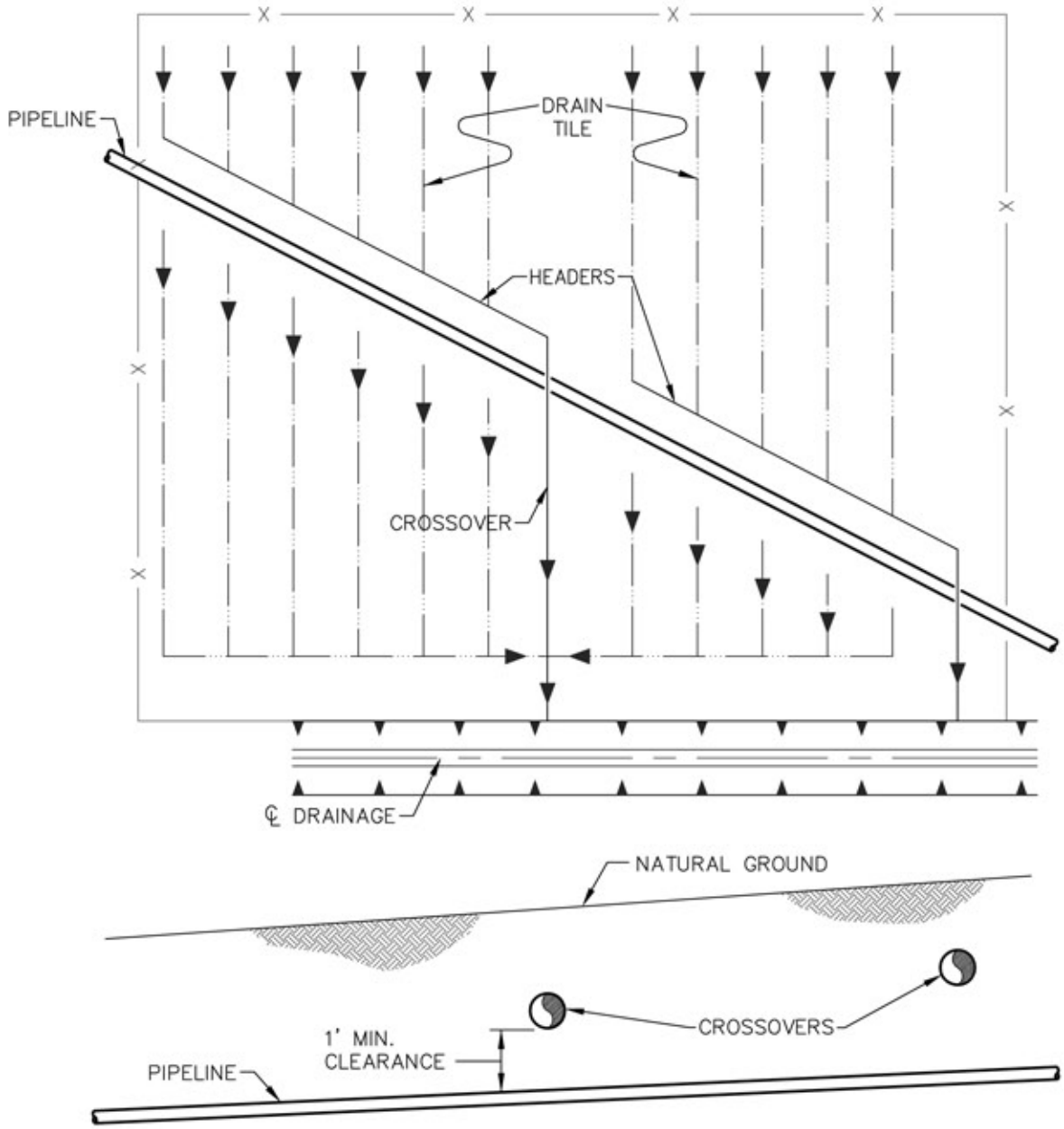

PROFILE

REVISIONS		
02	2010-10-11	REVISED TITLE BLOCK
01		ADDED DIMENSION

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DESIGN CHECKER: RW P7100

KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL 26
HEADER/MAIN CROSSOVERS OF PIPELINE

SCALE N.T.S. | DWG No 4359-03-ML-03-719 | REV 02

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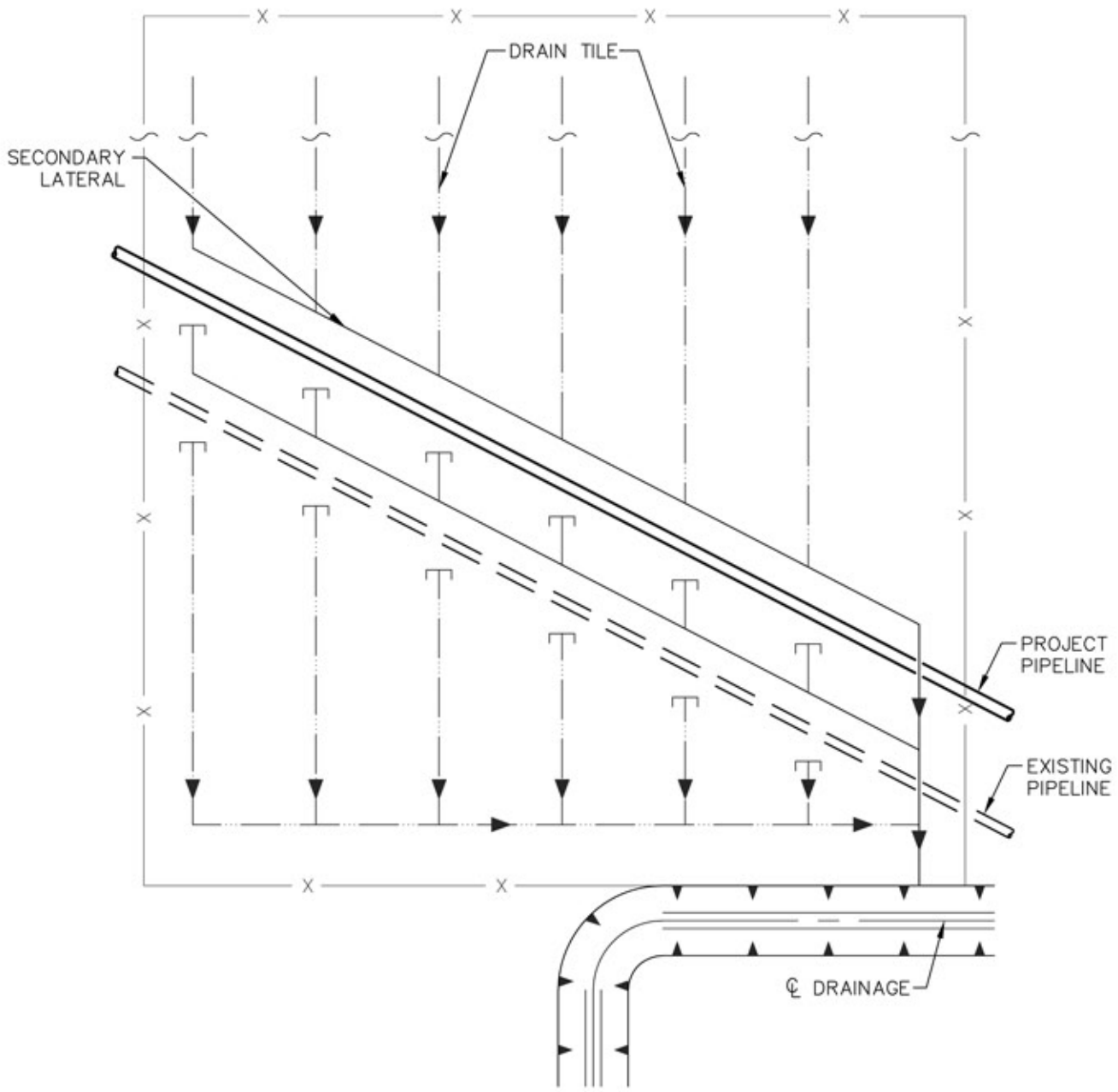
RELOCATE/REPLACE DRAINAGE HEADER/MAIN



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	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 27 HEADER/MAIN CROSSOVERS OF PIPELINE		
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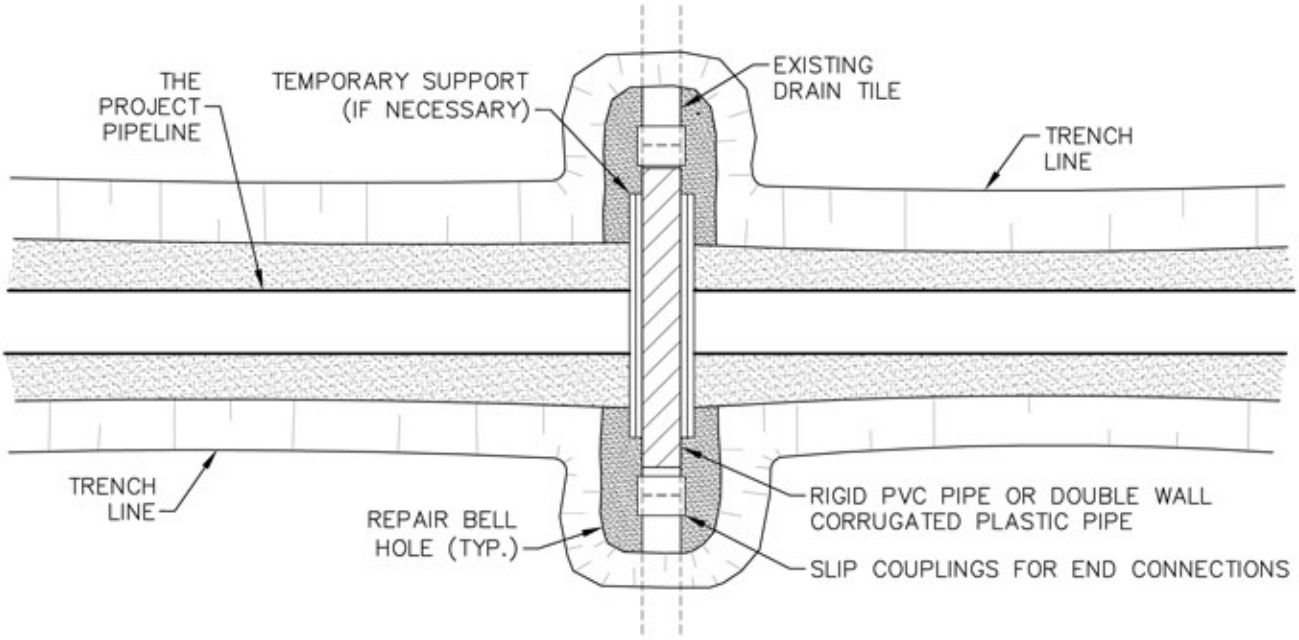
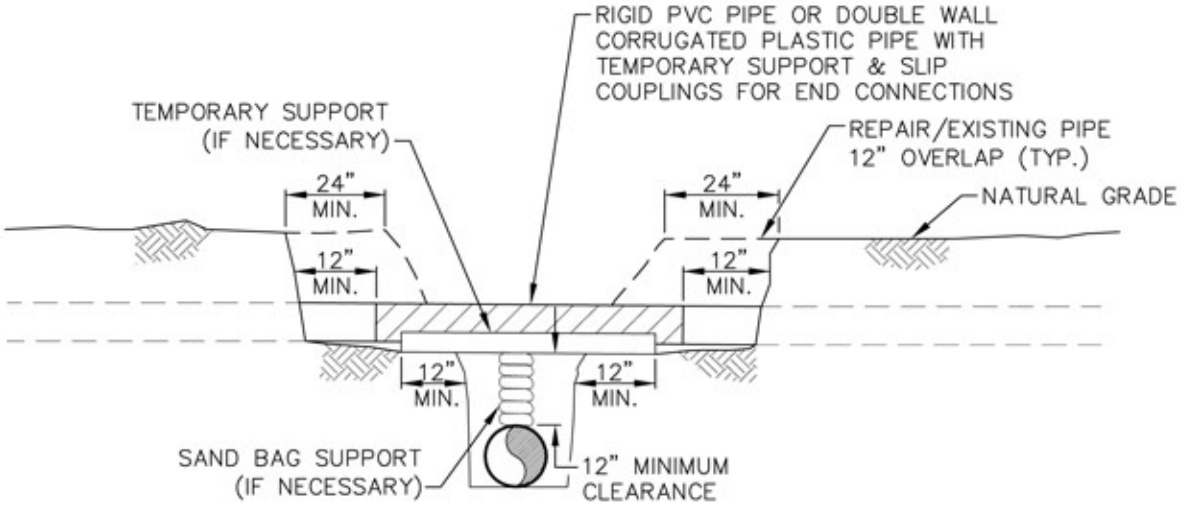


PLAN



PROFILE

NOTES:

1. IMMEDIATELY REPAIR TILE IF WATER IS FLOWING THROUGH TILE AT TIME OF TRENCHING.
2. SCREEN ALL EXPOSED ENDS OF TILE LINES.

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01 2008-11-04 UPDATED DRAWING NOTES
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KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE
DETAIL 28
DRAINAGE AND IRRIGATION
TEMPORARY DRAIN TILE REPAIR

SCALE N.T.S. | DWG No 4359-03-ML-03-721 | REV 02

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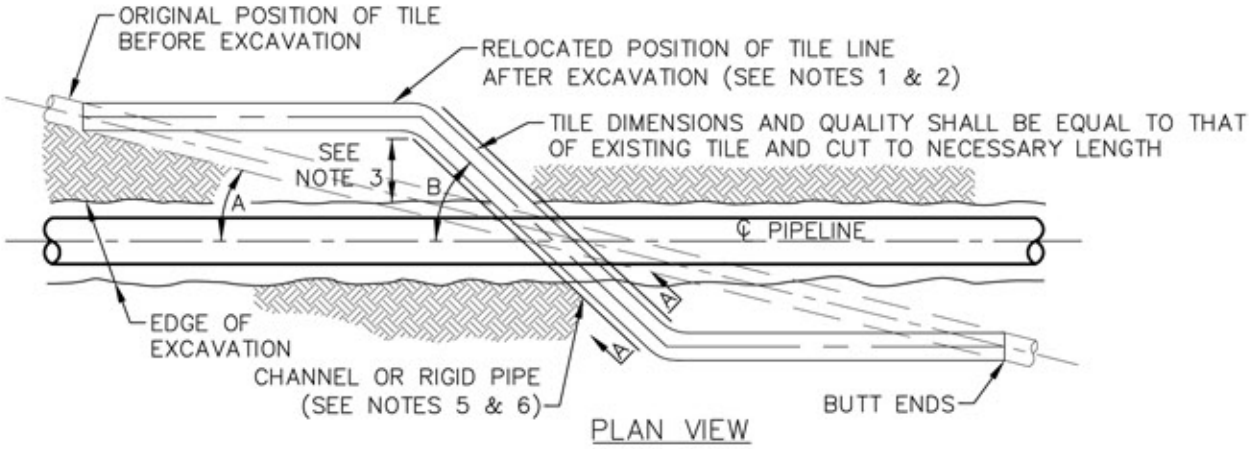
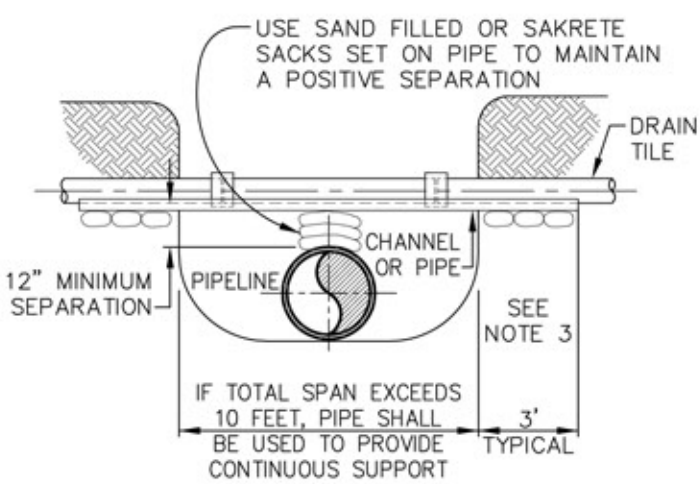
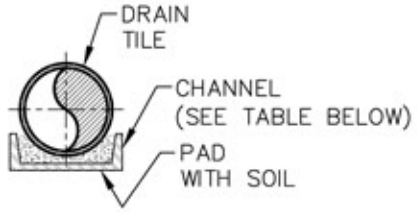
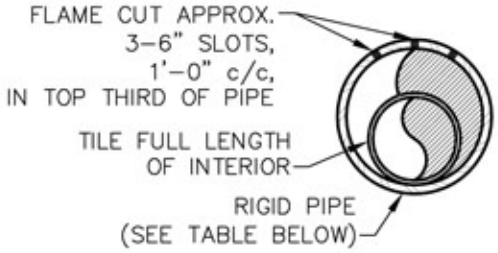


PLAN VIEW





SECTION "A–A" CHANNEL (SPANS < 10 FEET)



END VIEWS

SECTION "A–A" RIGID PIPE (SPANS > 10 FEET)

NOTES:

1. TILE REPAIR SHALL MAINTAIN ORIGINAL ALIGNMENT AND GRADIENT WHEN ANGLE "A", BETWEEN PIPELINE AND ORIGINAL TILE, IS MORE THAN 20 FEET UNLESS OTHERWISE DIRECTED BY THE PROJECT REPRESENTATIVE.
2. WHEN ANGLE "A" IS LESS THAN 20 FEET, UNLESS OTHERWISE DIRECTED BY COMPANY, ANGLE "B" SHALL BE 45° FOR USUAL WIDTHS OF TRENCH. FOR EXTRA WIDTHS, IT MAY BE GREATER AS DIRECTED BY THE PROJECT REPRESENTATIVE.
3. 3 FOOT MINIMUM LENGTH OF CHANNEL OR RIGID PIPE SHALL BE SUPPORTED BY UNDISTURBED SOIL, OR IF CROSSING IS NOT AT RIGHT ANGLES TO GAS PIPELINE, EQUIVALENT LENGTH PERPENDICULAR TO TRENCH. SHIM WITH SAKRETE, SAND BAGS OR CONCRETE BLOCKS TO UNDISTURBED SOIL FOR SUPPORT AND DRAINAGE GRADIENT MAINTENANCE (TYPICAL BOTH SIDES).
4. DRAINAGE TILE SHALL BE REPLACED SO THAT ITS FORMER GRADIENT AND ALIGNMENT ARE RESTORED.
5. DIAMETER OF RIGID PIPE SHALL BE OF ADEQUATE SIZE TO ALLOW FOR THE INSTALLATION OF THE TILE FOR THE FULL LENGTH OF THE RIGID PIPE.
6. OTHER METHODS OF SUPPORTING DRAIN TILE MAY BE USED IF THE ALTERNATE PROPOSED IS EQUIVALENT IN STRENGTH TO THE CHANNEL/PIPE SECTIONS SHOWN AND IF APPROVED BY THE PROJECT REPRESENTATIVE IN ADVANCE. SITE SPECIFIC ALTERNATE SUPPORT SYSTEM TO BE DEVELOPED BY THE PROJECT REPRESENTATIVE AND FURNISHED TO CONTRACTOR FOR SPANS IN EXCESS OF 20 FEET, TILE GREATER THAN 10 INCHES DIAMETER, AND FOR HEADER SYSTEMS.
7. ALL MATERIAL TO BE FURNISHED BY CONTRACTOR.
8. PRIOR TO REPAIRING TILE, CONTRACTOR SHALL PROBE INTO THE EXISTING TILE TO THE FULL WIDTH OF THE RIGHT–OF–WAY TO DETERMINE IF ADDITIONAL DAMAGE HAS OCCURRED. ALL DAMAGED/DISTURBED TILE SHALL BE REPAIRED AS NEAR AS PRACTICABLE TO ITS ORIGINAL OR BETTER CONDITION.
9. "NIGHT CAP" OPEN ENDS OF PIPE AND/OR DRAIN TILES IF REPAIRS ARE NOT COMPLETED BY END OF WORK DAY.

MINIMUM SUPPORT TABLE

TILE SIZE	CHANNEL SIZE	PIPE SIZE
3"	4" @ 5.4 #/FT.	4" STD. WT
4"–5"	5" @ 6.7 #/FT.	6" STD. WT
6"–9"	7" @ 9.8 #/FT.	8"–10" STD. WT
10"	10" @ 15.3 #/FT.	12" STD. WT

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KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL 29 DRAINAGE AND IRRIGATION PERMANENT DRAIN TILE REPAIR

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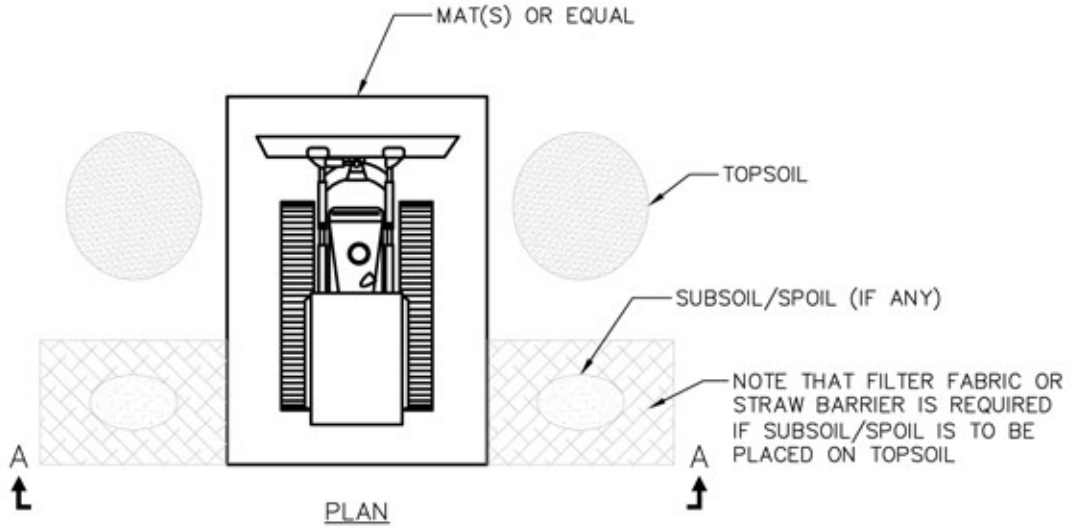
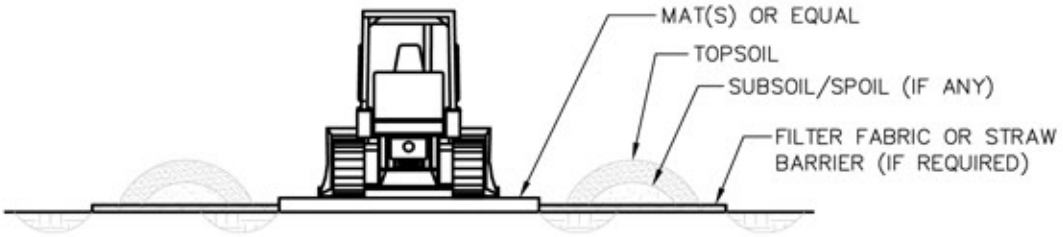


PLAN



SECTION A–A

CLEANING STATION NOTES:

1. ALL EQUIPMENT WILL BE REQUIRED TO BE CLEANED AT EQUIPMENT CLEANING STATIONS LOCATED AS SHOWN ON THE CONSTRUCTION DRAWINGS OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
2. STOCKPILE TOPSOIL/SUBSOIL AS SHOWN OR IN ANY CONFIGURATION APPROVED BY THE ENVIRONMENTAL INSPECTOR.
3. SHOVELS OR OTHER HAND TOOLS AND/OR COMPRESSED AIR WILL BE USED TO REMOVE AS MUCH AS MUCH SOIL AS PRACTICAL FROM TRACKED EQUIPMENT. EFFORT WILL BE FOCUSED ON TRACKS AND BLADES.
4. IF CONDITIONS ARE MUDDY, WHEELED EQUIPMENT WILL ALSO BE CLEANED USING HAND TOOLS TO REMOVE EXCESS SOIL FROM TIRES AND WHEEL WELLS.
5. CLEANING WILL BE CONDUCTED ON CONSTRUCTION MATS OR OTHER RAISED SURFACE TO MINIMIZE REATTACHMENT OF SOIL THAT HAS BEEN PREVIOUSLY REMOVED.
6. MATS WILL BE CLEANED BETWEEN EACH PIECE OF EQUIPMENT.
7. SOIL COLLECTED DURING THE CLEANING PROCESS WILL BE STOCKPILED AT A CONVENIENT LOCATION NEAR THE CLEANING STATION AND DISPOSED OF IN AN ACCEPTABLE LAND FILL.
8. IF THE SOIL HAS A SIGNIFICANT COMPONENT OF SUBSOIL, IT WILL BE PLACED OVER THE BACKFILLED TRENCH OR IN THE ADJACENT SPOIL STORAGE AREA, AND SUBSEQUENTLY COVERED WITH TOPSOIL. IF THE LAND OWNER DIES NOT APPROVE OF ON–SITE DISPOSAL, THE SOIL WILL BE TAKEN TO AN APPROVED DISPOSAL SITE.
9. SOILS CONTAMINATED WITH OIL OR GREASE WILL BE REMOVED AND DISPOSED OF IN ACCORDANCE PROJECT SPCCC PLAN.

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	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 30 EQUIPMENT CLEANING STATION DETAIL		
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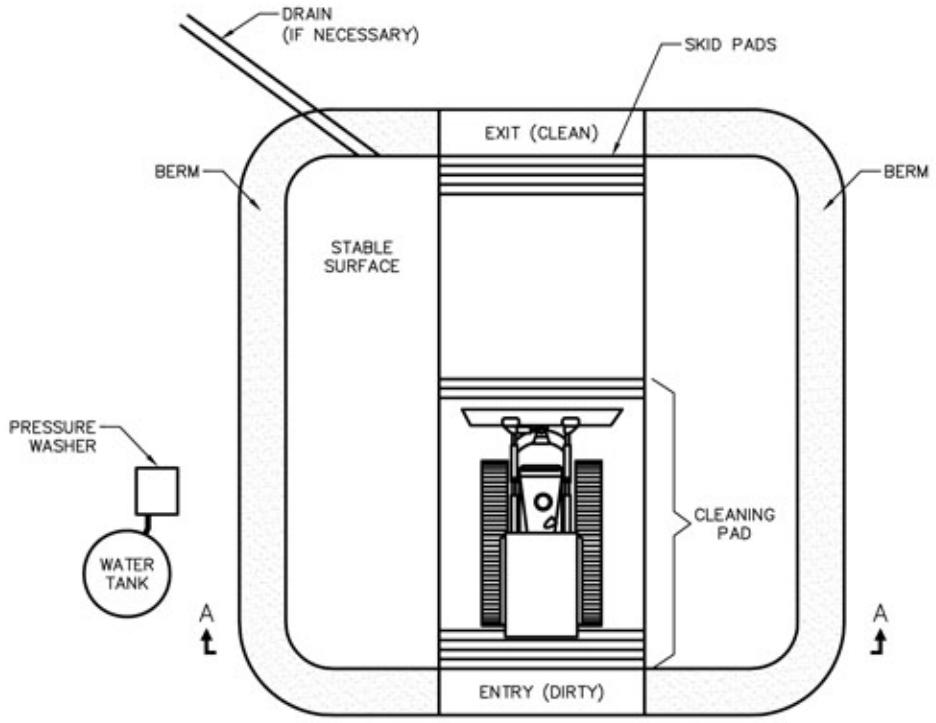

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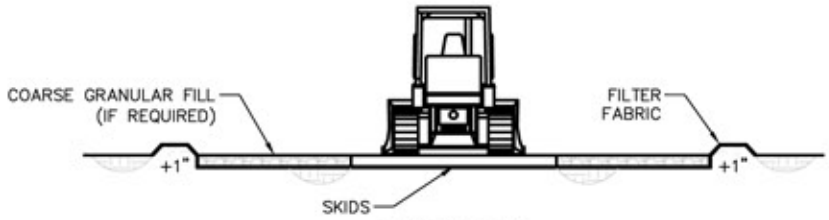

SECTION A–A

WASH STATION NOTES:

1. ALL EQUIPMENT AND VEHICLES ARE REQUIRED TO BE CLEANED AT WASH STATION LOCATIONS SHOWN ON THE CONSTRUCTION DRAWINGS OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR. WASH STATIONS WILL BE CONSTRUCTED BY THE CONTRACTOR. WASHINGS WILL BE CARRIED OUT UNDER THE SUPERVISION AND TO SATISFACTION OF THE ENVIRONMENTAL INSPECTOR.
2. WASH WATER USED FOR CLEANING WILL NOT BE ALLOWED TO ENTER ANY WATERBODY, WETLAND, OR IRRIGATION CANAL/DITCH. ANY SOILS CONTAMINATED BY PETROLEUM–BASED, OR OTHER UNDESIRABLE MATERIALS FROM WASH STATIONS WILL BE REMOVED.
3. THE SIZE OF STATION WILL BE ADEQUATE TO ACCOMMODATE THE MAXIMUM SIZE OF EQUIPMENT EXPECTED.
4. EQUIPMENT WILL CONSISTENTLY ENTER THE "DIRTY END" AND EXIT THE "CLEAN END."
5. STABLE DRAINAGE FROM THE SITE WILL BE PROVIDED (IF NECESSARY). NO DISCHARGE TO STREAMS OR WETLANDS WILL BE ALLOWED.
6. WASH STATIONS WILL BE EQUIPPED WITH SKID PADS OR WASH RACKS TO PREVENT SOIL FROM BEING CARRIED ON TRACKS OR TIRES AS EQUIPMENT AND VEHICLES EXIT THE WASH STATION. SKIDS ARE TO BE CLEANED EACH TIME A PIECE OF EQUIPMENT IS CLEANED.
7. GRAVEL FILL (IF REQUIRED) AND FILTER FABRIC WILL BE REMOVED AND DISPOSED OF IN AN ACCEPTABLE LAND FILL.
8. THE DEPRESSION WILL BE BACKFILLED WITH BERMED MATERIAL.
9. CLEANING SITES WILL BE MONITORED DURING THE POST CONSTRUCTION MONITORING PROGRAM AND WEEDS WILL BE CONTROLLED PER THE NOXIOUS WEED MANAGEMENT PLAN.

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	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 31 EQUIPMENT WASH STATION DETAIL		
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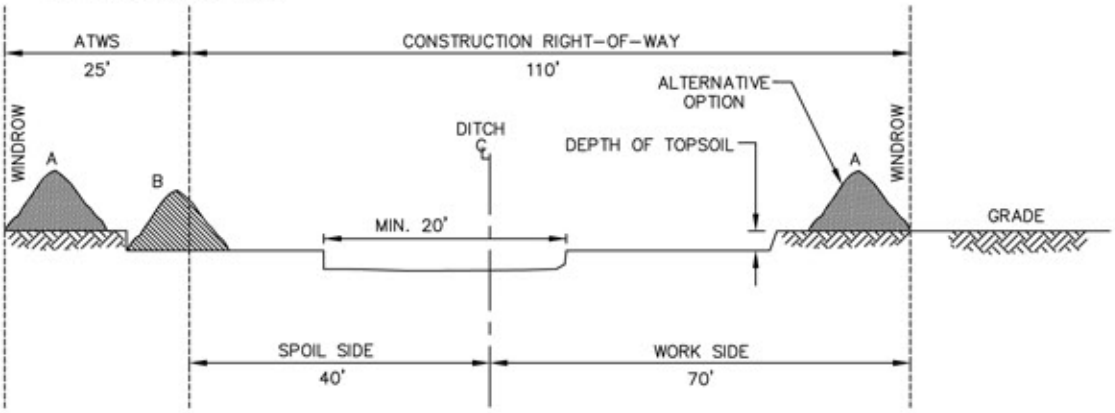
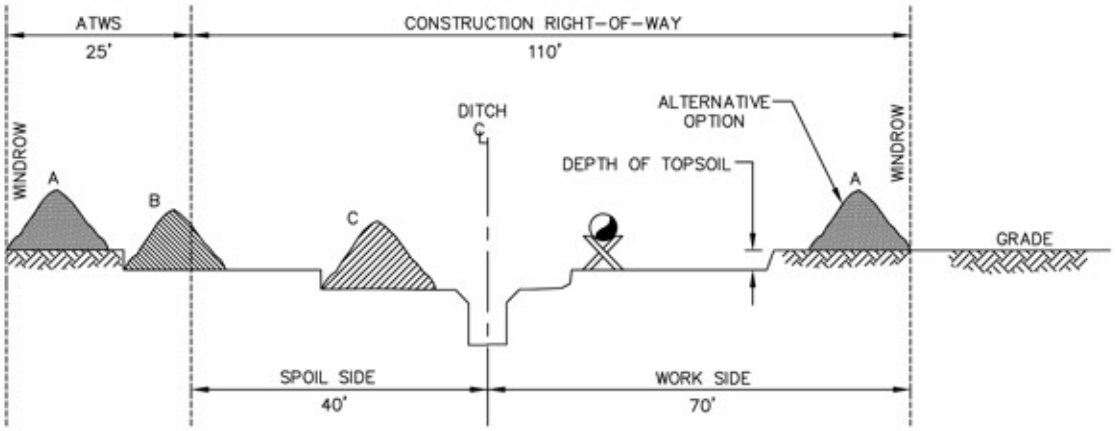
1. POTENTIAL LOCATIONS WHERE TRIPLE DITCH TOPSOIL CONSERVATION MAY BE COMPLETED ARE SHOWN ON THE ALIGNMENT SHEETS. KEYSTONE WILL DIRECT THE ACTUAL LOCATIONS WHERE TRIPLE DITCH WILL BE COMPLETED DURING, OR IMMEDIATELY PRIOR TO, TOPSOILING THE ROW. KEYSTONE MAY MODIFY TRIPLE DITCH PROCEDURES FROM THOSE DESCRIBED HERE TO ADDRESS SITE-SPECIFIC, OR SOIL-SPECIFIC, CONDITIONS.

2. STRIP TOPSOIL ("A" HORIZON) ACCORDING TO THE "A" HORIZON DEPTHS AND CONSTRUCTION DETAILS SHOWN ON CONSTRUCTION ALIGNMENT SHEETS. PLACE "A" HORIZON IN THE ADDITIONAL TEMPORARY WORKSPACE OR THE WINDROW WITHIN THE WORKING SIDE OF THE CONSTRUCTION RIGHT-OF-WAY. IN AREAS OF THICKER "A" HORIZON'S, "A" HORIZON MAY BE SPLIT TO BOTH SIDES OF THE RIGHT-OF-WAY.
REMOVE "B" HORIZON (2ND DITCH) TO DEPTHS SPECIFIED BY KEYSTONE AND STOCKPILE ON SPOIL SIDE. THE "B" HORIZON SHOULD BE REMOVED IN A STRIP AT LEAST 20 FEET WIDE OVER THE TRENCH TO ALLOW FOR STORAGE OF THE TRENCH SPOIL MATERIALS. MAINTAIN A MINIMUM OF 2 FEET BETWEEN "A" HORIZON AND "B" HORIZON STOCKPILES.



3. EXCAVATE TRENCH. ENSURE THE DIFFERENT SOIL HORIZONS ("B" HORIZON AND "C" HORIZON) ARE IN SEPARATE STOCKPILES. THE VISUAL DISTINCTION OF EACH PILE MUST BE POSSIBLE AT ALL TIMES. THE STOCKPILING SHALL ALLOW FOR RE-PLACEMENT OF THE SOIL HORIZONS BACK TO THEIR ORIGINAL SEQUENCE WITHOUT LOSS OF SOIL. MAINTAIN A MINIMUM OF 2 FEET BETWEEN "B" HORIZON AND "C" HORIZON STOCKPILES.



REVISIONS | 01 REVISED LABELS | 02 2010-10-08 REVISED DETAIL | 03 2010-10-11 REVISED TITLE BLOCK

TransCanada
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1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

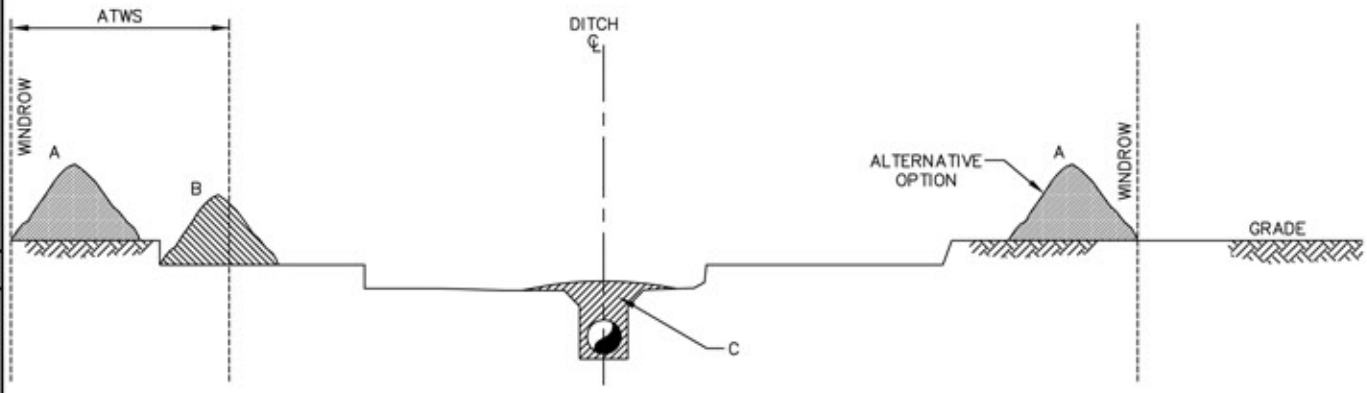
DESIGNER:		KEYSTONE XL PROJECT		
JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 67 TOPSOIL CONSERVATION DITCH & SPOIL STRIPPING TRIPLE DITCH		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-05-724	REV 03

TC_A4_BR.DWG 8.5X11

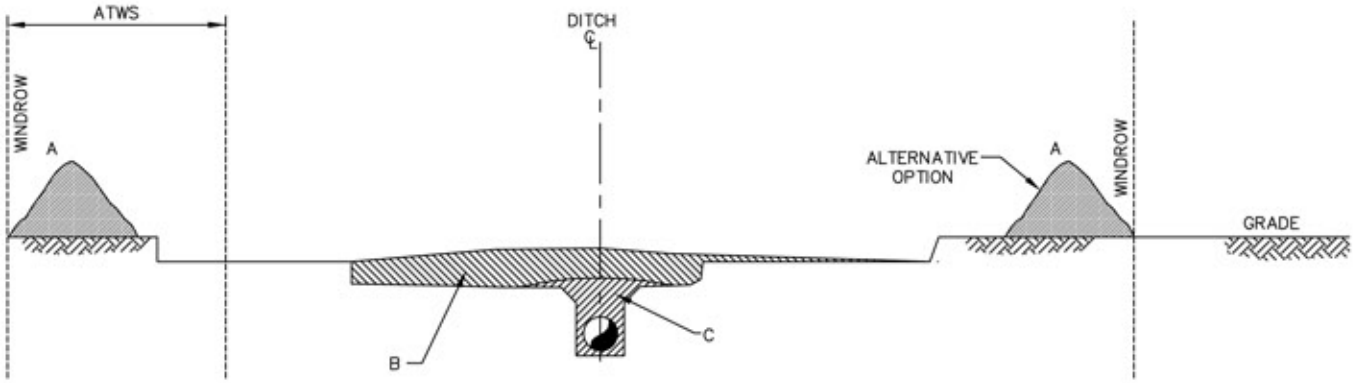
CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

THESE ARE TYPICAL DRAWINGS; ACTUAL SITE CONDITIONS MAY VARY FROM THE SITE GRAPHICALLY REPRESENTED.

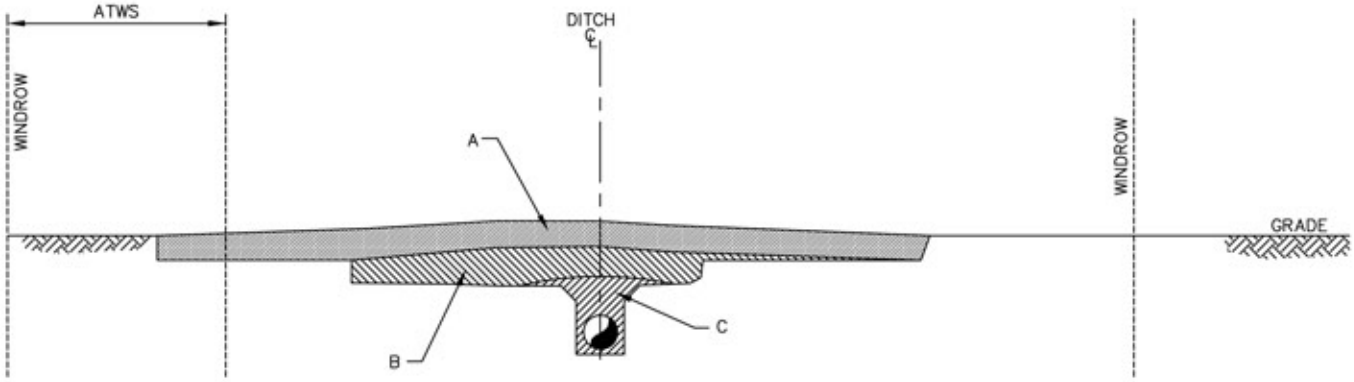
4. BACKFILL TRENCH AND COMPACT AS PER APPROVED PROCEDURE.. PLACE THE SOIL HORIZONS BACK IN THEIR ORIGINAL SEQUENCE IN THE TRENCH.



5. RELIEVE AREAS OF COMPACTION AND FEATHER (B) MATERIAL EVENLY OVER STRIPPED AREA.



6. REPLACE "A" HORIZON PILE EVENLY OVER STRIPPED AREA.



REVISIONS		
01	REVISED LABELS	
02	2010-10-08 REVISED DETAIL	
03	2010-10-11 REVISED TITLE BLOCK	

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DESIGNER: JMP (NAME) 2010-10-21 (DATE)

CHECKED BY: WSF

DESIGN CHECKER: RW P7100

KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL 67A
TOPSOIL CONSERVATION DITCH & SPOIL STRIPPING TRIPLE DITCH

SCALE: N.T.S. | DWG No: 4359-03-ML-05-725 | REV: 03

TC_A4_BR.DWG 8.5X11

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

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Appendix C –
Horizontal Directional Drill Frac-Out Contingency Plan

Keystone XL Pipeline Project

HORIZIONTAL DIRECTIONAL DRILL
FRAC-OUT CONTINGENCY PLAN

Prepared for:

TransCanada PipeLines Limited
450-1st Street, S.W.
Calgary, Alberta T2P 5H1

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Project No:

Revision No:
Issue Date: August 31, 2011

Table of Contents

1. Introduction 1
2. Drilling Fluid and Drilling Fluid System 2
3. HDD Contractor Responsibilities and Requirements 3
4. Fluid Migration Detection 4
5. Corrective Action for an Inadvertent Release 5
6. Containment of Drilling Fluid Release 7
7. Clean-up of Releases 8
8. Agency Notification Procedures 9

1. Introduction

This horizontal directional drilling mud contingency plan provides specific procedures and steps to contain the inadvertent releases of drilling mud (frac-outs) during pipeline installations using horizontal direction drilling (HDD) techniques. Keystone will designate a representative that will coordinate the implementation of this plan and perform any environmental agency communications in the event of a frac-out during the project.

2. Drilling Fluid and Drilling Fluid System

The HDD process involves the use of a drilling fluid (also referred to as drilling mud) made up primarily of water. Bentonite clay is added to the water to enhance lubricating, spoil transport and caking properties of the drilling fluid. Bentonite is a naturally occurring, non-toxic, inert substance that meets NSF/ANSI 60 NSF Drinking Water Additives Standards and is frequently used for drilling potable water wells.

The primary purpose of drilling fluid is to power the downhole cutting tools, remove cuttings from the drill hole, stabilize the hole, and act as a coolant and lubricant during the drilling process.

The drilling fluid is prepared in a mixing tank containing both new and clean recycled drilling fluid. The fluid is pumped at rate of 100 to 1,000 gallons per minute (gpm) through the center of the drill pipe to the cutters. Return flow is through the annulus created between the wall of the boring and the drill pipe. The cuttings are then carried back to either the entry or the exit pit, depending on a combination of elevation difference and drilling/hole opening direction.

Once in the entry pit, the fluid moves to the pickup pit to be pumped to the fluid processing equipment. Typically, shaker screens, desanders and desilters remove increasingly finer cuttings from the drilling fluid. The cleaned and recycled fluid is returned to the mixing tank and pumps for reuse in the borehole. Following completion of the drill, cuttings and clay will be disposed of in accordance with all applicable federal, state and local environmental regulations. Accordingly, this material may be made available to landowners for use, mixed with native soil and buried on site with landowner permission, or disposed of in a landfill.

The HDD method has the potential for loss or seepage of drilling fluid into the native material through which the drill passes. In some cases, the drilling fluid may be forced to the surface resulting in what is commonly referred to as an inadvertent release or a frac-out. While one of the positive aspects of the HDD method is the avoidance surface disturbance, surface disturbances may occur when there is an inadvertent release of drilling fluid. Drilling fluid release is typically caused by pressurization of the drill hole beyond the containment capability of the overburden soil material or due to inherent weaknesses within the overlying soils such as a fissure or other pathway. In some cases, the pathway can be associated with boreholes advanced for geotechnical investigations or by bridge or building pilings.

The HDD operation is a closed system to minimize the discharge of drilling mud, fluids, and cuttings outside of the work area. To minimize the possibility of fluid escape, mud pits shall be used to contain the drilling fluids. The drilling fluids are cleaned and recycled to the extent possible. Tanks or dumpsters will be installed in lined pits. Care will be taken to prevent the fluids from getting into the soil and to prevent groundwater from entering the pits.

3. HDD Contractor Responsibilities and Requirements

The HDD contractor is responsible for execution of the HDD operation, including actions for detecting and controlling the inadvertent release of drilling fluid. Keystone will closely supervise the progress and actions of the HDD contractor through the use of onsite inspection teams.

The HDD contractor will be required to conduct the HDD operation in compliance with the project specific Spill Prevention Control and Countermeasure Plan (SPCC) which includes specifies the types and quantities of equipment to be provided, which would typically consist of a tracked hydraulic excavator, straw or hay bales, stakes to secure bails, silt fence, sand bags, shovels, pumps, and any other materials or equipment deemed necessary and adequate to contain and clean up inadvertent releases. The contractor will also provide for a vacuum truck and operator to be on call during drilling operations, such that the vacuum truck can respond and be on-site within three hours of notification.

The Contractor will provide a site-specific plan for each HDD crossing, identifying any site-specific requirements and provisions to be made to meet special site conditions.

Ancillary items must be readily available during drilling operations including a light tower in case cleanup operations are needed after dark, a boat with relevant safety equipment during the crossing of large water bodies, and leak free hose to allow pumping spilled drilling mud for mitigation where small creeks or drainages are involved.

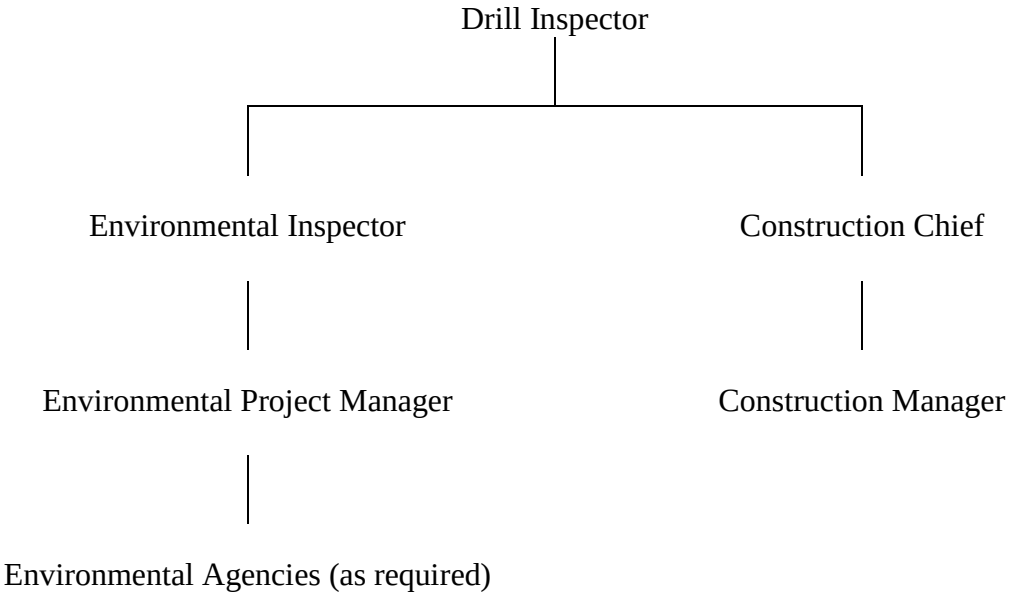
4. Fluid Migration Detection

Drilling crews and the Keystone inspection personnel will be responsible for monitoring and detection of frac-outs. The most obvious signs of a frac-out are the visible pooling of drilling mud on the surface or a sudden decease in mud volume during drilling operations or loss in drilling mud pressure. The annular pressure will be specified in the HDD contract. Drilling and mud system personnel will observe alterations in drilling pressure or the volume of drilling fluid return and immediately report reductions or anomolies to the foreman and Keystone personnel. The contract will specify the use of an Electronic Data Recorder (EDR) to monitor volumes, pressures and other HDD operations.

5. Corrective Action for an Inadvertent Release

In the event of inadvertent release to the surface at locations other than the borehole location, the following actions will be taken:

- Notify the Keystone Drill Inspector, who will contact the appropriate Keystone representatives per the following communication outline:



- Suspend active drilling operations
- Search for surface fractures
- Determine the volume of lost fluid to surface
- Contain any drilling fluid that has surfaced
- Evaluate the circumstances leading to circulation loss to determine if the fracture can be sealed. This shall include a review of the annular pressure history during the drill
- In the event of partial circulation loss, pumping of drilling fluid may be reduced to reduce pressure applied to native formation materials or LCM's may be added. Use of pressure reduction or addition of LCM's will be identified in the contract specification.
- Additional berms will be constructed around the bore pit as directed by the Keystone Representative to prevent release of materials into the adjacent water body

- The contractor will pump the spill in an attempt to recover all of the spilled fluid for disposal
- Measures will be implemented (berm, silt fence, and/or hay bale installation) to prevent silt laden water from flowing into the water body.
- If hand tools cannot contain a small on-land release, small collection sumps may be constructed to pump the released material into the mud processing system.
- Sump pumps or vacuum trucks will be used to remove and dispose of any drilling fluids.

6. Containment of Drilling Fluid Release

Immediately following the detection of the inadvertent drilling fluid release, containment and clean-up operations shall commence and Keystone will notify all appropriate authorities. For releases on land, Contractor shall use straw bales, silt fences, sand bags and earth berms to prevent fluid from migrating or flowing from the immediate area of the discharge. If the volume released is too small for containment measures or if the release occurs in an environmentally sensitive area where release of containments can cause additional damage, the receiving area will be allowed to dry naturally. If there is a threat to a sensitive resource or a threat to public safety, HDD activities will cease immediately.

In cases of inadvertent releases to open water or flooded wetlands, it may impractical or impossible to contain the release. For releases in shallow water, the HDD contractor shall install staked sediment barriers as described in the Keystone XL Construction Mitigation and Reclamation Plan (CMRP). Removal by vacuum truck may be attempted if deemed appropriate. The decision to proceed with the drilling operation will be at the sole discretion of the Keystone representative after all methods to seal off the location of the discharge identified in the SPCC Plan have been attempted. Underwater releases may be allowed to dissipate where cleanup would cause more damage than leaving the material in place. Where cleanup can be accomplished without causing additional damage, the cleanup of the spill will be conducted. The regulating agency with jurisdiction over the operation will be advised of planned actions in response to spills, when those actions do not include complete removal of the spilled material.

7. Clean-up of Releases

The clean-up shall commence after the release is contained. Clean-up shall include removal of all visible drilling fluid located in accessible areas. Removal methods will vary based on the volume of the release and the site specific conditions. Removal equipment may include vacuum trucks, loader and track hoe buckets, small pumps, shovels, buckets, brooms and squeegees. If the release occurs in a sensitive area, it may be necessary to pump the fluid into an upland area for additional containment and disposal. After removal of the released drilling fluid, the release area will be returned as close to the original condition as feasible. It may be necessary to store the drilling fluid residue on-site prior to disposal. On-site storage will include secondary containment with the capacity of 110 percent of the volume of drilling fluid residue to be stored.

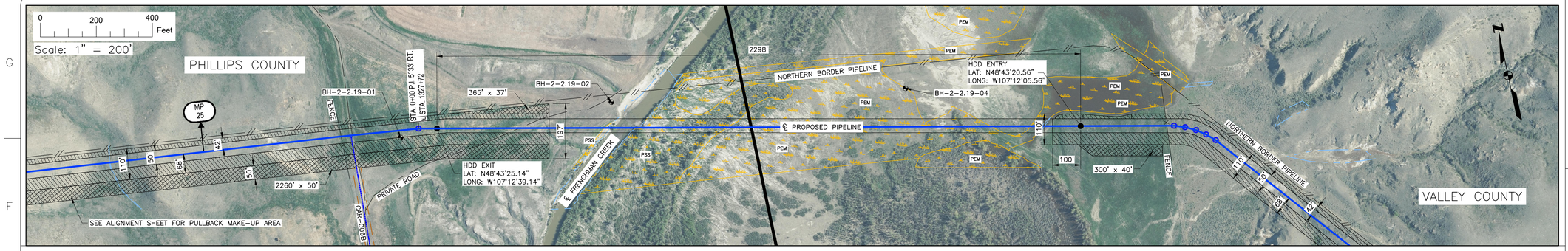
Any water discharged from the HDD operation will be discharged through filter bags, or other approved dewatering structure, to contain suspended solids.

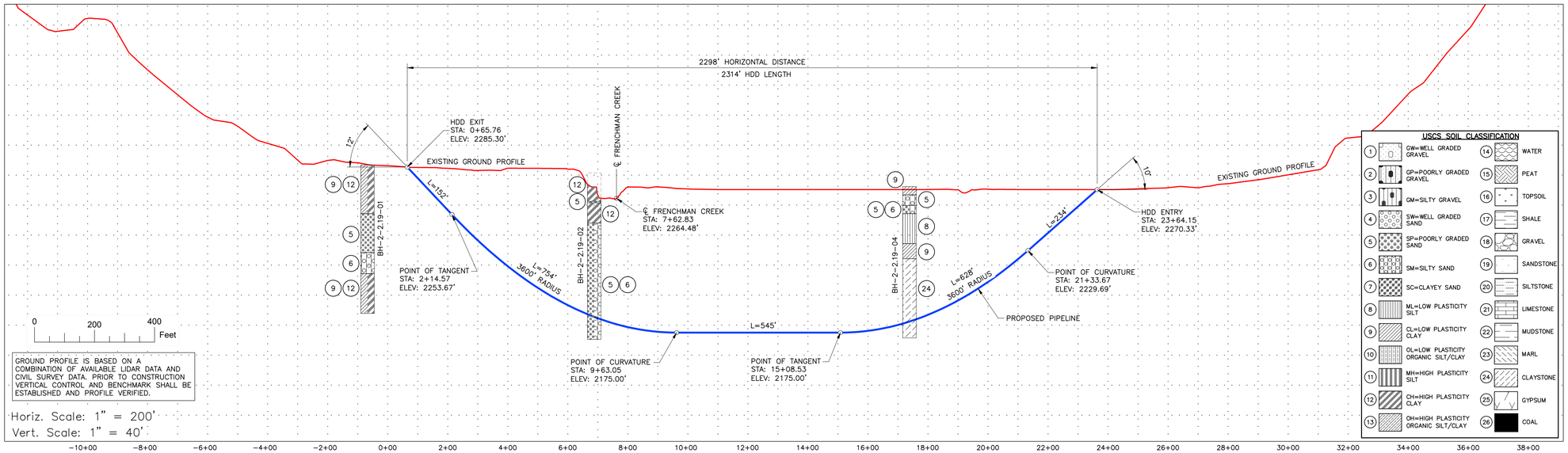
8. Agency Notification Procedures

If an inadvertent release is discovered, steps will be taken to contain the release as described in Section 4. It will be reported in accordance with the Keystone communication outline. The appropriate agency(s) will be consulted regarding the nature of the release the corrective actions to be applied and any additional measures necessary to minimize potentially adverse environmental impacts.

In the event an HDD crossing cannot be successfully completed, an alternative crossing plan will be developed and its implementation will be coordinated with the appropriate agencies.

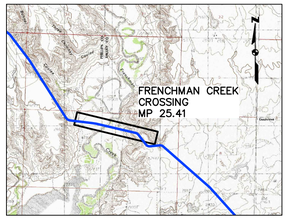
Appendix D –
Site Specific HDD Drawings





USCS SOIL CLASSIFICATION

1	GW=WELL GRADED GRAVEL	14	WATER
2	GP=POORLY GRADED GRAVEL	15	PEAT
3	GM=SILTY GRAVEL	16	TOPSOIL
4	SW=WELL GRADED SAND	17	SHALE
5	SP=POORLY GRADED SAND	18	GRAVEL
6	SM=SILTY SAND	19	SANDSTONE
7	SC=CLAYEY SAND	20	SILTSTONE
8	ML=LOW PLASTICITY SILT	21	LIMESTONE
9	CL=LOW PLASTICITY CLAY	22	MUDSTONE
10	OL=LOW PLASTICITY ORGANIC SILT/CLAY	23	MARL
11	MH=HIGH PLASTICITY SILT	24	CLAYSTONE
12	CH=HIGH PLASTICITY CLAY	25	GYPSUM
13	OH=HIGH PLASTICITY ORGANIC SILT/CLAY	26	COAL



INSTALLATION NOTES

1. CONTRACTOR SHALL ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY USING ONLY PUBLIC OR APPROVED PRIVATE ROADS.
2. THE ENTIRE AREA OF INTEREST ALONG THE RIGHT-OF-WAY SHALL BE INSPECTED FOR OTHER UNDERGROUND APPURTENANCES TO ENSURE ALL HAZARDS HAVE BEEN IDENTIFIED.
3. CONTRACTOR SHALL NOTIFY THE APPROPRIATE ONE-CALL PRIOR TO SOIL DISTURBANCE.
4. VEHICLE AND EQUIPMENT CROSSINGS MAY BE INSTALLED IF APPROVED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
5. WORKSPACE LIMITS ARE DEPICTED. CLEARINGS SHALL BE RESTRICTED TO THE WORKSPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA. NO CLEARING BETWEEN THE ENTRY AND EXIT POINTS OF THE HDD EXCEPT WHERE APPROVED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
6. DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH KPP-901 REV12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATERBODY.
7. PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PROJECT PERMITS. DISCHARGES SHALL BE SENT TO AN UPLAND LOCATION NEAR THE WITHDRAWAL POINT AS DIRECTED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES. DISCHARGES SHALL NOT CAUSE EROSION OR SEDIMENTATION, TO REDUCE THE VELOCITY OF THE DISCHARGE, CONTRACTOR SHALL UTILIZE AN ENERGY-DISSIPATING DEVISE DESCRIBED IN KPP-901 REV12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION.
8. ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATERBODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATERBODIES AND WETLANDS. EACH CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.
9. CONTRACTOR SHALL SUPPLY, INSTALL, AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH TES-CT-GEN-L PIPELINE CONSTRUCTION SPECIFICATION (US). CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
10. CONTRACTOR SHALL PROVIDE PLANNED DRILL PROFILE (IN PDF AND .DWG FORMAT) TO COMPANY FOR APPROVAL PRIOR TO STARTING THE PILOT HOLE.
11. THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE-UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR MORE AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK. PIPING FOR BALLAST MUST BE IN CONTINUOUS ROLL (NOT JOINTS) UNLESS APPROVED BY COMPANY.
12. PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO COMPANY REPRESENTATIVE FOR APPROVAL.
13. CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISPOSED OF IN WATERBODIES OR WETLANDS. ANY DRILLING MUD WHICH INADVERTENTLY EXITS AT POINTS OTHER THAN THE ENTRY AND EXIT SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PRACTICAL AND DISPOSED OF AS DIRECTED BY COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS.
14. ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED ON THE CONSTRUCTION ALIGNMENT SHEETS.
15. CONTRACTOR SHALL COMPLY WITH THE LATEST EDITION OF REFERENCE SPECIFICATIONS. REFER TO TES-CT-GEN-L PIPELINE SPECIFICATION (US), KPP-801 REV 05 SPECIFICATION FOR HORIZONTAL DIRECTIONAL DRILLING, KPP-901 REV 12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION, PROJECT ENVIRONMENTAL REQUIREMENT FOR THIS SITE SPECIFIC DETAIL, PART 195 OF CODE OF FEDERAL REGULATION, AND ASME B31.4.
16. TREE CLEARING SHALL BE MINIMIZED THROUGH NARROWING OF THE CONSTRUCTION RIGHT-OF-WAY, AND FINAL CENTERLINE LOCATION NEAR CROSSING OF THE STREAM.
17. PLEASE REFER TO ALIGNMENT SHEETS FOR SPECIFIC WETLAND AND WATERBODY CROSSING CONSTRUCTION DTL REQUIREMENTS.

SITE SPECIFIC NOTES:

18. 36" O.D. X 0.618" W.T., API 5L PSL 2-X70M W/ FBE COATING & ABRASION COATING
19. 36" O.D. X 0.515" W.T., API 5L PSL 2-X70M W/ FBE COATING

DRAWING NOTES:

20. PIPELINE STRESS ANALYSIS IS NOT THE RESPONSIBILITY OF EXP AND HAS BEEN COMPLETED BY OTHERS. THE STRESS MITIGATION RECOMMEDATION PROVIDED BY OTHERS HAS BEEN INCORPORATED INTO THE PIPELINE DESIGN.

CROSSING INFORMATION (ESTIMATED STATIONING)

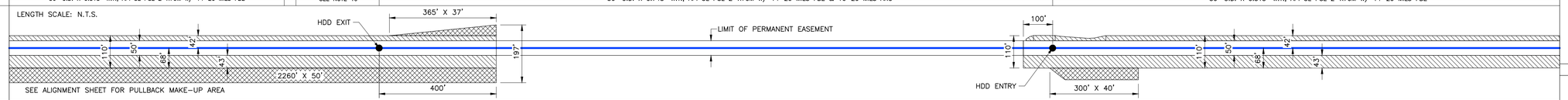
SEE NOTE 18 · 0+67 BH-2-2.19-01 · 0+00 P.I. 5°33' RT. ℄ STA. 132+72 · 0+65.76 HDD EXIT POINT LAT: N48°43'25.14" LONG: W107°12'39.14" · 2+14.57 PT OF TANGENT · 6+89 BH-2-2.19-02 · 7+63 ℄ FRENCHMAN CREEK · 9+63.05 PT OF CURVATURE · 15+08.53 PT OF TANGENT · 17+39 BH-2-2.19-04 · 21+33.67 PT OF CURVATURE · 22+64.15 HDD ENTRY POINT LAT: N48°43'20.56" LONG: W107°12'05.56"

PIPELINE DATA

36" O.D. X 0.515" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE — SEE NOTE 19 — 36" O.D. X 0.748" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE & 16-20 MILS ARO — 36" O.D. X 0.515" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE

CONSTRUCTION WORKSPACE

LENGTH SCALE: N.T.S.



ENVIRONMENTAL MITIGATION/RECLAMATION

TOPSOIL SALVAGE METHOD	SEE ALIGNMENT SHEET
STREAMS	SEE ALIGNMENT SHEET
WETLANDS	SEE ALIGNMENT SHEET
TIMING CONSTRAINTS	SEE ALIGNMENT SHEET
MILEPOST	SEE ALIGNMENT SHEET
MONITORING	SEE ALIGNMENT SHEET
RECLAMATION	SEE ALIGNMENT SHEET
SPECIAL CONSIDERATIONS	SEE ALIGNMENT SHEET

LEGEND

CL P.I.	COUNTY LINE	SECTION LINE
ENTRY OR EXIT POINT	PERMANENT EASEMENT BOUNDARY	FOREIGN PIPELINE
GEOTECHNICAL BOREHOLE	TEMPORARY WORKSPACE BOUNDARY	WATER LINE
PIPELINE ROUTE	ADDITIONAL TEMPORARY WORKSPACE	OVERHEAD POWERLINE
CATHODIC PROTECTION TEST STATION	PERMANENT ACCESS ROAD	UNDERGROUND UTILITY
ROAD CL	TEMPORARY ACCESS ROAD	TELEPHONE LINE
ROAD EDGE	EXISTING GROUND	PROPERTY PARCEL
FIELD PATH	WATER BODY	HEADCUT AREA
RAILWAY	WETLAND BOUNDARY	EXCLUSION FENCE
FENCE		TEMP. ACCESS ROAD EASEMENT

REFERENCE DRAWINGS

DRAWING No	TITLE
4359-03-ML-02-017	ALIGNMENT SHEET

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2013-05-31	ISSUED FOR CONSTRUCTION	2095406	EXP	TLB	BLS	KJM	KJM	EXP
00A	2018-07-12	ISSUED FOR BID	2095406	EXP	ADH	ZM	REW	SAS	EXP
00B	2019-04-10	ISSUED FOR REVIEW	2095406	EXP	ADH	ZM	REW	SAS	EXP
00C	2020-05-05	ISSUED FOR MT IP	2095406	EXP	ADH	ZM	REW	SAS	EXP

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL

FIRM: EXP ENERGY SERVICES, INC. — DATE

FIRM LICENSE: PEL-EF-LIC-1435

REV. NO. | DATE | PERMIT NUMBER:

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1800 West Loop South, Suite 850
Houston, TX 77027
USA
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KEYSTONE XL (NPS 36 2014) PHILLIPS SECTION

FACILITY # 4359 | ENG STATION: MP 25.41 | DISCIPLINE # 03

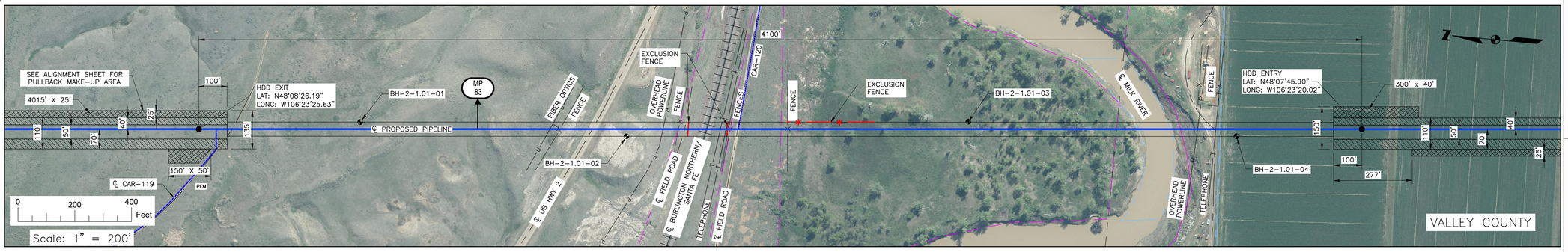
FRENCHMAN CREEK
HDD INSTALLATION – KEYSTONE XL PROJECT
PHILLIPS & VALLEY COUNTY, MONTANA

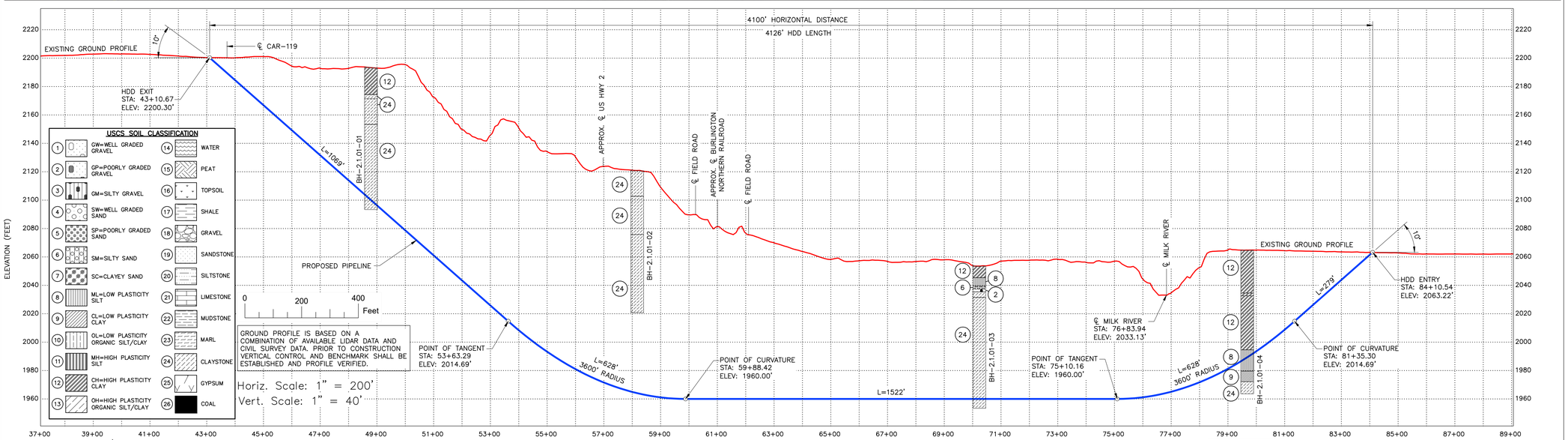
SCALE AS SHOWN | DRAWING # 4359-03-ML-03-001 | REV. 00C

TC_UD_BR.DWG 22X34

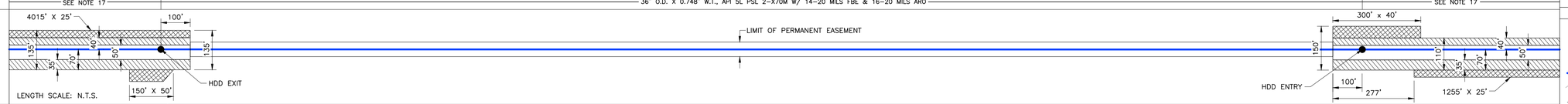
CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)

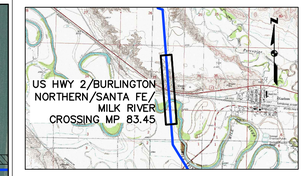




CROSSING INFORMATION (ESTIMATED STATIONING)	0+00 P.I. 69°24' RT. ℄ STA. 4329+46; 43+10.67 HDD EXIT POINT LAT: N48°08'26.19" LONG: W106°23'25.63"; 43+71.90 ℄ CAR-119; 48+79 BH-2.1.01-01; 53+63.29 PT OF TANGENT; 56+97.50 ℄ US HWY 2; 58+18 BH-2.1.01-02 59+88.42 PT OF CURVATURE; 60+23.55 ℄ FIELD RD; 61+00.91 APPROX ℄ BURLINGTON NORTHERN RAILROAD; 61+83.15 ℄ FIELD RD; 70+24 BH-2.1.01-03; 75+10.16 PT OF TANGENT; 76+83.94 ℄ MILK RIVER; 79+68 BH-2.1.01-04; 81+35.30 PT OF CURVATURE; 84+10.54 HDD ENTRY POINT LAT: N48°07'45.90" LONG: W106°23'20.02"
PIPELINE DATA	SEE NOTE 17 — 36" O.D. X 0.748" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE & 16-20 MILS ARO — SEE NOTE 17



ENVIRONMENTAL MITIGATION/RECLAMATION	
TOPSOIL SALVAGE METHOD	SEE ALIGNMENT SHEET
STREAMS	SEE ALIGNMENT SHEET
WETLANDS	SEE ALIGNMENT SHEET
TIMING CONSTRAINTS	SEE ALIGNMENT SHEET
MILEPOST	SEE ALIGNMENT SHEET
MONITORING	SEE ALIGNMENT SHEET
RECLAMATION	SEE ALIGNMENT SHEET
SPECIAL CONSIDERATIONS	SEE ALIGNMENT SHEET



INSTALLATION NOTES

1. CONTRACTOR SHALL ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY USING ONLY PUBLIC OR APPROVED PRIVATE ROADS.
2. THE ENTIRE AREA OF INTEREST ALONG THE RIGHT-OF-WAY SHALL BE INSPECTED FOR OTHER UNDERGROUND APPURTENANCES TO ENSURE ALL HAZARDS HAVE BEEN IDENTIFIED.
3. CONTRACTOR SHALL NOTIFY THE APPROPRIATE ONE-CALL PRIOR TO SOIL DISTURBANCE.
4. VEHICLE AND EQUIPMENT CROSSINGS MAY BE INSTALLED IF APPROVED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
5. WORKSPACE LIMITS ARE DEPICTED. CLEARINGS SHALL BE RESTRICTED TO THE WORKSPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA. NO CLEARING BETWEEN THE ENTRY AND EXIT POINTS OF THE HDD EXCEPT WHERE APPROVED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
6. DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH KPP-901 REV12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATERBODY.
7. PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PROJECT PERMITS. DISCHARGES SHALL BE SENT TO AN UPLAND LOCATION NEAR THE WITHDRAWL POINT AS DIRECTED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES. DISCHARGES SHALL NOT CAUSE EROSION OR SEDIMENTATION. TO REDUCE THE VELOCITY OF THE DISCHARGE, CONTRACTOR SHALL UTILIZE AN ENERGY-DISSAPATING DEVISE DESCRIBED IN KPP-901 REV12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION.
8. ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATERBODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATERBODIES AND WETLANDS. EACH CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.
9. CONTRACTOR SHALL SUPPLY, INSTALL, AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH TES-CT-GEN-L PIPELINE CONSTRUCTION SPECIFICATION (US). CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
10. CONTRACTOR SHALL PROVIDE PLANNED DRILL PROFILE (IN PDF AND .DWG FORMAT) TO COMPANY FOR APPROVAL PRIOR TO STARTING THE PILOT HOLE.
11. THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE-UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR MORE AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK. PIPING FOR BALLAST MUST BE IN CONTINUOUS ROLL (NOT JOINTS) UMLESS APPROVED BY COMPANY.
12. PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO COMPANY REPRESENTATIVE FOR APPROVAL.
13. CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISPOSED OF IN WATERBODIES OR WETLANDS. ANY DRILLING MUD WHICH INADVERTENTLY EXITS AT POINTS OTHER THAN THE ENTRY AND EXIT SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PARCTICAL AND DISPOSED OF AS DIRECTED BY COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS.
14. ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED ON THE CONSTRUCTION ALIGNMENT SHEETS.
15. CONTRACTOR SHALL COMPLY WITH THE LATEST EDITION OF REFERENCE SPECIFICATIONS. REFER TO TES-CT-GEN-L PIPELINE SPECIFICATION (US), KPP-801 REV 05 SPECIFICATION FOR HORIZONTAL DIRECTIONAL DRILLING, KPP-901 REV 12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION, PROJECT ENVIRONMENTAL REQUIREMENT FOR THIS SITE SPECIFIC DETAIL, PART 195 OF CODE OF FEDERAL REGULATION, AND ASME B31.4.
16. TREE CLEARING SHALL BE MINIMIZED THROUGH NARROWING OF THE CONSTRUCTION RIGHT-OF-WAY, AND FINAL CENTERLINE LOCATION NEAR CROSSING OF THE STREAM.

SITE SPECIFIC NOTES:

17. 36" O.D. X 0.465" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE

DRAWING NOTES:

18. PIPELINE STRESS ANALYSIS IS NOT THE RESPONSIBILITY OF EXP AND HAS BEEN COMPLETED BY OTHERS, THE STRESS MITIGATION RECOMMEDATION PROVIDED BY OTHERS HAS BEEN INCORPORATED INTO THE PIPELINE DESIGN.

LEGEND

- CL P.I.
- ENTRY OR EXIT POINT
- GEOTECHNICAL BOREHOLE
- PIPELINE ROUTE
- CATHODIC PROTECTION TEST STATION
- ROAD CL
- ROAD EDGE
- FIELD PATH
- RAILWAY
- FENCE
- FOREIGN PIPELINE
- WATER LINE
- OVERHEAD POWERLINE
- UNDERGROUND UTILITY
- TELEPHONE LINE
- PROPERTY PARCEL
- SECTION LINE
- COUNTY LINE
- PERMANENT EASEMENT BOUNDARY
- TEMPORARY WORKSPACE BOUNDARY
- ADDITIONAL TEMPORARY WORKSPACE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- EXISTING GROUND
- WATER BODY
- WETLAND BOUNDARY
- HEADCUT AREA
- EXCLUSION FENCE
- MDEQ CORRIDOR

REFERENCE DRAWINGS

DRAWING No	TITLE
4360-03-ML-02-023	ALIGNMENT SHEET

REVISION

REV No	DATE	DESCRIPTION
00	2013-05-31	ISSUED FOR CONSTRUCTION
00A	2018-07-12	ISSUED FOR BID
00B	2019-04-10	ISSUED FOR REVIEW
00C	2020-01-10	ISSUED FOR CORP 404 FILING

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2095406	EXP	TLB	BLS	KJM	KJM	EXP
2095406	EXP	ADH	ZM	REW	SAS	EXP
2095406	EXP	ADH	ZM	REW	SAS	EXP
2095406	EXP	ADH	ZM	REW	SAS	EXP

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL

FIRM: EXP ENERGY SERVICES, INC.
FIRM LICENSE: PEL-EF-LIC-1435
DATE

REV. NO. | DATE | PERMIT NUMBER:

TC Energy

EXP Energy Services Inc.
t +1.850.385.5441 | f +1.850.385.5523
1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

KEYSTONE XL (NPS 36 2014) VALLEY SECTION

FACILITY # 4360 | ENG STATION: MP 83.45 | DISCIPLINE # 03

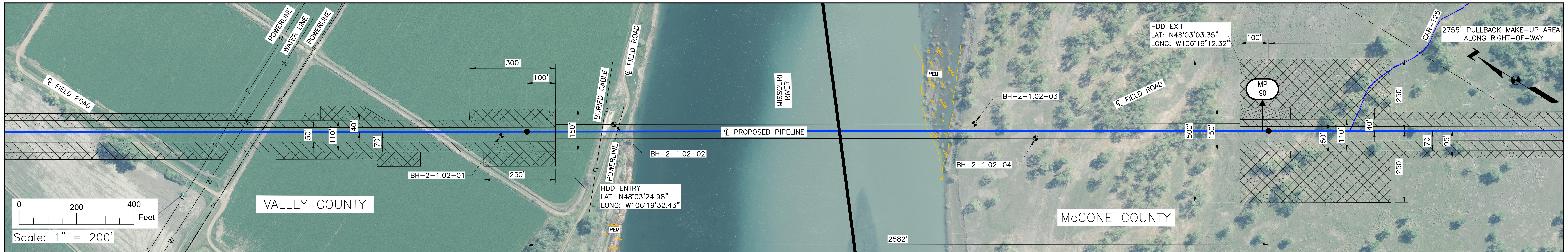
US HWY 2/BURLINGTON NORTHERN/SANTA FE/MILK RIVER HDD INSTALLATION – KEYSTONE XL PROJECT VALLEY COUNTY, MONTANA

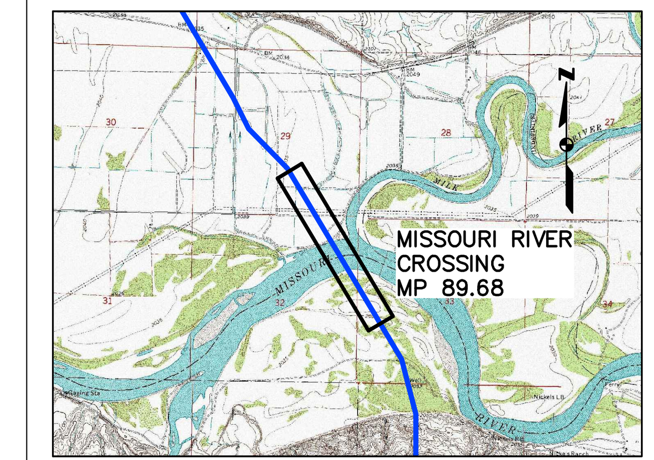
SCALE AS SHOWN | DRAWING # 4360-03-ML-03-001 | REV. 00C

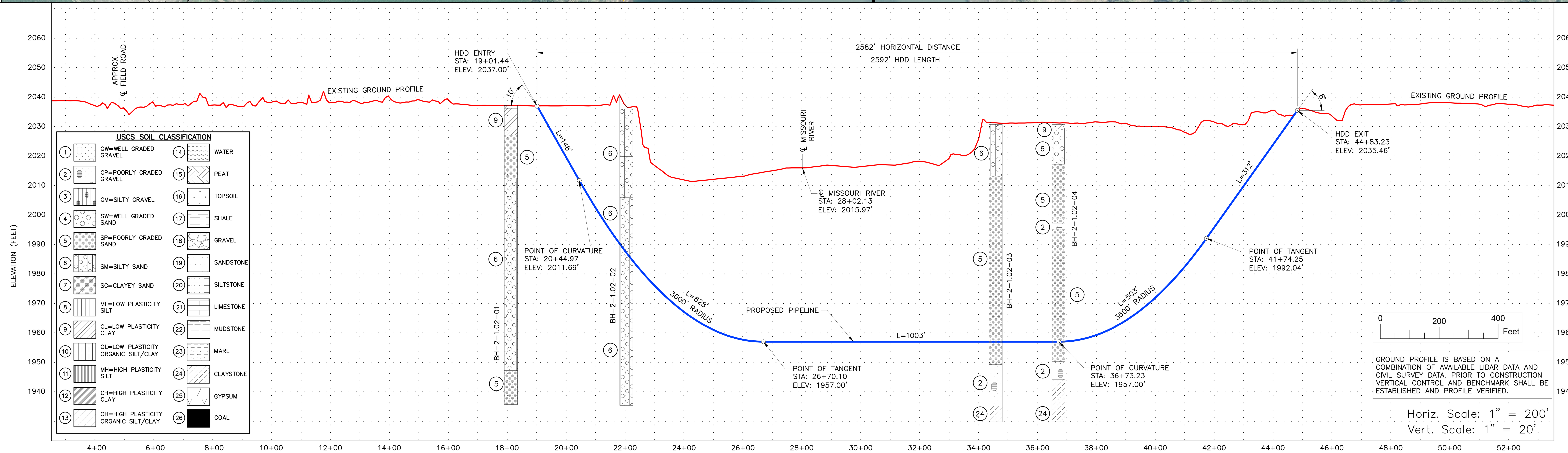
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)







USCS SOIL CLASSIFICATION

1	GW=WELL GRADED GRAVEL	14	WATER
2	GP=POORLY GRADED GRAVEL	15	PEAT
3	GM=SILTY GRAVEL	16	TOPSOIL
4	SW=WELL GRADED SAND	17	SHALE
5	SP=POORLY GRADED SAND	18	GRAVEL
6	SM=SILTY SAND	19	SANDSTONE
7	SC=CLAYEY SAND	20	SILTSTONE
8	ML=LOW PLASTICITY SILT	21	LIMESTONE
9	CL=LOW PLASTICITY CLAY	22	MUDSTONE
10	OL=LOW PLASTICITY ORGANIC SILT/CLAY	23	MARL
11	MH=HIGH PLASTICITY SILT	24	CLAYSTONE
12	CH=HIGH PLASTICITY CLAY	25	GYPSUM
13	OH=HIGH PLASTICITY ORGANIC SILT/CLAY	26	COAL

GROUND PROFILE IS BASED ON A COMBINATION OF AVAILABLE LIDAR DATA AND CIVIL SURVEY DATA. PRIOR TO CONSTRUCTION VERTICAL CONTROL AND BENCHMARK SHALL BE ESTABLISHED AND PROFILE VERIFIED.

Horiz. Scale: 1" = 200'
Vert. Scale: 1" = 20'

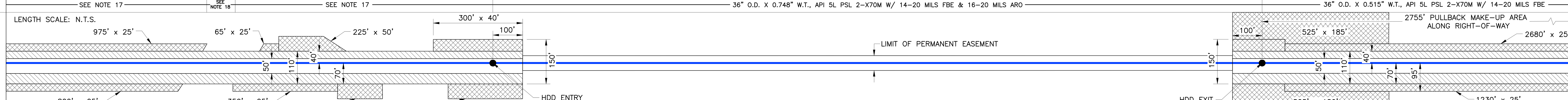
CROSSING INFORMATION (ESTIMATED STATIONING)

- 0+00 P.I. 06°40' RT. ℄ STA. 4707+39
- 4+82 ℄ FIELD RD
- 9+90 CAR–124/GARWOOD RD. 2
- 16+34 CAR–124
- 18+13 BH–2–1.02–01
- 19+01.44 HDD ENTRY POINT LAT: N48°03'24.98" LONG: W106°19'32.43"
- 20+44.97 PT OF CURVATURE
- 21+71 ℄ MAN MADE DITCH
- 22+04 BH–2–1.02–02
- 22+07.61 ℄ UNNAMED ROAD
- 26+70.10 PT OF TANGENT
- 28+02.13 ℄ MISSOURI RIVER
- 34+59 BH–2–1.02–03
- 36+72 BH–2–1.02–04
- 36+73.23 PT OF CURVATURE
- 41+74.25 PT OF TANGENT
- 44+83.23 HDD EXIT POINT LAT: N48°03'03.35" LONG: W106°19'12.32"
- 47+65 CAR–125

PIPELINE DATA

SEE NOTE 17 — SEE NOTE 18 — SEE NOTE 17 — 36" O.D. X 0.748" W.T., API 5L PSL 2–X70M W/ 14–20 MILS FBE & 16–20 MILS ARO — 36" O.D. X 0.515" W.T., API 5L PSL 2–X70M W/ 14–20 MILS FBE

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION

TOPSOIL SALVAGE METHOD	SEE ALIGNMENT SHEET
STREAMS	SEE ALIGNMENT SHEET
WETLANDS	SEE ALIGNMENT SHEET
TIMING CONSTRAINTS	SEE ALIGNMENT SHEET
MILEPOST	SEE ALIGNMENT SHEET
MONITORING	SEE ALIGNMENT SHEET
RECLAMATION	SEE ALIGNMENT SHEET
SPECIAL CONSIDERATIONS	SEE ALIGNMENT SHEET

INSTALLATION NOTES

1. CONTRACTOR SHALL ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT–OF–WAY USING ONLY PUBLIC OR APPROVED PRIVATE ROADS.
2. THE ENTIRE AREA OF INTEREST ALONG THE RIGHT–OF–WAY SHALL BE INSPECTED FOR OTHER UNDERGROUND APPURTENANCES TO ENSURE ALL HAZARDS HAVE BEEN IDENTIFIED.
3. CONTRACTOR SHALL NOTIFY THE APPROPRIATE ONE–CALL PRIOR TO SOIL DISTURBANCE.
4. VEHICLE AND EQUIPMENT CROSSINGS MAY BE INSTALLED IF APPROVED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
5. WORKSPACE LIMITS ARE DEPICTED. CLEARINGS SHALL BE RESTRICTED TO THE WORKSPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE–UP AREA. NO CLEARING BETWEEN THE ENTRY AND EXIT POINTS OF THE HDD EXCEPT WHERE APPROVED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
6. DRILL WATER AND PRE–INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH KPP–901 REV12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATERBODY.
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9. CONTRACTOR SHALL SUPPLY, INSTALL, AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH TES–CT–GEN–L PIPELINE CONSTRUCTION SPECIFICATION (US). CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
10. CONTRACTOR SHALL PROVIDE PLANNED DRILL PROFILE (IN PDF AND .DWG FORMAT) TO COMPANY FOR APPROVAL PRIOR TO STARTING THE PILOT HOLE.
11. THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE–UP WITHIN THE RIGHT–OF–WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR MORE AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK. PIPING FOR BALLAST MUST BE IN CONTINUOUS ROLL (NOT JOINTS) UMLESS APPROVED BY COMPANY.
12. PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO COMPANY REPRESENTATIVE FOR APPROVAL.
13. CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISPOSED OF IN WATERBODIES OR WETLANDS. ANY DRILLING MUD WHICH INADVERTENTLY EXITS AT POINTS OTHER THAN THE ENTRY AND EXIT SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PARCTICAL AND DISPOSED OF AS DIRECTED BY COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS.
14. ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED ON THE CONSTRUCTION ALIGNMENT SHEETS.
15. CONTRACTOR SHALL COMPLY WITH THE LATEST EDITION OF REFERENCE SPECIFICATIONS. REFER TO TES–CT–GEN–L PIPELINE SPECIFICATION (US), KPP–801 REV 05 SPECIFICATION FOR HORIZONTAL DIRECTIONAL DRILLING, KPP–901 REV 12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION, PROJECT ENVIRONMENTAL REQUIREMENT FOR THIS SITE SPECIFIC DETAIL, PART 195 OF CODE OF FEDERAL REGULATION, AND ASME B31.4.
16. TREE CLEARING SHALL BE MINIMIZED THROUGH NARROWING OF THE CONSTRUCTION RIGHT–OF–WAY, AND FINAL CENTERLINE LOCATION NEAR CROSSING OF THE STREAM.

SITE SPECIFIC NOTES:

17. 36" O.D. X 0.465" W.T., API 5L PSL 2–X70M W/14–20 MILS FBE
18. 36" O.D. X 0.618" W.T., API 5L PSL 2–X70M W/14–20 MILS FBE & 16–20 MILS ARO.
19. CONTRACTOR, AT ITS DISCRETION, SHALL USE 8–DEGREE FIELD BEND OR 3R FITTING AT THE HDD EXIT TIE–IN POINT. COMPANY WILL PROVIDE 3R FITTINGS FOR THIS CROSSING.

DRAWING NOTES:

20. PIPELINE STRESS ANALYSIS IS NOT THE RESPONSIBILITY OF EXP AND HAS BEEN COMPLETED BY OTHERS, THE STRESS MITIGATION RECOMMENDATION PROVIDED BY OTHERS HAS BEEN INCORPORATED INTO THE PIPELINE DESIGN.

LEGEND

CL P.I.	COUNTY LINE	SECTION LINE
ENTRY OR EXIT POINT	PERMANENT EASEMENT BOUNDARY	FOREIGN PIPELINE
GEOTECHNICAL BOREHOLE	TEMPORARY WORKSPACE BOUNDARY	WATER LINE
PIPELINE ROUTE	ADDITIONAL TEMPORARY WORKSPACE	OVERHEAD POWERLINE
CATHODIC PROTECTION TEST STATION	PERMANENT ACCESS ROAD	UNDERGROUND UTILITY
ROAD CL	TEMPORARY ACCESS ROAD	TELEPHONE LINE
ROAD EDGE	EXISTING GROUND	PROPERTY PARCEL
FIELD PATH	WATER BODY	HEADCUT AREA
RAILWAY	WETLAND BOUNDARY	EXCLUSION FENCE
FENCE		MDEQ CORRIDOR

REFERENCE DRAWINGS

DRAWING No	TITLE
4360–03–ML–02–028	ALIGNMENT SHEET

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2013–05–31	ISSUED FOR CONSTRUCTION	2095406	EXP	TLB	BLS	KJM	KJM	EXP
00A	2018–07–12	ISSUED FOR BID	2095406	EXP	ADH	ZM	REW	SAS	EXP
00B	2019–04–10	ISSUED FOR REVIEW	2095406	EXP	ADH	ZM	REW	SAS	EXP
00C	2020–01–10	ISSUED FOR CORP 404 FILING	2095406	EXP	ADH	ZM	REW	SAS	EXP

PROFESSIONAL ENGINEER/RPT
FIRM: EXP ENERGY SERVICES, INC.
FIRM LICENSE: PEL–EF–LIC–1435

PERMIT/ ENG. APPROVAL
DATE

REV. NO. | DATE | PERMIT NUMBER:

TC Energy

EXP Energy Services Inc.
t: +1.850.385.5441 | f: +1.850.385.5523
1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

KEYSTONE XL (NPS 36 2014) VALLEY SECTION

FACILITY # 4360 | ENG STATION: MP 89.68 | DISCIPLINE # 03

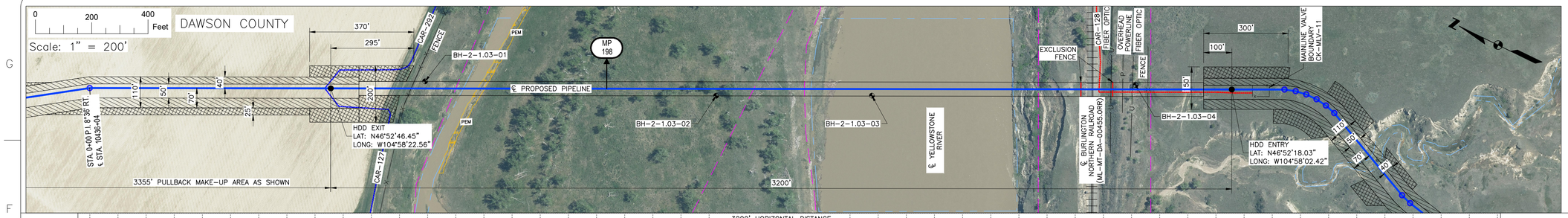
MISSOURI RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
VALLEY & McCONE COUNTY, MONTANA

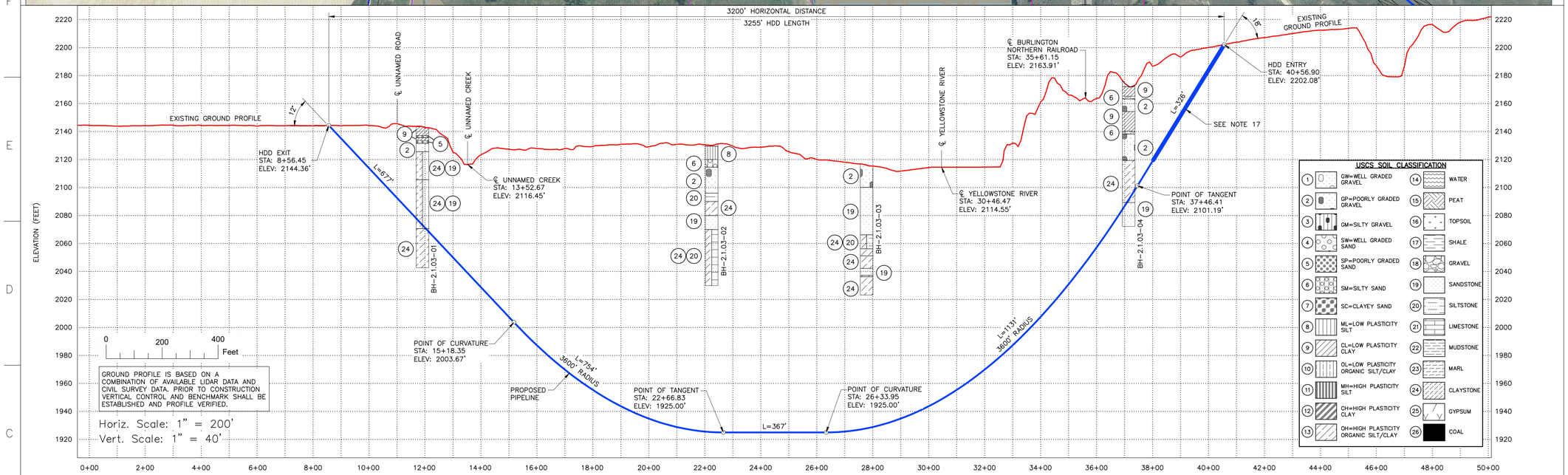
SCALE AS SHOWN | DRAWING # 4360–03–ML–03–002 | REV 00C

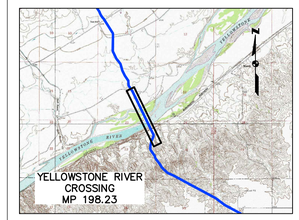
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)







USCS SOIL CLASSIFICATION

1	GW=WELL GRADED GRAVEL	14	WATER
2	GP=POORLY GRADED GRAVEL	15	PEAT
3	GM=SILTY GRAVEL	16	TOPSOIL
4	SW=WELL GRADED SAND	17	SHALE
5	SP=POORLY GRADED SAND	18	GRAVEL
6	SM=SILTY SAND	19	SANDSTONE
7	SC=CLAYEY SAND	20	SILTSTONE
8	ML=LOW PLASTICITY SILT	21	LIMESTONE
9	CL=LOW PLASTICITY CLAY	22	MUDSTONE
10	OL=LOW PLASTICITY ORGANIC SILT/CLAY	23	MARL
11	MH=HIGH PLASTICITY SILT	24	CLAYSTONE
12	CH=HIGH PLASTICITY CLAY	25	GYPSUM
13	OH=HIGH PLASTICITY ORGANIC SILT/CLAY	26	COAL

INSTALLATION NOTES

1. CONTRACTOR SHALL ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY USING ONLY PUBLIC OR APPROVED PRIVATE ROADS.
2. THE ENTIRE AREA OF INTEREST ALONG THE RIGHT-OF-WAY SHALL BE INSPECTED FOR OTHER UNDERGROUND APPURTENANCES TO ENSURE ALL HAZARDS HAVE BEEN IDENTIFIED.
3. CONTRACTOR SHALL NOTIFY THE APPROPRIATE ONE-CALL PRIOR TO SOIL DISTURBANCE.
4. VEHICLE AND EQUIPMENT CROSSINGS MAY BE INSTALLED IF APPROVED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
5. WORKSPACE LIMITS ARE DEPICTED. CLEARINGS SHALL BE RESTRICTED TO THE WORKSPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA. NO CLEARING BETWEEN THE ENTRY AND EXIT POINTS OF THE HDD EXCEPT WHERE APPROVED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
6. DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH KPP-901 REV12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATERBODY.
7. PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PROJECT PERMITS. DISCHARGES SHALL BE SENT TO AN UPLAND LOCATION NEAR THE WITHDRAWL POINT AS DIRECTED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES. DISCHARGES SHALL NOT CAUSE EROSION OR SEDIMENTATION. TO REDUCE THE VELOCITY OF THE DISCHARGE, CONTRACTOR SHALL UTILIZE AN ENERGY-DISSAPATING DEVISE DESCRIBED IN KPP-901 REV12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION.
8. ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATERBODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATERBODIES AND WETLANDS. EACH CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.
9. CONTRACTOR SHALL SUPPLY, INSTALL, AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH TES-CT-GEN-L PIPELINE CONSTRUCTION SPECIFICATION (US). CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
10. CONTRACTOR SHALL PROVIDE PLANNED DRILL PROFILE (IN PDF AND .DWG FORMAT) TO COMPANY FOR APPROVAL PRIOR TO STARTING THE PILOT HOLE.
11. THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE-UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR MORE AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK. PIPING FOR BALLAST MUST BE IN CONTINUOUS ROLL (NOT JOINTS) UMLESS APPROVED BY COMPANY.
12. PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO COMPANY REPRESENTATIVE FOR APPROVAL.
13. CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISPOSED OF IN WATERBODIES OR WETLANDS. ANY DRILLING MUD WHICH INADVERTENTLY EXITS AT POINTS OTHER THAN THE ENTRY AND EXIT SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PARCTICAL AND DISPOSED OF AS DIRECTED BY COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS.
14. ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED ON THE CONSTRUCTION ALIGNMENT SHEETS.
15. CONTRACTOR SHALL COMPLY WITH THE LATEST EDITION OF REFERENCE SPECIFICATIONS. REFER TO TES-CT-GEN-L PIPELINE SPECIFICATION (US), KPP-801 REV 05 SPECIFICATION FOR HORIZONTAL DIRECTIONAL DRILLING, KPP-901 REV 12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION, PROJECT ENVIRONMENTAL REQUIREMENT FOR THIS SITE SPECIFIC DETAIL, PART 195 OF CODE OF FEDERAL REGULATION, AND ASME B31.4.
16. TREE CLEARING SHALL BE MINIMIZED THROUGH NARROWING OF THE CONSTRUCTION RIGHT-OF-WAY, AND FINAL CENTERLINE LOCATION NEAR CROSSING OF THE STREAM.

SITE SPECIFIC NOTES:

17. 36" O.D. X 0.515" W.T., API 5L PSL 2-X70M W/14-20 MILS FBE

DRAWING NOTES:

18. PIPELINE STRESS ANALYSIS IS NOT THE RESPONSIBILITY OF EXP AND HAS BEEN COMPLETED BY OTHERS. THE STRESS MITIGATION RECOMMEDATION PROVIDED BY OTHERS HAS BEEN INCORPORATED INTO THE PIPELINE DESIGN.

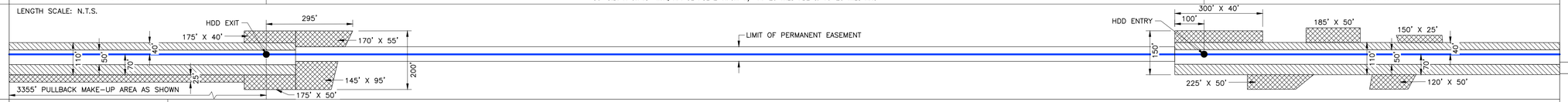
CROSSING INFORMATION

STA	Description
0+00	P.I. 08°36' RT ℄ STA. 10436+04
8+58.45	HDD EXIT POINT LAT: N46°52'46.45" LONG: W104°58'22.56"
11+01	℄ UNNAMED ROAD
11+91	BH-2.1.03-01
13+52.67	℄ UNNAMED CREEK
15+18.35	PT OF CURVATURE
22+25	BH-2.1.03-02
22+66.83	PT OF TANGENT
26+33.95	PT OF CURVATURE
27+78	BH-2.1.03-03
30+46.47	℄ YELLOWSTONE RIVER
35+61.15	℄ BURLINGTON
35+86	℄ CAR-128
37+15	BH-2.1.03-04
37+46.41	PT OF TANGENT
40+56.90	HDD ENTRY POINT LAT: N46°52'18.03" LONG: W104°58'02.42"
41+48	℄ 260-CIRCLE-03A-BO-CKV-01
41+64	℄ 260-CIRCLE-03A-BO-MLV-01

PIPELINE DATA

SEE NOTE 17 — 36" O.D. X 0.748" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE & 16-20 MILS ARO — SEE NOTE 17

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION

TOPSOIL SALVAGE METHOD	SEE ALIGNMENT SHEET
STREAMS	SEE ALIGNMENT SHEET
WETLANDS	SEE ALIGNMENT SHEET
TIMING CONSTRAINTS	SEE ALIGNMENT SHEET
MILEPOST	SEE ALIGNMENT SHEET
MONITORING	SEE ALIGNMENT SHEET
RECLAMATION	SEE ALIGNMENT SHEET
SPECIAL CONSIDERATIONS	SEE ALIGNMENT SHEET

LEGEND

CL P.I.	COUNTY LINE	SECTION LINE
ENTRY OR EXIT POINT	PERMANENT EASEMENT BOUNDARY	FOREIGN PIPELINE
GEOTECHNICAL BOREHOLE	TEMPORARY WORKSPACE BOUNDARY	W — WATER LINE
PIPELINE ROUTE	ADDITIONAL TEMPORARY WORKSPACE	P — OVERHEAD POWERLINE
CATHODIC PROTECTION TEST STATION	PERMANENT ACCESS ROAD	U — UNDERGROUND UTILITY
ROAD CL	TEMPORARY ACCESS ROAD	T — TELEPHONE LINE
ROAD EDGE	EXISTING GROUND	PROPERTY PARCEL
FIELD PATH	WATER BODY	HEADCUT AREA
RAILWAY	WETLAND BOUNDARY	EXCLUSION FENCE
FENCE		MDEQ CORRIDOR

REFERENCE DRAWINGS

DRAWING No	TITLE
4362-03-ML-02-032	ALIGNMENT SHEET

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2013-05-31	ISSUED FOR CONSTRUCTION	2095406	EXP	TLB	BLS	KJM	KJM	EXP
00A	2018-07-12	ISSUED FOR BID	2095406	EXP	ADH	ZM	REW	SAS	EXP
00B	2019-04-10	ISSUED FOR REVIEW	2095406	EXP	ADH	ZM	REW	SAS	EXP
00C	2020-01-10	ISSUED FOR CORP 404 FILING	2095406	EXP	ADH	ZM	REW	SAS	EXP

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL

FIRM: EXP ENERGY SERVICES, INC.
FIRM LICENSE: PEL-EF-LIC-1435
DATE

REV. NO. | DATE | PERMIT NUMBER:

TC Energy

EXP Energy Services Inc.
t: +1.850.385.5441 | f: +1.850.385.5523
1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

KEYSTONE XL (NPS 36 2014) CIRCLE SECTION

FACILITY # 4362 | ENG STATION: MP 198.23 | DISCIPLINE # 03

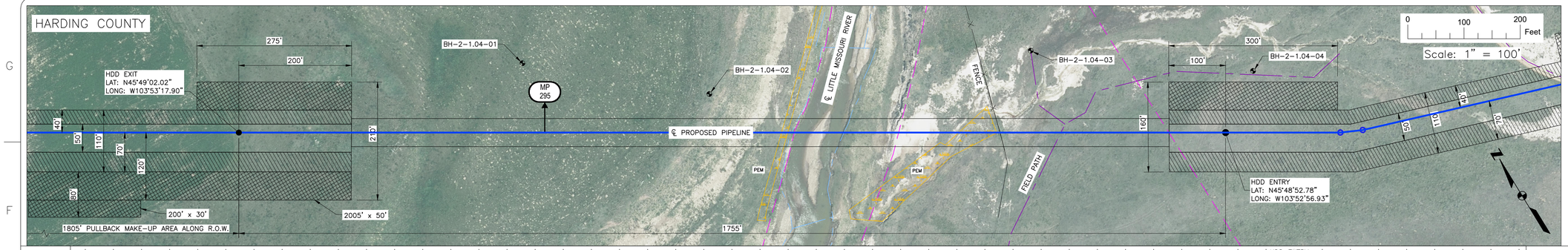
YELLOWSTONE RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
DAWSON COUNTY, MONTANA

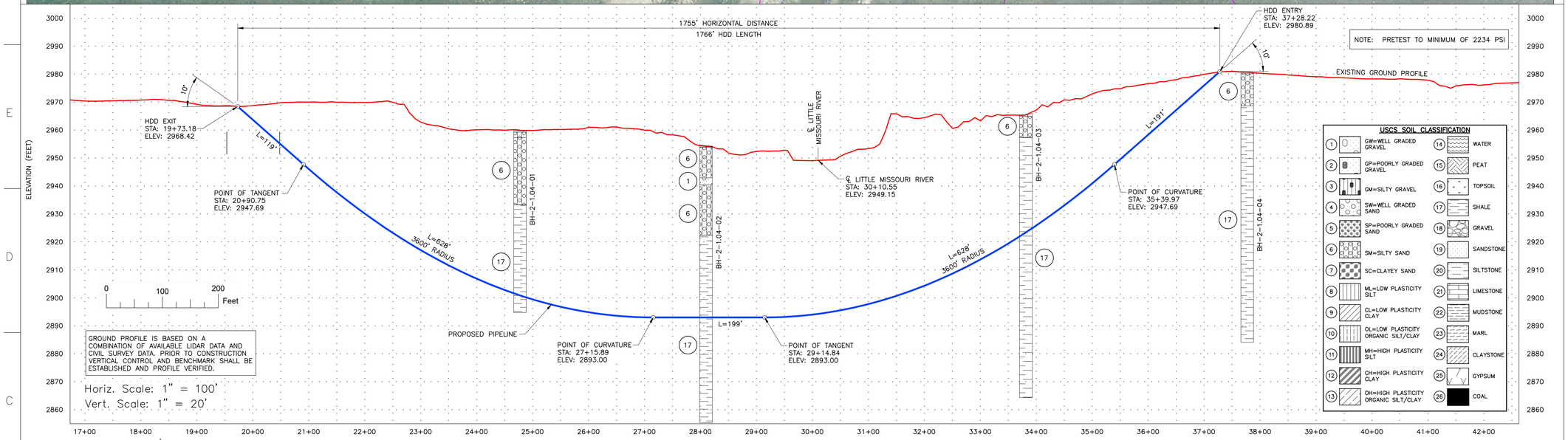
SCALE: AS SHOWN | DRAWING # 4362-03-ML-03-001 | REV. 00C

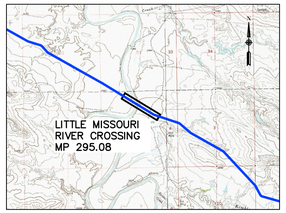
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)







USCS SOIL CLASSIFICATION

1	GW=WELL GRADED GRAVEL	14	WATER
2	GP=POORLY GRADED GRAVEL	15	PEAT
3	GM=SILTY GRAVEL	16	TOPSOIL
4	SW=WELL GRADED SAND	17	SHALE
5	SP=POORLY GRADED SAND	18	GRAVEL
6	SM=SILTY SAND	19	SANDSTONE
7	SC=CLAYEY SAND	20	SILTSTONE
8	ML=LOW PLASTICITY SILT	21	LIMESTONE
9	CL=LOW PLASTICITY CLAY	22	MUDSTONE
10	OL=LOW PLASTICITY ORGANIC SILT/CLAY	23	MARL
11	MH=HIGH PLASTICITY SILT	24	CLAYSTONE
12	CH=HIGH PLASTICITY CLAY	25	GYPSUM
13	OH=HIGH PLASTICITY ORGANIC SILT/CLAY	26	COAL

INSTALLATION NOTES

1) ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.

2) VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.

3) WORKSPACE: WORKSPACE LIMITS ARE DEPICTED. CLEARING WILL BE RESTRICTED TO THE WORKSPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE UP AREA ALONG THE RIGHT-OF-WAY. NO CLEARING BETWEEN THE ENTRY AND EXIT POINTS OF THE HDD EXCEPT WHERE APPROVED BY THE COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.

4) WATER SOURCE: DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. THE CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT THE ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH THE TES-CT-GEN-L PIPELINE CONSTRUCTION SPECIFICATION (US) AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATERBODY.

5) HYDROSTATIC TEST: PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. THE CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PROJECT PERMITS. DISCHARGES WILL BE SENT TO AN UPLAND LOCATION NEAR THE WITHDRAWAL POINT AS DIRECTED BY THE COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES. DISCHARGES SHALL NOT CAUSE EROSION OR SEDIMENTATION. TO REDUCE THE VELOCITY OF THE DISCHARGE, THE CONTRACTOR SHALL UTILIZE AN ENERGY-DISSIPATING DEVICE AS DESCRIBED IN THE TES-CT-GEN-L PIPELINE CONSTRUCTION SPECIFICATION (US).

6) SPILL-PREVENTION: ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATERBODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATER BODIES AND WETLANDS. EACH CONSTRUCTION CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.

7) EROSION AND SEDIMENT CONTROL: CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH CONTRACT DOCUMENTS. CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY THE COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.

8) PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO THE COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES FOR APPROVAL.

9) THE CONTRACTOR HAS TO PROVIDE PLANNED DRILL PROFILE TO COMPANY PRIOR TO STARTING THE PILOT HOLE.

10) INSTALLATION: THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK. PIPING FOR BALLAST MUST BE IN CONTINUOUS ROLL (NOT JOINTS) UNLESS APPROVED BY THE COMPANY.

11) MUD DISPOSAL: CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISPOSED OF IN WATERBODIES OR WETLANDS. ANY DRILLING MUD WHICH INADVERTENTLY EXITS AT POINTS OTHER THAN THE ENTRY AND EXIT POINTS SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PRACTICAL AND DISPOSED OF AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS.

12) CLEANUP/STABILIZATION/RESTORATION: ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED IN PROJECT DOCUMENTS.

13) CONTRACTOR SHALL FOLLOW LATEST EDITION OF REFERENCE SPECIFICATIONS. REFER TO PIPELINE CONSTRUCTION SPECIFICATION (US), HORIZONTAL DIRECTIONAL DRILLING SPECIFICATION (KPP-801), HYDROSTATIC TESTING SPECIFICATION (KPP-901), PROJECT ENVIRONMENTAL REQUIREMENT FOR THIS SITE SPECIFIC DETAIL, PART 195 OF CODE OF FEDERAL REGULATION, ASME B31.4 AND API 1102.

14) 36" O.D. X 0.572" W.T., API 5L PSL 2-X70M W/14-20 MILS FBE

15) PIPELINE STRESS ANALYSIS IS NOT THE RESPONSIBILITY OF EXP AND HAS BEEN COMPLETED BY OTHERS. THE STRESS MITIGATION RECOMMENDATION PROVIDED BY OTHERS HAS BEEN INCORPORATED INTO THE PIPELINE DESIGN.

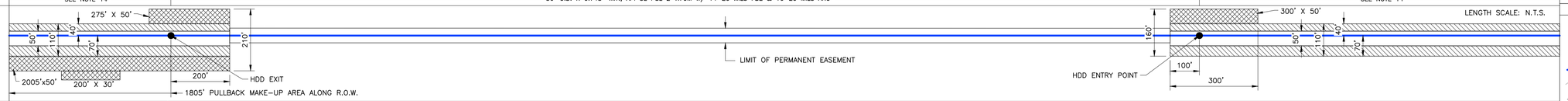
CROSSING INFORMATION (ESTIMATED STATIONING)

0+00 P.I. 0200' RT. ℄ STA. 15550+83
19+73 HDD EXIT POINT LAT: N45°49'02.02" LONG: W103°53'17.90"
20+90.75 PT OF TANGENT
24+78 BH-2-1.04-01
27+15.89 PT OF CURVATURE
28+10 BH-2-1.04-02
29+14.84 PT OF TANGENT
30+10.55 ℄ LITTLE MISSOURI RIVER
33+82 BH-2-1.04-03
35+39.97 PT OF CURVATURE
37+28.29 HDD ENTRY POINT LAT: N45°48'52.78" LONG: W103°52'56.93"
37+77 BH-2-1.04-04

PIPELINE DATA

SEE NOTE 14 — 36" O.D. X 0.748" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE & 16-20 MILS ARO — SEE NOTE 14

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION

TOPSOIL SALVAGE METHOD	SEE ALIGNMENT SHEET
STREAMS	SEE ALIGNMENT SHEET
WETLANDS	SEE ALIGNMENT SHEET
TIMING CONSTRAINTS	SEE ALIGNMENT SHEET
MILEPOST	SEE ALIGNMENT SHEET
MONITORING	SEE ALIGNMENT SHEET
RECLAMATION	SEE ALIGNMENT SHEET
SPECIAL CONSIDERATIONS	SEE ALIGNMENT SHEET

LEGEND

CL P.I.
ENTRY OR EXIT POINT
GEOTECHNICAL BOREHOLE
PIPELINE ROUTE
CATHODIC PROTECTION TEST STATION
ROAD CL
ROAD EDGE
FIELD PATH
RAILWAY
FENCE
FOREIGN PIPELINE
WATER LINE
OVERHEAD POWERLINE
UNDERGROUND UTILITY
TELEPHONE LINE
PROPERTY PARCEL
SECTION LINE
COUNTY LINE
PERMANENT EASEMENT BOUNDARY
TEMPORARY WORKSPACE BOUNDARY
ADDITIONAL TEMPORARY WORKSPACE
PERMANENT ACCESS ROAD
TEMPORARY ACCESS ROAD
EXISTING GROUND
WATER BODY
WETLAND BOUNDARY
HEADCUT AREA
EXCLUSION FENCE
MDEQ CORRIDOR

REFERENCE DRAWINGS

DRAWING No	TITLE
4365-03-ML-02-005	ALIGNMENT SHEET

REVISION

REV No	DATE	DESCRIPTION
00	2013-05-31	ISSUED FOR CONSTRUCTION
00A	2018-07-12	ISSUED FOR BID
00B	2019-04-10	ISSUED FOR REVIEW
00C	2020-01-07	ISSUED FOR CORP 404 FILING

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2095406	EXP	TLB	BLS	KJM	KJM	EXP
2095406	EXP	ADH	ZM	REW	SAS	EXP
2095406	EXP	ADH	ZM	REW	SAS	EXP
2095406	EXP	ADH	ZM	REW	SAS	EXP

PROFESSIONAL ENGINEER/RPT
FIRM: EXP ENERGY SERVICES, INC.
FIRM LICENSE: C-6263

PERMIT/ ENG. APPROVAL
DATE

REV. NO. | DATE | PERMIT NUMBER:

TC Energy

EXP Energy Services Inc.
t: +1.850.385.5441 | f: +1.850.385.5523
1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

KEYSTONE XL (NPS 36 2014) HARDING SECTION

FACILITY # 4365 | ENG STATION: MP 295.08 | DISCIPLINE # 03

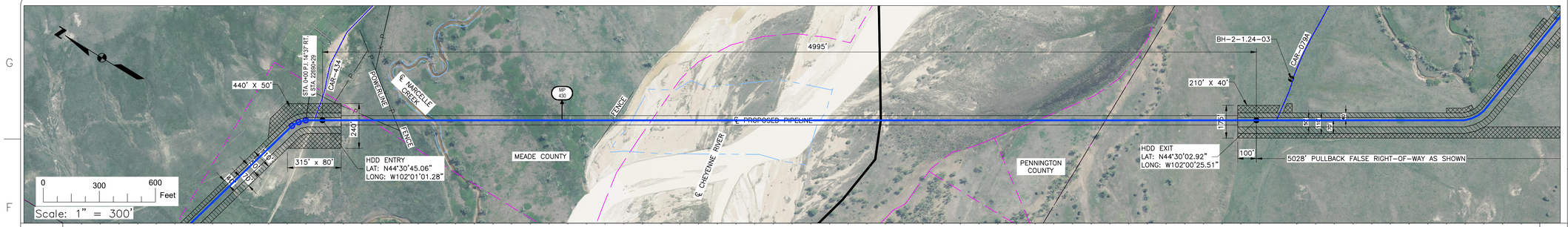
LITTLE MISSOURI RIVER HDD INSTALLATION
PROPOSED KEYSTONE XL PROJECT
HARDING COUNTY, SOUTH DAKOTA

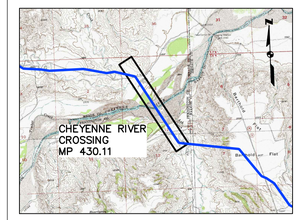
SCALE AS SHOWN | DRAWING # 4365-03-ML-03-001 | REV. 00C

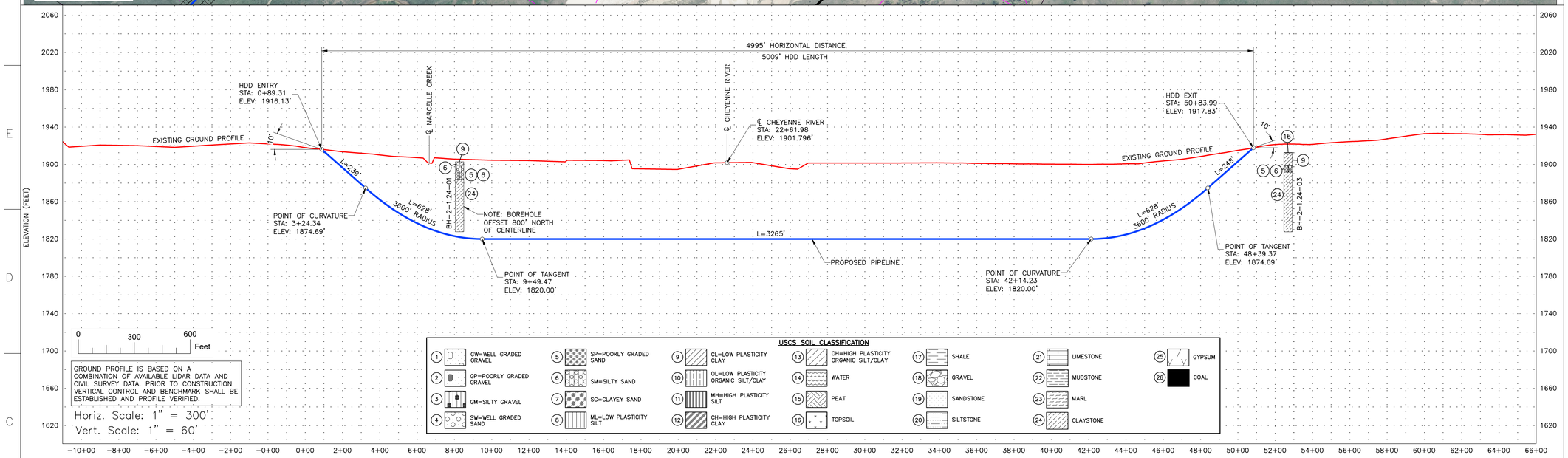
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

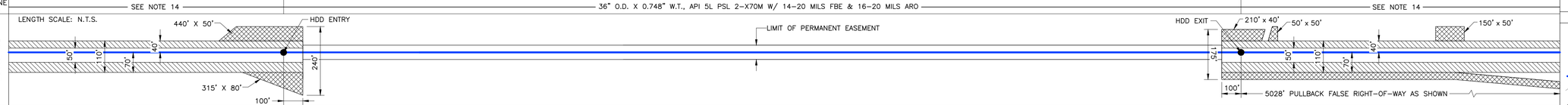
PLOTTED SIZE: ANSI D (22x34)







CROSSING INFORMATION (ESTIMATED STATIONING)	0+00 P.I. 14°37' RT. ℄ STA. 22690+29; 0+89.31 HDD ENTRY POINT LAT: N44°30'45.06" LONG: W102°01'01.28"; 3+24.34 PT OF CURVATURE; 6+65.78 ℄ NARCELLE CREEK; 8+28 BH-2-1.24-01; 9+49.47 PT OF TANGENT; 22+61.98 ℄ CHEYENNE RIVER; 42+14.23 PT OF CURVATURE; 48+39.37 PT OF TANGENT; 50+83.99 HDD EXIT POINT LAT: N44°30'02.92" LONG: W102°00'25.51"; 52+70 BH-2-1.24-03
PIPELINE DATA	SEE NOTE 14 — 36" O.D. X 0.748" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE & 16-20 MILS ARO — SEE NOTE 14



ENVIRONMENTAL MITIGATION/RECLAMATION	
STREAMS	SEE ALIGNMENT SHEET
WETLANDS	SEE ALIGNMENT SHEET
TIMING CONSTRAINTS	SEE ALIGNMENT SHEET
MILEPOST	SEE ALIGNMENT SHEET
MONITORING	SEE ALIGNMENT SHEET
RECLAMATION	SEE ALIGNMENT SHEET
SPECIAL CONSIDERATIONS	SEE ALIGNMENT SHEET

INSTALLATION NOTES

1) ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.

2) VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.

3) WORKSPACE: WORKSPACE LIMITS ARE DEPICTED. CLEARING WILL BE RESTRICTED TO THE WORKSPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE UP AREA ALONG THE RIGHT-OF-WAY. NO CLEARING BETWEEN THE ENTRY AND EXIT POINTS OF THE HDD EXCEPT WHERE APPROVED BY THE COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.

4) WATER SOURCE: DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. THE CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT THE ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH THE TES-CT-GEN-L PIPELINE CONSTRUCTION SPECIFICATION (US) AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATERBODY.

5) HYDROSTATIC TEST: PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. THE CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PROJECT PERMITS. DISCHARGES WILL BE SENT TO AN UPLAND LOCATION NEAR THE WITHDRAWAL POINT AS DIRECTED BY THE COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES. DISCHARGES SHALL NOT CAUSE EROSION OR SEDIMENTATION. TO REDUCE THE VELOCITY OF THE DISCHARGE, THE CONTRACTOR SHALL UTILIZE AN ENERGY-DISSIPATING DEVICE AS DESCRIBED IN THE TES-CT-GEN-L PIPELINE CONSTRUCTION SPECIFICATION (US).

6) SPILL-PREVENTION: ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATERBODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATER BODIES AND WETLANDS. EACH CONSTRUCTION CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.

7) EROSION AND SEDIMENT CONTROL: CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH CONTRACT DOCUMENTS. CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY THE COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.

8) PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO THE COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES FOR APPROVAL.

9) THE CONTRACTOR HAS TO PROVIDE PLANNED DRILL PROFILE TO COMPANY PRIOR TO STARTING THE PILOT HOLE.

10) INSTALLATION: THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK. PIPING FOR BALLAST MUST BE IN CONTINUOUS ROLL (NOT JOINTS) UNLESS APPROVED BY THE COMPANY.

11) MUD DISPOSAL: CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISPOSED OF IN WATERBODIES OR WETLANDS. ANY DRILLING MUD WHICH INADVERTENTLY EXITS AT POINTS OTHER THAN THE ENTRY AND EXIT POINTS SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PRACTICAL AND DISPOSED OF AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS.

12) CLEANUP/STABILIZATION/RESTORATION: ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED IN PROJECT DOCUMENTS.

13) CONTRACTOR SHALL FOLLOW LATEST EDITION OF REFERENCE SPECIFICATIONS. REFER TO PIPELINE CONSTRUCTION SPECIFICATION (US), HORIZONTAL DIRECTIONAL DRILLING SPECIFICATION (KPP-801), HYDROSTATIC TESTING SPECIFICATION (KPP-901), PROJECT ENVIRONMENTAL REQUIREMENT FOR THIS SITE SPECIFIC DETAIL, PART 195 OF CODE OF FEDERAL REGULATION, ASME B31.4 AND API 1102.

14) 36" O.D. X 0.515" W.T., API 5L PSL 2-X70M W/14-20 MILS FBE

15) CANADA THISTLE AND LEAFY SPURGE ARE PRESENT AT STREAM CROSSING SO EQUIPMENT MUST BE CLEANED BEFORE MOVING THROUGH THE STREAM CROSSING AREA OR WORKING IN INFESTED AREA. NO CLEANING IS REQUIRED IF CROSSED USING EXISTING BRIDGE NEAR NASHAU.

16) TREE CLEARING WILL BE MINIMIZED THROUGH NARROWING OF THE CONSTRUCTION RIGHT-OF-WAY. AND FINAL CENTERLINE LOCATION NEAR CROSSING OF THE STREAM.

17) INTERSECT DRILLING METHOD SHALL BE UTILIZED BY CONTRACTOR TO DRILL THE PILOT HOLE.

18) PIPELINE STRESS ANALYSIS IS NOT THE RESPONSIBILITY OF EXP AND HAS BEEN COMPLETED BY OTHERS, THE STRESS MITIGATION RECOMMENDATION PROVIDED BY OTHERS HAS BEEN INCORPORATED INTO THE PIPELINE DESIGN.

LEGEND

- CL P.I.
- ENTRY OR EXIT POINT
- GEOTECHNICAL BOREHOLE
- PIPELINE ROUTE
- CATHODIC PROTECTION TEST STATION
- ROAD CL
- ROAD EDGE
- FIELD PATH
- RAILWAY
- FENCE
- FOREIGN PIPELINE
- WATER LINE
- OVERHEAD POWERLINE
- UNDERGROUND UTILITY
- TELEPHONE LINE
- PROPERTY PARCEL
- SECTION LINE
- COUNTY LINE
- PERMANENT EASEMENT BOUNDARY
- TEMPORARY WORKSPACE BOUNDARY
- ADDITIONAL TEMPORARY WORKSPACE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- EXISTING GROUND
- WATER BODY
- WETLAND BOUNDARY
- HEADCUT AREA
- EXCLUSION FENCE
- MDEQ CORRIDOR

REFERENCE DRAWINGS

DRAWING No	TITLE
4367-03-ML-02-026	ALIGNMENT SHEET

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2013-05-31	ISSUED FOR CONSTRUCTION	2095406	EXP	TLB	BLS	KJM	KJM	EXP
00A	2018-07-12	ISSUED FOR BID	2095406	EXP	ADH	ZM	REW	SAS	EXP
00B	2019-04-10	ISSUED FOR REVIEW	2095406	EXP	ADH	ZM	REW	SAS	EXP
00C	2020-01-07	ISSUED FOR CORP 404 FILING	2095406	EXP	ADH	ZM	REW	SAS	EXP

PROFESSIONAL ENGINEER/RPT — FIRM: EXP ENERGY SERVICES, INC. — FIRM LICENSE: C-6263

PERMIT/ ENG. APPROVAL — DATE

REV. NO. | DATE | PERMIT NUMBER:

TC Energy

EXP Energy Services Inc.
t: +1.850.385.5441 | f: +1.850.385.5523
1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

KEYSTONE XL (NPS 36 2014) FAITH SECTION

FACILITY # 4367 | ENG STATION: MP 430.11 | DISCIPLINE # 03

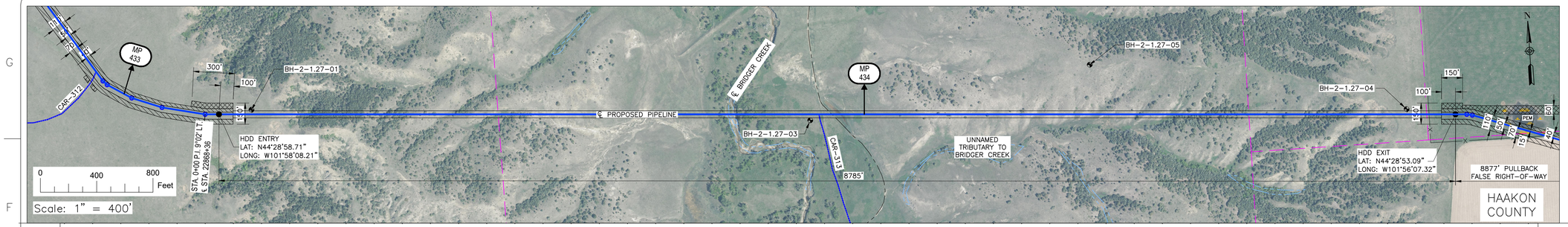
CHEYENNE RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
MEADE & PENNINGTON COUNTY, SOUTH DAKOTA

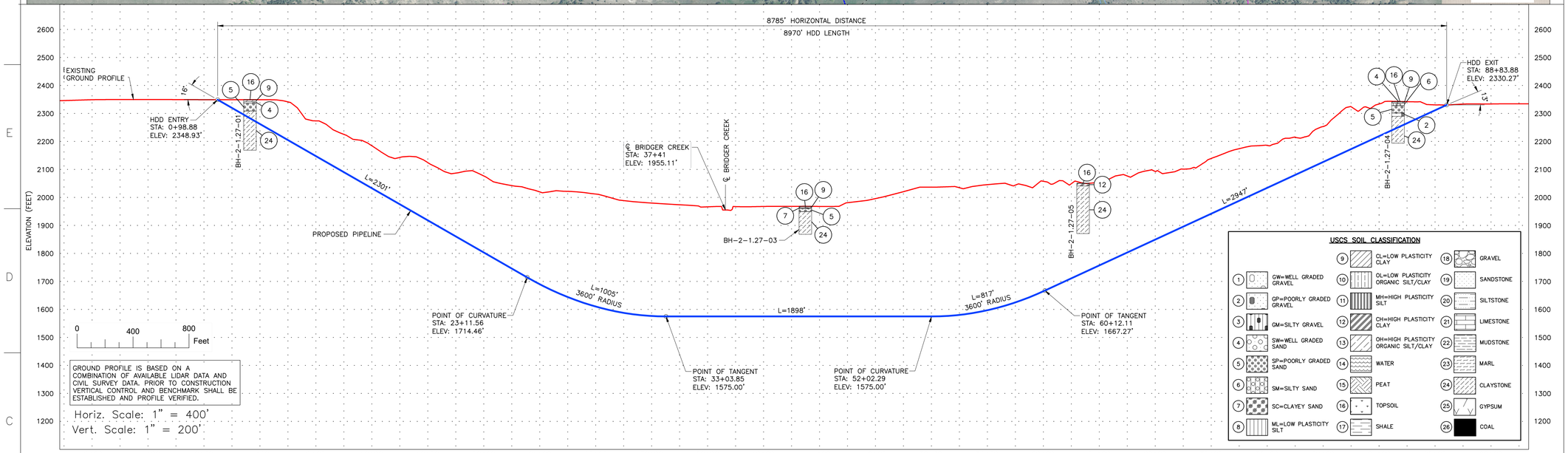
SCALE: AS SHOWN | DRAWING # 4367-03-ML-03-001 | REV. 00C

TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

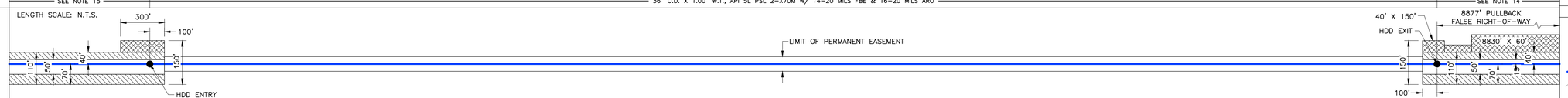
PLOTTED SIZE: ANSI D (22x34)



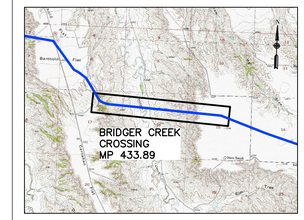


CROSSING INFORMATION (ESTIMATED STATIONS)	0+00 P.I. 09°02' LT. ℄ STA. 22868+36	0+98.88 HDD ENTRY POINT LAT: N44°28'58.71" LONG: W101°58'08.21"	3+30 BH-2-1.27-01	23+11.56 PT OF CURVATURE	33+03.85 PT OF TANGENT	37+41 ℄ BRIDGER CREEK	43+00 BH-2-1.27-03	52+02.29 PT OF CURVATURE	60+12.11 PT OF TANGENT	62+85 BH-2-1.27-05	85+36 BH-2-1.27-04	86+95 FENCE	88+83.88 HDD EXIT POINT LAT: N44°28'53.09" LONG: W101°56'07.32"	95+45 FENCE
PIPELINE DATA	SEE NOTE 15						36" O.D. X 1.00" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE & 16-20 MILS ARO							SEE NOTE 14

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION	
TOPSOIL SALVAGE METHOD	SEE ALIGNMENT SHEET
STREAMS	SEE ALIGNMENT SHEET
WETLANDS	SEE ALIGNMENT SHEET
TIMING CONSTRAINTS	SEE ALIGNMENT SHEET
MILEPOST	SEE ALIGNMENT SHEET
MONITORING	SEE ALIGNMENT SHEET
RECLAMATION	SEE ALIGNMENT SHEET
SPECIAL CONSIDERATIONS	SEE ALIGNMENT SHEET



INSTALLATION NOTES

1) ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.

2) VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.

3) WORKSPACE: WORKSPACE LIMITS ARE DEPICTED. CLEARING WILL BE RESTRICTED TO THE WORKSPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE UP AREA ALONG THE RIGHT-OF-WAY. NO CLEARING BETWEEN THE ENTRY AND EXIT POINTS OF THE HDD EXCEPT WHERE APPROVED BY THE COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.

4) WATER SOURCE: DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. THE CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT THE ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH THE TES-CT-GEN-L PIPELINE CONSTRUCTION SPECIFICATION (US) AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATERBODY.

5) HYDROSTATIC TEST: PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. THE CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PROJECT PERMITS. DISCHARGES WILL BE SENT TO AN UPLAND LOCATION NEAR THE WITHDRAWAL POINT AS DIRECTED BY THE COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES. DISCHARGES SHALL NOT CAUSE EROSION OR SEDIMENTATION. TO REDUCE THE VELOCITY OF THE DISCHARGE, THE CONTRACTOR SHALL UTILIZE AN ENERGY-DISSIPATING DEVICE AS DESCRIBED IN THE TES-CT-GEN-L PIPELINE CONSTRUCTION SPECIFICATION (US).

6) SPILL-PREVENTION: ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATERBODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATER BODIES AND WETLANDS. EACH CONSTRUCTION CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.

7) EROSION AND SEDIMENT CONTROL: CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH CONTRACT DOCUMENTS. CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY THE COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.

8) PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO THE COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES FOR APPROVAL.

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14) 36" O.D. X 0.465" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE

15) 36" O.D. X 0.515" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE

16) TREE CLEARING WILL BE MINIMIZED THROUGH NARROWING OF THE CONSTRUCTION RIGHT-OF-WAY, AND FINAL CENTERLINE LOCATION NEAR CROSSING OF THE STREAM.

17) INTERSECT DRILLING METHOD SHALL BE UTILIZED BY CONTRACTOR TO DRILL THE PILOT HOLE.

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LEGEND

- CL P.I.
- ENTRY OR EXIT POINT
- GEOTECHNICAL BOREHOLE
- PIPELINE ROUTE
- CATHODIC PROTECTION TEST STATION
- ROAD CL
- ROAD EDGE
- FIELD PATH
- RAILWAY
- FENCE
- FOREIGN PIPELINE
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- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- EXISTING GROUND
- WATER BODY
- WETLAND BOUNDARY
- HEADCUT AREA
- EXCLUSION FENCE
- MDEQ CORRIDOR

REFERENCE DRAWINGS

DRAWING No	TITLE
4367-03-ML-02-028	ALIGNMENT SHEET
4367-03-ML-02-029	ALIGNMENT SHEET
4367-03-ML-02-030	ALIGNMENT SHEET

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2013-05-31	ISSUED FOR CONSTRUCTION	2095406	EXP	TLB	BLS	KJM	KJM	EXP
00A	2018-07-12	ISSUED FOR BID	2095406	EXP	ADH	ZM	REW	SAS	EXP
00B	2019-04-10	ISSUED FOR REVIEW	2095406	EXP	ADH	ZM	REW	SAS	EXP
00C	2020-01-07	ISSUED FOR CORP 404 FILING	2095406	EXP	ADH	ZM	REW	SAS	EXP

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL

FIRM: EXP ENERGY SERVICES, INC.
FIRM LICENSE: C-6263
DATE

REV. NO. | DATE | PERMIT NUMBER:

TC Energy
EXP Energy Services Inc.
t: +1.850.385.5441 | f: +1.850.385.5523
1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

KEYSTONE XL (NPS 36) FAITH SECTION

FACILITY # 4367 | ENG STATION: MP 433.89 | DISCIPLINE # 03

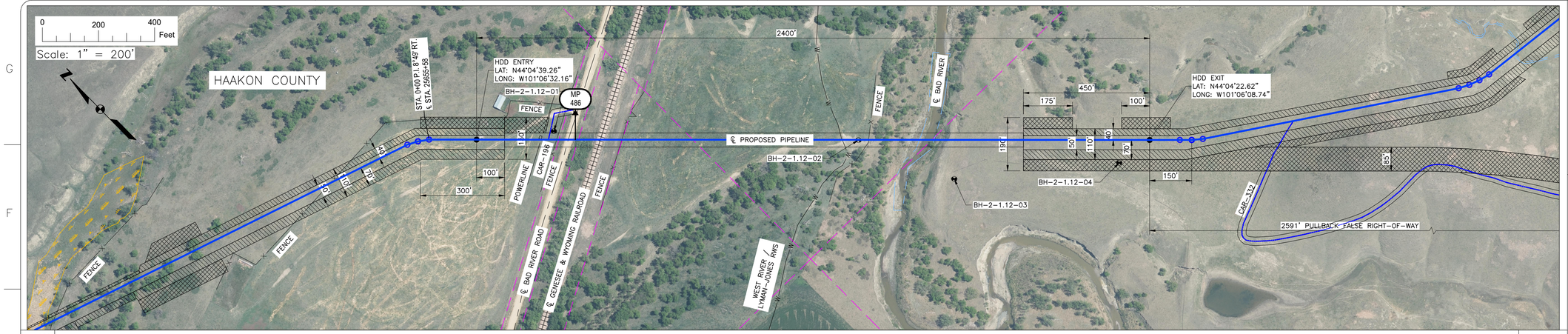
BRIDGER CREEK HDD INSTALLATION
KEYSTONE XL PROJECT
HAAKON COUNTY, SOUTH DAKOTA

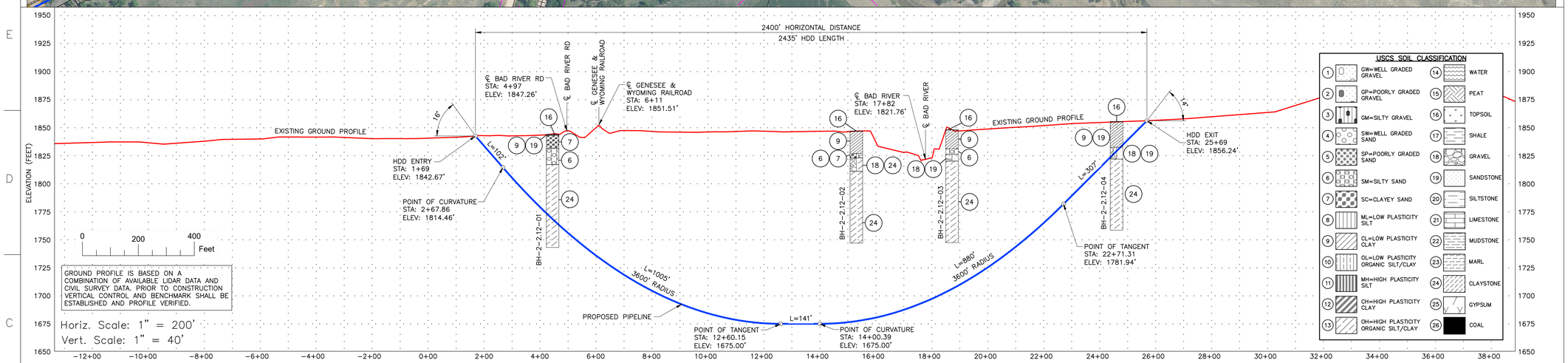
SCALE AS SHOWN | DRAWING # 4367-03-ML-03-003 | REV. 00C

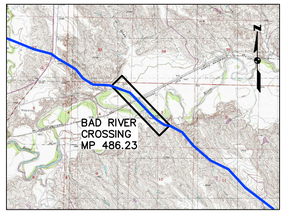
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)







INSTALLATION NOTES

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15) PIPELINE STRESS ANALYSIS IS NOT THE RESPONSIBILITY OF EXP AND HAS BEEN COMPLETED BY OTHERS, THE STRESS MITIGATION RECOMMENDATION PROVIDED BY OTHERS HAS BEEN INCORPORATED INTO THE PIPELINE DESIGN.

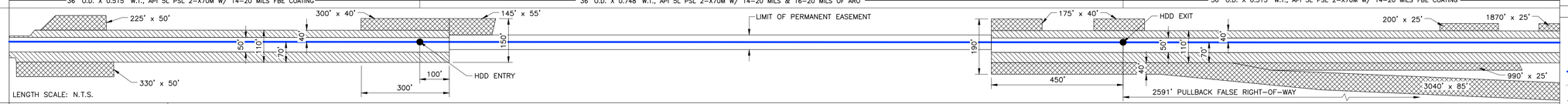
CROSSING INFORMATION (ESTIMATED STATIONING)

0+00	P.I. 08°49' RT. ℄ STA. 25655+58
1+69	HDD ENTRY POINT LAT: N44°04'39.26" LONG: W101°06'32.16"
2+67.86	POINT OF CURVATURE
4+45	BH-2-2.12-01
4+97	℄ BAD RIVER RD
6+11	℄ GENESEE & WYOMING RR
12+60.15	POINT OF TANGENT
14+00.39	POINT OF CURVATURE
15+31	BH-2-2.12-02
17+82	℄ BAD RIVER
18+73	BH-2-2.12-03
18+93.06	POINT OF TANGENT
24+61	BH-2-2.12-04
25+69	HDD EXIT POINT LAT: N44°04'22.62" LONG: W101°06'08.74"

PIPELINE DATA

36" O.D. X 0.515" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE COATING | 36" O.D. X 0.748" W.T., API 5L PSL 2-X70M W/ 14-20 MILS & 16-20 MILS OF ARO | 36" O.D. X 0.515" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE COATING

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION

TOPSOIL SALVAGE METHOD	SEE ALIGNMENT SHEET
STREAMS	SEE ALIGNMENT SHEET
WETLANDS	SEE ALIGNMENT SHEET
TIMING CONSRAINTS	SEE ALIGNMENT SHEET
MILEPOST	SEE ALIGNMENT SHEET
MONITORING	SEE ALIGNMENT SHEET
RECLAMATION	SEE ALIGNMENT SHEET
SPECIAL CONSIDERATIONS	SEE ALIGNMENT SHEET

LEGEND

CL P.I.
ENTRY OR EXIT POINT
GEOTECHNICAL BOREHOLE
PIPELINE ROUTE
CATHODIC PROTECTION TEST STATION
ROAD CL
ROAD EDGE
FIELD PATH
RAILWAY
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FOREIGN PIPELINE
WATER LINE
OVERHEAD POWERLINE
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PERMANENT ACCESS ROAD
TEMPORARY ACCESS ROAD
EXISTING GROUND
WATER BODY
WETLAND BOUNDARY
HEADCUT AREA
EXCLUSION FENCE
MOEQ CORRIDOR

REFERENCE DRAWINGS

DRAWING No	TITLE
4368-03-ML-02-028	ALIGNMENT SHEET

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2013-05-31	ISSUED FOR CONSTRUCTION	2095406	EXP	TLB	BLS	KJM	KJM	EXP
00A	2018-07-12	ISSUED FOR BID	2095406	EXP	ADH	ZM	REW	SAS	EXP
00B	2019-04-10	ISSUED FOR REVIEW	2095406	EXP	ADH	ZM	REW	SAS	EXP
00C	2020-01-07	ISSUED FOR CORP 404 FILING	2095406	EXP	ADH	ZM	REW	SAS	EXP

PROFESSIONAL ENGINEER/RPT
FIRM: EXP ENERGY SERVICES, INC.
FIRM LICENSE: C-6263

PERMIT/ ENG. APPROVAL
DATE

REV. NO. | DATE | PERMIT NUMBER:

TC Energy

EXP Energy Services Inc.
t: +1.850.385.5441 | f: +1.850.385.5523
1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

KEYSTONE XL (NPS 36 2014) HAAKON SECTION

FACILITY # 4368 | ENG STATION: MP 486.23 | DISCIPLINE # 03

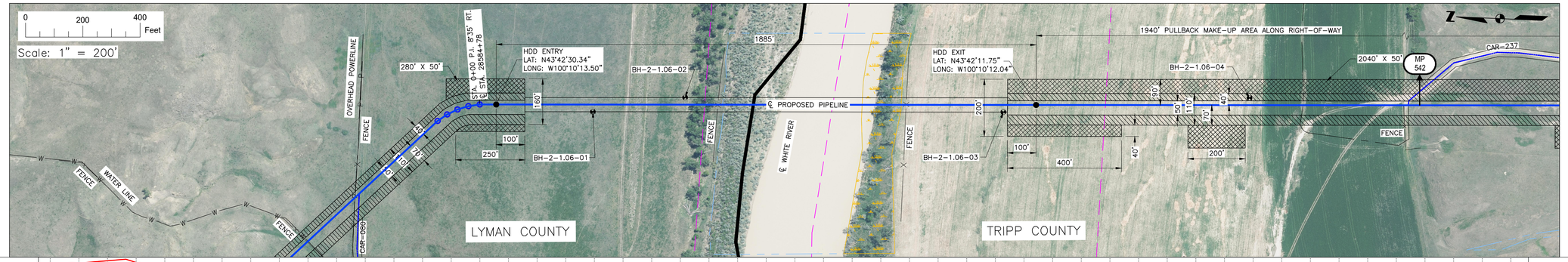
BAD RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
HAAKON COUNTY, SOUTH DAKOTA

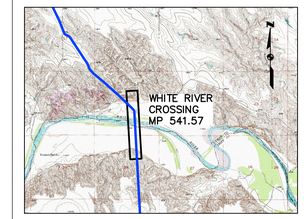
SCALE: AS SHOWN | DRAWING # 4368-03-ML-03-001 | REV. 00C

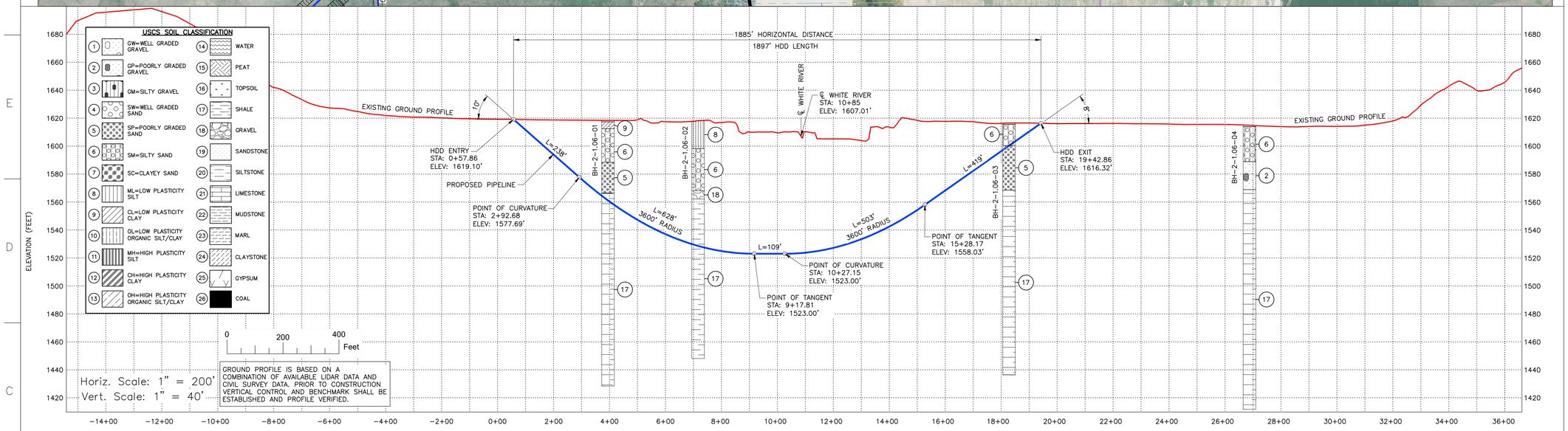
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)







CROSSING INFORMATION (ESTIMATED STATIONING)

0+00 P.I. 8°35' RT. ℄ STA. 28584+78	0+57.86 HDD ENTRY POINT LAT: N43°42'30.34" LONG: W100°10'13.50"	2+92.68 PT OF CURVATURE	3+95 BH-2-1.06-01	7+17 BH-2-1.06-02	9+17.81 PT OF TANGENT	10+27.15 PT OF CURVATURE	10+85 ℄ WHITE RIVER	15+28.17 PT OF TANGENT	18+29 BH-2-1.06-03	19+42.86 HDD EXIT POINT LAT: N43°42'11.75" LONG: W100°10'12.04"	26+88 BH-2-1.06-04

PIPELINE DATA

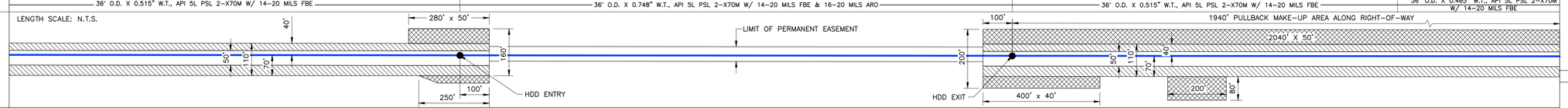
36" O.D. X 0.515" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE

36" O.D. X 0.748" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE & 16-20 MILS ARO

36" O.D. X 0.515" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE

36" O.D. X 0.465" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION

TOPSOIL SALVAGE METHOD	SEE ALIGNMENT SHEET
STREAMS	SEE ALIGNMENT SHEET
WETLANDS	SEE ALIGNMENT SHEET
TIMING CONSTRAINTS	SEE ALIGNMENT SHEET
MILEPOST	SEE ALIGNMENT SHEET
MONITORING	SEE ALIGNMENT SHEET
RECLAMATION	SEE ALIGNMENT SHEET
SPECIAL CONSIDERATIONS	SEE ALIGNMENT SHEET

INSTALLATION NOTES

1. CONTRACTOR SHALL ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY USING ONLY PUBLIC OR APPROVED PRIVATE ROADS.
2. THE ENTIRE AREA OF INTEREST ALONG THE RIGHT-OF-WAY SHALL BE INSPECTED FOR OTHER UNDERGROUND APPURTENANCES TO ENSURE ALL HAZARDS HAVE BEEN IDENTIFIED.
3. CONTRACTOR SHALL NOTIFY THE APPROPRIATE ONE-CALL PRIOR TO SOIL DISTURBANCE.
4. VEHICLE AND EQUIPMENT CROSSINGS MAY BE INSTALLED IF APPROVED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
5. WORKSPACE LIMITS ARE DEPICTED. CLEARINGS SHALL BE RESTRICTED TO THE WORKSPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA. NO CLEARING BETWEEN THE ENTRY AND EXIT POINTS OF THE HDD EXCEPT WHERE APPROVED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
6. DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH KPP-901 REV12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATERBODY.
7. PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PROJECT PERMITS. DISCHARGES SHALL BE SENT TO AN UPLAND LOCATION NEAR THE WITHDRAWL POINT AS DIRECTED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES. DISCHARGES SHALL NOT CAUSE EROSION OR SEDIMENTATION. TO REDUCE THE VELOCITY OF THE DISCHARGE, CONTRACTOR SHALL UTILIZE AN ENERGY-DISSAPATING DEVISE DESCRIBED IN KPP-901 REV12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION.
8. ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATERBODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATERBODIES AND WETLANDS. EACH CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.
9. CONTRACTOR SHALL SUPPLY, INSTALL, AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH TES-CT-GEN-L PIPELINE CONSTRUCTION SPECIFICATION (US). CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
10. CONTRACTOR SHALL PROVIDE PLANNED DRILL PROFILE (IN PDF AND .DWG FORMAT) TO COMPANY FOR APPROVAL PRIOR TO STARTING THE PILOT HOLE.
11. THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE-UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR MORE AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK. PIPING FOR BALLAST MUST BE IN CONTINUOUS ROLL (NOT JOINTS) UMLESS APPROVED BY COMPANY.
12. PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO COMPANY REPRESENTATIVE FOR APPROVAL.
13. CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISPOSED OF IN WATERBODIES OR WETLANDS. ANY DRILLING MUD WHICH INADVERTENTLY EXITS AT POINTS OTHER THAN THE ENTRY AND EXIT SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PARCTICAL AND DISPOSED OF AS DIRECTED BY COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS.
14. ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED ON THE CONSTRUCTION ALIGNMENT SHEETS.
15. CONTRACTOR SHALL COMPLY WITH THE LATEST EDITION OF REFERENCE SPECIFICATIONS. REFER TO TES-CT-GEN-L PIPELINE SPECIFICATION (US), KPP-801 REV 05 SPECIFICATION FOR HORIZONTAL DIRECTIONAL DRILLING, KPP-901 REV 12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION, PROJECT ENVIRONMENTAL REQUIREMENT FOR THIS SITE SPECIFIC DETAIL, PART 195 OF CODE OF FEDERAL REGULATION, AND ASME B31.4.
16. TREE CLEARING SHALL BE MINIMIZED THROUGH NARROWING OF THE CONSTRUCTION RIGHT-OF-WAY, AND FINAL CENTERLINE LOCATION NEAR CROSSING OF THE STREAM.

SITE SPECIFIC NOTES:

17. CONTRACTOR, AT ITS DISCRETION, SHALL USE 8-DEGREE FIELD BEND OR 3R FITTING AT THE HDD EXIT TIE-IN POINT. COMPANY WILL PROVIDE 3R FITTINGS FOR THIS CROSSING.

DRAWING NOTES:

18. PIPELINE STRESS ANALYSIS IS NOT THE RESPONSIBILITY OF EXP AND HAS BEEN COMPLETED BY OTHERS. THE STRESS MITIGATION RECOMMEDATION PROVIDED BY OTHERS HAS BEEN INCORPORATED INTO THE PIPELINE DESIGN.

LEGEND

CL P.I.	COUNTY LINE	SECTION LINE
ENTRY OR EXIT POINT	PERMANENT EASEMENT BOUNDARY	FOREIGN PIPELINE
GEOTECHNICAL BOREHOLE	TEMPORARY WORKSPACE BOUNDARY	WATER LINE
PIPELINE ROUTE	ADDITIONAL TEMPORARY WORKSPACE	OVERHEAD POWERLINE
CATHODIC PROTECTION TEST STATION	PERMANENT ACCESS ROAD	UNDERGROUND UTILITY
ROAD CL	TEMPORARY ACCESS ROAD	TELEPHONE LINE
ROAD EDGE	EXISTING GROUND	PROPERTY PARCEL
FIELD PATH	WATER BODY	HEADCUT AREA
RAILWAY	WETLAND BOUNDARY	EXCLUSION FENCE
FENCE		MDEQ CORRIDOR

REFERENCE DRAWINGS

DRAWING No	TITLE
4369-03-ML-02-028	ALIGNMENT SHEET
4369-03-ML-02-503	36" O.D. CRUDE OIL PIPELINE CONSTRUCTION TYPICAL DETAILS – DETAIL 15

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2013-05-31	ISSUED FOR CONSTRUCTION	2095406	EXP	TLB	BLS	KJM	KJM	EXP
00A	2018-07-12	ISSUED FOR BID	2095406	EXP	ADH	ZM	REW	SAS	EXP
00B	2019-06-21	ISSUED PER 60% DESIGN REVIEW	2095406	EXP	ADH	ZM	REW	SAS	EXP
00C	2019-11-15	ISSUED PER 90% DESIGN REVIEW	2095406	EXP	ADH	ZM	REW	SAS	EXP
00D	2020-01-07	ISSUED FOR CORP 404 FILING	2095406	EXP	ADH	ZM	REW	SAS	EXP

PROFESSIONAL ENGINEER/RPT

FIRM: EXP ENERGY SERVICES, INC.

FIRM LICENSE: C-6263

PERMIT/ ENG. APPROVAL

DATE

REV. NO. | DATE | PERMIT NUMBER:

TC Energy

EXP Energy Services Inc.
t: +1.850.385.5441 | f: +1.850.385.5523
1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

KEYSTONE XL (NPS 36) MURDO SECTION

FACILITY # 4369 | ENG STATION: MP 541.57 | DISCIPLINE # 03

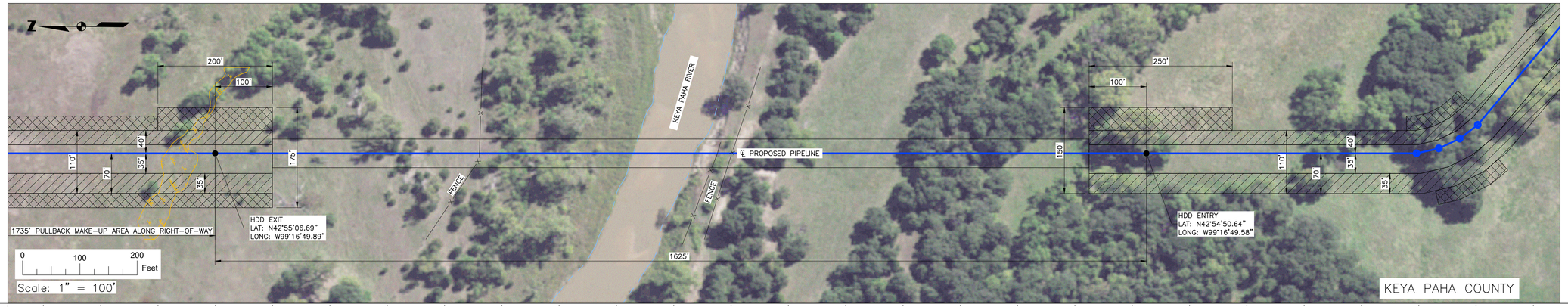
WHITE RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
LYMAN & TRIPP COUNTY, SOUTH DAKOTA

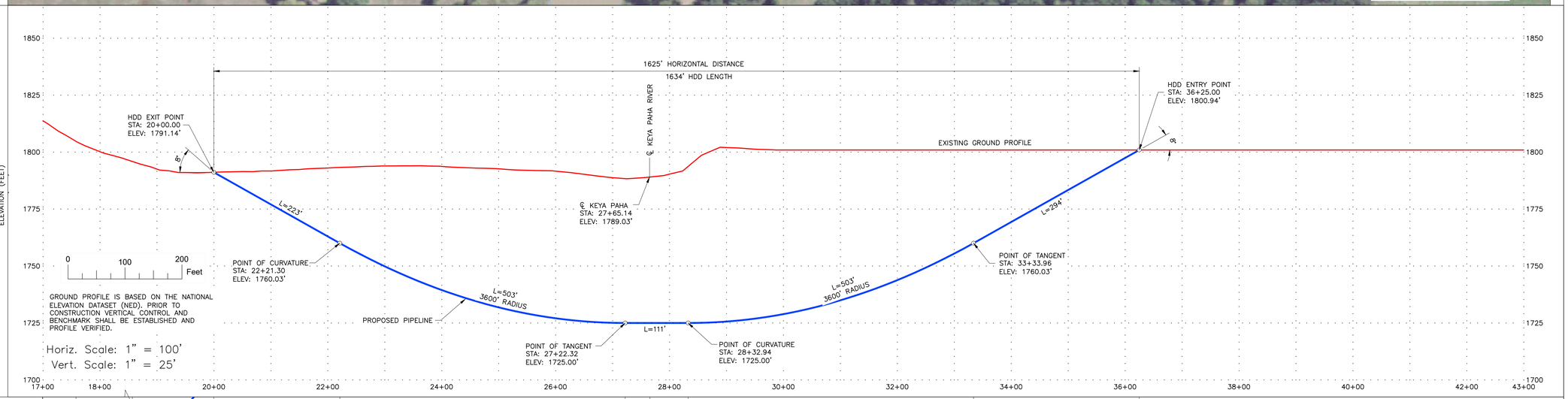
SCALE: AS SHOWN | DRAWING # 4369-03-ML-03-001 | REV. 00D

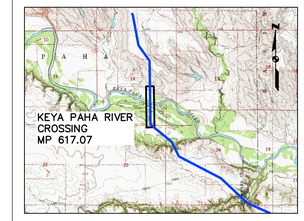
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)







INSTALLATION NOTES

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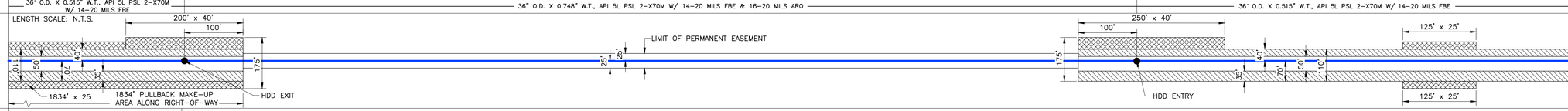
DRAWING NOTES:

18. PIPELINE STRESS ANALYSIS IS NOT THE RESPONSIBILITY OF EXP AND HAS BEEN COMPLETED BY OTHERS, THE STRESS MITIGATION RECOMMEDATION PROVIDED BY OTHERS HAS BEEN INCORPORATED INTO THE PIPELINE DESIGN.

CROSSING INFORMATION (STATIONING)	0+00 P.I.: 11°40' RT. ℄ STA. 32553+21	20+00.00 HDD EXIT POINT LAT: N42°55'06.69" LONG: W99°16'49.89"	22+21.30 PT OF CURVATURE	27+22.32 PT OF TANGENT	27+65.14 ℄ KEYA PAHA RIVER	28+32.94 PT OF CURVATURE	33+33.96 PT OF TANGENT	36+25.00 HDD ENTRY POINT LAT: N42°54'50.64" LONG: W99°16'49.58"			
PIPELINE DATA	36" O.D. X 0.515" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE	36" O.D. X 0.748" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE & 16-20 MILS ARO						36" O.D. X 0.515" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE			

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION	
TOPSOIL SALVAGE METHOD	SEE ALIGNMENT SHEET
STREAMS	SEE ALIGNMENT SHEET
WETLANDS	SEE ALIGNMENT SHEET
TIMING CONSTRAINTS	SEE ALIGNMENT SHEET
MILEPOST	SEE ALIGNMENT SHEET
MONITORING	SEE ALIGNMENT SHEET
RECLAMATION	SEE ALIGNMENT SHEET
SPECIAL CONSIDERATIONS	SEE ALIGNMENT SHEET

LEGEND

CL P.I.	COUNTY LINE	SECTION LINE
ENTRY OR EXIT POINT	PERMANENT EASEMENT BOUNDARY	FOREIGN PIPELINE
GEOTECHNICAL BOREHOLE	TEMPORARY WORKSPACE BOUNDARY	WATER LINE
PIPELINE ROUTE	ADDITIONAL TEMPORARY WORKSPACE	OVERHEAD POWERLINE
CATHODIC PROTECTION TEST STATION	PERMANENT ACCESS ROAD	UNDERGROUND UTILITY
ROAD CL	TEMPORARY ACCESS ROAD	TELEPHONE LINE
ROAD EDGE	EXISTING GROUND	PROPERTY PARCEL
FIELD PATH	WATER BODY	HEADCUT AREA
RAILWAY	WETLAND BOUNDARY	EXCLUSION FENCE
FENCE		MDEQ CORRIDOR

REFERENCE DRAWINGS

DRAWING No	TITLE
4479-03-ML-02-011	ALIGNMENT SHEET
4369-03-ML-02-503	36" O.D. CRUDE OIL PIPELINE CONSTRUCTION TYPICAL DETAILS – DETAIL 15

REVISION

REV No	DATE	DESCRIPTION
00A	2019-04-10	ISSUED FOR BID
00B	2019-09-20	ISSUED FOR 90% DESIGN REVIEW
00C	2019-11-15	ISSUED PER 90% DESIGN REVIEW
00D	2019-12-12	ISSUED FOR CORP 404 FILING

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2095406	EXP	ADH	ZM	REW	SAS	EXP
2095406	EXP	ADH	ZM	REW	SAS	EXP
2095406	EXP	ADH	ZM	REW	SAS	EXP
2095406	EXP	ADH	ZM	REW	SAS	EXP

PROFESSIONAL ENGINEER/RPT
FIRM: EXP ENERGY SERVICES, INC.
FIRM LICENSE: CA-2224

PERMIT/ ENG. APPROVAL
DATE

REV. NO. | DATE | PERMIT NUMBER:

TC Energy

EXP Energy Services Inc.
t +1.850.385.5441 | f +1.850.385.5523
1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

KEYSTONE XL (NPS 36 2014) KEYA PAHA SECTION

FACILITY # 4479 | ENG STATION: MP 617.07 | DISCIPLINE # 03

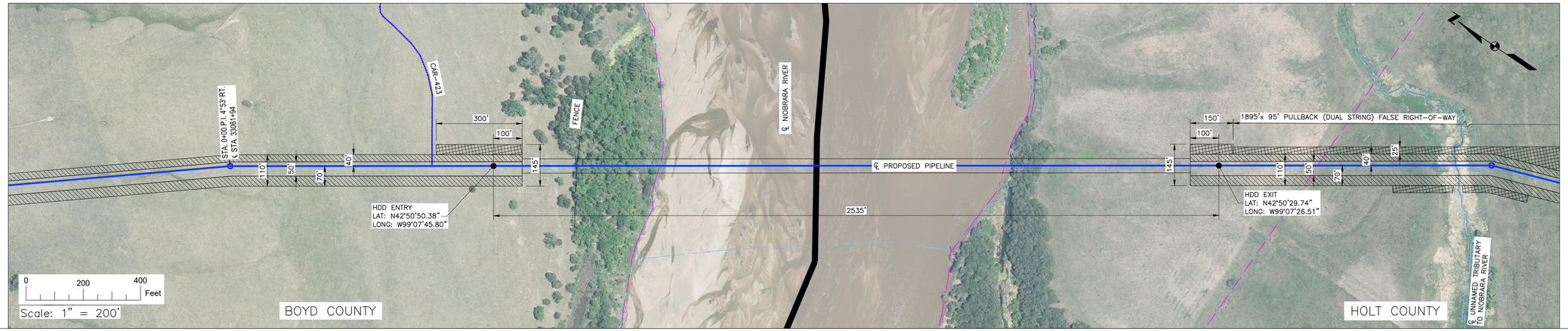
KEYA PAHA RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
KEYA PAHA COUNTY, NEBRASKA

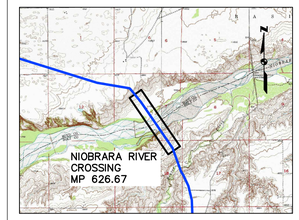
SCALE AS SHOWN | DRAWING # 4479-03-ML-03-001 | REV. 00D

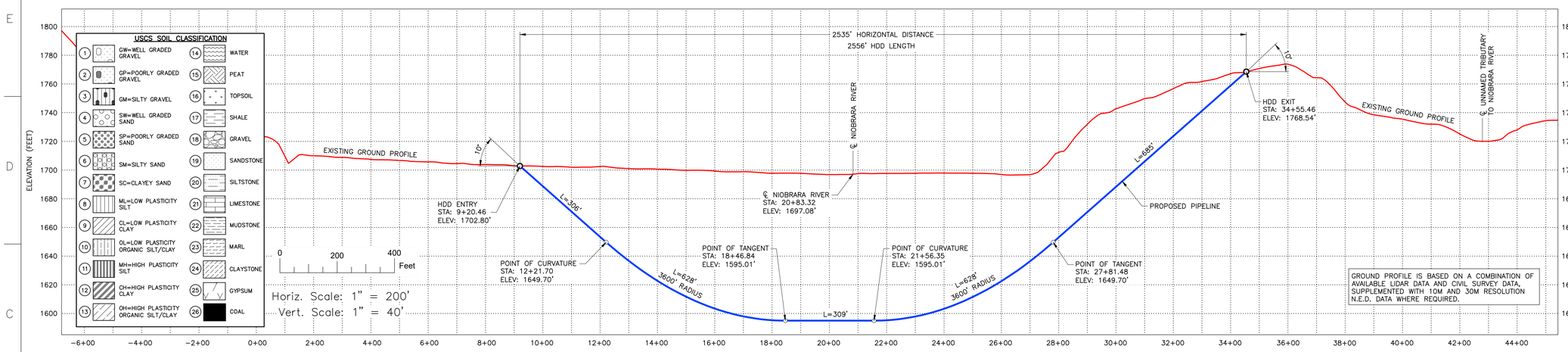
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)







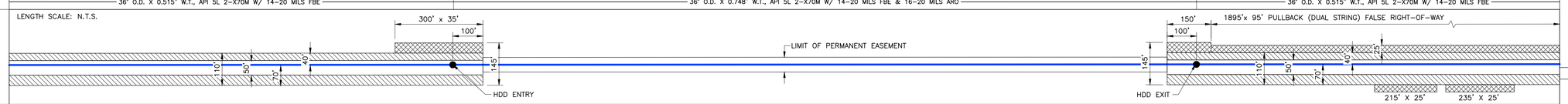
CROSSING INFORMATION (ESTIMATED STATIONING)

0+00 P.I. 4°53' RT. ℄ STA. 330614+94 | 9+20.46 HDD ENTRY POINT LAT: N42°50'50.38" LONG: W99°07'45.80" | 11+81 BH-2-1.08-01 | 12+21.70 PT OF CURVATURE | 13+88 BH-2-1.08-02 | 18+46.84 PT OF TANGENT | 20+83 ℄ NIOBRARA RIVER | 21+56.35 PT OF CURVATURE | 27+81.48 PT OF TANGENT | 28+56 BH-2-1.08-03 | 30+49 BH-2-1.08-04 | 34+55.46 HDD EXIT POINT LAT: N42°50'29.74" LONG: W99°07'26.51" | 42+80 ℄ UNNAMED TRIBUTARY TO NIOBRARA RIVER

PIPELINE DATA

36" O.D. X 0.515" W.T., API 5L 2-X70M W/ 14-20 MILS FBE | 36" O.D. X 0.748" W.T., API 5L 2-X70M W/ 14-20 MILS FBE & 16-20 MILS ARO | 36" O.D. X 0.515" W.T., API 5L 2-X70M W/ 14-20 MILS FBE

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION

TOPSOIL SALVAGE METHOD	SEE ALIGNMENT SHEET
STREAMS	SEE ALIGNMENT SHEET
WETLANDS	SEE ALIGNMENT SHEET
TIMING CONSTRAINTS	SEE ALIGNMENT SHEET
MILEPOST	SEE ALIGNMENT SHEET
MONITORING	SEE ALIGNMENT SHEET
RECLAMATION	SEE ALIGNMENT SHEET
SPECIAL CONSIDERATIONS	SEE ALIGNMENT SHEET

INSTALLATION NOTES

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5. WORKSPACE LIMITS ARE DEPICTED. CLEARINGS SHALL BE RESTRICTED TO THE WORKSPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA. NO CLEARING BETWEEN THE ENTRY AND EXIT POINTS OF THE HDD EXCEPT WHERE APPROVED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
6. DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH KPP-901 REV12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATERBODY.
7. PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PROJECT PERMITS. DISCHARGES SHALL BE SENT TO AN UPLAND LOCATION NEAR THE WITHDRAWL POINT AS DIRECTED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES. DISCHARGES SHALL NOT CAUSE EROSION OR SEDIMENTATION. TO REDUCE THE VELOCITY OF THE DISCHARGE, CONTRACTOR SHALL UTILIZE AN ENERGY-DISSAPATING DEVISE DESCRIBED IN KPP-901 REV12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION.
8. ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATERBODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATERBODIES AND WETLANDS. EACH CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.
9. CONTRACTOR SHALL SUPPLY, INSTALL, AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH TES-CT-GEN-L PIPELINE CONSTRUCTION SPECIFICATION (US). CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
10. CONTRACTOR SHALL PROVIDE PLANNED DRILL PROFILE (IN PDF AND .DWG FORMAT) TO COMPANY FOR APPROVAL PRIOR TO STARTING THE PILOT HOLE.
11. THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE-UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR MORE AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK. PIPING FOR BALLAST MUST BE IN CONTINUOUS ROLL (NOT JOINTS) UMLESS APPROVED BY COMPANY.
12. PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO COMPANY REPRESENTATIVE FOR APPROVAL.
13. CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISPOSED OF IN WATERBODIES OR WETLANDS. ANY DRILLING MUD WHICH INADVERTENTLY EXITS AT POINTS OTHER THAN THE ENTRY AND EXIT SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PARCTICAL AND DISPOSED OF AS DIRECTED BY COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS.
14. ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED ON THE CONSTRUCTION ALIGNMENT SHEETS.
15. CONTRACTOR SHALL COMPLY WITH THE LATEST EDITION OF REFERENCE SPECIFICATIONS. REFER TO TES-CT-GEN-L PIPELINE SPECIFICATION (US), KPP-801 REV 05 SPECIFICATION FOR HORIZONTAL DIRECTIONAL DRILLING, KPP-901 REV 12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION, PROJECT ENVIRONMENTAL REQUIREMENT FOR THIS SITE SPECIFIC DETAIL, PART 195 OF CODE OF FEDERAL REGULATION, AND ASME B31.4.
16. TREE CLEARING SHALL BE MINIMIZED THROUGH NARROWING OF THE CONSTRUCTION RIGHT-OF-WAY, AND FINAL CENTERLINE LOCATION NEAR CROSSING OF THE STREAM.

DRAWING NOTES:

17. PIPELINE STRESS ANALYSIS IS NOT THE RESPONSIBILITY OF EXP AND HAS BEEN COMPLETED BY OTHERS, THE STRESS MITIGATION RECOMMEDATION PROVIDED BY OTHERS HAS BEEN INCORPORATED INTO THE PIPELINE DESIGN.

LEGEND

CL P.I.	COUNTY LINE	SECTION LINE
ENTRY OR EXIT POINT	PERMANENT EASEMENT BOUNDARY	FOREIGN PIPELINE
GEOTECHNICAL BOREHOLE	TEMPORARY WORKSPACE BOUNDARY	WATER LINE
PIPELINE ROUTE	ADDITIONAL TEMPORARY WORKSPACE	OVERHEAD POWERLINE
CATHODIC PROTECTION TEST STATION	PERMANENT ACCESS ROAD	UNDERGROUND UTILITY
ROAD CL	TEMPORARY ACCESS ROAD	TELEPHONE LINE
ROAD EDGE	EXISTING GROUND	PROPERTY PARCEL
FIELD PATH	WATER BODY	HEADCUT AREA
RAILWAY	WETLAND BOUNDARY	EXCLUSION FENCE
FENCE		MDEQ CORRIDOR

REFERENCE DRAWINGS

DRAWING No	TITLE
4479-03-ML-02-018	ALIGNMENT SHEET
4369-03-ML-02-503	36" O.D. CRUDE OIL PIPELINE CONSTRUCTION TYPICAL DETAILS – DETAIL 15

REVISION

REV No	DATE	DESCRIPTION
00	2013-11-01	ISSUED FOR CONSTRUCTION
00A	2019-05-31	ISSUED FOR REVIEW
00B	2019-06-21	ISSUED PER 60% DESIGN REVIEW
00C	2019-09-20	ISSUED FOR 90% DESIGN REVIEW
00D	2019-11-15	ISSUED PER 90% DESIGN REVIEW
00E	2019-12-12	ISSUED FOR CORP 404 FILING

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2095406	EXP	TLB	UUD	KJM	KJM	EXP
2095406	EXP	ADH	ZM	REW	SAS	EXP
2095406	EXP	ADH	ZM	REW	SAS	EXP
2095406	EXP	ADH	ZM	REW	SAS	EXP
2095406	EXP	ADH	ZM	REW	SAS	EXP
2095406	EXP	ADH	ZM	REW	SAS	EXP

PROFESSIONAL ENGINEER/RPT

FIRM: EXP ENERGY SERVICES, INC.

FIRM LICENSE: CA-2224

PERMIT/ ENG. APPROVAL

DATE

REV. NO.	DATE	PERMIT NUMBER:

TC Energy

EXP Energy Services Inc.
t: +1.850.385.5441 | f: +1.850.385.5523
1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

KEYSTONE XL (NPS 36 2014) KEYA PAHA SECTION

FACILITY # 4479 | ENG STATION: MP 626.67 | DISCIPLINE # 03

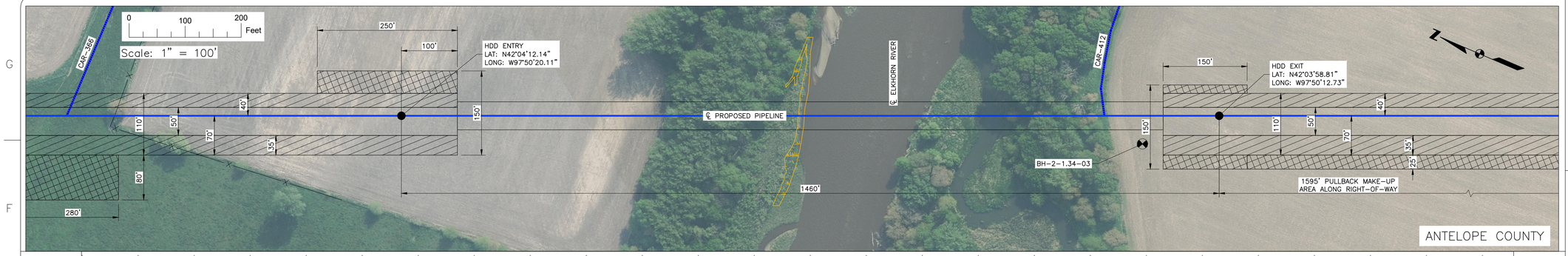
NIOBRARA RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
BOYD & HOLT COUNTY, NEBRASKA

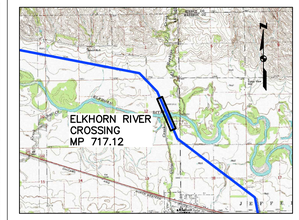
SCALE AS SHOWN | DRAWING # 4479-03-ML-03-002 | REV. 00E

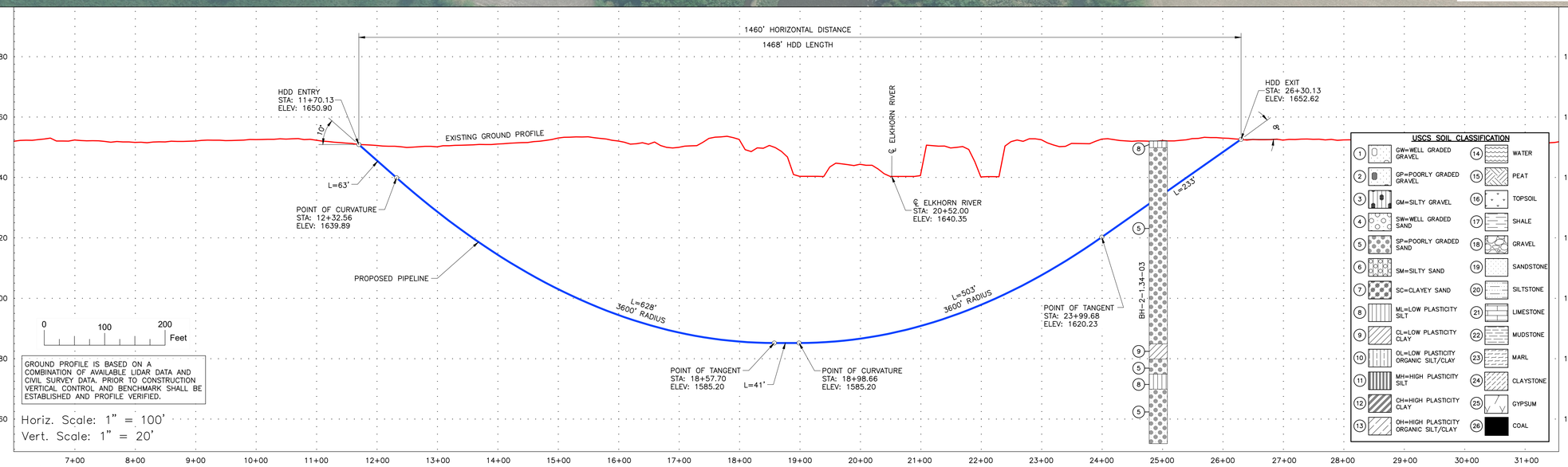
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

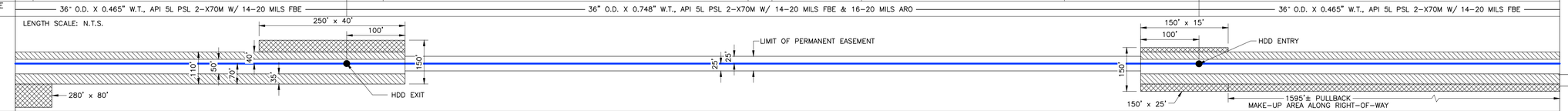
PLOTTED SIZE: ANSI D (22x34)







CROSSING INFORMATION (ESTIMATED STATIONING)	0+00 P.I. 10°24' RT. ℄ STA. 37843+65; 11+70.13 HDD ENTRY POINT LAT: N42°04'12.14" LONG: W97°50'20.11"; 12+32.56 PT OF CURVATURE; 18+57.70 PT OF TANGENT; 18+98.66 PT OF CURVATURE; 20+50.00 ℄ ELKHORN CREEK; 23+99.68 PT OF TANGENT; 26+30.13 HDD EXIT POINT LAT: N42°03'58.81" LONG: W97°50'12.73"
PIPELINE DATA	36" O.D. X 0.465" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE — 36" O.D. X 0.748" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE & 16-20 MILS ARO — 36" O.D. X 0.465" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE



ENVIRONMENTAL MITIGATION/RECLAMATION	
TOPSOIL SALVAGE METHOD	SEE ALIGNMENT SHEET
STREAMS	SEE ALIGNMENT SHEET
WETLANDS	SEE ALIGNMENT SHEET
TIMING CONSTRAINTS	SEE ALIGNMENT SHEET
MILEPOST	SEE ALIGNMENT SHEET
MONITORING	SEE ALIGNMENT SHEET
RECLAMATION	SEE ALIGNMENT SHEET
SPECIAL CONSIDERATIONS	SEE ALIGNMENT SHEET

INSTALLATION NOTES

1. CONTRACTOR SHALL ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY USING ONLY PUBLIC OR APPROVED PRIVATE ROADS.
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10. CONTRACTOR SHALL PROVIDE PLANNED DRILL PROFILE (IN PDF AND .DWG FORMAT) TO COMPANY FOR APPROVAL PRIOR TO STARTING THE PILOT HOLE.
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16. TREE CLEARING SHALL BE MINIMIZED THROUGH NARROWING OF THE CONSTRUCTION RIGHT-OF-WAY, AND FINAL CENTERLINE LOCATION NEAR CROSSING OF THE STREAM.

SITE SPECIFIC NOTES:

17. CONTRACTOR, AT ITS DISCRETION, SHALL USE 8-DEGREE FIELD BEND OR 3R FITTING AT THE HDD EXIT TIE-IN POINT. COMPANY WILL PROVIDE 3R FITTINGS FOR THIS CROSSING.

DRAWING NOTES:

18. PIPELINE STRESS ANALYSIS IS NOT THE RESPONSIBILITY OF EXP AND HAS BEEN COMPLETED BY OTHERS. THE STRESS MITIGATION RECOMMEDATION PROVIDED BY OTHERS HAS BEEN INCORPORATED INTO THE PIPELINE DESIGN.

LEGEND

CL P.I.
ENTRY OR EXIT POINT
GEOTECHNICAL BOREHOLE
PIPELINE ROUTE
CATHODIC PROTECTION TEST STATION
ROAD CL
ROAD EDGE
FIELD PATH
RAILWAY
FENCE
COUNTY LINE
PERMANENT EASEMENT BOUNDARY
TEMPORARY WORKSPACE BOUNDARY
ADDITIONAL TEMPORARY WORKSPACE
PERMANENT ACCESS ROAD
TEMPORARY ACCESS ROAD
EXISTING GROUND
WATER BODY
WETLAND BOUNDARY
SECTION LINE
FOREIGN PIPELINE
WATER LINE
OVERHEAD POWERLINE
UNDERGROUND UTILITY
TELEPHONE LINE
PROPERTY PARCEL
HEADCUT AREA
EXCLUSION FENCE
MDEQ CORRIDOR

REFERENCE DRAWINGS

DRAWING No	TITLE
4738-03-ML-02-006	ALIGNMENT SHEET
4369-03-ML-02-503	36" O.D. CRUDE OIL PIPELINE CONSTRUCTION TYPICAL DETAILS – DETAIL 15

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
00	2013-11-01	ISSUED FOR CONSTRUCTION	2095406	EXP	TLB	UUD	KJM	KJM	EXP
00A	2019-05-31	ISSUED FOR REVIEW	2095406	EXP	ADH	ZM	REW	SAS	EXP
00B	2019-06-21	ISSUED PER 60% DESIGN REVIEW	2095406	EXP	ADH	ZM	REW	SAS	EXP
00C	2019-09-20	ISSUED FOR 90% DESIGN REVIEW	2095406	EXP	ADH	ZM	REW	SAS	EXP
00D	2019-11-15	ISSUED PER 90% DESIGN REVIEW	2095406	EXP	ADH	ZM	REW	SAS	EXP
00E	2019-12-12	ISSUED FOR CORP 404 FILING	2095406	EXP	ADH	ZM	REW	SAS	EXP

PROFESSIONAL ENGINEER/RPT
FIRM: EXP ENERGY SERVICES, INC.
FIRM LICENSE: CA-2224

PERMIT/ ENG. APPROVAL
DATE

REV. NO. | DATE | PERMIT NUMBER:

TC Energy

EXP Energy Services Inc.
t: +1.850.385.5441 | f: +1.850.385.5523
1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

KEYSTONE XL (NPS 36) OAKDALE SECTION

FACILITY # 4738 | ENG STATION: MP 717.12 | DISCIPLINE # 03

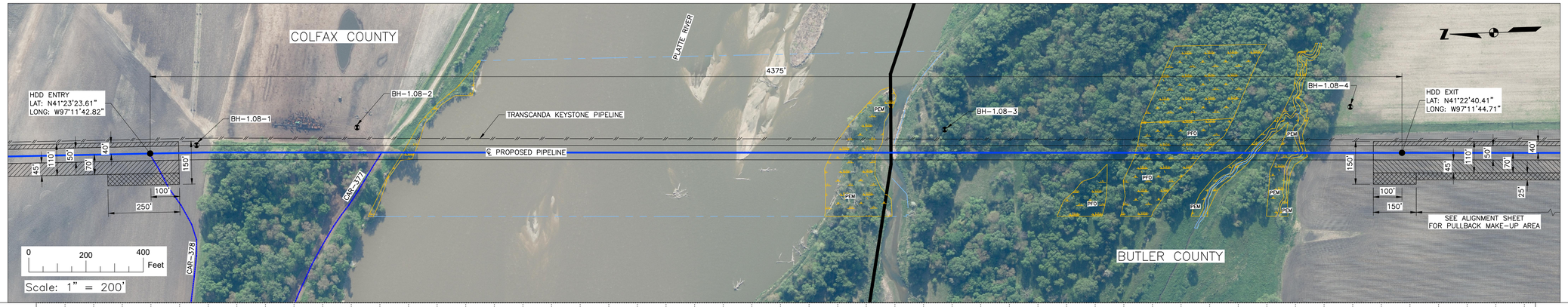
ELKHORN RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
ANTELOPE COUNTY, NEBRASKA

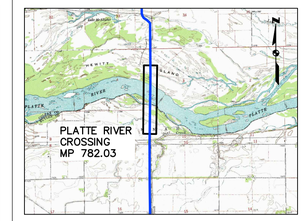
SCALE AS SHOWN | DRAWING # 4738-03-ML-03-003 | REV. 00E

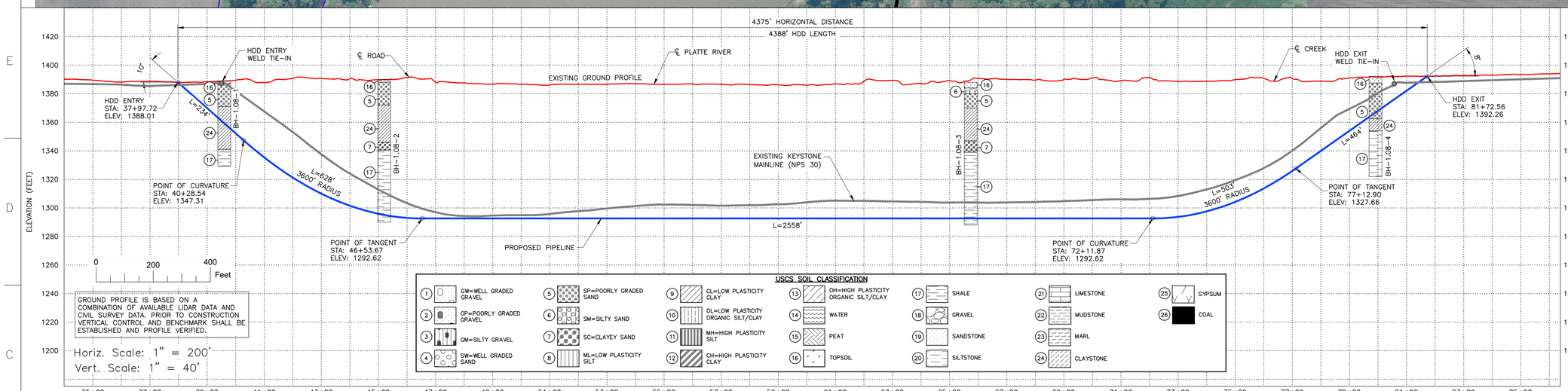
TC_UD_BR.DWG 22X34

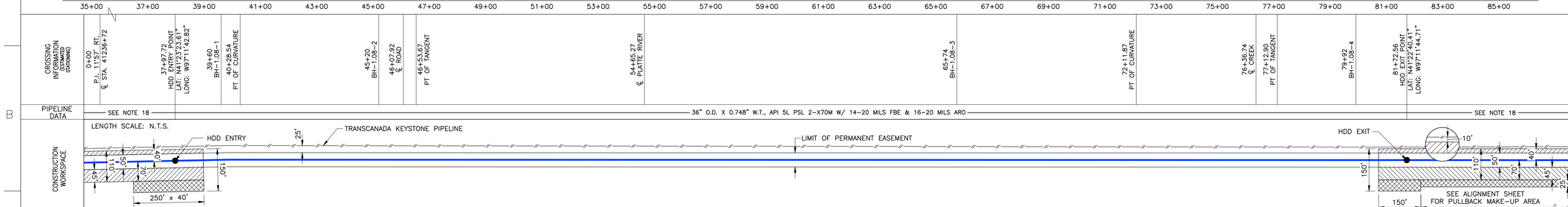
CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)









INSTALLATION NOTES

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SITE SPECIFIC NOTES:

17. CONTRACTOR, AT ITS DISCRETION, SHALL USE 8-DEGREE FIELD BEND OR 3R FITTING AT THE HDD EXIT TIE-IN POINT. COMPANY WILL PROVIDE 3R FITTINGS FOR THIS CROSSING.
18. 36" O.D. X 0.515" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE
19. CONTRACTOR SHALL FOLLOW ANY REQUIRED PRECAUTIONS WHEN PARALLELING EXISTING KEYSTONE MAINLINE HDD INCLUDING KEYSTONE MAINLINE CLEARANCE REQUIREMENTS.

DRAWING NOTES:

20. PIPELINE STRESS ANALYSIS IS NOT THE RESPONSIBILITY OF EXP AND HAS BEEN COMPLETED BY OTHERS. THE STRESS MITIGATION RECOMMEDATION PROVIDED BY OTHERS HAS BEEN INCORPORATED INTO THE PIPELINE DESIGN.

LEGEND

CL P.I.	COUNTY LINE	SECTION LINE
ENTRY OR EXIT POINT	PERMANENT EASEMENT BOUNDARY	FOREIGN PIPELINE
GEOTECHNICAL BOREHOLE	TEMPORARY WORKSPACE BOUNDARY	WATER LINE
PIPELINE ROUTE	ADDITIONAL TEMPORARY WORKSPACE	OVERHEAD POWERLINE
CATHODIC PROTECTION TEST STATION	PERMANENT ACCESS ROAD	UNDERGROUND UTILITY
ROAD CL	TEMPORARY ACCESS ROAD	TELEPHONE LINE
ROAD EDGE	EXISTING GROUND	PROPERTY PARCEL
FIELD PATH	WATER BODY	HEADCUT AREA
RAILWAY	WETLAND BOUNDARY	EXCLUSION FENCE
FENCE		MDEQ CORRIDOR

REFERENCE DRAWINGS

DRAWING No	TITLE
75528-03-ML-02-015	ALIGNMENT SHEET
4369-03-ML-02-503	36" O.D. CRUDE OIL PIPELINE CONSTRUCTION TYPICAL DETAILS – DETAIL 15

REVISION

REV No	DATE	DESCRIPTION
00	2013-11-01	ISSUED FOR CONSTRUCTION
00A	2019-05-31	ISSUED FOR REVIEW
00B	2019-06-21	ISSUED PER 60% DESIGN REVIEW
00C	2019-09-20	ISSUED FOR 90% DESIGN REVIEW
00D	2019-11-15	ISSUED PER 90% DESIGN REVIEW
00E	2019-12-12	ISSUED FOR CORP 404 FILING

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2095406	EXP	TLB	UUD	KJM	KJM	EXP
2095406	EXP	ADH	ZM	REW	SAS	EXP
2095406	EXP	ADH	ZM	REW	SAS	EXP
2095406	EXP	ADH	ZM	REW	SAS	EXP
2095406	EXP	ADH	ZM	REW	SAS	EXP
2095406	EXP	ADH	ZM	REW	SAS	EXP

PROFESSIONAL ENGINEER/RPT

FIRM: EXP ENERGY SERVICES, INC.

FIRM LICENSE: CA-2224

PERMIT/ ENG. APPROVAL

DATE

REV. NO. | DATE | PERMIT NUMBER:

TC Energy

EXP Energy Services Inc.
t: +1.850.385.5441 | f: +1.850.385.5523
1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

KEYSTONE XL (NPS 36) LEIGH SECTION

FACILITY # 75528 | ENG STATION: MP 782.03 | DISCIPLINE # 03

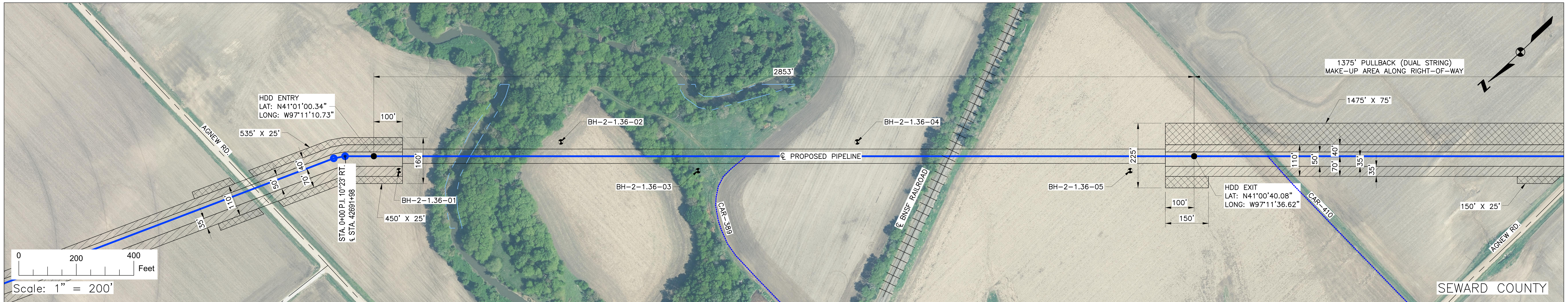
PLATTE RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
COLFAX & BUTLER COUNTIES, NEBRASKA

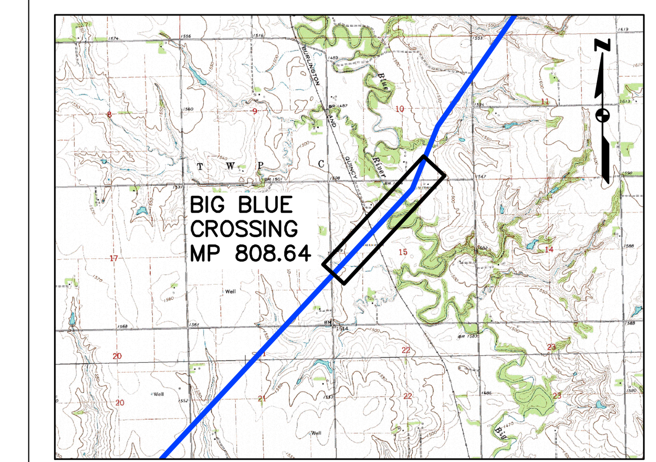
SCALE AS SHOWN | DRAWING # 75528-03-ML-03-001 | REV. 00E

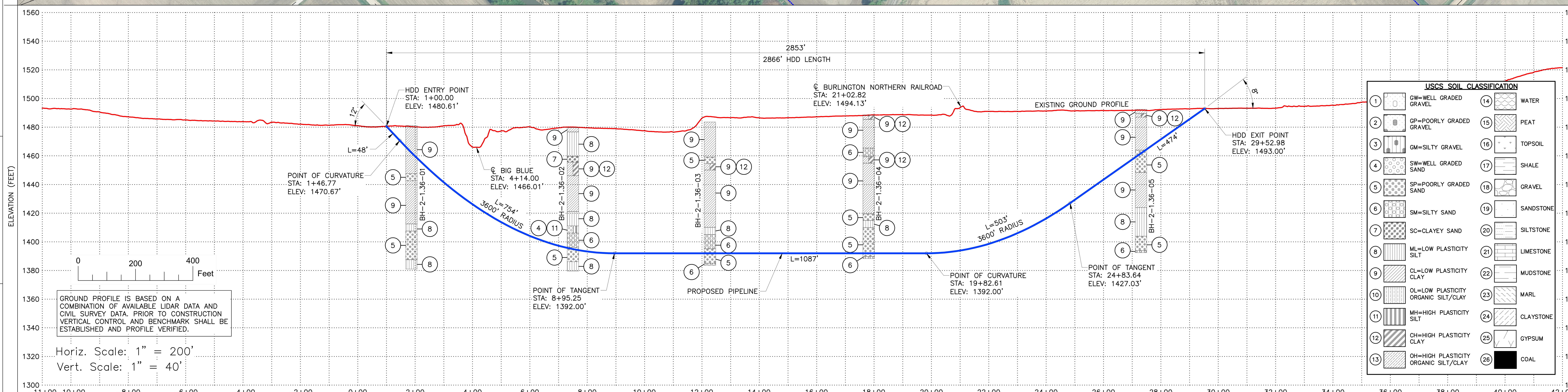
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)







USCS SOIL CLASSIFICATION

No.	Classification	No.	Classification
1	GW=WELL GRADED GRAVEL	14	WATER
2	GP=POORLY GRADED GRAVEL	15	PEAT
3	GM=SILTY GRAVEL	16	TOPSOIL
4	SW=WELL GRADED SAND	17	SHALE
5	SP=POORLY GRADED SAND	18	GRAVEL
6	SM=SILTY SAND	19	SANDSTONE
7	SC=CLAYEY SAND	20	SILTSTONE
8	ML=LOW PLASTICITY SILT	21	LIMESTONE
9	CL=LOW PLASTICITY CLAY	22	MUDSTONE
10	OL=LOW PLASTICITY ORGANIC SILT/CLAY	23	MARL
11	MH=HIGH PLASTICITY SILT	24	CLAYSTONE
12	CH=HIGH PLASTICITY CLAY	25	GYPSUM
13	OH=HIGH PLASTICITY ORGANIC SILT/CLAY	26	COAL

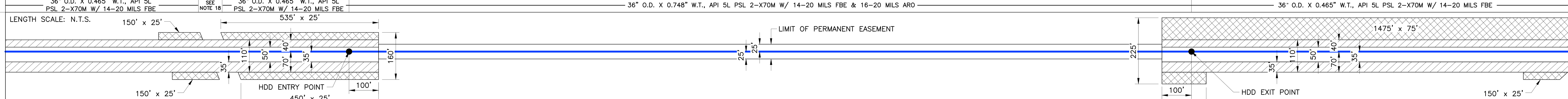
CROSSING INFORMATION (ESTIMATED STATIONING)

- 0+00 P.I. 10°23' RT. ℄ STA. 42691+98
- 1+00.00 HDD ENTRY POINT LAT: N41°01'00.34" LONG: W97°11'10.73"
- 1+46.77 PT OF CURVATURE
- 4+14.00 ℄ BIG BLUE RIVER
- 8+95.25 PT OF TANGENT
- 19+82.61 PT OF CURVATURE
- 24+83.64 PT OF TANGENT
- 29+52.98 HDD EXIT POINT LAT: N41°00'40.08" LONG: W97°11'36.62"

PIPELINE DATA

36" O.D. X 0.465" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE — SEE NOTE 18 — 36" O.D. X 0.465" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE — 36" O.D. X 0.748" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE & 16-20 MILS ARO — 36" O.D. X 0.465" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION

TOPSOIL SALVAGE METHOD	SEE ALIGNMENT SHEET
STREAMS	SEE ALIGNMENT SHEET
WETLANDS	SEE ALIGNMENT SHEET
TIMING CONSTRAINTS	SEE ALIGNMENT SHEET
MILEPOST	SEE ALIGNMENT SHEET
MONITORING	SEE ALIGNMENT SHEET
RECLAMATION	SEE ALIGNMENT SHEET
SPECIAL CONSIDERATIONS	SEE ALIGNMENT SHEET

INSTALLATION NOTES

1. CONTRACTOR SHALL ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY USING ONLY PUBLIC OR APPROVED PRIVATE ROADS.
2. THE ENTIRE AREA OF INTEREST ALONG THE RIGHT-OF-WAY SHALL BE INSPECTED FOR OTHER UNDERGROUND APPURTENANCES TO ENSURE ALL HAZARDS HAVE BEEN IDENTIFIED.
3. CONTRACTOR SHALL NOTIFY THE APPROPRIATE ONE-CALL PRIOR TO SOIL DISTURBANCE.
4. VEHICLE AND EQUIPMENT CROSSINGS MAY BE INSTALLED IF APPROVED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
5. WORKSPACE LIMITS ARE DEPICTED. CLEARINGS SHALL BE RESTRICTED TO THE WORKSPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA. NO CLEARING BETWEEN THE ENTRY AND EXIT POINTS OF THE HDD EXCEPT WHERE APPROVED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
6. DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH KPP-901 REV12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATERBODY.
7. PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PROJECT PERMITS. DISCHARGES SHALL BE SENT TO AN UPLAND LOCATION NEAR THE WITHDRAWL POINT AS DIRECTED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES. DISCHARGES SHALL NOT CAUSE EROSION OR SEDIMENTATION. TO REDUCE THE VELOCITY OF THE DISCHARGE, CONTRACTOR SHALL UTILIZE AN ENERGY-DISSAPATING DEVISE DESCRIBED IN KPP-901 REV12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION.
8. ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATERBODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATERBODIES AND WETLANDS. EACH CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.
9. CONTRACTOR SHALL SUPPLY, INSTALL, AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH TES-CT-GEN-L PIPELINE CONSTRUCTION SPECIFICATION (US). CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY COMPANY REPRESENTATIVE AND APPROPRIATE REGULATORY AGENCIES.
10. CONTRACTOR SHALL PROVIDE PLANNED DRILL PROFILE (IN PDF AND .DWG FORMAT) TO COMPANY FOR APPROVAL PRIOR TO STARTING THE PILOT HOLE.
11. THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE-UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR MORE AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK. PIPING FOR BALLAST MUST BE IN CONTINUOUS ROLL (NOT JOINTS) UMLESS APPROVED BY COMPANY.
12. PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO COMPANY REPRESENTATIVE FOR APPROVAL.
13. CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISPOSED OF IN WATERBODIES OR WETLANDS. ANY DRILLING MUD WHICH INADVERTENTLY EXITS AT POINTS OTHER THAN THE ENTRY AND EXIT SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PARCTICAL AND DISPOSED OF AS DIRECTED BY COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS.
14. ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED ON THE CONSTRUCTION ALIGNMENT SHEETS.
15. CONTRACTOR SHALL COMPLY WITH THE LATEST EDITION OF REFERENCE SPECIFICATIONS. REFER TO TES-CT-GEN-L PIPELINE SPECIFICATION (US), KPP-801 REV 05 SPECIFICATION FOR HORIZONTAL DIRECTIONAL DRILLING, KPP-901 REV 12 SPECIFICATION FOR CLEANING, FILLING, HYDROSTATIC/PNEUMATIC TESTING, DEWATERING, DRYING, CALIPER AND EXCAVATION, PROJECT ENVIRONMENTAL REQUIREMENT FOR THIS SITE SPECIFIC DETAIL, PART 195 OF CODE OF FEDERAL REGULATION, AND ASME B31.4.
16. TREE CLEARING SHALL BE MINIMIZED THROUGH NARROWING OF THE CONSTRUCTION RIGHT-OF-WAY, AND FINAL CENTERLINE LOCATION NEAR CROSSING OF THE STREAM.

SITE SPECIFIC NOTES:

17. CONTRACTOR, AT ITS DISCRETION, SHALL USE 8-DEGREE FIELD BEND OR 3R FITTING AT THE HDD EXIT TIE-IN POINT. COMPANY WILL PROVIDE 3R FITTINGS FOR THIS CROSSING.
18. 36" O.D. X 0.618" W.T., API 5L PSL 2-X70M W/ 14-20 MILS FBE & 16-20 MILS ARO.

DRAWING NOTES:

19. PIPELINE STRESS ANALYSIS IS NOT THE RESPONSIBILITY OF EXP AND HAS BEEN COMPLETED BY OTHERS, THE STRESS MITIGATION RECOMMEDATION PROVIDED BY OTHERS HAS BEEN INCORPORATED INTO THE PIPELINE DESIGN.

LEGEND

CL P.I.; ENTRY OR EXIT POINT; GEOTECHNICAL BOREHOLE; PIPELINE ROUTE; CATHODIC PROTECTION TEST STATION; ROAD CL; ROAD EDGE; FIELD PATH; RAILWAY; FENCE; COUNTY LINE; PERMANENT EASEMENT BOUNDARY; TEMPORARY WORKSPACE BOUNDARY; ADDITIONAL TEMPORARY WORKSPACE; PERMANENT ACCESS ROAD; TEMPORARY ACCESS ROAD; EXISTING GROUND; WATER BODY; WETLAND BOUNDARY; SECTION LINE; FOREIGN PIPELINE; W WATER LINE; P OVERHEAD POWERLINE; U UNDERGROUND UTILITY; T TELEPHONE LINE; PROPERTY PARCEL; HEADCUT AREA; EXCLUSION FENCE; MDEQ CORRIDOR

REFERENCE DRAWINGS

DRAWING No	TITLE
75529-03-ML-02-017	ALIGNMENT SHEET
4369-03-ML-02-503	36" O.D. CRUDE OIL PIPELINE CONSTRUCTION TYPICAL DETAILS – DETAIL 15

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
A	2019-05-31	ISSUED FOR REVIEW	2095406	EXP	ADH	ZM	REW	SAS	EXP
B	2019-06-21	ISSUED PER 60% DESIGN REVIEW	2095406	EXP	ADH	ZM	REW	SAS	EXP
C	2019-09-20	ISSUED FOR 90% DESIGN REVIEW	2095406	EXP	ADH	ZM	REW	SAS	EXP
D	2019-11-15	ISSUED PER 90% DESIGN REVIEW	2095406	EXP	ADH	ZM	REW	SAS	EXP
E	2019-12-12	ISSUED FOR CORP 404 FILING	2095406	EXP	ADH	ZM	REW	SAS	EXP

PROFESSIONAL ENGINEER/RPT
FIRM: EXP ENERGY SERVICES, INC.
FIRM LICENSE: CA-2224

PERMIT/ ENG. APPROVAL
DATE

REV. NO. | DATE | PERMIT NUMBER:

TC Energy

EXP Energy Services Inc.
t: +1.850.385.5441 | f: +1.850.385.5523
1300 Metropolitan Blvd
Tallahassee, FL 32308
USA
www.exp.com

KEYSTONE XL (NPS 36) BELLWOOD SECTION

FACILITY # 75529 | ENG STATION: MP 808.64 | DISCIPLINE # 03

BIG BLUE HDD INSTALLATION
KEYSTONE XL PROJECT
SEWARD COUNTY, NEBRASKA

SCALE AS SHOWN | DRAWING # 75529-03-ML-03-001 | REV E

TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)

Appendix E –
Adjoining Property Owners

The Adjoining Property Owner List contains Privileged and Confidential information and is provided under separate cover.

Appendix F – Permit Table

Table B-1 - Project Permits, Licenses, Approvals, and Consultation Requirements for the Project

Agency	Permit or Consultation/Authority	Agency Action	Status
Federal			
Office of the U.S. President	Presidential Permit, Executive Order 13337 of April 30, 2004 (69 Fed. Reg. 25299, et seq.)	Considers approval of cross-border facilities	Issued March 2019
U.S. Department of State (DOS)	National Environmental Policy Act Clearance	DOS is the lead federal agency for the environmental review in connection with consideration of Presidential Permit application	Final Supplemental Environmental Impact Statement for the Keystone XL Project Issued December 20, 2019
	Section 106 of the National Historic Preservation Act (NHPA)	DOS is the lead federal agency for compliance with Section 106 of NHPA and consultation with interested Tribal agencies	Programmatic Agreement amended and signed by cooperating agencies and entities in 2013
U.S. Army Corps of Engineers (USACE) – Omaha District	Section 10 of the Rivers and Harbor Act / 404 of the Clean Water Act (CWA)	Considers issuance of Section 404 permits for the placement of dredge or fill material in waters of the United States, including wetlands and issuance of Section 10 for the crossing of navigable waters of the United States.	Pending USACE approval
U.S. Army Corps of Engineers (USACE) – Omaha District	Section 408, Navigation and Navigable Waters (33 USC 408)	Considers issuance of Section 408 permits for the construction, placement, maintenance, or modification of a structure or improvements in, over, below, or above a navigable river	Permission Issued January 21, 2020
Bureau of Land Management (BLM)	SF 299 Right-of-Way (ROW) Grant and Temporary Use Permit with Determination of National Environmental Policy Act Adequacy	Considers issuance of permit for construction projects on BLM land	ROW Grant Offer Issued January 22, 2020; ROW grant signed February 7, 2020.
U.S. Fish and Wildlife Service (USFWS)	Endangered Species Act (ESA) Section 7 Consultation	Considers lead agency findings of an impact of federally listed or proposed species; provide Biological Opinion (BO) if the Project is likely to adversely affect federally listed or proposed species or their habitats	Amended BO for the Keystone XL Project issued December 23, 2019
	Section 10 -Incidental Take Permit (ITP) for American Burying Beetle (ABB)	Considers issuance of permit under Section 10 of the ESA to private, non-federal entities projects that might result in the wake of an endangered or threatened species	On November 25, 2019, Keystone submitted a Draft Habitat Conservation Plan to the USFWS under Section 10 of the ESA for an ITP of the American burying beetle. Anticipated that USFWS will issue Incidental Take Permit in August 2020
State and Local			
Montana			
Montana Department of Environmental Quality	Major Oil Pipeline Siting Act Certificate	Major Facility Siting Act (MFSA) Certificate of Compliance	Considers issuance of certification to construct a major pipeline to be placed in operation of Montana

Table B-1 - Project Permits, Licenses, Approvals, and Consultation Requirements for the Project

Agency	Permit or Consultation/Authority	Agency Action	Status
	MFSA Certificate of Compliance	Considers issuance of certification to construct a major pipeline to be placed in operation of Montana	Issued: March 30, 2012
	Section 401, CWA, Water Quality Certification	Considers issuance of permit for stream and wetland crossings	Issued in concert with issuance of the Section 10/404 Permit.
	Section 402 CWA NPDES Discharge Permit for Hydrostatic Test Water (MTG770000)	Considers issuance of permit for discharge of hydrostatic test waters	Permit applications are submitted/issued by spread and in accordance with construction start dates.
	Section 402 CWA NPDES General Permit for Construction Dewatering (MTG070000)	Considers issuance of permit for discharges from dewatering construction to surface waters	Permit applications are submitted/issued by spread and in accordance with construction start dates.
	Section 402 CWA NPDES General Permit for Construction Stormwater Discharge (MTG0100000)	Considers issuance of permit for discharges associated with activity that causes land disturbance equal to or greater than one acre	Permit applications are submitted/issued by spread and in accordance with construction start dates.
	318 Authorization	Considers issuance of permit for activities that will cause unavoidable short-term violations of water quality standards (turbidity)	Permit applications are submitted/issued by spread and in accordance with construction start dates.
County Conservation District	310 Authorization	Considers issuance of permit for activities that physically alters or modifies the bed or banks of a perennially flowing stream	Pending application submittal
Montana Department of Transportation	State Highway Crossing and Access Permits	Considers issuance of permits to construct, operate, use, and/or maintain a facility within a state managed roadway	Majority of permits acquired
County and Local Authorities	Road Crossing and Access Permits	Considers issuance of permits to construct, operate, use, and/or maintain a facility within a county or local authority managed right-of-way	Majority of permits acquired
	Pump Station Zoning Approvals, where required		
	Special or Conditional Use Permits, where required		
	Municipal Water Use Agreements	Considers issuance of agreement to appropriate water use within a county or local authority	Majority of permits acquired
South Dakota			
South Dakota Public Utilities Commission (PUC)	Energy Conversion and Transmission Facilities Act	Considers issuance of certification to construct a major utility to be placed in operation within South Dakota	A PUC certificate was issued March 2010
South Dakota Department of	Section 401, CWA, Water Quality Certification	Considers issuance of permit for stream and wetland crossings; consult for Section 404 process	Issued in concert with issuance of the Section 10/404 Permit.

Table B-1 - Project Permits, Licenses, Approvals, and Consultation Requirements for the Project

Agency	Permit or Consultation/Authority	Agency Action	Status
Environment and Natural Resources	Section 402 CWA NPDES Hydrostatic Testing/Temporary Water Use Permit (SDG070000)	Considers issuance of General Permit regulating hydrostatic test water discharge, construction dewatering to waters of the State, and Temporary Water Use Permit	Permit applications are submitted/issued by spread and in accordance with construction start dates.
	General Stormwater Discharge and Construction Site Dewatering Permit (NER160000)	Considers issuance of permit for discharges associated with activity that causes land disturbance equal to or greater than one acre.	Permit applications are submitted/issued by spread and in accordance with construction start dates.
	Standard Water Appropriations Permit	Considers issuance of permit to appropriate water from a state jurisdictional waterbody.	Application submitted
County Floodplain Departments	County Floodplain Permits	Considers issuance of permits and review of work in floodplains	Pending application submittal
South Dakota Department of Transportation	State Highway Crossing and Access Permits	Considers issuance of permits to construct, operate, use, and/or maintain a facility within a state managed roadway	Majority of permits acquired
County and local Authorities	Road Crossing and Access Permits	Considers issuance of permits to construct, operate, use, and/or maintain a facility within a county or local authority managed ROW	Majority of permits acquired
	Pump Station Zoning Approvals, where required		
	Special or Conditional Use Permits, where required		
	Municipal Water Use Agreements	Reviews under County approval process	Majority of permits acquired
Nebraska			
Nebraska Public Service Commission (PSC)	Major Oil Pipeline Siting Act Certificate	Considers issuance of certification to construct a major pipeline to be placed in operation of Nebraska.	On November 20, 2017, the Nebraska PSC approved the Mainline Alternative Route
Nebraska Department of Environment and Energy	Section 401, CWA, Water Quality Certification	Considers issuance of permit for stream and wetland crossings	Issued in concert with issuance of the Section 10/404 Permit.
	Section 402 CWA NPDES-General Hydrostatic Test Water Discharge Permit (NEG672000)	Considers issuance of permit for discharge of hydrostatic test waters.	Permit applications are submitted/issued by spread and in accordance with construction start dates.
	Section 402 CWA NPDES General Storm Water Discharges from Construction Sites Permit (NER160000)	Considers issuance of permit for discharges associated with activity that causes land disturbance equal to or greater than one acre.	Permit applications are submitted/issued by spread and in accordance with construction start dates.
	Section 402 CWA NPDES General Dewatering Discharges from Construction Excavation Sites and/or Wells Permit (NEG671000)	Considers issuance of permit for discharges from dewatering construction excavations to ground and surface waters	Permit applications are submitted/issued by spread and in accordance with construction start dates.
Nebraska Department of Natural Resources	Permit to Appropriate Water	Considers issuance of permit to appropriate water from a state jurisdictional waterbody	Permit applications are submitted/issued by spread and in accordance with construction start dates.
County Floodplain Departments	County Floodplain Permits	Considers issuance of permits and review of work in floodplains	Permit applications are submitted/issued by spread and in accordance with construction start dates.

Table B-1 - Project Permits, Licenses, Approvals, and Consultation Requirements for the Project

Agency	Permit or Consultation/Authority	Agency Action	Status
County and Local Authorities	Road Crossing and Access Permits	Considers issuance of permits to construct, operate, use, and/or maintain a facility within a county or local authority managed right-of-way.	Majority of permits acquired
	Pump Station Zoning Approvals, where required		
	Special or Conditional Use Permits, where required		
	Municipal Water Use Agreements	Considers issuance of agreement to appropriate water use within a county or local authority.	Pending application submittal

Key:

ABB: American burying beetle
CWA: Clean Water Act
DOS: U.S. Department of State
ITP: Incidental Take Permit
MFSA: Major Facility Siting Act
NHPA: National Historic Preservation Act
PSC: Public Service Commission
PUC: Public Utilities Commission
ROW: right-of-way
USACE: U.S. Army Corps of Engineers
USFWS: U.S. Fish and Wildlife Service

Appendix G – Wetland Datasheets

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 25.27 City/County: Phillips County Sampling Date: 5/12/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: MT Sampling Point: W_UTM13_00385_W1

Investigator(s): C. Westfall (Desktop) Section, Township, Range: S12, T34N, R34E

Landform (hillslope, terrace, etc.): terrace/slope Local relief (concave, convex, none): none Slope (%): 3

Subregion (LRR): F Lat: 48.7230000 Long: -107.209000 Datum: WGS84

Soil Map Unit Name: MT641-901A NWI Classification: PSS

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Desktop form based on nearby wetland dataforms, Web Soil Survey, and site notes taken from 2018 and 2019 site notes. To date, all wetland indicators have not been field verified at this site. Similar datasheet(s) used: W106VA002 (PSS)

Photos: No Photos Associated Plots: W_UTM13_00385_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1. *Salix amygdaloides*	40	✓	FACW
2. *Salix exigua*	30	✓	FACW
3.			
4.			
5.			
	70 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	20	✓	FACW
2. *Bromus inermis*	10		UPL
3. *Hordeum jubatum*	5		FAC
4. *Poa pratensis*	5		FAC
5.			
6.			
7.			
8.			
9.			
10.			
	40 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	90	x 2 =	180
FAC Species	10	x 3 =	30
FACU Species		x 4 =	
UPL Species	10	x 5 =	50
Column Totals	110 (A)		260 (B)

Prevalence Index (B/A) = 2.36

Hydrophytic Vegetation Indicators:

- [x] 1 – Rapid Test for Hydrophytic Vegetation
- [x] 2 – Dominance Test is >50%
- [x] 3 – Prevalence Index is ≤3.0[1]
- [ ] 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Desktop assessment of vegetation was determined to be similar to that of data form: W106VA002. Field map notes of plant species in 2010 were also used to select accurate plant species in the area.

SOIL

Sampling Point: W_UTM13_00385_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 3	10YR3/2	100					SiL	
3 - 8	10YR4/2	95	10YR4/6	5	C	M	CL	
8 - 16	10YR4/2	98	10YR4/6	2	C	M	SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Desktop assessment of soils were determined to be similar to that of data form: W106VA002. Soil determinations were supported by field map notes from 2009 as well as NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 6
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of data form: W106VA002 (PSS). Soil determinations were supported by NRCS Web Soil Survey data for Depth to Water Table.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 25.27 City/County: Phillips County Sampling Date: 5/12/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: MT Sampling Point: W_UTM13_00385_U1

Investigator(s): C. Westfall (Desktop) Section, Township, Range: S12, T34N, R34E

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): none Slope (%): 3

Subregion (LRR): F Lat: 48.7230000 Long: -107.209000 Datum: WGS84

Soil Map Unit Name: MT641-901A NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Desktop form based on nearby wetland dataforms, Web Soil Survey, and site notes taken from 2018 and 2019 site notes. To date, all wetland indicators have not been field verified at this site. Similar datasheet(s) used: W106VA002 (PSS)

Photos: No Photos Associated Plots: W_UTM13_00385_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1. *Artemisia cana*	10	✓	FACU
2. *Shepherdia argentea*	5		UPL
3.			
4.			
5.			
	15 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Agropyron smithii*	20	✓	FACU
2. *Agropyron cristatum*	15	✓	(UPL)
3. *Bouteloua gracilis*	12	✓	(UPL)
4. *Stipa comata*	10		(UPL)
5.			
6.			
7.			
8.			
9.			
10.			
	57 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	30	x 4 =	120
UPL Species	42	x 5 =	210
Column Totals	72 (A)		330 (B)

Prevalence Index (B/A) = 4.58

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Desktop assessment of vegetation was determined to be similar to that of data form: W106VA002. Field map notes of plant species in 2010 were also used to select accurate plant species in the area.

SOIL

Sampling Point: W_UTM13_00385_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 3	10YR 3/1	100					SiL	
3 - 12	10YR 3/2	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Desktop assessment of soils were determined to be similar to that of data form: W106VA002. Soil determinations were supported by field map notes from 2009 as well as NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of data form: W106VA002 (PSS). Soil determinations were supported by NRCS Web Soil Survey data for Depth to Water Table.

PSS Wetland plot

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL Pipeline – Phase IV ~~City~~/County: Valley Sampling Date: 5/31/10

Applicant/Owner: TransCanada – Trow State: MT Sampling Point: W106VA002

Investigator(s): B106 Section, Township, Range: —

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): flat Slope (%): 2

Subregion (LRR): Northern Great Plains Lat: — Long: — Datum: —

Soil Map Unit Name: — NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: PSS abutts Frenchman Creek and transitions into PEM w/in Pasture area.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: NA)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 15' ~~NA~~)			
1. Salix amygdaloides	55	Y	FacW
2.			
3.			
4.			
5.			
	55 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Phalaris arundinacea	20	Y	FacW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	20 = Total Cover		
Woody Vine Stratum (Plot size: NA)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

W106VA002

SOIL

Sampling Point: PSS

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR3/2	100					Sil	
3-8	10YR 4/2	95	10YR 4/6	5	C	M	cl	
8-16	10YR 4/2	98	10YR 4/6	2	C	M	SCl	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 0-6"

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): Surface to 3"

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

PEM Wetland

Project/Site: KXL Pipeline - Phase IV City/County: Valley Sampling Date: 5/31/10

Applicant/Owner: TransCanada - Trow State: MT Sampling Point: W106VA002

Investigator(s): B/O 6 Section, Township, Range: —

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 3

Subregion (LRR): Northern Great Plains Lat: — Long: — Datum: —

Soil Map Unit Name: — NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Area part of Pasture. PEM transitions to PSS near Frenchman Creek.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: NA)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: NA)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Juncus balticus	18	Y	OBL
2. Phalaris arundinacea	50	Y	FACW+
3. Rumex crispus	10	N	FACW
4. Carex sp.	20		—
5.			
6.			
7.			
8.			
9.			
10.			
	78 = Total Cover		
Woody Vine Stratum (Plot size: NA)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 3%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

PEM

SOIL

Sampling Point: W106VA002

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-1	organics							
1-3	10YR 3/2	100%					Sil	
3-8	10YR 4/2	95%	10YR 4/6	5	C	M	cl	
8-12	10YR 4/2	98%	10YR 4/6	2	C	M	Sicl	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- X Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes X No ~~X~~ FM Depth (inches): 0-4"

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): Surface

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

upland plot

Project/Site: KXL Pipeline – Phase IV City/County: Valley Sampling Date: 5/31/10

Applicant/Owner: TransCanada – Trow State: MT Sampling Point: W106VA002

Investigator(s): B106 Section, Township, Range: —

Landform (hillslope, terrace, etc.): Low hill Local relief (concave, convex, none): Slope Slope (%): 5

Subregion (LRR): Northern Great Plains Lat: — Long: — Datum: —

Soil Map Unit Name: — NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Plot Adjacent to PEM. – Area part of pasture

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: NA)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: NA)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Artemisia cana	25		FacU
2. Agropyron cristatum	15		NI
3. Artemisia campestris	10		NI
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	50 = Total Cover		
Woody Vine Stratum (Plot size: NA)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

upland

SOIL

Sampling Point: W106VA002

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/1	100					Sil	
3-12	10YR 3/2	100					Sicl	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks: Dry soil (moistend to get profile)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Dry

W304VA001

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL pipeline City/County: Valley Sampling Date: 7/16/12

Applicant/Owner: State: Sampling Point:

Investigator(s): Robson/Vielweber Section, Township, Range:

Landform (hillslope, terrace, etc.): oxbow channel Local relief (concave, convex, none): Slope (%):

Subregion (LRR): LRR F Lat: Long: Datum:

Soil Map Unit Name: NWI classification: PER

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation NO, Soil NO, or Hydrology NO significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation NO, Soil NO, or Hydrology NO naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	Is the Sampled Area within a Wetland? Yes X No
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1. Salix (spp)	30	yes	FACW
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size:)			
1. Juncus (spp)	10	yes	OBL
2. Typha latifolia	20	yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	60 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 40

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 3/3 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks:

Sampling Point: _____

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-20+	dark grey							

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- X Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 20+

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM

Feature ID# W7AMC001

Survey Type: Centerline: ☒ Re-Route: ☐ Access Road (explain): ☐ CAR ID: Ancillary Facility (explain): ☐
T-Line ☐ Other (explain)

Survey Description:

Centerline ID#: 20080509 **Date:** 6/5/2008 **Client/ Project Name:** KEYSTONE-XL-10623-007-803A

Investigators: Novak **Team No.** 7A **Milepost:** 89.4 **Tract No.** ML-MT-VA-00905.000

State/County: MT/McCon **Section, Township, Range:** T27N R42E S32

Lat/Long: 48.0536/ -106.3221 **Quad Name:** Milk River Hills **Region:** Northern Great Plains Spring Wheat

Subregion (LRR or MLRA): LRRF **Datum:** NAD 83 **Soil Map Name:** W

NWI classification: PEM **Landform (hillslope, terrace, etc.):** Missouri River Bank

Local relief: ☒ concave ☐ convex ☐ none **Slope (%):** 0

Logbook No.: 7A-1 **Logbook Page No.:** 7 **Picture No.** W7AMC001 1W,2N,3E

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (if no explain in remarks)

Are "Normal Circumstances" present? Yes ☒ No ☐ (If no, explain in remarks.)

Is Vegetation ☐ **Soil** ☐ **Hydrology** ☐ **"Significantly Disturbed"?** No ☒ (If yes, explain in remarks)

Is Vegetation ☐ **Soil** ☐ **Hydrology** ☐ **"Naturally Problematic"?** No ☒ (If yes, explain in remarks.)

Wetland Type: PFO ☐ PSS ☐ PEM ☒ Other ☐ (explain)

Remarks: PEM begins @ the top of bank to the Missouri River

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover:			

Sapling/Shrub Stratum ( )			
1. RUSSIAN OLIVE	TRACE	N	
2.			
3.			
4.			
5.			
6.			
Total Cover:			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species:	X 1 =
FACW species:	X 2 =
FAC species	X 3 =
FACU species	X 4 =
UPL species	X 5 =
Column Totals: (B)	(B)

PI = B/A =

WETLAND DETERMINATION DATA FORM

Feature ID# W7AMC001

HYDROLOGY (check all that apply)
Region Code: WM-Western Mountain; AW–Arid West; GP-Great Plains; A&G –Atl & Gulf Coast; M-Midwest; NCNE-Northcentral Northeast

Always Primary Indicators (minimum of one required)	Always Secondary (minimum of two required)
☐ Surface Water (A1) (All)	☐ Drainage Patterns (B10) (All)
☐ High Water Table (A2) (All)	☐ Moss Trim Lines (B16) (A&G, NCNE)
☐ Saturation (A3) (All)	☐ Crayfish Burrows (C8) (All but WM)
☐ Algal Mat or Crust (B4) (All but AW)	☐ Saturation Visible on Aerial Imagery (C9) (All)
☐ Iron Deposits (B5) (All but AW)	☐ Geomorphic Position (D2) (All but AW)
☐ Inundation Visible on Aerial Imagery (B7) (All)	☐ Shallow Aquitard (D3) (WM, AW, A&G, NCNE)
☐ Salt Crust (B11) (AW, WM, GP)	☐ FAC-Neutral Test (D5) (All)
☐ Biotic Crust (B12) (AW)	☐ Frost-heave Hummocks (D7) (WM, GP:LRR F)
☐ Aquatic Fauna/Invertebrates (B13) (All)	
☐ True Aquatic Plants (B14) (M)	
☐ Marl Deposits (B15) (AW, A&G LRR U, NCNE)	
☐ Hydrogen Sulfide Odor (C1) (All)	
☒ Presence of Reduced Iron (C4) (All)	
☐ Recent Iron Reduction in Tilled Soils (C6) (All but GP)	

Primary or Secondary in different regions	Primary Regions	Secondary Regions
Water Marks (B1)	☐ All but AW riverine	☐ AW riverine
Sediment Deposits (B2)	☐ All but AW riverine	☐ AW riverine
Drift Deposits (B3)	☐ All but AW Riverine	☐ AW Riverine
Surface Soil Cracks (B6)	☐ WM & AW	☐ GP, A&G, M
Sparsely Vegetated Concave Surface (B8)	☐ M	☐ WM, AW, GP, A&G
Water-Stained Leaves (B9)	☐ AW, WM, GP, A&G, M	☐ WM: MLRA 1, 2, 4A, 4B
Dry-Season Water Table (C2)	☐ GP	☐ WM, AW, A&G, NCNE
Oxidized Rhizospheres on Living Roots (C3)	☒ All but GP tilled	☒ GP tilled
Thin Muck Surface (C7)	☐ A&G, NCNE	☐ AW, GP
Stunted/Stressed Plants (D1)	☐ AW (LRR A)	☐ NCNE

Other (Explain in Remarks)

Field Observations:

Surface Water Present? Yes ☐ No ☐ Depth (inches):_____

Water Table Present? Yes ☐ No ☐ Depth (inches):_____

Saturation Present? Yes ☐ No ☐ Depth (inches):_____
(includes capillary fringe)

Wetland Hydrology Present?

Yes ☒ **No** ☐

Remarks: Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections)

WETLAND DETERMINATION DATA FORM

Feature ID# W7AMC001

JURISDICTIONAL DETERMINATION

Is This Sampling Point Within a Wetland? Yes ☒ No ☐ | **Is This An Isolated Wetland?** Yes ☐ No ☒ Unknown ☐

Is Wetland Adjacent to ☐ **or Abutting** ☒ **Associated Waterbody?** (explain in remarks) Unknown ☐

Associated Waterbody Name or Feature ID# S7AMC001

Separated by berm or barrier? Yes ☐ No ☐ Unknown ☐

Flow between Wetland and Waterbody is: Perennial ☐ Intermittent ☐ Ephemeral ☐ No Flow ☐ Unknown ☐

Surface flow between Wetland and Waterbody is:
Discreet ☐ Confined ☐ Discrete and Confined ☐ Overland Sheet-flow ☐ No Flow ☐ Unknown ☐

Direction of Surface flow between Wetland and Waterbody is:
From Wetland to Waterbody ☐ From Waterbody to Wetland ☐ Both To/From Wetland to Waterbody ☐ No Flow ☐ Unknown ☐

Subsurface Connection Yes (explain in remarks) ☐ No ☐ Unknown ☐

Surface Water Appearance?

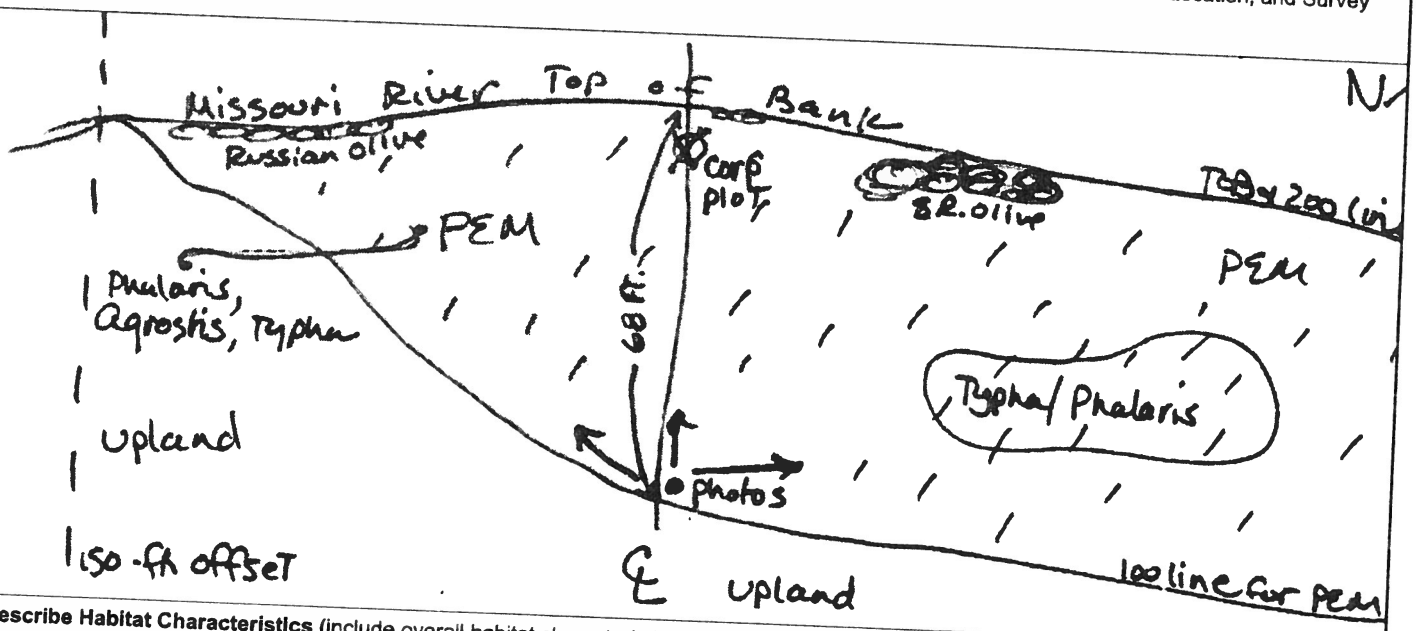
No Water ☐ Clear ☐ Floating Algal Mats ☐ Greenish Color ☐ Surface Scum ☐ Slightly Turbid ☐ Turbid ☐ Very Turbid ☐

Wetland Supports riparian buffer? Yes ☒ No ☐ If yes, width of buffer? 68' for first terrace

Wetland Quality: High ☐ Medium ☒ Low ☐ (please explain designation in remarks)

Remarks:
Wetland fed by high groundwater in low flood terrace abutting river & from over bank flooding of Missouri River.

Field Sketch: (Please include Directional & North Arrow, Centerline, Length of Feature, Distances from Centerline, Photo Location, and Survey Corridor



Describe Habitat Characteristics (include overall habitat characteristics, aquatic and terrestrial diversity, etc., and provide unique descriptors):
Relatively small PEM on lowest floodplain terrace abutting the Mo. River. Diverse herbaceous spp., few shrubs, song birds heard, lots of deer scat.

General Comments (i.e., angle at pipeline crossing, construction constraints, erosion potential, existing disturbances, and meanders):

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 119.62 City/County: McCone County Sampling Date: 7/23/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: MT Sampling Point: W0723619MC001_W1

Investigator(s): J. Beaver, S. Owen Section, Township, Range: S22, T23N, R45E

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): G Lat: 47.7361835631278 Long: -105.940248743222 Datum: WGS84

Soil Map Unit Name: MT055 – 144 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Flooded pond, emergent wetland veg mostly under water.

Photos: JB1411 Associated Plots: W0722619MC001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Eleocharis palustris*	60	✓	OBL
2. *Carex praeceptorum*	5		OBL
3. *Alisma plantago-aquatica*	4		(UPL)
4. *Rumex crispus*	3		FAC
5. *Schoenoplectus tabernaemontani*	3		OBL
6. *Cirsium arvense*	1		FACU
7. *Hordeum jubatum*	1		FACW
8. *Glycyrrhiza lepidota*	0.5		FACU
9.			
10.			
	77.5 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0.5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	68	x 1 =	68
FACW Species	1	x 2 =	2
FAC Species	3	x 3 =	9
FACU Species	1.5	x 4 =	6
UPL Species	4	x 5 =	20
Column Totals	77.5 (A)		105 (B)

Prevalence Index (B/A) = 1.35

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0723619MC001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 4/2	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☑ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Likely redox at depth, but pit full of water.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☑ Water Marks (B1)
- ☑ Sediment Deposits (B2)
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☑ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 36
Water Table Present?	Yes ✓	No ____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 119.61 City/County: McCone County Sampling Date: 7/23/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: MT Sampling Point: W0723619MC001_U1

Investigator(s): J. Beaver, S. Owen Section, Township, Range: S22, T23N, R45E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): G Lat: 47.7362382963246 Long: -105.940222376514 Datum: WGS84

Soil Map Unit Name: MT055 – 144 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Terrace above flooded pond with emergent vegetation. Clay soils pond water in upland, but no hydric soils.

Photos: JB1410 Associated Plots: W0722619MC001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1. *Artemisia cana*	2		FACU
2. *Symphoricarpos occidentalis*	0.5		UPL
3.			
4.			
5.			
	2.5 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Poa secunda*	45	✓	FACU
2. *Distichlis spicata*	15		FACW
3. *Agropyron smithii*	8		FACU
4. *Taraxacum officinale*	6		FACU
5. *Bromus japonicus*	5		FACU
6. *Artemisia frigida*	2		(UPL)
7. *Hordeum jubatum*	1		FACW
8. *Kochia scoparia*	1		FACU
9. *Achillea millefolium*	0.5		FACU
10. *Grindelia squarrosa*	0.5		UPL
	84 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 15

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	16	x 2 =	32
FAC Species		x 3 =	
FACU Species	67.5	x 4 =	270
UPL Species	3	x 5 =	15
Column Totals	86.5 (A)		317 (B)

Prevalence Index (B/A) = 3.66

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Ungrazed at this time.

SOIL

Sampling Point: W0723619MC001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	2.5Y 3/3	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Some salt accumulation in soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL Phase 4 City/County: McCone Sampling Date: 5/18/10

Applicant/Owner: State: MT Sampling Point: #1 wetland

Investigator(s): Bio Team 105 - T. Novak Section, Township, Range:

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 0-2%

Subregion (LRR): LRR F - N. Great Plains Lat: Long: Datum:

Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation __, Soil __, or Hydrology __ significantly disturbed? no Are "Normal Circumstances" present? Yes X No

Are Vegetation __, Soil __, or Hydrology __ naturally problematic? no (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No
Hydric Soil Present?	Yes X	No
Wetland Hydrology Present?	Yes X	No

Is the Sampled Area within a Wetland? Yes X No

Remarks: this wetland abuts Lost Creek. W105MC001

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Herb Stratum (Plot size: 5' radius)			
1. Juncus balticus	80%	Y	OBL
2. Spartina pectinata	30%	Y	OBL
3. Carex spp.	5%	N	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	115%	= Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- __ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- __ 3 - Prevalence Index is ≤3.0[1]
- __ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- __ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks:

50% = 58%

20% = 23%

SOIL

Sampling Point: #1 wetland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR3/1	100	10YR5/6	5%	C	M	clay loam	
			10YR2/1	40%	D	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks: * Soils meet hydric soil criteria No. 3 & No. 4
↳ ponded ↳ flooded long enough during the growing season.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): @ Surface

Water Table Present? Yes X No ___ Depth (inches): Surface ponded

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): ~~saturated~~ surface

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Photos: W105MC001 - across
W105MC001 - Corps plot
W105MC001 - upland plot

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL Phase 4 City/County: McCone Sampling ~~Date~~ Pt: #1 upland

Applicant/Owner: State: MT Sampling ~~Point~~ Date: 5/18/10

Investigator(s): BTO Team 105 T. Novak Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%): 0-2%

Subregion (LRR): NORTHERN GREAT PLAINS (F) Lat: Long: Datum:

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 5' radius)			
1.			
2. Agropyron Smithii	90%	Y	UPL
3. Stipa comata	10%	Y	UPL
4. Carex spp	5%	N	OBL
5.			
6.			
7.			
8.			
9.			
10.			
	105 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	105% = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): Ø (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: Ø % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

50% = 52%
20% = 20%

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

No req / No hydro - Soil NOT Needed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: MTV6 W105 MC-003 City/County: McCone Co. Sampling Date: 5/20/10

Applicant/Owner: Trow / TransCanada State: MT Sampling Point: W #1

Investigator(s): Bio Team 105 - J. Novak Section, Township, Range: _____

Landform (hillslope, terrace, etc.): drainage way Local relief (concave, convex, none): Concave Slope (%): 0-2%

Subregion (LRR): N. Great Plains - LRR F Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
located w/in drainage way that also intercepts gw.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 5' Rad)			
1.			
2. Distichlis spicata	100%	Y	FacW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:
Photos W105MC003 - 1N (across)
W105MC003 - 2E (upgradient)
W105MC003 - 3W (downgradient)
W105MC003 - 4 Corps plot - wet
W105MC003 - 5 upland

SOIL

W105MC003 (cont.) Sampling Point: W#1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 6/3	100%	10YR 6/8	10%	C	M	Clay loam	B redox [ ]'s @ 3"-12"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

X other - meets hydric soil criteria No 3 - ponded.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- X Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes X No ___ Depth (inches): @ Surface

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): @ Surface

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: MTV6 - W10SMC003 City/County: McCone Co. Sampling Date: 5/20/10

Applicant/Owner: Now / Trans Canada State: MT Sampling Point: upland #1

Investigator(s): Bio Team 105 J. Novak Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): N. Great Plains Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: [redacted]

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks: upland plot

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5' Rad)			
1.			
2. Agropyron Smithii	50%	Y	UPL
3. Agropyron Cristatum	50%	Y	UPL
4. ~~[illegible]~~			
5.			
6.			
7.			
8.			
9.			
10.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		
% Bare Ground in Herb Stratum _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:

SOIL

W105NC003 (cont) Sampling Point: Upland #1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6"	5YR 6/3	100%					Loam	No redox
6-7/12"	5YR 5/3						Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks: No other indicator needed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: MTV6 W105NC002 City/County: McCone Co. Sampling Date: 5/20/10

Applicant/Owner: TRW/ TRANSCANADA - KXL Phase 4 State: MT Sampling Point: W#1

Investigator(s): Bio Team 105 J. Novak Section, Township, Range: _____

Landform (hillslope, terrace, etc.): drainage way Local relief (concave, convex, none): Concave Slope (%): 0-2%

Subregion (LRR): N. Great Plains LRR F Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks:
Located upin drainageway which intercepts groundwater - (alkaline salt crusts)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1.			FACW
2. Distichlis spicata	90%	Y	~~X~~ NI
3. Juncus balticus	10%	N	OBL
4. ~~Phalaris arundinacea~~			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		
% Bare Ground in Herb Stratum _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:
Photos W105NC002_1N (across) W105NC002_3W (downgradient)
W105NC002_2E (upgradient) W105NC002_4 corps plot-wet, W105NC002_5UP

SOIL

W105MC002 (Cont.) Sampling Point: W #1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 6/3	100%	10YR 4/8	20%	C	M	Clay loam	
	10YR 5/3	70%	Black	30%	D	M	Sandy Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

X other = Meets hydric soil criteria No. 3: Ponded

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- X Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes X No ___ Depth (inches): @ Surface

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): @ Surface

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: MTV6 W105NC 002 City/County: McCone Co. Sampling Date: 5/20/10

Applicant/Owner: Trow / TransCanada State: MT Sampling Point: Upland #1

Investigator(s): Bio team 105; J. Novak Section, Township, Range: _____

Landform (hillslope, terrace, etc.): N. Great Plains - F Local relief (concave, convex, none): ~~[illegible]~~ Slope (%): 0-2%

Subregion (LRR): ~~[illegible]~~ hillslope Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks: upland plot

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1.			
2. Agropyron Smithii	50%	Y	UPL
3. Agropyron Cristatum	50%	Y	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): Ø (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: Ø% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:

SOIL

W105NC002 (cont) Sampling Point: Upland # 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 6/3						loam	No redox features
3-16"	7.5YR 4/3						loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

W901DA001 wdp

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: _____ City/County: Dawson/ _____ Sampling Date: 8/28/13

Applicant/Owner: Exp _____ State: MT _____ Sampling Point: _____

Investigator(s): ME/DV _____ Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Basin _____ Local relief (concave, convex, none): Concave _____ Slope (%): 2

Subregion (LRR): _____ Lat: _____ Long: _____ Datum: NAD83

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: adjacent wetland to S901DA002

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		

Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		

Herb Stratum (Plot size: _____)			
1. Green Bulrush	70		
2. Aster spp	10		
3. Carex Stricta	15		
4. Horse nettle	5		
5.			
6.			
7.			
8.			
9.			
10.			
	_____ = Total Cover		

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: W901DA001 wdp

Profile Description: (Describe to the depth needed to document the Indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/1	90	7.5YR 5/6	10	C	M	SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- X Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 14

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

W901DA001 udp

Project/Site: _____ City/County: _____ Sampling Date: 8/28/13

Applicant/Owner: EXP State: _____ Sampling Point: _____

Investigator(s): ME/DV Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Sideslope Local relief (concave, convex, none): ~~concave~~ concave Slope (%): 3

Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	Is the Sampled Area within a Wetland? Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks: upland Data Point for W901DA001

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		

Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		

Herb Stratum (Plot size: _____)			
1. Solidago canadensis	10		
2. Horsenettle	20		
3. Aster spp	20		
4. Cirsium arvense	10		
5. Bromus inermis	20		
6. Little Blue stem	20		
7.			
8.			
9.			
10.			
	_____ = Total Cover		

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC–): _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:

h 901DA001 ndp

Sampling Point: _____

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR4/2	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Unknown

Depth (inches): 2

Hydric Soil Present? Yes _____ No X

Remarks: Soil is very dry + compact

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 180.09 City/County: Dawson County Sampling Date: 5/13/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: MT Sampling Point: W_UTM13_02312_W1

Investigator(s): C. Westfall (Desktop) Section, Township, Range: S5, T15N, R52E

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): G Lat: 47.088518 Long: -105.159043 Datum: WGS84

Soil Map Unit Name: MT021-20B NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Desktop form based on nearby wetland data forms, Web Soil Survey, and site notes taken in 2009. To date, all wetland indicators have not been field verified at this site. No access granted to this property.

Photos: No Photos Associated Plots: W_UTM13_02312_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1. *Symphoricarpos occidentalis*	5		UPL
2. *Rosa woodsii*	3		FACU
3.			
4.			
5.			
	8 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Eleocharis palustris*	35	✓	OBL
2. *Schoenoplectus pungens*	15	✓	OBL
3. *Hordeum jubatum*	12	✓	FACW
4. *Distichlis spicata*	10		FACU
5. *Artemisia ludoviciana*	3		UPL
6.			
7.			
8.			
9.			
10.			
	75 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50	x 1 =	50
FACW Species	12	x 2 =	24
FAC Species		x 3 =	
FACU Species	13	x 4 =	52
UPL Species	8	x 5 =	40
Column Totals	83 (A)		166 (B)

Prevalence Index (B/A) = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Desktop assessment of vegetation was determined to be similar to that of nearby wetlands. Field map notes of plant species were also used to select accurate plant species in the area.

SOIL

Sampling Point: W_UTM13_02312_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 3	10YR 3/1	100					SCL	
3 - 22	2.5 YR 3/1	90	10YR 4/6	10	C	M	SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Desktop assessment of soils determination were supported by field map notes from 2010 as well as NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☑ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☑ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology determinations were supported by NRCS Web Soil Survey data for Depth to Water Table and aerial imagery.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 180.09 City/County: Dawson County Sampling Date: 5/13/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: MT Sampling Point: W_UTM13_02312_U1

Investigator(s): C. Westfall (Desktop) Section, Township, Range: S5, T15N, R52E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 3

Subregion (LRR): G Lat: 47.088518 Long: -105.159043 Datum: WGS84

Soil Map Unit Name: MT021-20B NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Desktop form based on nearby wetland dataforms, Web Soil Survey, and site notes taken in 2009. To date, all wetland indicators have not been field verified at this site.

Photos: No Photos Associated Plots: W_UTM13_02312_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1. *Symphoricarpos occidentalis*	5		UPL
2. *Rosa woodsii*	2		FACU
3.			
4.			
5.			
	7 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Agropyron smithii*	25	✓	FACU
2. *Poa pratensis*	15	✓	FACU
3. *Stipa comata*	10	✓	(UPL)
4. *Andropogon scoparius*	8		FACU
5. *Calamovilfa longifolia*	5		(UPL)
6.			
7.			
8.			
9.			
10.			
	63 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 8

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	50	x 4 =	200
UPL Species	20	x 5 =	100
Column Totals	70 (A)		300 (B)

Prevalence Index (B/A) = 4.29

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Desktop assessment of vegetation was determined to be similar to that of nearby wetlands. Field map notes of plant species were also used to select accurate plant species in the area.

SOIL

Sampling Point: W_UTM13_02312_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	7.5YR 3/2	100					SiL	
4 - 16	10YR 3/2	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks: Desktop assessment of soil determinations were supported by field map notes from 2009 as well as NRCS Web Soil Survey.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology determinations were supported by NRCS Web Soil Survey data for Depth to Water Table and aerial imagery.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL Pipeline City/County: McCone County Sampling Date: 7/31/2017

Applicant/Owner: TransCanada State: MT Sampling Point: W06628W01

Investigator(s): J. Allewalt Section, Township, Range: S14, T13N, R53E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): G Lat: 46.8782755012 Long: -104.97199327 Datum: WGS84

Soil Map Unit Name: To; Glendive loam; non-hydric NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Drought conditions. Plot located on first terrace of a side channel of the Yellowstone River. About 5 feet above water level. Sandy soils with *Spartina pectinata*.

Photos: JA 3232-3235

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15' x 5')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 15' x 5')			
1. *Populus deltoides*	1		FAC
2.			
3.			
4.			
5.			
	1 = Total Cover		
Herb Stratum (Plot size: 15' x 5')			
1. *Spartina pectinata*	65	✓	FACW
2. *Agropyron pseudorepens*	15		(UPL)
3. *Equisetum arvense*	8		FAC
4. *Euthamia occidentalis*	5		OBL
5. *Euphorbia esula*	4		(UPL)
6. *Bromus inermis*	2		UPL
7. *Ambrosia psilostachya*	1		FACU
8. *Cirsium arvense*	1		FACU
9. *Polygonum amphibium*	1		OBL
10. *Hordeum jubatum*	0.5		FACW
	103 = Total Cover		
Vine Stratum (Plot size: 15' x 5')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 2

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	6.5	x 1 =	6.5
FACW Species	65.5	x 2 =	131
FAC Species	9	x 3 =	27
FACU Species	2	x 4 =	8
UPL Species	21	x 5 =	105
Column Totals	104 (A)		277.5 (B)

Prevalence Index (B/A) = 2.67

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Tall, variable width *Spartina pectinata* fringe on terrace above water. Presumably subirrigated and seasonally flooded from high river flows. Supplemental vegetation sheet attached.

SOIL

Sampling Point: W06628W01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 17	10YR 4/2	100					LS	homogenous, barely moist

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☑ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Sandy soil throughout profile. Appears siltier toward base of bank looking at OHWM on opposite bank. Alluvial deposit of relatively young soil that is developing hydric soil characteristics. Based on presence of hydrophytic vegetation and wetland hydrology, as well as site location within 2 year floodplain, professional judgment is hydric soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Likely wet, or close to wet, in spring, but above scour line/OHWM for side channel. Surface water/water table present in side channel ≈10' north of plot and large drift deposits in channel indicate water much higher during runoff.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL Pipeline City/County: McCone County Sampling Date: 7/31/2017

Applicant/Owner: TransCanada State: MT Sampling Point: W06628W01

Investigator(s): J. Allewalt Section, Township, Range: S14, T13N, R53E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): G Lat: 46.8782755012 Long: -104.97199327 Datum: WGS84

Soil Map Unit Name: To; Glendive loam; non-hydric NWI Classification: PEM

VEGETATION – Use scientific names of plants.

Tree Stratum	Absolute % Cover	Dominant Species?	Indicator Status
5.			
6.			
7.			
8.			
Shrub Stratum			
6.			
7.			
8.			
9.			
10.			
Herb Stratum			
11. *Lycopus asper*	0.5		OBL
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
21.			
Vine Stratum			
3.			
4.			

Intentionally left empty.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL Pipeline City/County: McCone County Sampling Date: 7/31/2017

Applicant/Owner: TransCanada State: MT Sampling Point: W06628U01

Investigator(s): J. Allewalt Section, Township, Range: S32, T13N, R53E

Landform (hillslope, terrace, etc.): terrace slope Local relief (concave, convex, none): convex Slope (%): 2

Subregion (LRR): G Lat: 46.8782038546 Long: -104.97196512 Datum: WGS84

Soil Map Unit Name: To; Glendive loam; non-hydric NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Drought conditions. Plot located on slight 2' tall, 3' run terrace slope between first and second terrace on side/overflow channel of Yellowstone River. Slope break marked by *Populus deltoides* (saplings) recruitment line.

Photos: JA 3326-3329

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1. *Symphoricarpos occidentalis*	12	✓	UPL
2. *Populus deltoides*	6	✓	FAC
3.			
4.			
5.			
	18 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	70	✓	UPL
2. *Euphorbia esula*	8		(UPL)
3. *Equisetum arvense*	1		FAC
4. *Spartina pectinata*	0.5		FACW
5.			
6.			
7.			
8.			
9.			
10.			
	79.5 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	0.5	x 2 =	1
FAC Species	7	x 3 =	21
FACU Species		x 4 =	
UPL Species	90	x 5 =	450
Column Totals	97.5 (A)		472 (B)

Prevalence Index (B/A) = 4.84

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Predominantly smooth brome w/ snowberry and noxious leafy spurge. The plot is in dry, upland vegetation that is typical of this terrace between the wetland and cottonwood gallery forest.

SOIL

Sampling Point: W06628U01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 4/2	100					LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Similar alluvial sands/loamy sand as on first terrace below, but as site lacks wetland vegetation and hydrology there is no reason to think that hydric soils are developing.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Slight, but distinct, second terrace above side channel. Surface water in channel is ≈40 feet to north and ≈12-15 feet below pit.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 210.03 City/County: Prairie County Sampling Date: 7/29/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: MT Sampling Point: W0729620PR001_W1

Investigator(s): J. Beaver Section, Township, Range: S32, T12N, R55E

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): G Lat: 46.751991327355 Long: -104.826287600163 Datum: WGS84

Soil Map Unit Name: MT079 – 72 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Wetland swale, no OHWM.

Photos: JB1521 Associated Plots: W0729620PR001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Schoenoplectus tabernaemontani*	75	✓	OBL
2. *Carex praegracilis*	5		FACW
3. *Hordeum jubatum*	0.5		FACW
4. *Rumex salicifolius*	0.5		FACW
5.			
6.			
7.			
8.			
9.			
10.			
	81 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	75	x 1 =	75
FACW Species	6	x 2 =	12
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	81 (A)		87 (B)

Prevalence Index (B/A) = 1.07

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0729620PR001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 3/1	100					SiCL	
6 - 16	10YR 5/2	85	7.5YR 5/6	15	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☑ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☑ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 10

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 210.03 City/County: Prairie County Sampling Date: 7/29/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: MT Sampling Point: W0729620PR001_U1

Investigator(s): J. Beaver Section, Township, Range: S32, T12N, R55E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 20

Subregion (LRR): G Lat: 46.7520329373833 Long: -104.826209767249 Datum: WGS84

Soil Map Unit Name: MT079 – 72 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: *Agropyron cristatum* terrace.

Photos: JB1520 Associated Plots: W0729620PR001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Agropyron cristatum*	80	✓	(UPL)
2. *Agropyron smithii*	15		FACU
3. *Iva axillaris*	3		FAC
4. *Symphyotrichum falcatum*	1		FACU
5. *Melilotus officinalis*	0.5		FACU
6.			
7.			
8.			
9.			
10.			
	99.5 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	3	x 3 =	9
FACU Species	16.5	x 4 =	66
UPL Species	80	x 5 =	400
Column Totals	99.5 (A)		475 (B)

Prevalence Index (B/A) = 4.77

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0729620PR001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 4/3	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PEM

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL Phase IV ~~City/~~County: Prairie Sampling Date: 6/14/10

Applicant/Owner: TransCanada - Trow - KXL State: MT Sampling Point: W106PR001

Investigator(s): B106 Section, Township, Range: —

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 2-3%

Subregion (LRR): Northern Great Plains Lat: — Long: — Datum: —

Soil Map Unit Name: NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Small depressional PEM w/in drainage ≈ 2'-8' wide & ≈ 200' long (linear)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: NA)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: NA)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Hordeum Jubatum	15%	Y	FacW
2. Carex sp.	5%	N	—
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: NA)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 75%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

PEM

SOIL

Sampling Point: W106PR001

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4"	5Y 5/3	100	—	—	—	—	Clay loam	
4-8"	5Y 3/1	95	5Y 5/6	5	C	M	Clay	
8-12"	5Y 6/1	92	5Y 6/8	8	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 0-2"

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): Surface

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

upland

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL-Phase IV ~~City~~/County: Prairie Sampling Date: 5/14/10

Applicant/Owner: TransCanada-Trow-KXL State: MT Sampling Point: W106PR001

Investigator(s): B106 Section, Township, Range: —

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Slope Slope (%): 5%

Subregion (LRR): Northern Great Plains Lat: — Long: — Datum: —

Soil Map Unit Name: — NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Pasture surrounding PEM.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: NA)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: NA)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Agropyron cristatum	15%	Y	NI
2. Poa pratensis	12%	Y	FacU
3. Bromus tectorum	10%	N	NI
4. Bromus inermis	20%	Y	NI
5.			
6.			
7.			
8.			
9.			
10.			
	57% = Total Cover		
Woody Vine Stratum (Plot size: NA)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 3%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

upland

SOIL

Sampling Point: W106PR001

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8"	5Y 5/3	100					clay loam	
8-12"	5Y 5/3	100					clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

AECOM Environment
1601 PROSPECT PKWY
FORT COLLINS CO 80525-9992

Wetland Determination Data Form

Feature ID: W121fa004

☑ Centerline ☐ Re-Route ☐ Access Road ☐ Ancillary Facility ☐ Transmission Line ☐ Other

Survey Description
Centerline ID: 20091019

Date: 2009/09/10 Client/Project Name 10623-016
Investigators: Milepost: 227.079 - 227.155 Tract No.: ML-MT-FA-00110.000

State/County: MT - Fallon Section, Township, Range: 5 T9N 57E
Lat/Long: 46.555660* -104.5669* Quad Name: Lawrence Creek West Region: Western Great Plains

Subregion (LRR or MLRA): Lower Yellowstone Datum: NAD 83 Soil Map Name: Lonna silt loa
NWI classification: N/A Landform (Hillslope, Terrace, etc.):

Local Relief (Concave, Convex, None): concave Slope (%): 20

Logbook No.: 1 Logbook Page No.: 47

Are climatic/hydrologic conditions on the site typical for this time of year? ☑ Yes ☐ No
Are "Normal Circumstances" present? ☑ Yes ☐ No
Significantly Disturbed: ☐ Vegetation ☐ Soil ☐ Hydrology ☑ None
Naturally Problematic: ☐ Vegetation ☐ Soil ☐ Hydrology ☑ None

Wetland Type: ☐ PFO ☑ PEM ☐ PSS ☐ Other

Remarks:

VEGETATION

VEGETATION - Tree Stratum

Plot Size:

Scientific And Common Name	% Cover	Indicator	Dominant
Total Cover:	0		

VEGETATION - Sapling Stratum

Plot Size:

Scientific And Common Name	% Cover	Indicator	Dominant
Total Cover:	0		

VEGETATION - Shrub Stratum

Plot Size:

Scientific And Common Name	% Cover	Indicator	Dominant
Symphoricarpos albus	10	YES	FACU-
Total Cover:	10		

VEGETATION - Herb Stratum

Plot Size:

Scientific And Common Name	% Cover	Indicator	Dominant
Sonchus arvensis	10	NO	FAC
Helianthus maximiliani	10	NO	FACU
Spartina pectinata	60	YES	FACW
Rosa arkansana	10	NO	NONE
Total Cover:	90		

VEGETATION - Vine Stratum

Plot Size:

Scientific And Common Name	% Cover	Indicator	Dominant
Total Cover:	0		

AECOM Environment
1601 PROSPECT PKWY
FORT COLLINS CO 80525-9992

Dominance Test Worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	1
Total Number of Dominant Species Across All Strata:	2
Percent of Dominant Species that are OBL, FACW, or FAC:	50

Prevalence Index Worksheet:

Total % Cover of:

OBL Species:	0	X 1 =	0
FACW Species:	60	X 2 =	120
FAC Species:	10	X 3 =	30
FACU Species:	20	X 4 =	80
UPL Species:	0	X 5 =	0
Column Totals:	90	(A)	230 (B)
		PI = B/A	2.6

Hydrophytic Vegetation Indicators

- ☐ Rapid Test for Hydrophytic Vegetation
- ☐ Prevalence index is < 3
- ☐ Morphological Adaptations
- ☐ Problematic Hydrophytic Vegetation
- ☑ Dominance Test is >50%
- ☐ None

Nonvascular Plants

Scientific And Common Name	% Cover

Mean % Wetland Specialist Bryophytes: 0

Hydrophytic Vegetation Present? ☑ Yes ☐ No ☐ Unknown

Remarks:

HYDROLOGY

Primary Indicators

OXIDIZED ROOT CHANNELS (C3)
INDATION VISIBLE ON AERIALS (B7)

Secondary Indicators

DRAINAGE PATTERNS IN WETLANDS (B10)
OXIDIZED ROOT CHANNELS (C3)
SATURATION VISIBLE ON AERIAL IMAGERY (C9)

Field Observations

Surface Water Present:	☐ Yes	☐ No	☐ Unknown	Depth (inches):
Water Table Present:	☐ Yes	☐ No	☐ Unknown	Depth (inches):
Saturation Present:	☐ Yes	☐ No	☐ Unknown	Depth (inches):
Wetland Hydrology Present?	☐ Yes	☐ No	☐ Unknown	

Remarks:

HYDRIC SOIL

Soil Profile Description

Depth	Matrix		Redox Features				Texture	Remarks
(in)	Color (Moist)	%	Color (Moist)	%	Type	Loc		

Matrix Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered Sand or Coated Sand Grains. 2 Location: PL=Pore Lining, M=Matrix

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Hydric Soil Indicators	
F natic Hydric Soil:	☐ Yes ☐ No ☐ Unknown
Hydric Soil Criteria:	☐ 1 ☐ 2(A) ☐ 2(B)(1) ☐ 2(B)(2) ☐ 2(B)(3) ☐ 3 ☐ 4
Restrictive Layer Present:	☐ Yes ☐ No ☐ Unknown
Hydric Soil Present:	☐ Yes ☐ No ☐ Unknown
Remarks:	

JURISDICTIONAL DETERMINATION

Sampling Point Within a Wetland: ☐ Yes ☐ No ☐ Unknown	Isolated Wetland? ☐ Yes ☐ No ☐ Unknown
Wetland Proximity Associated Waterbody:	☐ Adjacent ☐ Abutting ☐ Unknown
Associated Waterbody Name or Feature ID#:	
Berm or Barrier Separation?	☐ Yes ☐ No ☐ Unknown
Flow Type between Wetland and Stream:	☐ Perennial ☐ Intermittent ☐ Ephemeral ☐ Seasonal ☐ No Flow
Surface flow between Wetland and Stream:	☐ Discrete ☐ Confine ☐ Discrete and Confined ☐ Overland Sheet-flow ☐ No Flow ☐ Unknown
Direction of Surface flow between Wetland and Waterbody :	☐ From Wetland to Waterbod ☐ From Waterbody to Wetlan ☐ Both To/From Wetland to Waterbod ☐ No Flow ☐ Unknown
Subsurface Connection:	☐ Yes ☐ No ☐ Unknown
Surface Water Appearance:	☐ Clear ☐ Floating Algal Mats ☐ Grenish Color ☐ Obvious Surface Scum ☐ Other ☐ Sheen On Surface ☐ Slightly Turbid ☐ Turbi ☐ Very Turbid ☐ No Flow
Wetland Supports Riparian Buffer:	☑ Yes ☐ No ☐ Unknown
W d Quality	☐ High ☑ Moderate ☐ Low
Remarks:	

Sketch

AECOM Environment
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Description of Habitat Characteristics, Aquatic Terrestrial Diversity or General Comments

General Comments

W276FA001

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL City/County: Fallon Sampling Date: 6/10/11

Applicant/Owner: State: MT Sampling Point:

Investigator(s): Robson, Stuckmeyer Section, Township, Range: Section 1, T6N R59E

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Concave Slope (%): <1%

Subregion (LRR): LRR G Lat: Unknown Long: Unknown Datum:

Soil Map Unit Name: unknown NWI classification: Unknown

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks.)

Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No, Soil NO, or Hydrology NO naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	Is the Sampled Area within a Wetland? Yes X No ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	

Remarks: Late, wet spring with unseasonable heavy rain, flooding

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0		
2.			
3.			
4.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Herb Stratum (Plot size: ___)			
1. Juncus	60%		
2. Sedge	35%		
3. other mixed grasses	5%		
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		

Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum <5% 0 = Total Cover

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): ___ (A)

Total Number of Dominant Species Across All Strata: ___ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ___ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x 1 = ___
FACW species ___	x 2 = ___
FAC species ___	x 3 = ___
FACU species ___	x 4 = ___
UPL species ___	x 5 = ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Both Juncus and sedge are prevalent in the wetland. Exact species of each is unknown.

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
8-10	Grey							Gleyed Soil

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- X Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:
Gleyed Soil

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 8

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 8-10

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
wetland is small (approx. .03 acres) and is located in an ephemeral drainage. Surface runoff appears to be main source of hydrology.

WETLAND DETERMINATION DATA FORM

Feature ID# W8AFA004

Survey Type: Centerline: ☒ Re-Route: ☐ Access Road (explain): ☐ CAR ID: Ancillary Facility (explain): ☐
T-Line ☐ Other (explain)

Survey Description:

Centerline ID#: 20080509CL **Date:** 6/15/08 **Client/ Project Name:** KEYSTONE-XL-10623-007-803A

Investigators: Jones/Dalrymple **Team No.** 8A **Milepost:** 258.5 **Tract No.** ML-MT-FA-00630.000

State/County: MT/Fallon **Section, Township, Range:** T5N R60E S9

Lat/Long: 46.2049/ -104.198920257 **Quad Name:** Webster NW **Region:** Western Great Plains

Subregion (LRR or MLRA): LRR G **Datum:** NAD 83 **Soil Map Name:** 156A

NWI classification: PEM **Landform (hillslope, terrace, etc.):** River Channel

Local relief: ☒ concave ☐ convex ☐ none **Slope (%):** 0-2

Logbook No.: 1 **Logbook Page No.:** 108-109 **Picture No.** W8AFA004 W1,N2,E3

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (if no explain in remarks)

Are "Normal Circumstances" present? Yes ☒ No ☐ (If no, explain in remarks.)

Is Vegetation ☐ **Soil** ☐ **Hydrology** ☐ **"Significantly Disturbed"?** No ☒ (If yes, explain in remarks)

Is Vegetation ☐ **Soil** ☐ **Hydrology** ☐ **"Naturally Problematic"?** No ☒ (If yes, explain in remarks.)

Wetland Type: PFO ☐ PSS ☐ PEM ☒ Other ☐ (explain)

Remarks:

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover:			

Sapling/Shrub Stratum ( )			
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover:			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species:		X 1 =
FACW species:		X 2 =
FAC species		X 3 =
FACU species		X 4 =
UPL species		X 5 =
Column Totals:	(B)	(B)

PI = B/A =

WETLAND DETERMINATION DATA FORM

Feature ID# W8AFA004

Herb Stratum (_____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Carex sp.	20	Yes	FACW
2. Poa anna	5	Yes	FACU
3. Schoenoplectus americanus	30	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
Total Cover:	55		

Woody Vine Stratum (____)

1.
2.
3.
4.
5.

Total Cover:

Hydrophytic Vegetation Present?

Yes ☒ No ☐

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is ≥50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations (explain in remarks)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Nonvascular Plants (Wetland Specialists) (WM):
(10 inch x 10 inch sample frames)

1. % wetland specialist bryophytes
2. % wetland specialist bryophytes
3. % wetland specialist bryophytes

_____**Mean % wetland specialist bryophytes**

Remarks: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

Feature ID# W8AFA004

HYDROLOGY (check all that apply)
Region Code: WM-Western Mountain; AW–Arid West; GP-Great Plains; A&G –Atl & Gulf Coast; M-Midwest; NCNE-Northcentral Northeast

Always Primary Indicators (minimum of one required)	Always Secondary (minimum of two required)
☐ Surface Water (A1) (All)	☐ Drainage Patterns (B10) (All)
☐ High Water Table (A2) (All)	☐ Moss Trim Lines (B16) (A&G, NCNE)
☒ Saturation (A3) (All)	☐ Crayfish Burrows (C8) (All but WM)
☐ Algal Mat or Crust (B4) (All but AW)	☐ Saturation Visible on Aerial Imagery (C9) (All)
☐ Iron Deposits (B5) (All but AW)	☐ Geomorphic Position (D2) (All but AW)
☐ Inundation Visible on Aerial Imagery (B7) (All)	☐ Shallow Aquitard (D3) (WM, AW, A&G, NCNE)
☐ Salt Crust (B11) (AW, WM, GP)	☐ FAC-Neutral Test (D5) (All)
☐ Biotic Crust (B12) (AW)	☐ Frost-heave Hummocks (D7) (WM, GP:LRR F)
☐ Aquatic Fauna/Invertebrates (B13) (All)	
☐ True Aquatic Plants (B14) (M)	
☐ Marl Deposits (B15) (AW, A&G LRR U, NCNE)	
☐ Hydrogen Sulfide Odor (C1) (All)	
☐ Presence of Reduced Iron (C4) (All)	
☐ Recent Iron Reduction in Tilled Soils (C6) (All but GP)	

Primary or Secondary in different regions	Primary Regions	Secondary Regions
Water Marks (B1)	☐ All but AW riverine	☐ AW riverine
Sediment Deposits (B2)	☐ All but AW riverine	☐ AW riverine
Drift Deposits (B3)	☒ All but AW Riverine	☐ AW Riverine
Surface Soil Cracks (B6)	☐ WM & AW	☐ GP, A&G, M
Sparsely Vegetated Concave Surface (B8)	☐ M	☐ WM, AW, GP, A&G
Water-Stained Leaves (B9)	☐ AW, WM, GP, A&G, M	☐ WM: MLRA 1, 2, 4A, 4B
Dry-Season Water Table (C2)	☐ GP	☐ WM, AW, A&G, NCNE
Oxidized Rhizospheres on Living Roots (C3)	☐ All but GP tilled	☐ GP tilled
Thin Muck Surface (C7)	☐ A&G, NCNE	☐ AW, GP
Stunted/Stressed Plants (D1)	☐ AW (LRR A)	☐ NCNE

Other (Explain in Remarks)

Field Observations:

Surface Water Present? Yes ☒ No ☐ Depth (inches): 2

Water Table Present? Yes ☒ No ☐ Depth (inches): 10

Saturation Present? Yes ☒ No ☐ Depth (inches): 0
(includes capillary fringe)

Wetland Hydrology Present?

Yes ☒ **No** ☐

Remarks: Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections)

WETLAND DETERMINATION DATA FORM

Feature ID# W8AFA004

HYDRIC SOIL

Soil Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-15	10YR 4/1		10YR 4/4		D	M	Sandy Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered Sand or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators (check all that apply)

Region Code: WM-Western Mountain; AW–Arid West; GP-Great Plains; A&G –Atl & Gulf Coast; M-Midwest; NCNE-Northcentral Northeast

Histosol (A1) (All)	☐	Polyvalue Below Surface (S8) (A&G LRR S, T, U; NCNE LRR R, 149B, Problem LRR K, L)	☐
Histic Epipedon (A2) (All)	☐	Thin Dark Surface (S9) (A&G LRR S, T, U; NCNE LRR R, 149B, Problem LRR K, L)	☐
Black Histic (A3) (All except NCNE MLRA 143 of LRR R)	☐	Loamy Mucky Mineral (F1) (WM except MLRA1; A, GP, M, A&G LRR O; NCNE LRR K, L)	☐
Hydrogen Sulfide (A4) (All)	☐	Loamy Gleyed Matrix (F2) (All)	☐
Stratified Layers (A5) (A&G, M, AW LRR C, GP LRR F, NCNE)	☐	Depleted Matrix (F3) (All)	☒
Organic Bodies (A6) (A&G LRR P, T, U)	☐	Redox Dark Surface (F6) (All)	☐
5 cm Mucky Mineral (A7) (A&G LRR P, T, U)	☐	Depleted Dark Surface (F7) (All)	☐
Muck Presence (A8) (A&G LRR U)	☐	Redox Depressions (F8) (All)	☐
1 cm Muck (A9) (LRR D, F, G H, P, T; Problem C, I, J, O)	☐	Vernal Pools (F9) (Arid)	☐
2 cm Muck (A10) (M; Problem WM, AW LRR B, A&G LRR S, NCNE LRR K L 149B of S)	☐	Marl (F10) (A&G LRR U)	☐
Depleted Below Dark Surface (A11) (All)	☐	Depleted Ochric (F11) (A&G MLRA 151)	☐
Thick Dark Surface (A12) (All)	☐	Iron-Manganese Masses (F12) (A&G LRR O, P, T; Problem in M, NCNE)	☐
Coast Prairie Redox (A16) (A&G MLRA 150A; Problem GP LRR F, G, H; M Problem; Problem NCNE except 149B of LRR S)	☐	Umbric Surface (F13) (A&G LRR P, T, U)	☐
Sandy Mucky Mineral (S1) (All except A&G LRRs O&S only)	☐	High Plains Depressions (F16) (GP MLRA 72, 73; Problem in rest of LRR H)	☐
2.5 cm Mucky Peat or Peat (S2) (GP LRR G, H)	☐	Delta Ochric (F17) (A&G MLRA 151)	☐
5 cm Mucky Peat or Peat (S3) (GP LRR F; NCNE Problem)	☐	Reduced Vertic (F18) (A&G MLRA 150A, 150B) (AW, GP, A&G)	☐
Sandy Gleyed Matrix (S4) (All)	☐	Piedmont Floodplain Soils (F19) (A&G: MLRA 149A; Problem in LRR P, S, T)	☐
Sandy Redox (S5) (All)	☐	Anomalous Bright Loamy Soils (F20) (A&G MLRA 149A, 153C, 153D; Problem in MLRA 153B)	☐
Stripped Matrix (S6) (All)	☐	Red Parent Material (TF2) (Problem in All but M)	☐
Dark Surface (S7) (A&G LRR P, S, T, U; GP Problem in LRR G; NCNE MLRA 149B, Problem LRR K, L)	☐	Other (Explain in Remarks)	☐

Problematic Hydric Soil? Yes ☐ (explain in remarks) No ☒

Hydric Soil Criteria (1)____ (2A)____ (2 (B)(1)____ (2 (B)(2)____ (2 (B)(3)____ (3)____ (4)____

Restrictive Layer Present? Yes ☐ (explain in remarks) No ☒

Hydric Soil Present? Yes ☒ No ☐

Remarks:

WETLAND DETERMINATION DATA FORM

Feature ID# W8AFA004

JURISDICTIONAL DETERMINATION

Is This Sampling Point Within a Wetland? Yes ☒ No ☐ | **Is This An Isolated Wetland?** Yes ☐ No ☒ Unknown ☐

Is Wetland Adjacent to ☐ **or Abutting** ☒ **Associated Waterbody?** (explain in remarks) Unknown ☐

Associated Waterbody Name or Feature ID# S8AFA006

Separated by berm or barrier? Yes ☐ No ☒ Unknown ☐

Flow between Wetland and Waterbody is: Perennial ☐ Intermittent ☐ Ephemeral ☒ No Flow ☐ Unknown ☐

Surface flow between Wetland and Waterbody is:
Discreet ☐ Confined ☐ Discrete and Confined ☐ Overland Sheet-flow ☒ No Flow ☐ Unknown ☐

Direction of Surface flow between Wetland and Waterbody is:
From Wetland to Waterbody ☐ From Waterbody to Wetland ☐ Both To/From Wetland to Waterbody ☒ No Flow ☐ Unknown ☐

Subsurface Connection Yes (explain in remarks) ☐ No ☐ Unknown ☒

Surface Water Appearance?

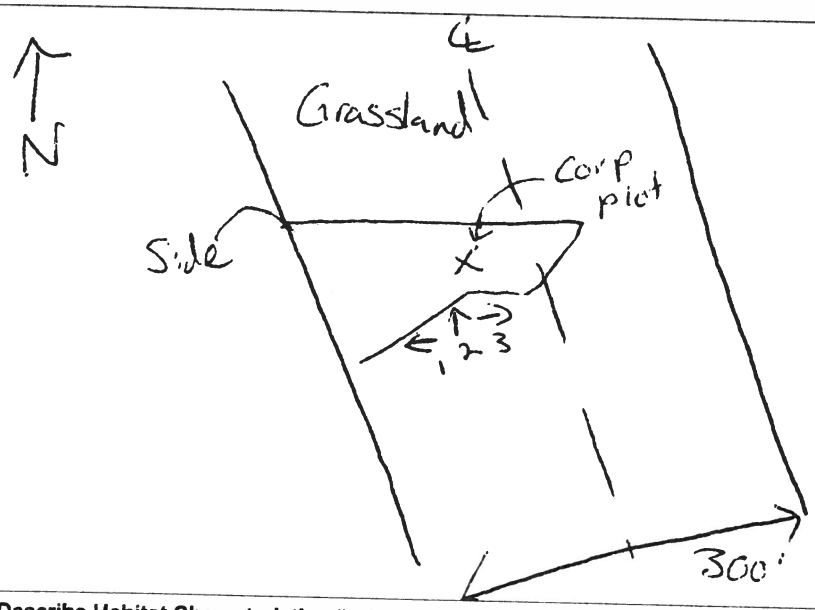
No Water ☐ Clear ☐ Floating Algal Mats ☐ Greenish Color ☐ Surface Scum ☐ Slightly Turbid ☐ Turbid ☐ Very Turbid ☐

Wetland Supports riparian buffer? Yes ☒ No ☐ If yes, width of buffer? NOT ON ORIGINAL DATA SHEET

Wetland Quality: High ☐ Medium ☒ Low ☐ (please explain designation in remarks)

Remarks:

Field Sketch: (Please include Directional & North Arrow, Centerline, Length of Feature, Distances from Centerline, Photo Location, and Survey Corridor



Describe Habitat Characteristics (include overall habitat characteristics, aquatic and terrestrial diversity, etc., and provide unique descriptors):

Wetland is abutting stream

General Comments (i.e., angle at pipeline crossing, construction constraints, erosion potential, existing disturbances, and meanders):

Wetland is right next to Hidden Water Creek

WETLAND DETERMINATION DATA FORM – Great Plains Region

PEM

Project/Site: KXL Phase IV City/County: Fallon Sampling Date: 6/10/10

Applicant/Owner: Trans Canada - Trow - KXL State: MT Sampling Point: W106FA002

Investigator(s): B106 Section, Township, Range: —

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): concave Slope (%): 1%

Subregion (LRR): Northern Great Plains Lat: — Long: — Datum: —

Soil Map Unit Name: — NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Linear wetland ≈ 300' wide. fed by a stream to the east, it splays out and creates a wetland in this reach.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: NA)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		

Sapling/Shrub Stratum (Plot size: NA)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		

Herb Stratum (Plot size: 5-1)			
1. Juncus balticus	80%	Y	OBL
2. Distichlis spicata	10%	N	FACW
3. Carex rostrata	15%	N	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	105% = Total Cover		

Woody Vine Stratum (Plot size: NA)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 3%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

~~PEM~~ PEM

SOIL

Sampling Point: W106FA002

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	5Y 5/1	95	5Y 3/1	5%	C	M	clay loam	
4-12	5Y 5/1	95	5Y 3/1	5%	C	M	Sandy ~~clay~~ clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ~~X~~ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- X Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 0-3"

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): Surface

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Upland

Project/Site: KXL Pipeline - Phase IV City/County: Fallon Sampling Date: 6/10/10

Applicant/Owner: TransCanada - Trow - KXL State: MT Sampling Point: W106FA002

Investigator(s): B106 Section, Township, Range: —

Landform (hillslope, terrace, etc.): Slope - hill Local relief (concave, convex, none): Slope Slope (%): 5%

Subregion (LRR): Northern Great Plains Lat: — Long: — Datum: —

Soil Map Unit Name: — NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	Is the Sampled Area within a Wetland? Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Pasture - Rangeland

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: NA)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: NA)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Poa Pratensis	30%	Y	FacU
2. Artemisia frigida	15%	Y	NI
3. Artemisia Cana	10%	N	FacU
4. Pascopyrum Smithii	8%	N	FacU
5.			
6.			
7.			
8.			
9.			
10.			
	63% = Total Cover		
Woody Vine Stratum (Plot size: NA)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 2%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

upland

SOIL

Sampling Point: W106FA002

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	2.5Y3/1	100					Sandy loam	
6-12	2.5Y4/2	100					Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 270.78 City/County: Fallon County Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: MT Sampling Point: W_UTM13_03718_W1

Investigator(s): C. Westfall (Desktop) Section, Township, Range: S28, T4N, R61E

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave Slope (%): 3

Subregion (LRR): G Lat: 46.075002 Long: -104.154001 Datum: WGS84

Soil Map Unit Name: MT025-83C NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Bottom of unnamed tributary to Mud Creek. Desktop form based on nearby wetland data forms, Web Soil Survey, and site notes taken in 2009 and 2019. To date, all wetland indicators have not been field verified at this site. Similar datasheet(s) used: W0529618FA001_U1

Photos: No photos Associated Plots: W_UTM13_03718_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Carex nebrascensis*	30	✓	OBL
2. *Juncus balticus*	25	✓	FACW
3. *Eleocharis palustris*	12	✓	OBL
4. *Hordeum jubatum*	10		FACW
5. *Carex utriculata*	6		OBL
6. *Mentha arvensis*	1		FACW
7.			
8.			
9.			
10.			
	84 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 2

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	48	x 1 =	48
FACW Species	36	x 2 =	72
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	84 (A)		120 (B)

Prevalence Index (B/A) = 1.43

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Desktop assessment of vegetation was based on field map notes of plant species at or near the site in 2009 and 2019. Used data form from 2018 for W0529618FA001_W1.

SOIL

Sampling Point: W_UTM13_03718_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 5	10YR 4/2	70	5YR 4/6	30	C	M	SCL	
5 - 20	10YR 3/1	100					L	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks: Desktop assessment of soils were supported by field map notes from 2009 and 2018 as well as NRCS Web Soil Survey.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 2

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of data form: W0529618FA001_W1. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 270.78 City/County: Fallon County Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: MT Sampling Point: W_UTM13_03718_U1

Investigator(s): C. Westfall (Desktop) Section, Township, Range: S28, T4N, R61E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): G Lat: 46.075002 Long: -104.154001 Datum: WGS84

Soil Map Unit Name: MT025-83C NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Desktop form based on nearby wetland data forms, Web Soil Survey, and site notes taken in 2009 and 2019. To date, all wetland indicators have not been field verified at this site. Similar datasheet(s) used: W0529618FA001_U1

Photos: No Photos Associated Plots: W_UTM13_03718_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Agropyron smithii*	30	✓	FACU
2. *Poa pratensis*	30	✓	FACU
3. *Artemisia frigida*	15		(UPL)
4. *Carex filifolia*	10		(UPL)
5. *Stipa comata*	5		(UPL)
6.			
7.			
8.			
9.			
10.			
	90 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	60	x 4 =	240
UPL Species	30	x 5 =	150
Column Totals	90 (A)		390 (B)

Prevalence Index (B/A) = 4.33

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Desktop assessment of vegetation was determined to be similar to that of data form: W0529618FA001_U1. Field map notes of plant species in 2009 and 2019 were also used to select accurate plant species in the area.

SOIL

Sampling Point: W_UTM13_03718_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 3	10YR 5/3	100					L	
3 - 20	7.5YR 4/2	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Desktop assessment of soils were determined to be similar to that of field data form: W0529618FAA001. Soil determinations were supported by field map notes from 2009 and 2019 as well as NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of field data form: W0529618FA001. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WETLAND DETERMINATION DATA FORM -- Great Plains Region

W 901 FA007 map

Project/Site: _____ City/County: Fallon Sampling Date: 8/29/13

Applicant/Owner: EXP State: MT Sampling Point: _____

Investigator(s): MG/DV Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Basin Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS -- Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks: wetland Data pt.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: _____)			
1. Softstem bulrush	100		
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		
% Bare Ground in Herb Stratum _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-18	10 YR 2/1	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- X Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 2-3

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

w 901FA001 udp

Project/Site: _____ City/County: Fallon Sampling Date: 8/29/13

Applicant/Owner: BLM State: MT Sampling Point: _____

Investigator(s): MR/DV Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): Flat Slope (%): 1

Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. Sagebrush	100		
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: _____)			
1. Bromus inermis	40		
2. Taraxacum officinale	10		
3. Sagebrush	20		
4. Festuca spp	30		
5.			
6.			
7.			
8.			
9.			
10.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		
% Bare Ground in Herb Stratum _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No _____

Remarks:

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 5/4	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Unknown

Depth (inches): 4

Hydric Soil Present? Yes _____ No X

Remarks: Soil is very dry + compact

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM

Feature ID# W8AFA001

Survey Type: Centerline: ☒ Re-Route: ☐ Access Road (explain): ☐ CAR ID: Ancillary Facility (explain): ☐ T-Line ☐ Other (explain)

Survey Description:

Centerline ID#: 20080509CL **Date:** 6/13/08 **Client/ Project Name:** KEYSTONE-XL-10623-007-803A

Investigators: Dalrymple/ Jones **Team No.** 8A **Milepost:** 276.2 **Tract No.** ML-MT-FA-00930.000

State/County: MT/ Fallon **Section, Township, Range:** Western Great Plains

Lat/Long: 45.9619/-104.1161 **Quad Name:** Snider Hill **Region:** Western Great Plains

Subregion (LRR or MLRA): LRR G **Datum:** NAD 83 **Soil Map Name:** 386E

NWI classification: PEM **Landform (hillslope, terrace, etc.):** Creek Channel

Local relief: ☒ concave ☐ convex ☐ none **Slope (%):** 15-35

Logbook No.: 1 **Logbook Page No.:** 75&76 **Picture No.** W8AFA001_NE1,SW2,S3

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (if no explain in remarks)

Are "Normal Circumstances" present? Yes ☒ No ☐ (If no, explain in remarks.)

Is Vegetation ☐ **Soil** ☐ **Hydrology** ☐ **"Significantly Disturbed"?** No ☒ (If yes, explain in remarks)

Is Vegetation ☐ **Soil** ☐ **Hydrology** ☐ **"Naturally Problematic"?** No ☒ (If yes, explain in remarks.)

Wetland Type: PFO ☐ PSS ☐ PEM ☒ Other ☐ (explain)

Remarks:

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover:			

Sapling/Shrub Stratum ( )			
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover:			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species:	X 1 =
FACW species:	X 2 =
FAC species	X 3 =
FACU species	X 4 =
UPL species	X 5 =
Column Totals: (B)	(B)

PI = B/A =

WETLAND DETERMINATION DATA FORM

Feature ID# W8AFA001

Herb Stratum (_____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Poa pratensis	30	Yes	FACU
2. Schoenoplec heterochaetus	20	Yes	OBL
3. Carex sp.	15	Yes	FACW
4.			
5.			
6.			
7.			
8.			
9.			
Total Cover:	65		

Woody Vine Stratum (____)

1.
2.
3.
4.
5.

Total Cover:

Hydrophytic Vegetation Present?

Yes ☒ No ☐

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is ≥50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations (explain in remarks)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Nonvascular Plants (Wetland Specialists) (WM):
(10 inch x 10 inch sample frames)

1. % wetland specialist bryophytes
2. % wetland specialist bryophytes
3. % wetland specialist bryophytes

_____**Mean % wetland specialist bryophytes**

Remarks: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

Feature ID# W8AFA001

HYDROLOGY (check all that apply)
Region Code: WM-Western Mountain; AW–Arid West; GP-Great Plains; A&G –Atl & Gulf Coast; M-Midwest; NCNE-Northcentral Northeast

Always Primary Indicators (minimum of one required)	Always Secondary (minimum of two required)
☐ Surface Water (A1) (All)	☐ Drainage Patterns (B10) (All)
☐ High Water Table (A2) (All)	☐ Moss Trim Lines (B16) (A&G, NCNE)
☒ Saturation (A3) (All)	☐ Crayfish Burrows (C8) (All but WM)
☐ Algal Mat or Crust (B4) (All but AW)	☐ Saturation Visible on Aerial Imagery (C9) (All)
☐ Iron Deposits (B5) (All but AW)	☐ Geomorphic Position (D2) (All but AW)
☐ Inundation Visible on Aerial Imagery (B7) (All)	☐ Shallow Aquitard (D3) (WM, AW, A&G, NCNE)
☐ Salt Crust (B11) (AW, WM, GP)	☐ FAC-Neutral Test (D5) (All)
☐ Biotic Crust (B12) (AW)	☐ Frost-heave Hummocks (D7) (WM, GP:LRR F)
☐ Aquatic Fauna/Invertebrates (B13) (All)	
☐ True Aquatic Plants (B14) (M)	
☐ Marl Deposits (B15) (AW, A&G LRR U, NCNE)	
☐ Hydrogen Sulfide Odor (C1) (All)	
☒ Presence of Reduced Iron (C4) (All)	
☐ Recent Iron Reduction in Tilled Soils (C6) (All but GP)	

Primary or Secondary in different regions	Primary Regions	Secondary Regions
Water Marks (B1)	☐ All but AW riverine	☐ AW riverine
Sediment Deposits (B2)	☐ All but AW riverine	☐ AW riverine
Drift Deposits (B3)	☐ All but AW Riverine	☐ AW Riverine
Surface Soil Cracks (B6)	☐ WM & AW	☐ GP, A&G, M
Sparsely Vegetated Concave Surface (B8)	☐ M	☐ WM, AW, GP, A&G
Water-Stained Leaves (B9)	☐ AW, WM, GP, A&G, M	☐ WM: MLRA 1, 2, 4A, 4B
Dry-Season Water Table (C2)	☐ GP	☐ WM, AW, A&G, NCNE
Oxidized Rhizospheres on Living Roots (C3)	☐ All but GP tilled	☒ GP tilled
Thin Muck Surface (C7)	☐ A&G, NCNE	☐ AW, GP
Stunted/Stressed Plants (D1)	☐ AW (LRR A)	☐ NCNE

Other (Explain in Remarks)

Field Observations:

Surface Water Present? Yes ☒ No ☐ Depth (inches): 2

Water Table Present? Yes ☒ No ☐ Depth (inches): 6

Saturation Present? Yes ☒ No ☐ Depth (inches): 0
(includes capillary fringe)

Wetland Hydrology Present?

Yes ☒ **No** ☐

Remarks: Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections)

WETLAND DETERMINATION DATA FORM

Feature ID# W8AFA001

HYDRIC SOIL

Soil Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-15	10YR 4/1		10YR 4/6		D	M	Silt	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered Sand or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators (check all that apply)

Region Code: WM-Western Mountain; AW–Arid West; GP-Great Plains; A&G –Atl & Gulf Coast; M-Midwest; NCNE-Northcentral Northeast

Histosol (A1) (All)	☐	Polyvalue Below Surface (S8) (A&G LRR S, T, U; NCNE LRR R, 149B, Problem LRR K, L)	☐
Histic Epipedon (A2) (All)	☐	Thin Dark Surface (S9) (A&G LRR S, T, U; NCNE LRR R, 149B, Problem LRR K, L)	☐
Black Histic (A3) (All except NCNE MLRA 143 of LRR R)	☐	Loamy Mucky Mineral (F1) (WM except MLRA1; A, GP, M, A&G LRR O; NCNE LRR K, L)	☐
Hydrogen Sulfide (A4) (All)	☐	Loamy Gleyed Matrix (F2) (All)	☐
Stratified Layers (A5) (A&G, M, AW LRR C, GP LRR F, NCNE)	☐	Depleted Matrix (F3) (All)	☒
Organic Bodies (A6) (A&G LRR P, T, U)	☐	Redox Dark Surface (F6) (All)	☐
5 cm Mucky Mineral (A7) (A&G LRR P, T, U)	☐	Depleted Dark Surface (F7) (All)	☐
Muck Presence (A8) (A&G LRR U)	☐	Redox Depressions (F8) (All)	☐
1 cm Muck (A9) (LRR D, F, G H, P, T; Problem C, I, J, O)	☐	Vernal Pools (F9) (Arid)	☐
2 cm Muck (A10) (M; Problem WM, AW LRR B, A&G LRR S, NCNE LRR K L 149B of S)	☐	Marl (F10) (A&G LRR U)	☐
Depleted Below Dark Surface (A11) (All)	☐	Depleted Ochric (F11) (A&G MLRA 151)	☐
Thick Dark Surface (A12) (All)	☐	Iron-Manganese Masses (F12) (A&G LRR O, P, T; Problem in M, NCNE)	☐
Coast Prairie Redox (A16) (A&G MLRA 150A; Problem GP LRR F, G, H; M Problem; Problem NCNE except 149B of LRR S)	☐	Umbric Surface (F13) (A&G LRR P, T, U)	☐
Sandy Mucky Mineral (S1) (All except A&G LRRs O&S only)	☐	High Plains Depressions (F16) (GP MLRA 72, 73; Problem in rest of LRR H)	☐
2.5 cm Mucky Peat or Peat (S2) (GP LRR G, H)	☐	Delta Ochric (F17) (A&G MLRA 151)	☐
5 cm Mucky Peat or Peat (S3) (GP LRR F; NCNE Problem)	☐	Reduced Vertic (F18) (A&G MLRA 150A, 150B) (AW, GP, A&G)	☐
Sandy Gleyed Matrix (S4) (All)	☐	Piedmont Floodplain Soils (F19) (A&G: MLRA 149A; Problem in LRR P, S, T)	☐
Sandy Redox (S5) (All)	☐	Anomalous Bright Loamy Soils (F20) (A&G MLRA 149A, 153C, 153D; Problem in MLRA 153B)	☐
Stripped Matrix (S6) (All)	☐	Red Parent Material (TF2) (Problem in All but M)	☐
Dark Surface (S7) (A&G LRR P, S, T, U; GP Problem in LRR G; NCNE MLRA 149B, Problem LRR K, L)	☐	Other (Explain in Remarks)	☐

Problematic Hydric Soil? Yes ☐ (explain in remarks) No ☒

Hydric Soil Criteria (1)____ (2A)____ (2 (B)(1)____ (2 (B)(2)____ (2 (B)(3)____ (3)____ (4)____

Restrictive Layer Present? Yes ☐ (explain in remarks) No ☒

Hydric Soil Present? Yes ☒ No ☐

Remarks:
Meanders slightly. Habitat diversity good since wetland exists either side of North Fork Coal Bank Creek.

Moderate Quality since there is some disturbance by grazing livestock.

WETLAND DETERMINATION DATA FORM

Feature ID# W8AFA001

JURISDICTIONAL DETERMINATION

Is This Sampling Point Within a Wetland? Yes ☒ No ☐ | **Is This An Isolated Wetland?** Yes ☐ No ☒ Unknown ☐

Is Wetland Adjacent to ☐ **or Abutting** ☒ **Associated Waterbody?** (explain in remarks) Unknown ☐

Associated Waterbody Name or Feature ID# S8AFA001

Separated by berm or barrier? Yes ☐ No ☒ Unknown ☐

Flow between Wetland and Waterbody is: Perennial ☐ Intermittent ☒ Ephemeral ☐ No Flow ☐ Unknown ☐

Surface flow between Wetland and Waterbody is:
Discreet ☐ Confined ☐ Discrete and Confined ☐ Overland Sheet-flow ☒ No Flow ☐ Unknown ☐

Direction of Surface flow between Wetland and Waterbody is:
From Wetland to Waterbody ☐ From Waterbody to Wetland ☐ Both To/From Wetland to Waterbody ☒ No Flow ☐ Unknown ☐

Subsurface Connection Yes (explain in remarks) ☐ No ☐ Unknown ☒

Surface Water Appearance?

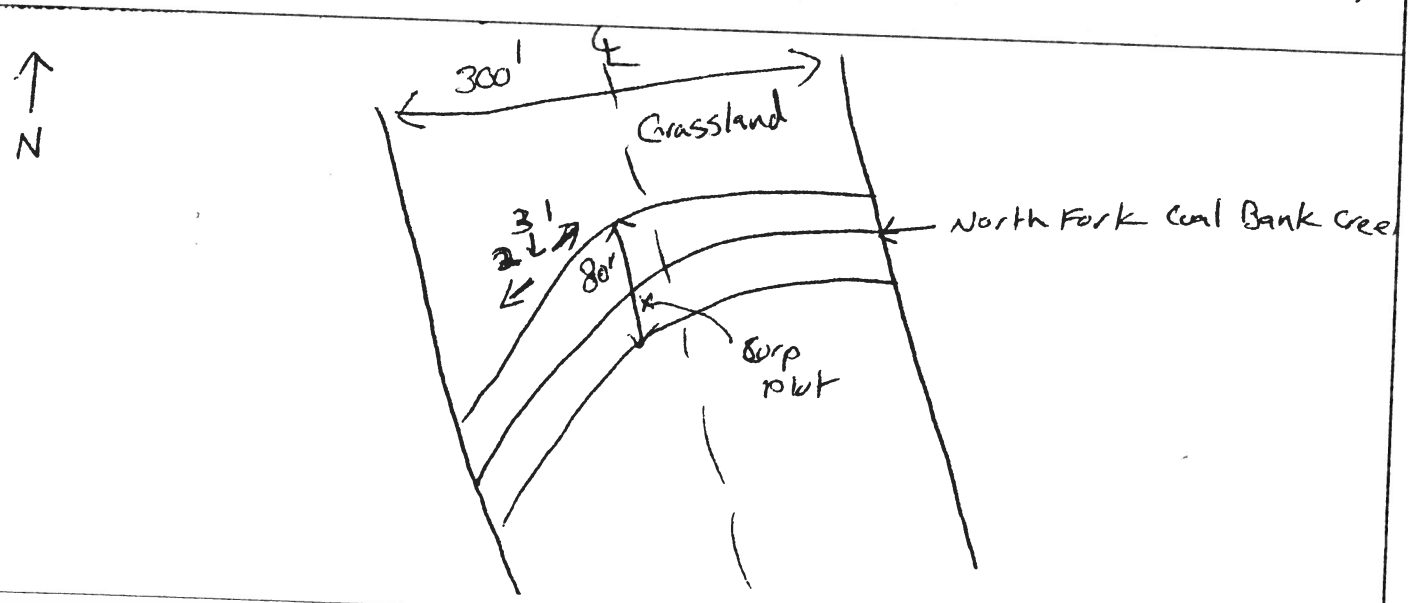
No Water ☐ Clear ☐ Floating Algal Mats ☐ Greenish Color ☐ Surface Scum ☐ Slightly Turbid ☐ Turbid ☐ Very Turbid ☐

Wetland Supports riparian buffer? Yes ☒ No ☐ If yes, width of buffer? NO WIDTH POSTED ON ORIGINAL DATA SHEET

Wetland Quality: High ☐ Medium ☒ Low ☐ (please explain designation in remarks)

Remarks:

Field Sketch: (Please include Directional & North Arrow, Centerline, Length of Feature, Distances from Centerline, Photo Location, and Survey Corridor



Describe Habitat Characteristics (include overall habitat characteristics, aquatic and terrestrial diversity, etc., and provide unique descriptors):

General Comments (i.e., angle at pipeline crossing, construction constraints, erosion potential, existing disturbances, and meanders):

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 149.24 City/County: McCone County Sampling Date: 7/25/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: MT Sampling Point: W0725619MC001_W1

Investigator(s): J. Beaver, D. Culwell II, S. Laster Section, Township, Range: S31, T2N, R49E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): G Lat: 47.4469782079527 Long: -105.513952495831 Datum: WGS84

Soil Map Unit Name: MT055 – 45 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Wetland fringe adjacent to pond.

Photos: JB1487 - JB1488 Associated Plots: W0725619MC001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	65	✓	FACW
2. *Poa pratensis*	8		FACU
3. *Glycyrrhiza lepidota*	2		FACU
4. *Bromus inermis*	0.5		UPL
5. *Carex utriculata*	0.5		OBL
6. *Sonchus arvensis*	0.5		FAC
7.			
8.			
9.			
10.			
	76.5 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.5	x 1 =	0.5
FACW Species	65	x 2 =	130
FAC Species	0.5	x 3 =	1.5
FACU Species	10	x 4 =	40
UPL Species	0.5	x 5 =	2.5
Column Totals	76.5 (A)		174.5 (B)

Prevalence Index (B/A) = 2.28

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0725619MC001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 5	10YR 3/1	100					SiC	
5 - 16	10YR 5/2	90	5YR 5/6	10	C	M	SiC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☑ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 149.25 City/County: McCone County Sampling Date: 7/25/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: MT Sampling Point: W0725619MC001_U1

Investigator(s): J. Beaver, D. Culwell II, S. Laster Section, Township, Range: S31, T2N, R49E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): convex Slope (%): 4

Subregion (LRR): G Lat: 47.44687570188 Long: -105.513907093005 Datum: WGS84

Soil Map Unit Name: MT055 – 45 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: *Agropyron cristatum* adjacent to pond.

Photos: JB1489 Associated Plots: W0725619MC001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1. *Artemisia cana*			
2. *Symphoricarpos occidentalis*			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Agropyron cristatum*	40	✓	(UPL)
2. *Bromus inermis*	30	✓	UPL
3. *Melilotus officinalis*	6		FACU
4. *Glycyrrhiza lepidota*	4		FACU
5. *Agropyron smithii*	3		FACU
6. *Artemisia frigida*	2		(UPL)
7. *Symphyotrichum falcatum*	0.5		FACU
8.			
9.			
10.			
	85.5	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	13.5	x 4 =	54
UPL Species	72	x 5 =	360
Column Totals	85.5 (A)		414 (B)

Prevalence Index (B/A) = 4.84

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0725619MC001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 4/3	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 198.34 City/County: Dawson County Sampling Date: 10/23/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: MT Sampling Point: W1023620DA002_W1

Investigator(s): D. Hagen, P. Christensen Section, Township, Range: S13, T013N, R053E

Landform (hillslope, terrace, etc.): valley Local relief (concave, convex, none): none Slope (%): 0-1

Subregion (LRR): F Lat: 46.8764431318 Long: -104.955601938 Datum: WGS84

Soil Map Unit Name: MT021 – Lm NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Photos: DH23 - DH26 Associated Plots: W1023620DA002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.1 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Elaeagnus angustifolia*	15	✓	FACU
2.			
3.			
4.			
	15	= Total Cover	
Shrub Stratum (Plot size: 0.1 acre)			
1. *Salix amygdaloides*	1		FACW
2.			
3.			
4.			
5.			
	1	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Spartina pectinata*	65	✓	FACW
2. *Carex nebrascensis*	30	✓	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	95	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	30	x 1 =	30
FACW Species	66	x 2 =	132
FAC Species		x 3 =	
FACU Species	15	x 4 =	60
UPL Species		x 5 =	
Column Totals	111 (A)		222 (B)

Prevalence Index (B/A) = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: heavily impacted by cattle

SOIL

Sampling Point: W1023620DA002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 3/1	100					SCL	
2 - 20	10YR 3/1	90	10YR 4/6	10	C	M	SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☑ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☑ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 3
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 198.34 City/County: Dawson County Sampling Date: 10/23/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: MT Sampling Point: W1023620DA002_U1

Investigator(s): D. Hagen, P. Christensen Section, Township, Range: S13, T013N, R053E

Landform (hillslope, terrace, etc.): valley Local relief (concave, convex, none): none Slope (%): 0-1

Subregion (LRR): F Lat: 46.876439127 Long: -104.955559469 Datum: WGS84

Soil Map Unit Name: MT021 – Lm NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: DH23 - DH26 Associated Plots: W1023620DA002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.1 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.1 acre)			
1. *Rosa woodsii*	10	✓	FACU
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Agropyron smithii*	40	✓	FACU
2. *Poa pratensis*	40	✓	FACU
3. *Taraxacum officinale*	5		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	85 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 15

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	95	x 4 =	380
UPL Species		x 5 =	
Column Totals	95 (A)		380 (B)

Prevalence Index (B/A) = 4.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: heavily impacted by cattle

SOIL

Sampling Point: W1023620DA002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 4/4	100					S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 199.84 City/County: Dawson County Sampling Date: 10/23/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: MT Sampling Point: W1023620DA001_U1

Investigator(s): D. Hagen, P. Christensen Section, Township, Range: S19, T013N, R054E

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave Slope (%): 3

Subregion (LRR): F Lat: 46.8744257523 Long: -104.93617128 Datum: WGS84

Soil Map Unit Name: MT021 – 403D NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: DH08 Associated Plots: W1023620DA001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.1 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Elaeagnus angustifolia*	10	✓	FACU
2. *Fraxinus pennsylvanica*	2		FAC
3. *Populus deltoides*	2		FAC
4.			
	14	= Total Cover	
Shrub Stratum (Plot size: 0.1 acre)			
1. *Rosa woodsii*	5	✓	FACU
2. *Symphoricarpos occidentalis*	2	✓	UPL
3.			
4.			
5.			
	7	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Poa pratensis*	45	✓	FACU
2. *Artemisia ludoviciana*	2		UPL
3. *Solidago canadensis var. salebrosa*	1		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	48	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 30

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	4	x 3 =	12
FACU Species	61	x 4 =	244
UPL Species	4	x 5 =	20
Column Totals	69 (A)		276 (B)

Prevalence Index (B/A) = 4.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W1023620DA001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 3/1	100					SL	
2 - 20	2.5Y 4/4	100					S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 199.84 City/County: Dawson County Sampling Date: 10/23/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: MT Sampling Point: W1023620DA001_W1

Investigator(s): D. Hagen, P. Christensen Section, Township, Range: S19, T013N, R054E

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave Slope (%): 1-2

Subregion (LRR): F Lat: 46.8744066851 Long: -104.936188688 Datum: WGS84

Soil Map Unit Name: MT021 – 403D NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Photos: DH07 Associated Plots: W1023620DA001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.1 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Elaeagnus angustifolia*	20	✓	FACU
2. *Salix amygdaloides*	5	✓	FACW
3.			
4.			
	25	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Spartina pectinata*	80	✓	FACW
2. *Polygonum amphibium*	10		OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	90	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 10

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	10	x 1 =	10
FACW Species	85	x 2 =	170
FAC Species		x 3 =	
FACU Species	20	x 4 =	80
UPL Species		x 5 =	
Column Totals	115 (A)		260 (B)

Prevalence Index (B/A) = 2.26

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W1023620DA001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 3/1	100					SL	
2 - 20	10YR 3/1	90	10YR 4/6	10	C	M	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☑ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☑ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 0-1

Water Table Present? Yes ✓ No ____ Depth (inches): 1

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 1

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: strong hydrogen sulfide odor

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 292.67 City/County: Harding County Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0002_W1

Investigator(s): C. Westfall (Desktop) Section, Township, Range: S31, T22N, R2E

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave Slope (%): 3

Subregion (LRR): G Lat: 45.833833 Long: -103.927165 Datum: WGS84

Soil Map Unit Name: SD063-Kg NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Bottom of Shaw Creek. Desktop form based on nearby wetland data forms, Web Soil Survey, and site notes taken in 2009. To date, all wetland indicators have not been field verified at this site. Similar datasheet(s) used: W0616619HA001.

Photos: 2019 LL245 (NW) - 246 (SE) Associated Plots: W0002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Juncus balticus*	20	✓	FACW
2. *Schoenoplectus pungens*	17	✓	OBL
3. *Puccinellia nuttalliana*	15	✓	OBL
4. *Distichlis spicata*	8		FACW
5. *Hordeum jubatum*	7		FACW
6. *Carex praegracilis*	6		FACW
7. *Spartina gracilis*	3		FACW
8.			
9.			
10.			
	76 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):	3	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:		
OBL Species	32	x 1 =	32	
FACW Species	44	x 2 =	88	
FAC Species		x 3 =		
FACU Species		x 4 =		
UPL Species		x 5 =		
Column Totals	76 (A)		120	(B)

Prevalence Index (B/A) = 1.58

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Desktop assessment of vegetation was determined to be similar to that of data form: W0616619HA001. Field map notes of plant species in 2009 and 2019 were also used to select accurate plant species in the area.

SOIL

Sampling Point: W0002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
1 - 8	10YR 5/1	70	5YR 4/6	30	C	M	SCL	
8 - 20	10YR 3/1	100					L	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Desktop assessment of soils were supported by field map notes from 2009 and 2019 as well as NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 2

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 292.67 City/County: Harding County Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0002_U1

Investigator(s): C. Westfall (Desktop) Section, Township, Range: S31, T22N, R2E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 5

Subregion (LRR): G Lat: 45.833833 Long: -103.927165 Datum: WGS84

Soil Map Unit Name: SD063-Kg NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Desktop form based on nearby wetland data forms, Web Soil Survey, and site notes taken in 2009 and 2019. To date, all wetland indicators have not been field verified at this site. Similar datasheet(s) used: W0616619HA001_U1.

Photos: 2019 LL 245 (NW) and LL 246(SE) Associated Plots: W0002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	45	✓	UPL
2. *Poa pratensis*	20	✓	FACU
3. *Calamovilfa longifolia*	10	✓	(UPL)
4. *Bouteloua gracilis*	8		(UPL)
5. *Carex filifolia*	5		(UPL)
6.			
7.			
8.			
9.			
10.			
	88	= Total Cover	
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	20	x 4 =	80
UPL Species	68	x 5 =	340
Column Totals	88 (A)		420 (B)

Prevalence Index (B/A) = 4.77

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Desktop assessment of vegetation was determined to be similar to that of data form: W00661619HA001_U1. Field map notes of plant species in 2009 and 2019 were also used to select accurate plant species in the area.

SOIL

Sampling Point: W0002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 5/3	100					L	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Desktop assessment of soils were determined to be similar to that of data form: W0616619HA001_U1. Soil determinations were supported by field map notes from 2009 and 2019 as well as NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of data form: W0616619HA001_U1. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

MP. 292.05

WS67MA001

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL PHASE IV City/County: HARDING Sampling Date: 10/17

Applicant/Owner: State: Sampling Point:

Investigator(s): 567 Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): CONCAVE Slope (%): —

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	Is the Sampled Area within a Wetland? Yes X No
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. —			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. —			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: ____)			
1. GREEN RUSH	30	Y	OBL
2. HORSETAIL	20		FACW
3. SPIKE RUSH	40	Y	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC–): 2 (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks:

Sampling Point: _____

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-15"	GREY 4-1	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- X Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- X Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 4"

Water Table Present? Yes X No ___ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): _____

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WS67142001
UPLAND

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL PHASE IV City/County: _____ Sampling Date: _____

Applicant/Owner: _____ State: _____ Sampling Point: _____

Investigator(s): _____ Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	Is the Sampled Area within a Wetland? Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: _____)			
1. WESTERN WHEAT GRASS	60	Y	NI
2. SAGE	20	Y	
3. FIELD THISTLE	20	Y	
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC–): 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:

Sampling Point: _____

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-15	3/2	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 295.08 City/County: Harding County Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W_UTM13_04445_W1

Investigator(s): C. Westfall (Desktop) Section, Township, Range: S4, T21N, R2E

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave Slope (%): 3

Subregion (LRR): G Lat: 45.816075 Long: -103.884818 Datum: WGS84

Soil Map Unit Name: SD063-Ge NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Very narrow wetland strip on the northwest side of the Little Missouri River. Desktop form based on nearby wetland data forms, Web Soil Survey, aerial imagery, and site notes taken in 2009. To date, all wetland indicators have not been field verified at this site. Similar

Photos: 2019 LL 231-234, 2009 LL 248-250 Associated Plots: W_UTM13_04445_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1. *Salix exigua*	5		FACW
2.			
3.			
4.			
5.			
	5 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Spartina gracilis*	40	✓	FACW
2. *Puccinellia nuttalliana*	30	✓	OBL
3. *Poa pratensis*	12		FACU
4. *Rumex crispus*	5		FAC
5. *Hordeum jubatum*	3		FACW
6.			
7.			
8.			
9.			
10.			
	90 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 2

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	30	x 1 =	30
FACW Species	48	x 2 =	96
FAC Species	5	x 3 =	15
FACU Species	12	x 4 =	48
UPL Species		x 5 =	
Column Totals	95 (A)		189 (B)

Prevalence Index (B/A) = 1.99

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Desktop assessment of vegetation was determined to be similar to that of data form: W0802619HA001. Field map notes of plant species in 2009 and 2019 were also used to select accurate plant species in the area.

SOIL

Sampling Point: W_UTM13_04445_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 4/2	80	7.5YR 5/6	20	C	M	SCL	
8 - 20	7.5YR 3/1	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Desktop assessment of soils were determined to be similar to that of data form: W0802619HA001. Soil determinations were supported by field map notes from 2009 and 2019 as well as NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 20
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 10

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of data form: W0802619HA001. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 295.08 City/County: Harding County Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W_UTM13_04445_U1

Investigator(s): C. Westfall (Desktop) Section, Township, Range: S4, T21N, R2E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 4

Subregion (LRR): G Lat: 45.816075 Long: -103.884818 Datum: WGS84

Soil Map Unit Name: SD063-Ge NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Very narrow wetland strip on the northwest side of the Little Missouri River. Desktop form based on nearby wetland data forms, Web Soil Survey, aerial imagery, and site notes taken in 2009. To date, all wetland indicators have not been field verified at this site. Similar

Photos: 2019 LL 231-234, 2009 LL 248-250 Associated Plots: W_UTM13_04445_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Agropyron smithii*	30	✓	FACU
2. *Agropyron cristatum*	15	✓	
3. *Poa pratensis*	15	✓	FACU
4. *Bouteloua gracilis*	12	✓	(UPL)
5. *Carex filifolia*	8		(UPL)
6. *Artemisia frigida*	5		(UPL)
7.			
8.			
9.			
10.			
	85 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 8

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	45	x 4 =	180
UPL Species	25	x 5 =	125
Column Totals	70 (A)		305 (B)

Prevalence Index (B/A) = 4.36

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Desktop assessment of vegetation was determined to be similar to that of data forms: W0802619HA001 and W0616619HA001 . Field map notes of plant species in 2009 and 2019 were also used to select accurate plant species in the area.

SOIL

Sampling Point: W_UTM13_04445_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 18	2.5Y 4/2	100					SiC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Desktop assessment of soils were determined to be similar to that of data forms: W0802619HA001 and W0616619HA001. Soil determinations were supported by field map notes from 2009 and 2019 as well as NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of data forms: W0802619HA001 and W0616619HA001. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

W567HA002 → UPLAND AREA MP: 293.53

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL PHASE IV City/County: HARDING Sampling Date: 10/17

Applicant/Owner: State: SD Sampling Point:

Investigator(s): 567 Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X
Hydric Soil Present?	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X

Is the Sampled Area within a Wetland? Yes ____ No X

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. GIANT SAGEBRUSH	20	Y	UPL
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. WESTERN WHEATGRASS	80%	Y	FAC
2. SAGE	15%	Y	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

Sampling Point: _____

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-15	3/2	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WS6HA002 MP: 293.53

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL PHASE IV City/County: HARDING Sampling Date: 10/17

Applicant/Owner: State: SD Sampling Point:

Investigator(s): SGZ Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	Is the Sampled Area within a Wetland? Yes X No
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: ____)			
1. CAREX SPP	80%	Y	
2. WESTERN WHEAT GRASS	10%		
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks:

Sampling Point: _____

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-15	4-1 GLEYED	100%						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- X 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- X Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- X Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): _____

Water Table Present? Yes X No ___ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 8

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: SD-HA-0063.000 / MP 298.84 City/County: HARDING COUNTY Sampling Date: 6/15/13

Applicant/Owner: KEYSTONE XL State: SD Sampling Point: WWTRVHA001

Investigator(s): L. LARSEN / J. BEAVER Section, Township, Range: S13, T21N, R2E

Landform (hillslope, terrace, etc.): DRAINAGE w/ SIDEHILL SEEP Local relief (concave, convex, none): CONCAVE Slope (%): 3% to 10%

Subregion (LRR): LRRG Lat: Long: Datum:

Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? NO Are "Normal Circumstances" present? Yes X No

Are Vegetation, Soil, or Hydrology naturally problematic? NO (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	Is the Sampled Area within a Wetland? Yes X No
Hydric Soil Present?	Yes	No	
Wetland Hydrology Present?	Yes	No	

Remarks: Typical prairie wetland in swale below hillside seep. Entire complex in one GPS file. Photo: LL 2385 (down) / LL 2386 (up)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: Ø)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: Ø)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Herb Stratum (Plot size: 0.01)			
1. CARPRA	50	Y	FACW
2. POAPRA	10		FACW
3. SPAGRA	5		FACW
4. AGRSMI	2		FACW
5. JUNBAL	5		FACW
6. AGRSTO	2		FACW
7.			
8.			
9.			
10.			
	74 = Total Cover		

Woody Vine Stratum (Plot size: 0)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- X Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks: Wetland in swale below hillside seep.

SOIL

Sampling Point: WWTRVHA001

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	7.5YR 2.5/2	100	—	—	—	—	SiCL	High om + roots
2-9.5	10YR 3/2	100	—	—	—	—	SiCL	
9.5-16+	2.5Y 2.5/2	85	10YR 5/8	15	C	M	SiC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: NO

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks: Typical low chroma plains wetland soil in swale w/out bed or bank

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hydrology based on oxidized rhizospheres. Minor H_2O glistening in soil @ 12 inches.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: SD-HA-00630.000 / MP 298.86 City/County: HARDING Co. Sampling Date: 6/15/13

Applicant/Owner: KEYSTONE XL State: SD Sampling Point: WWTRVHA001

Investigator(s): L. LARSEN / J. BEAVER Section, Township, Range: S 13, T 21N, R 2E

Landform (hillslope, terrace, etc.): HILLSLOPE SEEP Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR): LRR-G Lat: Long: Datum:

Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? NO Are "Normal Circumstances" present? Yes X No

Are Vegetation, Soil, or Hydrology naturally problematic? NO (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No
Hydric Soil Present?	Yes X	No
Wetland Hydrology Present?	Yes X	No

Is the Sampled Area within a Wetland? Yes X No

Remarks: Saturated hillside seep above plot SDWTL-01
Photo: LL2387, 2388

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: Ø)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: Ø)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Herb Stratum (Plot size: 0.01)			
1. CARPRA	50	Y	FACW
2. JUNBAL	20	Y	FACW
3. SPAGRA	10		FACW
4. PUCNUT	5		OBL
5. DISSP.1	2		FACW
6.			
7.			
8.			
9.			
10.			
	87 = Total Cover		

Woody Vine Stratum (Plot size: Ø)			
1.			
2.			
	87 = Total Cover		

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks: Same species as in drainage for most part

SOIL

Sampling Point: WNTRVHA001

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	7.5YR 2.5/2	100	—	—	—	—	SiL	
2-16+	4/10Y	70	10YR 5/6	5	C	M	SCL	Gley sandy clay loam
	10YR 2/1	25	—	—	—	—	Muck	Black muck inclusion

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- X Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: NO

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Clear hydric soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 1

Water Table Present? Yes X No ___ Depth (inches): @ surface

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): @ surface

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Very saturated hillside seep.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: MP 298.986 City/County: HARDING Sampling Date: 6.15.13

Applicant/Owner: KXL State: SD Sampling Point: U WTRVHA0

Investigator(s): L. Larsen, J. Beaver Section, Township, Range: S13, T21N, R2E

Landform (hillslope, terrace, etc.): Upper Slope Local relief (concave, convex, none): _____ Slope (%): 6

Subregion (LRR): LRR G Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: UPLAND

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	Is the Sampled Area within a Wetland? Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Photo LL 2389

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: —)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 0.01 A)			
1. ART CAN	3		
2.			
3.			
4.			
5.			
	3 = Total Cover		
Herb Stratum (Plot size: 0.01 A)			
1. AGRSMI	15	Y	FACU
2. POA PRA	6	Y	FACU
3. STI VIR	3	Y	FACU
4. PSO ARG	2		
5. BOUGRA	7		
6. DISSTR	7		
7. KOECRI	5		
8.			
9.			
10.			
	45 = Total Cover		
Woody Vine Stratum (Plot size: —)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

SOIL

Sampling Point: WTRVHA001

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks: No pit - upland veg - no hydrophytic spp and no hydric indicators

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No hydrology

Site is exp feature:
W_UTM13_04537

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: MP 300.35 SD-HA-00640.020 City/County: Harding Sampling Date: 6.15.2013
Applicant/Owner: KYL State: SD Sampling Point: WWTRVHA003
Investigator(s): L. Larsen J. Beaver Section, Township, Range: S18 T21N R3E
Landform (hillslope, terrace, etc.): Drainage Local relief (concave, convex, none): Concave Slope (%): 1
Subregion (LRR): Lat: Long: Datum:
Soil Map Unit Name: NWI classification: PEM
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? NO Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? NO (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	Is the Sampled Area within a Wetland? Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: LL Photo 2401, 2402
Large saline-affected wetland around Kemble Cr.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		

Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		

Herb Stratum (Plot size: 0.10A)			
1. DISSTR	8		FACW
2. HORJUB	5		FACW
3. CARPRA	25	✓	FACW
4. ELEPAL	55	✓	OBL
5. SPAGRA	3		FACW
6.			
7.			
8.			
9.			
10.			
	96 = Total Cover		

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
__ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: WWTRVHA003

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	7.5YR 3/1	90	10YR 5/8	10	C	M	SiCL	High OM/roots
2-14+	10YR 3/2	70	10YR 5/8	30	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: No

Depth (inches): —

Hydric Soil Present? Yes X No ___

Remarks: Typical plains wetland soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- X Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- X Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 14"

Water Table Present? Yes X No ___ Depth (inches): ~12"

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): @ Surface

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Areas of naturally ponded water, saturated to surface.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: MP 300.35 - SD-HA-00640.000 City/County: Harding Sampling Date: 6.15.2013

Applicant/Owner: KXL State: SD Sampling Point: UWTRNHA003

Investigator(s): J. Deane, L. Larsen Section, Township, Range: S18 T21N R3E

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification: UPL

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	Is the Sampled Area within a Wetland? Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks: LL Photo 2400
Agravi adjacent to wetland SDWTL-03

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		

Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		

Herb Stratum (Plot size: 0.01A)			
1. AGRCRI	30	✓	N1
2. MEDSAT	8		UPL
3. TAROFF	3		
4. POAPRA	15	✓	FACU
5. AGRSMI	4		
6.			
7.			
8.			
9.			
10.			
	60 = Total Cover		

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 40

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: No hydrophytic species

SOIL

Sampling Point: U WTRVHA003

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks: No pit — no hydric indicators, no hydrophytic plant species

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No hydrology present

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 303.48 City/County: Harding County Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0004_W1

Investigator(s): C. Westfall (Desktop) Section, Township, Range: S27, T21N, R3E

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): G Lat: 45.754745 Long: -103.740043 Datum: WGS84

Soil Map Unit Name: SD063-SaA NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Wetland fringe in the bottom of Dry House Creek. Desktop form based on nearby wetland data forms, Web Soil Survey, and site notes taken in 2009 and 2019. To date, all wetland indicators have not been field verified at this site. Similar field datasheet(s) used: 0802619HA001.

Photos: No Photos Associated Plots: W0004_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Spartina pectinata*	50	✓	FACW
2. *Schoenoplectus tabernaemontani*	12	✓	OBL
3. *Hordeum jubatum*	10		FACW
4. *Puccinellia nuttalliana*	10		OBL
5. *Melilotus officinalis*	8		FACU
6. *Poa pratensis*	8		FACU
7.			
8.			
9.			
10.			
	98	= Total Cover	
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	22	x 1 =	22
FACW Species	60	x 2 =	120
FAC Species		x 3 =	
FACU Species	16	x 4 =	64
UPL Species		x 5 =	
Column Totals	98 (A)		206 (B)

Prevalence Index (B/A) = 2.10

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Desktop assessment of vegetation was determined to be similar to that of field data form: W0802619HA001. Field map notes of plant species in 2009 and 2019 were also used to select accurate plant species in the area.

SOIL

Sampling Point: W0004_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 5	10YR 4/2	70	5YR 4/6	30	C	M	CL	
5 - 20	10YR 3/1	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Desktop assessment of soils were determined to be similar to that of field data form: W0802619HA001. Soil determinations were supported by field map notes from 2009 and 2019 as well as NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 10

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of field data form: W0802619HA001. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 303.48 City/County: Harding County Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0004_U1

Investigator(s): C. Westfall (Desktop) Section, Township, Range: S27, T21N, R3E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 4

Subregion (LRR): G Lat: 45.754745 Long: -103.740043 Datum: WGS84

Soil Map Unit Name: SD063-SaA NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Wetland fringe in the bottom of Dry House Creek. Desktop form based on nearby wetland data forms, Web Soil Survey, and site notes taken in 2009 and 2019. To date, all wetland indicators have not been field verified at this site. Similar field datasheet(s) used: 0802619HA001.

Photos: No Photos Associated Plots: W0004_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1. *Symphoricarpos occidentalis*	4		UPL
2. *Artemisia cana*	3		FACU
3.			
4.			
5.			
	7 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Agropyron smithii*	25	✓	FACU
2. *Agropyron cristatum*	18	✓	(UPL)
3. *Melilotus officinalis*	18		FACU
4. *Poa pratensis*	10		FACU
5. *Bouteloua gracilis*	8		(UPL)
6. *Carex filifolia*	8		(UPL)
7. *Artemisia ludoviciana*	5		UPL
8. *Symphyotrichum falcatum*	5		FACU
9.			
10.			
	97 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 6

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	61	x 4 =	244
UPL Species	43	x 5 =	215
Column Totals	104 (A)		459 (B)

Prevalence Index (B/A) = 4.41

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Desktop assessment of vegetation was determined to be similar to that of field data form: W0802619HA001. Field map notes of plant species in 2009 and 2019 were also used to select accurate plant species in the area.

SOIL

Sampling Point: W0004_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 3/2	100					L	
10 - 20	7.5YR 4/2	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ **No** ✓

Remarks: Desktop assessment of soils were determined to be similar to that of field data form: W0802619HA001. Soil determinations were supported by field map notes from 2009 and 2019 as well as NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of field data form: W0802619HA001. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WETLAND DETERMINATION DATA FORM – Great Plains Region

wetland plot

Project/Site: Keystone XL - Phase IV City/~~County~~: Harding Sampling Date: 11/4/10

Applicant/Owner: TransCanada - Trow State: SD Sampling Point: W500 HA002

Investigator(s): B500 Section, Township, Range: Sec11, 19N, 4E

Landform (hillslope, terrace, etc.): valley Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR): Northern Great Plains Lat: — Long: — Datum: —

Soil Map Unit Name: — NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: PEM wetland w/in valley, transforms into strean down grade.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: NA)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: NA)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 5')			
1.			
2. Distichlis spicata	25	Y	FacW
3. Juncus sp.	20	Y	fac
4. Carex sp.	15	Y	fac
5.			
6.			
7.			
8.			
9.			
10.			
	60 = Total Cover		
Woody Vine Stratum (Plot size: NA)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 10%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- X 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

Wetland

SOIL

Sampling Point: W500HA002

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR4/1	100					Sandy loam	
4-15	10YR 5/1	95	10YR5/6	5	C	M	Sandy clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 1"

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): Surface

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Upland

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL-Phase IV ~~City~~/County: Harding Sampling Date: 11/4/10

Applicant/Owner: Trans Canada-Trow State: SD Sampling Point: W500HA002

Investigator(s): B.500 Section, Township, Range: Sec 11, 19N, 4E

Landform (hillslope, terrace, etc.): — Local relief (concave, convex, none): NA Slope (%): 5

Subregion (LRR): Northern Great Plains Lat: — Long: — Datum: —

Soil Map Unit Name: — NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Alone valley pasture/Rangeland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: NA)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: NA)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Schizachyrium scoparium	10	Y	FACU
2. Vassella viridula	8	Y	NI
3. Artemisia campestris	5	N	NI
4. Pascopyrum smithii	10	Y	NI
5.			
6.			
7.			
8.			
9.			
10.			
	33 = Total Cover		
Woody Vine Stratum (Plot size: NA)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 3

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

__ 2 - Dominance Test is >50%

__ 3 - Prevalence Index is ≤3.0[1]

__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

upland

SOIL

Sampling Point: WS001HA002

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/1	100%					Sandy loam	
8-15	10YR 4/1	100%					Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

W302HA002
PEM

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL pipeline City/County: HARDING Co. Sampling Date: 7.16.12
Applicant/Owner: State: SD Sampling Point: wetland
Investigator(s): B10 302 Section, Township, Range: MP ~ 332.3
Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%): 0-2%
Subregion (LRR): LRR-G Lat: Long: Datum:
Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✗ No ____ (If no, explain in Remarks.)
Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ✗ No ____
Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✗ No ____	Is the Sampled Area within a Wetland? Yes ✗ No ____
Hydric Soil Present?	Yes ✗ No ____	
Wetland Hydrology Present?	Yes ✗ No ____	

Remarks:
PEM in drainageway

photos: -001 SE -005 Corps plot
-002 NE -006 upland
-003 NW
-004 SW

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1.			
2. eleocharis palustris	50%	✗	OBL
3. spartina pectinata	50%	✗	facW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		
% Bare Ground in Herb Stratum ____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✗ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✗ No ____

Remarks:
PEM in drainageway w/ weak OHWM - but areas of wetland + standing water. Unknown if continues downgradient to other W.O.U.S. - can't go off ROW.

W302HA 002 (cont.)

SOIL

Sampling Point: wetland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-1"								thick roots
2"-19"	2.5YR 4/2	90%	2.5YR 6/6	5%	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:
thick decay -

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: wet / ponded soils in drainageway.

W302HA002

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL pipeline City/County: Harding Co., SD Sampling Date: 7.16.12

Applicant/Owner: State: SD Sampling Point: Upland

Investigator(s): Biw 302 Section, Township, Range: MP 332.3

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%): 0-2%

Subregion (LRR): LRR-G Lat: Long: Datum:

Soil Map Unit Name: NWI classification: upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	Is the Sampled Area within a Wetland? Yes No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Remarks: @ higher elevation out of drainage, loose wetland criteria.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5' rad)			
1.			
2. Bromis inermis	80%	X	
3. Chokecherry - prunis	20%	X	
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		
% Bare Ground in Herb Stratum			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): Ø (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No X

Remarks:

W302HA002 (cont.)

SOIL

Sampling Point: upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
	Same as No mottles/concentrations or depletions							

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 345.29 City/County: Harding County Sampling Date: 8/6/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0806619HA002_W1

Investigator(s): P. Christensen, D. Culwell II Section, Township, Range: S23, T16N, R7E

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): G Lat: 45.3286634564716 Long: -103.22419234583 Datum: WGS84

Soil Map Unit Name: SD063 – PbB NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Photos: PC325 Associated Plots: W0806619HA002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Beckmannia syzigachne*	30	✓	OBL
2. *Eleocharis palustris*	30	✓	OBL
3. *Rumex crispus*	20	✓	FAC
4. *Hordeum jubatum*	5		FACW
5.			
6.			
7.			
8.			
9.			
10.			
	85 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 15

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	60	x 1 =	60
FACW Species	5	x 2 =	10
FAC Species	20	x 3 =	60
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	85 (A)		130 (B)

Prevalence Index (B/A) = 1.53

Hydrophytic Vegetation Indicators:

- [x] 1 – Rapid Test for Hydrophytic Vegetation
- [x] 2 – Dominance Test is >50%
- [x] 3 – Prevalence Index is ≤3.0[1]
- [ ] 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0806619HA002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	5Y 3/1	100					LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☑ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☑ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 8

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 345.29 City/County: Harding County Sampling Date: 8/6/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0806619HA002_W1

Investigator(s): P. Christensen, D. Culwell II Section, Township, Range: S23, T16N, R7E

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): G Lat: 45.3286634564716 Long: -103.22419234583 Datum: WGS84

Soil Map Unit Name: SD063 – PbB NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Photos: PC325 Associated Plots: W0806619HA002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Beckmannia syzigachne*	30	✓	OBL
2. *Eleocharis palustris*	30	✓	OBL
3. *Rumex crispus*	20	✓	FAC
4. *Hordeum jubatum*	5		FACW
5.			
6.			
7.			
8.			
9.			
10.			
	85 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 15

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	60	x 1 =	60
FACW Species	5	x 2 =	10
FAC Species	20	x 3 =	60
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	85 (A)		130 (B)

Prevalence Index (B/A) = 1.53

Hydrophytic Vegetation Indicators:

- [x] 1 – Rapid Test for Hydrophytic Vegetation
- [x] 2 – Dominance Test is >50%
- [x] 3 – Prevalence Index is ≤3.0[1]
- [ ] 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0806619HA002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	5Y 3/1	100					LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☑ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☑ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 8

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 345.29 City/County: Harding County Sampling Date: 8/6/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0806619HA002_U1

Investigator(s): P. Christensen, D. Culwell II Section, Township, Range: S23, T16N, R7E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): G Lat: 45.328628156182 Long: -103.224148867 Datum: WGS84

Soil Map Unit Name: SD063 – PbB NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: PC326 Associated Plots: W0806619HA002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Lotus corniculatus*	60	✓	FACU
2. *Pediomelum argophyllum*	20	✓	(UPL)
3. *Achillea millefolium*	10		FACU
4. *Poa pratensis*	10		FACU
5. *Bromus tectorum*	5		(UPL)
6.			
7.			
8.			
9.			
10.			
	105 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	80	x 4 =	320
UPL Species	25	x 5 =	125
Column Totals	105 (A)		445 (B)

Prevalence Index (B/A) = 4.24

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0806619HA002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	5Y 3/2	100					LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 345.29 City/County: Harding County Sampling Date: 8/6/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0806619HA002_U1

Investigator(s): P. Christensen, D. Culwell II Section, Township, Range: S23, T16N, R7E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): G Lat: 45.328628156182 Long: -103.224148867 Datum: WGS84

Soil Map Unit Name: SD063 – PbB NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: PC326 Associated Plots: W0806619HA002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Lotus corniculatus*	60	✓	FACU
2. *Pediomelum argophyllum*	20	✓	(UPL)
3. *Achillea millefolium*	10		FACU
4. *Poa pratensis*	10		FACU
5. *Bromus tectorum*	5		(UPL)
6.			
7.			
8.			
9.			
10.			
	105 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	80	x 4 =	320
UPL Species	25	x 5 =	125
Column Totals	105 (A)		445 (B)

Prevalence Index (B/A) = 4.24

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0806619HA002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	5Y 3/2	100					LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Site is exp feature: W23HA002

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: MP 351.73-351.80 MLSDHA0332 City/County: Harding Sampling Date: 6.18.2013

Applicant/Owner: KYL State: SD Sampling Point: WWTRVHA011

Investigator(s): J. Beaver L. LaBen Section, Township, Range: _____

Landform (hillslope, terrace, etc.): channel, floodplain Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	Is the Sampled Area within a Wetland? Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Large saline wetland on overflow terrace surrounding Spring Creek. Probably not perennial surface H_2O although groundwater likely always present. Photos: JB 1196, 97, 98, 99, 1201, 1208

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot size: 0.01 A)			
1. Schpur	45	X	OBL
2. Disspi	15		FACW
3. Sparec	1		FACW
4. Horjub	1		FACW
5.			
6.			
7.			
8.			
9.			
10.			
	62 = Total Cover		

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC–): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks: Note that Schame in wettest parts of channel. Large salt flat adjacent to channel are 90-100% Disspi.

SOIL

Sampling Point: WNTRVHA011

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	2.5Y 4/2	100	—	—	—	—	Loamy Sand	
3-16	Gley1 3/10Y	85	10YR 3/6	15	C	M	SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- X Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: NO

Depth (inches): —

Hydric Soil Present? Yes X No ___

Remarks: Sandy to sandy clay loam. Redox features + gleying
Extra soil pit in Disspi flat. 0-3" = 10YR 3/2 / 3-16+ = 10YR 4/2, H_2O @ 12" leaking in pit

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1)
- X Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- X Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 2-12

Water Table Present? Yes X No ___ Depth (inches): 10

Saturation Present? (includes capillary fringe) Yes Y No ___ Depth (inches): @ 10

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water present in main channel up to 12" deep. Also ponded in oxbows + old channel depressions.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: MP 351.50-351.80 MLSD HA 0332 City/County: Harding Sampling Date: 6.18.2013
Applicant/Owner: KXL State: SD Sampling Point: UWTRV HA011
Investigator(s): L. Larsen J Beaver Section, Township, Range: _____
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): straight Slope (%): 3-4
Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____
Soil Map Unit Name: _____ NWI classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	Is the Sampled Area within a Wetland? Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Terrace / slope adjacent to wetland

JB 1192

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. ARTCAN	8		
2.			
3.			
4.			
5.			
	8 = Total Cover		
Herb Stratum (Plot size: _____)			
1. AGRSMI	8		FACU
2. BOUGRA	12	X	NI
3. CAREIL	15	X	NI
4. ARTFRI	4		
5. STICOM	10	X	NI
6. POAARG	3		
7. CALLON	6		
8.			
9.			
10.			
	58 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: No hydrophytes – typical upland assemblage

SOIL

Sampling Point: UWJTRUHA011

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks: No pit (no hydrophytic vegetation / hydrology)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No hydrologic indicators

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 359.33 City/County: Butte County Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W_UTM13_05228_W1

Investigator(s): C. Westfall (Desktop) Section, Township, Range: S3, T14N, R9E

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave Slope (%): 3

Subregion (LRR): G Lat: 45.205001 Long: -103.003002 Datum: WGS84

Soil Map Unit Name: SD019-Bd NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Herbaceous wetland bottom of tributary to the North Fork Moreau River. Desktop form based on nearby wetland data forms, Web Soil Survey, aerial imagery, and site notes taken in 2009. To date, all wetland indicators have not been field verified at this site. Similar field datasheet(s) used: W0806619HA001.
Photos: No Photos Associated Plots: W_UTM13_05228_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Juncus balticus*	30	✓	FACW
2. *Distichlis spicata*	20	✓	FACW
3. *Beckmannia syzigachne*	15	✓	OBL
4. *Hordeum jubatum*	15	✓	FACW
5. *Rumex crispus*	10		FAC
6.			
7.			
8.			
9.			
10.			
	90 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 2

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	15	x 1 =	15
FACW Species	65	x 2 =	130
FAC Species	10	x 3 =	30
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	90 (A)		175 (B)

Prevalence Index (B/A) = 1.94

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Desktop assessment of vegetation was determined to be similar to that of field data form: W0806619HA001. Field map notes of plant species in 2009 and 2019 were also used to select accurate plant species in the area.

SOIL

Sampling Point: W_UTM13_05228_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 5	10YR 4/1	70	5YR 4/6	30	C	M	SiCL	
5 - 20	10YR 3/1	100					L	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Desktop assessment of soils were determined to be similar to that of field data form: W0806619HA001. Soil determinations were supported by field map notes from 2009 as well as NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 8

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of field data form: W0806619HA001. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 359.33 City/County: Butte County Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W_UTM13_05228_U1

Investigator(s): C. Westfall (Desktop) Section, Township, Range: S3, T14N, R9E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): convex Slope (%): 5

Subregion (LRR): G Lat: 45.205001 Long: -103.003002 Datum: WGS84

Soil Map Unit Name: SD019-Bd NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Herbaceous wetland bottom of tributary to the North Fork Moreau River. Desktop form based on nearby wetland data forms, Web Soil Survey, aerial imagery, and site notes taken in 2009. To date, all wetland indicators have not been field verified at this site. Similar field datasheet(s) used: W0806619HA001.

Photos: No Photos Associated Plots: W_UTM13_05228_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Lotus corniculatus*	30	✓	FACU
2. *Agropyron smithii*	20	✓	FACU
3. *Bromus inermis*	18	✓	UPL
4. *Poa secunda*	12		FACU
5. *Carex filifolia*	8		(UPL)
6. *Artemisia frigida*	5		(UPL)
7.			
8.			
9.			
10.			
	93 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 8

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	62	x 4 =	248
UPL Species	31	x 5 =	155
Column Totals	93 (A)		403 (B)

Prevalence Index (B/A) = 4.33

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Desktop assessment of vegetation was determined to be similar to that of field data form: W0806619HA001. Field map notes of plant species in 2009 and 2019 were also used to select accurate plant species in the area.

SOIL

Sampling Point: W_UTM13_05228_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 15	5Y 3/3	100					L	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Desktop assessment of soils were determined to be similar to that of field data form: W0806619HA001. Soil determinations were supported by field map notes from 2009 as well as NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of field data form: W0806619HA001. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WL-SA-ME-00538

US67ME003

WETLAND PLOT

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL IV City/County: MEADE Sampling Date: 10/20

State: SD Sampling Point:

Applicant/Owner:

Investigator(s): Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		

Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		

Herb Stratum (Plot size: ____)			
1. SPARTINA PECTINATA	80	Y	OBL
2. Juncus spp.	10	N	OBL
3. CAREX spp.	5	N	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	____ = Total Cover		

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	95	x 1 = 95
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	95 (A)	95 (B)

Prevalence Index = B/A = 1

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

Sampling Point: _____

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	3/2 A1	70	~~Bla~~ 4/6	30	RM			
5-15	3/3		Gley 5N	35				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- X Histosol (A1)
- ___ Histic Epipedon (A2)
- X Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- X Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- X Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 10

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

ML-50-ME-00530

WETLAND DETERMINATION DATA FORM – Great Plains Region

WS67ME003 UPLAND

Project/Site: KXL IV City/County: MEADE Sampling Date: 10/20

State: SD Sampling Point:

Applicant/Owner:

Investigator(s): Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		

Sapling/Shrub Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. SAGE	20	N	UPL
2. WESTERN WHEATGRASS	40	Y	FAC
3. NEEDLE GRASS	20	N	UPL
4. SETARIA	40	Y	FACU
5.			
	____ = Total Cover		

Herb Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	____ = Total Cover		

Woody Vine Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ____

Remarks:

Sampling Point: _____

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-15	4-6 10YR	100	NONE					

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WS67ME004

WETLAND

ML-SA-ME 0055 0.000

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL IV City/County: MEADE Sampling Date: 10/20

Applicant/Owner: State: SD Sampling Point:

Investigator(s): Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		

Sapling/Shrub Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. RED OSIER	20	Y	FACW
2.			
3.			
4.			
5.			
	____ = Total Cover		

Herb Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. SPARTINA PECTINATA	80	Y	OBL
2. CAREX SPP.	10	N	OBL
3. JUNCUS	5	N	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	____ = Total Cover		

Woody Vine Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

Sampling Point: _____

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	3/2 10YR	60	4/6 10YR	40	D			
6-15	3/2 10YR	60	GLEY1 5N	40	RM			

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- X Histosol (A1)
- X Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- X Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 12

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

ML-SD-MB-0055D

WS67ME004

UPLAND

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL IV City/County: MEADE Sampling Date: 10/20

Applicant/Owner: State: SD Sampling Point:

Investigator(s): Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		

Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		

Herb Stratum (Plot size: ____)			
1. SAGE	60	Y	UPL
2. WESTERN WHEATGRASS	20	N	FAC
3. RUDBECKIA	5	N	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	____ = Total Cover		

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

Sampling Point: _____

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-15	3/3 10YR	100	—					

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 428.27 City/County: Meade County Sampling Date: 6/14/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0614618ME001_W1

Investigator(s): C. Baker, C. Griffith Section, Township, Range: S3, T006N, R017E

Landform (hillslope, terrace, etc.): oxbow Local relief (concave, convex, none): concave Slope (%): <1

Subregion (LRR): G Lat: 44.5150760312 Long: -102.046337313 Datum: WGS84

Soil Map Unit Name: SD601 – Lg NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Marginal WL

Photos: CB291 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Spartina pectinata*	60	✓	FACW
2. *Poa pratensis*	15		FACU
3. *Hordeum jubatum*	8		FACW
4. *Juncus balticus*	2		FACW
5.			
6.			
7.			
8.			
9.			
10.			
	85	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 8

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	70	x 2 =	140
FAC Species		x 3 =	
FACU Species	15	x 4 =	60
UPL Species		x 5 =	
Column Totals	85 (A)		200 (B)

Prevalence Index (B/A) = 2.35

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0614618ME001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☑ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Dry at surface but saturated below 4".

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☑ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 4

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Marginal hydrology currently, but has been inundated this spring.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 428.28 City/County: Meade County Sampling Date: 6/14/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0614618ME001_U1

Investigator(s): C. Baker, C. Griffith Section, Township, Range: S3, T006N, R017E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): <1

Subregion (LRR): G Lat: 44.5150713001 Long: -102.046027105 Datum: WGS84

Soil Map Unit Name: SD601 – Lg NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: CB292 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1. *Artemisia cana*	1		
2.			
3.			
4.			
5.			
	1 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Agropyron cristatum*	50	✓	(UPL)
2. *Symphoricarpos occidentalis*	40		UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	90 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 9

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species	90	x 5 =	450
Column Totals	90 (A)		450 (B)

Prevalence Index (B/A) = 5.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0614618ME001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 3/2	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 428.37 City/County: Meade County Sampling Date: 6/14/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0614618ME002_W1

Investigator(s): C. Baker, C. Griffith Section, Township, Range: S3, T006N, R017E

Landform (hillslope, terrace, etc.): channel Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): G Lat: 44.5149592485 Long: -102.044241808 Datum: WGS84

Soil Map Unit Name: SD601 – Lg NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Photos: CB295 - CB296 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Schoenoplectus americanus*	50	✓	OBL
2. *Spartina pectinata*	28		FACW
3. *Juncus balticus*	6		FACW
4. *Poa pratensis*	5		FACU
5.			
6.			
7.			
8.			
9.			
10.			
	89	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 11

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50	x 1 =	50
FACW Species	34	x 2 =	68
FAC Species		x 3 =	
FACU Species	5	x 4 =	20
UPL Species		x 5 =	
Column Totals	89 (A)		138 (B)

Prevalence Index (B/A) = 1.55

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: SCH AME growing within saturated/inundated portion of stream channel.

SOIL

Sampling Point: W0614618ME002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	7.5YR 3/3	100					SiL	completely saturated, hard to read

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☑ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks: Fine-textured saturated soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☑ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 1
Water Table Present?	Yes ✓	No ____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 440.67 City/County: Haakon County Sampling Date: 6/14/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0614620HK002_W1

Investigator(s): D. Culwell II, A. Admiraal Section, Township, Range: S5, T005N, R019E

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): G Lat: 44.42493485 Long: -101.853635622 Datum: WGS84

Soil Map Unit Name: SD055 – OvA NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Wet swale above pond.

Photos: DC4625 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 50')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 20' x 50')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 20' x 50')			
1. *Hordeum jubatum*	65	✓	FACW
2. *Eleocharis palustris*	20	✓	OBL
3. *Distichlis spicata*	15		FACW
4. *Poa arida*	15		FAC
5. *Bolboschoenus maritimus*	6		OBL
6.			
7.			
8.			
9.			
10.			
	121 = Total Cover		
Vine Stratum (Plot size: 20' x 50')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 25

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	26	x 1 =	26
FACW Species	80	x 2 =	160
FAC Species	15	x 3 =	45
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	121 (A)		231 (B)

Prevalence Index (B/A) = 1.91

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Low diversity wetland dominated by hydrophytic species.

SOIL

Sampling Point: W0614620HK002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	7.5YR 2.5/1	100					SC	
2 - 8	10YR 2/2	90	7.5YR 6/8	10	C	PL	SC	
8 - 18	10YR 3/2	80	7.5YR 6/8	20	C	PL	SC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks: More saline or sodic than W0614620HK001

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☑ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Drainage from culvert down to pond.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 440.67 City/County: Haakon County Sampling Date: 6/14/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0614620HK002_U1

Investigator(s): D. Culwell II, A. Admiraal Section, Township, Range: S5, T005N, R019E

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): convex Slope (%): _____

Subregion (LRR): G Lat: 44.4248443307 Long: -101.853561017 Datum: WGS84

Soil Map Unit Name: SD055 – OvA NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Side slope above swale.

Photos: DC4626 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Agropyron smithii*	25	✓	FACU
2. *Buchloe dactyloides*	25	✓	FACU
3. *Poa pratensis*	20	✓	FACU
4. *Achillea millefolium*	10		FACU
5. *Cirsium undulatum*	5		FACU
6. *Ratibida columnifera*	3		(UPL)
7.			
8.			
9.			
10.			
	88	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 25

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	85	x 4 =	340
UPL Species	3	x 5 =	15
Column Totals	88 (A)		355 (B)

Prevalence Index (B/A) = 4.03

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Dominated by upland species.

SOIL

Sampling Point: W0614620HK002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	7.5YR 3/2	100					L	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Drains toward wetland.

WETLAND DETERMINATION DATA FORM

Feature ID# W8AHK002

Survey Type: Centerline: ☐ **Re-Route:** ☐ **Access Road** (explain): ☐ **CAR ID:** **Ancillary Facility (explain):** ☐
T-Line ☐ **Other** (explain)

Survey Description:

Centerline ID#: 20080616CL **Date:** 7/5/08 **Client/ Project Name:** KEYSTONE-XL-10623-007-803A

Investigators: Wood/ Freeborough **Team No.** 8A **Milepost:** 480.5 **Tract No.** ML-SD-HK-11829.000

State/County: SD/ Haakon **Section, Township, Range:** T1N R25E S4

Lat/Long: 44.0784/-101.1168 **Quad Name:** Midland SE **Region:** Western Great Plains

Subregion (LRR or MLRA): LRR G **Datum:** NAD 83 **Soil Map Name:** Ab

NWI classification: PEM **Landform (hillslope, terrace, etc.):** Channel

Local relief: ☒ **concave** ☐ **convex** ☐ **none** **Slope (%):** Depressional

Logbook No.: 2 **Logbook Page No.:** 115 **Picture No.** W8AHK002_SE,S,N

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (if no explain in remarks)

Are "Normal Circumstances" present? Yes ☐ No ☒ (If no, explain in remarks.)

Is Vegetation ☐ **Soil** ☐ **Hydrology** ☐ **"Significantly Disturbed"?** No ☒ (If yes, explain in remarks**)**

Is Vegetation ☐ **Soil** ☐ **Hydrology** ☐ **"Naturally Problematic"?** No ☒ (If yes, explain in remarks.)

Wetland Type: PFO ☐ PSS ☐ PEM ☒ Other ☐ (explain)

Remarks: The wetland is formed by an abandoned meander of the Bad River. Road and railroad grades have cut off meander from river. The longitudinal arms of the meander (out of row) have surface water. The point of the meander where wetland was delineated does not have much, if any, surface water.

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover:			

Sapling/Shrub Stratum ( )			
1.			
2.			
3.			
4.			
5.			
6.			
Total Cover:			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species:	X 1 =
FACW species:	X 2 =
FAC species	X 3 =
FACU species	X 4 =
UPL species	X 5 =
Column Totals: (B)	(B)
	PI = B/A =

WETLAND DETERMINATION DATA FORM **Feature ID# W8AHK002**

Herb Stratum (_____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Typha latifolia	60	Yes	OBL
2. Unk. Weedy Annuals	30	Yes	?
3. Rumex sp.	2	Yes	FACW, FACU
4. Field pennycress			
5.			
6.			
7.			
8.			
9.			
Total Cover:	92		

Woody Vine Stratum (____)

1.
2.
3.
4.
5.

Total Cover:

Hydrophytic Vegetation Present?
Yes ☒ No ☐

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation
☒ Dominance Test is ≥50%
☐ Prevalence Index is ≤3.0[1]
☐ Morphological Adaptations (explain in remarks)
☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Nonvascular Plants (Wetland Specialists) (WM):
(10 inch x 10 inch sample frames)

1. % wetland specialist bryophytes
2. % wetland specialist bryophytes
3. % wetland specialist bryophytes

_____**Mean % wetland specialist bryophytes**

Remarks: (If observed, list morphological adaptations below):

Looks as if vegetation died back significantly in past years drought. A few cattails and rumex sp. Comin this year. Past evidence of thick cattail and unk. Weedy annual remains present as well.

WETLAND DETERMINATION DATA FORM **Feature ID# W8AHK002**

HYDROLOGY (check all that apply)
Region Code: WM-Western Mountain; AW–Arid West; GP-Great Plains; A&G –Atl & Gulf Coast; M-Midwest; NCNE-Northcentral Northeast

Always Primary Indicators (minimum of one required)	Always Secondary (minimum of two required)
☐ Surface Water (A1) (All)	☐ Drainage Patterns (B10) (All)
☐ High Water Table (A2) (All)	☐ Moss Trim Lines (B16) (A&G, NCNE)
☐ Saturation (A3) (All)	☐ Crayfish Burrows (C8) (All but WM)
☒ Algal Mat or Crust (B4) (All but AW)	☐ Saturation Visible on Aerial Imagery (C9) (All)
☐ Iron Deposits (B5) (All but AW)	☒ Geomorphic Position (D2) (All but AW)
☐ Inundation Visible on Aerial Imagery (B7) (All)	☐ Shallow Aquitard (D3) (WM, AW, A&G, NCNE)
☐ Salt Crust (B11) (AW, WM, GP)	☐ FAC-Neutral Test (D5) (All)
☐ Biotic Crust (B12) (AW)	☐ Frost-heave Hummocks (D7) (WM, GP:LRR F)
☐ Aquatic Fauna/Invertebrates (B13) (All)	
☐ True Aquatic Plants (B14) (M)	
☐ Marl Deposits (B15) (AW, A&G LRR U, NCNE)	
☐ Hydrogen Sulfide Odor (C1) (All)	
☐ Presence of Reduced Iron (C4) (All)	
☐ Recent Iron Reduction in Tilled Soils (C6) (All but GP)	

Primary or Secondary in different regions	Primary Regions	Secondary Regions
Water Marks (B1)	☐ All but AW riverine	☐ AW riverine
Sediment Deposits (B2)	☐ All but AW riverine	☐ AW riverine
Drift Deposits (B3)	☐ All but AW Riverine	☐ AW Riverine
Surface Soil Cracks (B6)	☐ WM & AW	☒ GP, A&G, M
Sparsely Vegetated Concave Surface (B8)	☐ M	☐ WM, AW, GP, A&G
Water-Stained Leaves (B9)	☐ AW, WM, GP, A&G, M	☐ WM: MLRA 1, 2, 4A, 4B
Dry-Season Water Table (C2)	☐ GP	☐ WM, AW, A&G, NCNE
Oxidized Rhizospheres on Living Roots (C3)	☐ All but GP tilled	☒ GP tilled
Thin Muck Surface (C7)	☐ A&G, NCNE	☐ AW, GP
Stunted/Stressed Plants (D1)	☐ AW (LRR A)	☐ NCNE

Other (Explain in Remarks)

Field Observations:	Wetland Hydrology Present?
Surface Water Present? Yes ☐ No ☒ Depth (inches):_____	
Water Table Present? Yes ☐ No ☒ Depth (inches):____	**Yes** ☒ **No** ☐
Saturation Present? Yes ☒ No ☐ Depth (inches):___2__	
(includes capillary fringe)	

Remarks: Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections)
Abandoned river meander (Oxbow)

WETLAND DETERMINATION DATA FORM **Feature ID# W8AHK002**

HYDRIC SOIL

Soil Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	2.5 YR 4/2		10YR 3/2	50	C	M	Clay	
6+	2.5 YR 4/2		10YR 3/2	25	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered Sand or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators (check all that apply)

Region Code: WM-Western Mountain; AW–Arid West; GP-Great Plains; A&G –Atl & Gulf Coast; M-Midwest; NCNE-Northcentral Northeast

Histosol (A1) (All)	☐	Polyvalue Below Surface (S8) (A&G LRR S, T, U; NCNE LRR R, 149B, Problem LRR K, L)	☐
Histic Epipedon (A2) (All)	☐	Thin Dark Surface (S9) (A&G LRR S, T, U; NCNE LRR R, 149B, Problem LRR K, L)	☐
Black Histic (A3) (All except NCNE MLRA 143 of LRR R)	☐	Loamy Mucky Mineral (F1) (WM except MLRA1; A, GP, M, A&G LRR O; NCNE LRR K, L)	☐
Hydrogen Sulfide (A4) (All)	☐	Loamy Gleyed Matrix (F2) (All)	☒
Stratified Layers (A5) (A&G, M, AW LRR C, GP LRR F, NCNE)	☐	Depleted Matrix (F3) (All)	☐
Organic Bodies (A6) (A&G LRR P, T, U)	☐	Redox Dark Surface (F6) (All)	☐
5 cm Mucky Mineral (A7) (A&G LRR P, T, U)	☐	Depleted Dark Surface (F7) (All)	☐
Muck Presence (A8) (A&G LRR U)	☐	Redox Depressions (F8) (All)	☐
1 cm Muck (A9) (LRR D, F, G H, P, T; Problem C, I, J, O)	☐	Vernal Pools (F9) (Arid)	☐
2 cm Muck (A10) (M; Problem WM, AW LRR B, A&G LRR S, NCNE LRR K L 149B of S)	☐	Marl (F10) (A&G LRR U)	☐
Depleted Below Dark Surface (A11) (All)	☐	Depleted Ochric (F11) (A&G MLRA 151)	☐
Thick Dark Surface (A12) (All)	☐	Iron-Manganese Masses (F12) (A&G LRR O, P, T; Problem in M, NCNE)	☐
Coast Prairie Redox (A16) (A&G MLRA 150A; Problem GP LRR F, G, H; M Problem; Problem NCNE except 149B of LRR S)	☐	Umbric Surface (F13) (A&G LRR P, T, U)	☐
Sandy Mucky Mineral (S1) (All except A&G LRRs O&S only)	☐	High Plains Depressions (F16) (GP MLRA 72, 73; Problem in rest of LRR H)	☐
2.5 cm Mucky Peat or Peat (S2) (GP LRR G, H)	☐	Delta Ochric (F17) (A&G MLRA 151)	☐
5 cm Mucky Peat or Peat (S3) (GP LRR F; NCNE Problem)	☐	Reduced Vertic (F18) (A&G MLRA 150A, 150B) (AW, GP, A&G)	☐
Sandy Gleyed Matrix (S4) (All)	☐	Piedmont Floodplain Soils (F19) (A&G: MLRA 149A; Problem in LRR P, S, T)	☐
Sandy Redox (S5) (All)	☐	Anomalous Bright Loamy Soils (F20) (A&G MLRA 149A, 153C, 153D; Problem in MLRA 153B)	☐
Stripped Matrix (S6) (All)	☐	Red Parent Material (TF2) (Problem in All but M)	☐
Dark Surface (S7) (A&G LRR P, S, T, U; GP Problem in LRR G; NCNE MLRA 149B, Problem LRR K, L)	☐	Other (Explain in Remarks)	☐

Problematic Hydric Soil? Yes ☒ (explain in remarks) No ☐

Hydric Soil Criteria (1)_____(2A)_____(2 (B)(1)_____(2 (B)(2)_____(2 (B)(3)_____(3)_____(4)_____

Restrictive Layer Present? Yes ☐ (explain in remarks) No ☒

Hydric Soil Present? Yes ☒ No ☐

Remarks: Abandoned meander has been isolated by road bed and/or geomorphology. The wetland is formed by an abandoned meander of the Bad River. Road and railroad grades have cut off meander from river. The longitudinal arms of the meander (out of row) have surface water. The point of the meander where wetland was delineated does not have much if any surface water. A low quality wetland due to drought or dewatering. Vegetative community showing definite signs of stress/dieback in ROW. Higher quality wetlands are adjacent to the east and west.

WETLAND DETERMINATION DATA FORM **Feature ID# W8AHK002**

JURISDICTIONAL DETERMINATION

Is This Sampling Point Within a Wetland? Yes ☒ No ☐ | **Is This An Isolated Wetland?** Yes ☐ No ☐ Unknown ☒

Is Wetland Adjacent to ☐ **or Abutting** ☐ **Associated Waterbody?** (explain in remarks) Unknown ☒

Associated Waterbody Name or Feature ID#

Separated by berm or barrier? Yes ☒ No ☐ Unknown ☐

Flow between Wetland and Waterbody is: Perennial ☐ Intermittent ☐ Ephemeral ☐ No Flow ☒ Unknown ☐

Surface flow between Wetland and Waterbody is:
Discreet ☐ Confined ☐ Discrete and Confined ☐ Overland Sheet-flow ☐ No Flow ☒ Unknown ☐

Direction of Surface flow between Wetland and Waterbody is:
From Wetland to Waterbody ☐ From Waterbody to Wetland ☐ Both To/From Wetland to Waterbody ☐ No Flow ☒ Unknown ☐

Subsurface Connection Yes (explain in remarks) ☒ No ☐ Unknown ☐ PROBABLY?

Surface Water Appearance?

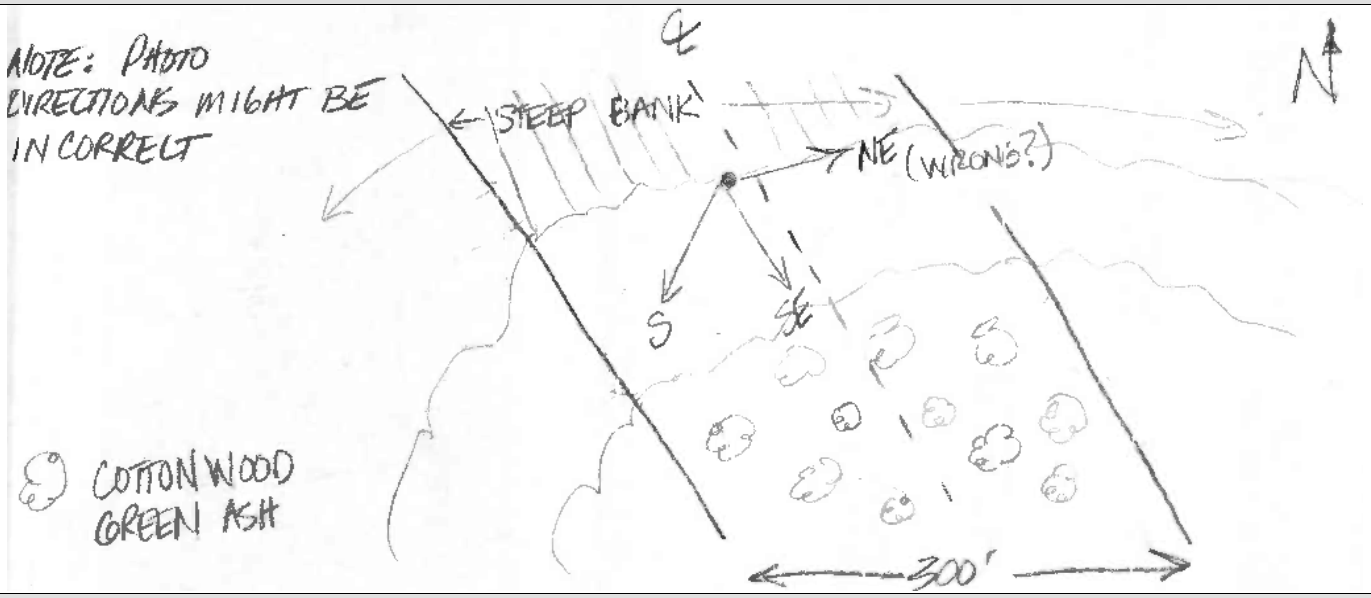
No Water ☐ Clear ☐ Floating Algal Mats ☐ Greenish Color ☐ Surface Scum ☐ Slightly Turbid ☐ Turbid ☐ Very Turbid ☐

Wetland Supports riparian buffer? Yes ☐ No ☒ If yes, width of buffer?

Wetland Quality: High ☐ Medium ☐ Low ☒ (please explain designation in remarks)

Remarks:

Field Sketch: (Please include Directional & North Arrow, Centerline, Length of Feature, Distances from Centerline, Photo Location, and Survey Corridor



Describe Habitat Characteristics (include overall habitat characteristics, aquatic and terrestrial diversity, etc., and provide unique descriptors):

Wetland appears to be impacted by drought; Reduced surface water might have led to decreased cattail survival , invasion by weedy annual spp. However, wetland on CL is adjacent to wetlands w/ surface water to the E and SW. Owl spooked from snag in wetland

General Comments (i.e., angle at pipeline crossing, construction constraints, erosion potential, existing disturbances, and meanders):

Probably a low quality wetland due to drought or dewatering. Veg. Comm. Showing definite signs of stress/ dieback in row. Higher quality wetlands are adjacent to E & SW.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 487.74 City/County: Haakon County Sampling Date: 5/25/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0525618HK001_W1

Investigator(s): C. Baker, D. Culwell II Section, Township, Range: S11, T1N, R25E

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): G Lat: 44.0617114554507 Long: -101.079937997701 Datum: WGS84

Soil Map Unit Name: SD055 – ObE NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Drainage below pond, recent high rainfall causing more than average water flow over dam, no channel.

Photos: CB719 - CB720 Associated Plots: W0525618HK001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Eleocharis palustris*	60	✓	OBL
2. *Symphyotrichum lanceolatum var. hesperium*	5		FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	65 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 35

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	60	x 1 =	60
FACW Species	5	x 2 =	10
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	65 (A)		70 (B)

Prevalence Index (B/A) = 1.08

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0525618HK001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	HISTIC	100					OM	
4 - 20	2.5Y4 4/2	80	2.5YR 5/8	20	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☑ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☑ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 2
Water Table Present?	Yes ✓	No ____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 487.74 City/County: Haakon County Sampling Date: 5/25/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0525618HK001_U1

Investigator(s): C. Baker, D. Culwell II Section, Township, Range: S11, T1N, R25E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 30

Subregion (LRR): G Lat: 44.0617388481563 Long: -101.079885374255 Datum: WGS84

Soil Map Unit Name: SD055 – ObE NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: CB721 - CB722 Associated Plots: W0525618HK001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1. *Symphoricarpos albus*	25	✓	UPL
2.			
3.			
4.			
5.			
	25	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Agropyron smithii*	40	✓	FACU
2. *Bromus inermis*	20	✓	UPL
3. *Cirsium arvense*	2		FACU
4. *Convolvulus arvensis*	2		(UPL)
5. *Medicago sativa*	1		UPL
6. *Taraxacum officinale*	0.5		FACU
7.			
8.			
9.			
10.			
	65.5	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 15

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	42.5	x 4 =	170
UPL Species	48	x 5 =	240
Column Totals	90.5 (A)		410 (B)

Prevalence Index (B/A) = 4.53

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: noxious weeds present (*Circium arvense*, *Convolvus arvensis)*

SOIL

Sampling Point: W0525618HK001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	2.5Y 4/2	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

MP 426.73

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL City/County: ~~[illegible]~~ Jones Sampling Date: 7-27-12

Applicant/Owner: State: SD Sampling Point: W308J0001

Investigator(s): SCI Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Concave Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No ___ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___		Is the Sampled Area within a Wetland? Yes X No ___
Hydric Soil Present? Yes X No ___		
Wetland Hydrology Present? Yes X No ___		

Remarks: wetland exists within swale high in watershed. Low quality.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	___ = Total Cover		
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		
Herb Stratum (Plot size: ___)			
1. Phalaris arundinacea	90	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	90 = Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x 1 = ___
FACW species ___	x 2 = ___
FAC species ___	x 3 = ___
FACU species ___	x 4 = ___
UPL species ___	x 5 = ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

W308J0001

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10 YR 4/2	85					sil	
4-15	10 YR 4/2	75	10 YR 4/4	25	RM	M	sicl	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): None

Water Table Present? Yes ___ No X Depth (inches): >15

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): >15

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL City/County: Jones Sampling Date: 7-27-12

Applicant/Owner: State: SD Sampling Point: W305T0001 (outo)

Investigator(s): SCI Section, Township, Range:

Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Pasture area on slope.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Physalis heterophylla	10		NI
2. Pascopyrum smithii	80		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		
% Bare Ground in Herb Stratum ____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species	80	x 4 =	320
UPL species		x 5 =	
Column Totals:	80 (A)		320 (B)

Prevalence Index = B/A = 4.0

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

W30ST0001

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-15	10YR 3/1	95					SiC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): None

Water Table Present? Yes _____ No X Depth (inches): >15

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): >15

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL City/County: Jones Sampling Date: 7-28-12

Applicant/Owner: State: SD Sampling Point: W305J0002 (out)

Investigator(s): SCI Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	Is the Sampled Area within a Wetland? Yes ___ No X
Hydric Soil Present?	Yes ___	No ___	
Wetland Hydrology Present?	Yes ___	No ___	

Remarks: Along slope adjacent to wetland area. (Drought Conditions)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	___ = Total Cover		
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		
Herb Stratum (Plot size: ___)			
1. Poa secunda smithii	60	Y	FACU
2. Gulyciyl gum weed	35	Y	UPL
3. Bromus inermis	75	Y	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	170 = Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		
% Bare Ground in Herb Stratum ___			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): ___ (A)

Total Number of Dominant Species Across All Strata: ___ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ___ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species	60	x 4 = 240
UPL species	110	x 5 = 550
Column Totals:	170 (A)	790 (B)

Prevalence Index = B/A = 4.65

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

Sampling Point: W30850002 (out)

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10 YR 3/1	95					Sil	
12-5	10 YR 3/2	95					Sil	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:
Dark, organic soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): None

Water Table Present? Yes ___ No X Depth (inches): >5

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): >5

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL City/County: Jones Sampling Date: 7-28-12

Applicant/Owner: State: SD Sampling Point: W308J0002 (In)

Investigator(s): SCI Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? Yes X No ___

Remarks: wetland area is located within a narrow swale between two ponds. Livestock appear to access the wetland regularly. Some vegetation is beginning to die. (Drought Conditions)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	___ = Total Cover		

Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		

Herb Stratum (Plot size: ___)			
1. Phalaris arundinacea	70	Y	FACW
2. Eleocharis obtusa	50	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	120 = Total Cover		

Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC–): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

W308J00002 (IA)

Sampling Point: _____

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10 YR 3/1	95					sicl	
4-15	10 YR 4/2	75	10 YR 4/6		RM	M	sicl	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:
Organic layer on upper 4 inches

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): None

Water Table Present? Yes ___ No X Depth (inches): 75

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): 75

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline - MP 541.64 City/County: Presho/Tripp Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W_UTM14_08449_W1

Investigator(s): J. A llewalt (Desktop) Section, Township, Range: S21, T103N, R78W

Landform (hillslope, terrace, etc.): river fringe Local relief (concave, convex, none): undulating Slope (%): 1

Subregion (LRR): G Lat: 43.7046200000 Long: -100.169030000 Datum: WGS84

Soil Map Unit Name: SD123 - Mu NWI Classification: PSS

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: CL crossing White River. Not site access. Desktop form based on nearby wetland data forms, Web Soil Survey, and aerial imagery. To date, all wetland indicators have not been field verified at this site.

Photos: No Photos Associated Plots: W_UTM14_08449_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	10	✓	FAC
2.			
3.			
4.			
	10	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1. *Salix exigua*	60	✓	FACW
2.			
3.			
4.			
5.			
	60	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Spartina pectinata*	45	✓	FACW
2. *Amorpha fruticosa*	10		FACW
3. *Eleocharis palustris*	5		OBL
4. *Poa pratensis*	5		FACU
5.			
6.			
7.			
8.			
9.			
10.			
	65	= Total Cover	
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 35

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	5	x 1 =	5
FACW Species	115	x 2 =	230
FAC Species	10	x 3 =	30
FACU Species	5	x 4 =	20
UPL Species		x 5 =	
Column Totals	135 (A)		285 (B)

Prevalence Index (B/A) = 2.11

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Vegetation species based on nearby wetland features and habitat inventories on north side of river. Desktop assessment of vegetation was determined to be similar to that of nearby wetlands. Field map notes of plant species were also used to select accurate plant species in the area.

SOIL

Sampling Point: W_UTM14_08449_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10 YR 4/2	98	7.5 YR 4/6	2	C	M	FSL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Desktop soil determinations were supported by information from nearby wetland features and NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☑ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop review. Shrub wetland bank adjacent to White River. Desktop assessment of hydrology was determined to be similar to that of nearby wetlands. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline - MP 541.64 City/County: Presho/Tripp Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W_UTM14_08449_U1

Investigator(s): J. Allewalt (Desktop) Section, Township, Range: S21, T103N, R78W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): G Lat: 43.7044700000 Long: -100.169210000 Datum: WGS84

Soil Map Unit Name: SD123 - Mu NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: CL crossing White River. Desktop review; no access to site. Desktop form based on nearby wetland data forms, Web Soil Survey, and aerial imagery. To date, all wetland indicators have not been field verified at this site.

Photos: No Photos Associated Plots: W_UTM14_08449_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Medicago sativa*	90		UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	90 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species	90	x 5 =	450
Column Totals	90 (A)		450 (B)

Prevalence Index (B/A) = 5.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Mowed upland adjacent to White River. Desktop assessment of vegetation was determined to be similar to that of nearby wetlands. Field map notes of plant species were also used to select accurate plant species in the area.

SOIL

Sampling Point: W_UTM14_08449_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10 YR 2/2	100					L	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Desktop soil determinations were supported by information from nearby wetland features and NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of nearby wetlands. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline - MP 554.18 City/County: Witten/Tripp Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W_UTM14_06217_W1

Investigator(s): J. Allewalt (Desktop) Section, Township, Range: S16, T101N, R77W

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): G Lat: 43.5480000000 Long: -100.057990000 Datum: WGS84

Soil Map Unit Name: SD123 - RlB NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Wetland fringe along unnamed tributary to Owl Creek. No access to site. Desktop form based on nearby wetland data forms, Web Soil Survey, and aerial imagery. To date, all wetland indicators have not been field verified at this site.

Photos: No Photos Associated Plots: W_UTM14_06217_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Spartina pectinata*	70	✓	FACW
2. *Sonchus arvensis*	2		FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	72 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 2

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	70	x 2 =	140
FAC Species	2	x 3 =	6
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	72 (A)		146 (B)

Prevalence Index (B/A) = 2.03

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Desktop review. Desktop assessment of vegetation was determined to be similar to that of nearby wetlands. Field map notes of plant species were also used to select accurate plant species in the area.

SOIL

Sampling Point: W_UTM14_06217_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 7	7.5 YR 3/1	100					SiCL	
7 - 20	7.5 YR 4/2	97	7.5 YR 3/4	3	C		SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Desktop soil determinations were supported by information from nearby wetland features and NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☑ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of nearby wetlands. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline - MP 554.18 City/County: Witten/Tripp Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W_UTM14_06217_U1

Investigator(s): J. Allewalt (Desktop) Section, Township, Range: S16, T101N, R77W

Landform (hillslope, terrace, etc.): field Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): G Lat: 43.5482100000 Long: -100.057990000 Datum: WGS84

Soil Map Unit Name: SD123 - RlB NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Field adjacent to fringe wetland. No access to site. Desktop form based on nearby wetland data forms, Web Soil Survey, and aerial imagery. To date, all wetland indicators have not been field verified at this site.

Photos: No Photos Associated Plots: W_UTM14_06217_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Zea mays*	80		(UPL)
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	80 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 20

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species	80	x 5 =	400
Column Totals	80 (A)		400 (B)

Prevalence Index (B/A) = 5.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Desktop assessment of vegetation was determined to be similar to that of nearby wetlands. Field map notes of plant species were also used to select accurate plant species in the area.

SOIL

Sampling Point: W_UTM14_06217_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	7.5 YR 2/1						SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Desktop soil determinations were supported by information from nearby wetland features and NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of nearby wetlands. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline - MP 557.90 City/County: Witten/Tripp Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W_UTM14_06201_W1

Investigator(s): J. Allewalt (Desktop) Section, Township, Range: S34, T101N, R77W

Landform (hillslope, terrace, etc.): stream bottom Local relief (concave, convex, none): concave Slope (%): 3

Subregion (LRR): G Lat: 43.5012700000 Long: -100.024630000 Datum: WGS84

Soil Map Unit Name: SD123 - MoB, Cc NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Fringe wetland adjacent to Owl Creek. No access to site. Desktop form based on nearby wetland data forms, Web Soil Survey, and aerial imagery. To date, all wetland indicators have not been field verified at this site.

Photos: No Photos Associated Plots: W_UTM14_06201_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Spartina pectinata*	30	✓	FACW
2. *Hordeum jubatum*	15	✓	FACW
3. *Poa pratensis*	14		FACU
4. *Sonchus arvensis*	12		FAC
5. *Eleocharis palustris*	3		OBL
6.			
7.			
8.			
9.			
10.			
	74 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	3	x 1 =	3
FACW Species	45	x 2 =	90
FAC Species	12	x 3 =	36
FACU Species	14	x 4 =	56
UPL Species		x 5 =	
Column Totals	74 (A)		185 (B)

Prevalence Index (B/A) = 2.50

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Desktop assessment of vegetation was determined to be similar to that of nearby wetlands. Field map notes of plant species were also used to select accurate plant species in the area.

SOIL

Sampling Point: W_UTM14_06201_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 9	10 YR 2/1	100					SiL	
9 - 20	10 YR 2/1	95	10 YR 4/6	5	C	M	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Desktop soil determinations were supported by information from nearby wetland features and NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☑ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of nearby wetlands. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline - MP 557.90 City/County: Witten/Tripp Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W_UTM14_06201_U1

Investigator(s): J. Allewalt (Desktop) Section, Township, Range: S34, T101N, R77W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): G Lat: 43.5012300000 Long: -100.024580000 Datum: WGS84

Soil Map Unit Name: SD123 - MoB, Cc NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Upland stream edge at Owl Creek. Desktop field form as there was no site access. Desktop form based on nearby wetland data forms, Web Soil Survey, and aerial imagery. To date, all wetland indicators have not been field verified at this site.

Photos: No Photos Associated Plots: W_UTM14_06201_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Poa pratensis*	45	✓	FACU
2. *Bromus inermis*	20	✓	UPL
3. *Kochia scoparia*	15		FACU
4. *Atriplex canescens*	5		(UPL)
5.			
6.			
7.			
8.			
9.			
10.			
	85 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	60	x 4 =	240
UPL Species	25	x 5 =	125
Column Totals	85 (A)		365 (B)

Prevalence Index (B/A) = 4.29

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Desktop assessment of vegetation was determined to be similar to that of nearby wetlands. Field map notes of plant species were also used to select accurate plant species in the area.

SOIL

Sampling Point: W_UTM14_06201_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10 YR 2/1	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Desktop soil determinations were supported by information from nearby wetland features and NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of nearby wetlands. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

AECOM Environment
1601 PROSPECT PKWY
FORT COLLINS CO 80525-9992

Wetland Determination Data Form

Feature ID: W104TR009

☑ Centerline ☐ Re-Route ☐ Access Road ☐ Ancillary Facility ☐ Transmission Line ☐ Other

Survey Description
Centerline ID: 2009215CL

Date: 2009/04/25 Client/Project Name Keystone XL- 10623-007
Investigators: BEB & RAR Milepost: 560.22 - 560.28 Tract No.: ML-SD-TR-10780.000

State/County: SD - Tripp Section, Township, Range: T 99 N R 77 W
Lat/Long: 43.414630* Quad Name: Miller Hill Region: Western Great Plains

Subregion (LRR or MLRA): LRR G Datum: NAD 83 Soil Map Name: Erd
NWI classification: PEM Landform (Hillslope, Terrace, etc.): DEPRESSION

Local Relief (Concave, Convex, None): CONCAVE Slope (%): 0

Logbook No.: 1 Logbook Page No.: 37

Are climatic/hydrologic conditions on the site typical for this time of year? ☑ Yes ☐ No
Are "Normal Circumstances" present? ☐ Yes ☐ No
Significantly Disturbed: ☐ Vegetation ☐ Soil ☐ Hydrology ☑ None
Naturally Problematic: ☐ Vegetation ☐ Soil ☐ Hydrology ☑ None

Wetland Type: ☐ PFO ☑ PEM ☐ PSS ☐ Other

Remarks:
OXBOW IN HAYED FIELD

VEGETATION

VEGETATION - Tree Stratum

Plot Size: NA

Scientific And Common Name	% Cover	Dominant	Indicator
Total Cover:	**0**		

VEGETATION - Sapling Stratum

Plot Size: NA

Scientific And Common Name	% Cover	Dominant	Indicator
Total Cover:	**0**		

VEGETATION - Shrub Stratum

Plot Size: NA

Scientific And Common Name	% Cover	Dominant	Indicator
Total Cover:	**0**		

VEGETATION - Herb Stratum

Plot Size: NA

Scientific And Common Name	% Cover	Dominant	Indicator
Panicum virgatum	15	YES	FAC
Spartina pectinata	60	YES	FACW
Total Cover:	**75**		

VEGETATION - Vine Stratum

Plot Size: NA

Scientific And Common Name	% Cover	Dominant	Indicator
Total Cover:	**0**		

AECOM Environment
1601 PROSPECT PKWY
FORT COLLINS CO 80525-9992

Dominance Test Worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	2
Total Number of Dominant Species Across All Strata:	2
Percent of Dominant Species that are OBL, FACW, or FAC:	100

Prevalence Index Worksheet:

Total % Cover of:

OBL Species:	0	X 1 =	0
FACW Species:	60	X 2 =	120
FAC Species:	15	X 3 =	45
FACU Species:	0	X 4 =	0
UPL Species:	0	X 5 =	0
Column Totals:	75	(A)	165 (B)
		PI = B/A	2.2

Hydrophytic Vegetation Indicators

- ☐ Rapid Test for Hydrophytic Vegetation
- ☐ Prevalence index is < 3
- ☐ Morphological Adaptations
- ☐ Problematic Hydrophytic Vegetation
- ☑ Dominance Test is >50%
- ☐ None

Nonvascular Plants

Scientific And Common Name	% Cover

Mean % Wetland Specialist Bryophytes: 0

Hydrophytic Vegetation Present? ☑ Yes ☐ No ☐ Unknown

Remarks:

HYDROLOGY

Primary Indicators

ALGAL MAT OR CRUST (B4)
HIGH WATER TABLE (A2)
PRESENCE OF REDUCED IRON (C4)
SATURATION (A3)
SURFACE WATER (A1)

Secondary Indicators

DRAINAGE PATTERNS IN WETLANDS (B10)
FAC-NEUTRAL TEST (D5)
GEOMORPHIC POSITION (D2)
SATURATION VISIBLE ON AERIAL IMAGERY (C9)

Field Observations

Surface Water Present:	☑ Yes	☐ No	☐ Unknown	Depth (inches): 12
Water Table Present:	☑ Yes	☐ No	☐ Unknown	Depth (inches): 0
Saturation Present:	☑ Yes	☐ No	☐ Unknown	Depth (inches): 18
Wetland Hydrology Present?	☑ Yes	☐ No	☐ Unknown	

Remarks:

AECOM Environment
1601 PROSPECT PKWY
FORT COLLINS CO 80525-9992

HYDRIC SOIL

Soil Profile Description

Depth (in)	Matrix Color (Moist)	Matrix %	Redox Features Color (Moist)	Redox Features %	Redox Features Type	Redox Features Loc	Texture	Remarks
0-4	10 YR 2\2	100		0			ORGANIC	
4-9	2.5 2.5\1	50		0			SILTY CLAY	OTHER MATRIX COLORS
9-20	2.5 Y 5\2	95	GLEY 2 3\10	5	D	M	SILTY CLAY	

Matrix Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered Sand or Coated Sand Grains. 2 Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators

OTHER (EXPLAIN)

Problematic Hydric Soil: ☐ Yes ☑ No ☐ Unknown

Hydric Soil Criteria: ☐ 1 ☐ 2(A) ☐ 2(B)(1) ☐ 2(B)(2) ☐ 2(B)(3) ☐ 3 ☐ 4

Restrictive Layer Present: ☐ Yes ☑ No ☐ Unknown

Hydric Soil Present: ☑ Yes ☐ No ☐ Unknown

Remarks:
1 cm MUCK (A9)

JURISDICTIONAL DETERMINATION

Sampling Point Within a Wetland: ☑ Yes ☐ No ☐ Unknown | Isolated Wetland? ☑ Yes ☐ No ☐ Unknown

Wetland Proximity Associated Waterbody: ☑ Adjacent ☐ Abutting ☐ Unknown

Associated Waterbody Name or Feature ID#: HOLLOW CR

Berm or Barrier Separation? ☐ Yes ☐ No ☐ Unknown

Flow Type between Wetland and Stream: ☐ Perennial ☐ Intermittent ☐ Ephemeral ☐ Seasonal ☑ No Flow

Surface flow between Wetland and Stream: ☐ Discrete ☐ Confined ☐ Discrete and Confined ☐ Overland Sheet-flow ☑ No Flow ☐ Unknown

Direction of Surface flow between Wetland and Waterbody : ☐ From Wetland to Waterbody ☐ From Waterbody to Wetland ☐ Both To/From Wetland to Waterbod ☑ No Flow ☐ Unknown

Subsurface Connection: ☑ Yes ☐ No ☐ Unknown

Surface Water Appearance: ☑ Clear ☑ Floating Algal Mats ☐ Grenish Color ☐ Obvious Surface Scum ☐ Other ☐ Sheen On Surface ☐ Slightly Turbid ☐ Turbid ☐ Very Turbid ☐ No Flow

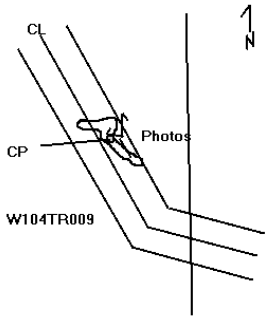
Wetland Supports Riparian Buffer: ☐ Yes ☑ No ☐ Unknown

Wetland Quality ☐ High ☑ Moderate ☐ Low

Remarks:

AECOM Environment
1601 PROSPECT PKWY
FORT COLLINS CO 80525-9992

Sketch



Description of Habitat Characteristics, Aquatic Terrestrial Diversity or General Comments

General Comments

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 577.32 City/County: Tripp County Sampling Date: 6/11/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0611618TR001_W1

Investigator(s): C. Baker, P. Christensen Section, Township, Range: S27, T098N, R076W

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): ____

Subregion (LRR): G Lat: 43.2704813178 Long: -99.8128254334 Datum: WGS84

Soil Map Unit Name: SD123 – DmA NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** **Yes ✓ No ____**
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Photos: CB146 - CB147 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1. *Salix exigua*	0.5		
2.			
3.			
4.			
5.			
	0.5 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Poa pratensis*	40	✓	FACU
2. *Carex nebrascensis*	35	✓	OBL
3. *Carex praeceptorum*	16		OBL
4. *Eleocharis palustris*	6		OBL
5.			
6.			
7.			
8.			
9.			
10.			
	97 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 2

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	57	x 1 =	57
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	40	x 4 =	160
UPL Species		x 5 =	
Column Totals	97 (A)		217 (B)

Prevalence Index (B/A) = 2.24

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No ____**

Remarks:

SOIL

Sampling Point: W0611618TR001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	7.5YR 2/2	80					SL	Consistent texture an color
0 - 20	7.5YR 4/2	20						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☑ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☑ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 2

Water Table Present? Yes ✓ No ____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 577.32 City/County: Tripp County Sampling Date: 6/11/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: MT Sampling Point: W0611618TR001_U1

Investigator(s): C. Baker, P. Christensen Section, Township, Range: S34, T098N, R076W

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): ____

Subregion (LRR): G Lat: 43.2703347542 Long: -99.8129430433 Datum: WGS84

Soil Map Unit Name: SD123 – VdC NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

Photos: CB148 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Poa pratensis*	55	✓	FACU
2. *Bromus inermis*	50	✓	UPL
3. *Agrostis stolonifera*	1		FACU
4. *Artemisia ludoviciana*	1		UPL
5. *Equisetum arvense*	1		FAC
6. *Tradescantia occidentalis*	0.5		UPL
7.			
8.			
9.			
10.			
	108.5 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	1	x 3 =	3
FACU Species	56	x 4 =	224
UPL Species	51.5	x 5 =	257.5
Column Totals	108.5 (A)		484.5 (B)

Prevalence Index (B/A) = 4.47

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** ✓

Remarks:

SOIL

Sampling Point: W0611618TR001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	7.5YR 4/3	100					LS	Moist throughout/saturated at 8"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Clay

Depth (inches): 22

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 8

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Saturated sand appears to be from recent rainfall not sub-irrigation.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 578.1 City/County: Tripp County Sampling Date: 1/27/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: exp_WL-0088_W1

Investigator(s): J. Beaver - Desktop Analysis Section, Township, Range: T098N R076W S035

Landform (hillslope, terrace, etc.): level plain Local relief (concave, convex, none): none Slope (%): _____

Subregion (LRR): G Lat: 43.263 Long: -99.804 Datum: WGS84

Soil Map Unit Name: _____ NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Desktop analysis of wet meadow PEM. Data based on proximal wetland plots.

Photos: None Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			FACW
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Poa pratensis*	10		FACU
2. *Carex nebrascensis*	45	✓	OBL
3. *Carex praeceptorum*	20	✓	OBL
4. *Agrostis stolonifera*	6	✓	FACW
5.			
6.			
7.			
8.			
9.			
10.			
	81 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 2

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	65	x 1 =	65
FACW Species	30	x 2 =	60
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	95 (A)		125 (B)

Prevalence Index (B/A) = 1.31

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: exp_WL_0088_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	7.5YR 2/2	80					SL	Consistent texture an color
0 - 20	7.5YR 4/2	20						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☑ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☑ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 2
Water Table Present?	Yes ✓	No ____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 578.1 City/County: Tripp County Sampling Date: 1/27/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: exp_WL-0088_U1

Investigator(s): J. Beaver - Desktop Analysis Section, Township, Range: T098N R076W S035

Landform (hillslope, terrace, etc.): level plain Local relief (concave, convex, none): none Slope (%): _____

Subregion (LRR): G Lat: 43.263 Long: -99.804 Datum: WGS84

Soil Map Unit Name: _____ NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Desktop analysis, data based on proximal upland plots.

Photos: CB148 Associated Plots: exp_WL-0088_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Poa pratensis*	55	✓	FACU
2. *Bromus inermis*	50	✓	UPL
3. *Agrostis stolonifera*	1		FACU
4. *Artemisia ludoviciana*	1		UPL
5. *Equisetum arvense*	1		FAC
6. *Tradescantia occidentalis*	0.5		UPL
7.			
8.			
9.			
10.			
	108.5 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	1	x 3 =	3
FACU Species	56	x 4 =	224
UPL Species	51.5	x 5 =	257.5
Column Totals	108.5 (A)		484.5 (B)

Prevalence Index (B/A) = 4.47

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: exp_WL-0088_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	7.5YR 4/3	100					LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Clay

Depth (inches): 22

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 599.43 City/County: Tripp County Sampling Date: 1/27/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. State: SD Sampling Point: exp_WL-0090_W1

P. Investigator(s): J. Beaver - Desktop Analysis Section, Township, Range: T095N R074W S26

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): 5

Subregion (LRR): G Lat: 43.019 Long: -99.556 Datum: WGS84

Soil Map Unit Name: NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Desktop analysis of wet meadow PEM. Data based on proximal wetland plots.

Photos: None Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			FACW
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Poa pratensis*	10		FACU
2. *Carex nebrascensis*	45	✓	OBL
3. *Carex praeceptorum*	20	✓	OBL
4. *Agrostis stolonifera*	6	✓	FACW
5.			
6.			
7.			
8.			
9.			
10.			
	81 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 2

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	65	x 1 =	65
FACW Species	30	x 2 =	60
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	95 (A)		125 (B)

Prevalence Index (B/A) = 1.31

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: exp_WL_0090_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	7.5YR 2/2	80					SL	Consistent texture an color
0 - 20	7.5YR 4/2	20						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☑ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☑ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 2

Water Table Present? Yes ✓ No ____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 599.43 City/County: Tripp County Sampling Date: 1/27/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: exp_WL-0090_U1

Investigator(s): J. Beaver - Desktop Analysis Section, Township, Range: T095N R074W S26

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): >1

Subregion (LRR): G Lat: 43.019 Long: -99.556 Datum: WGS84

Soil Map Unit Name: NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Desktop analysis, data based on proximal uplant plots.

Photos: None Associated Plots: exp_WL-0090_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Dactylis glomerata*	45	✓	FACU
2. *Atriplex canescens*	12		(UPL)
3. *Hordeum jubatum*	10		FACW
4. *Kochia scoparia*	8		FACU
5. *Rumex crispus*	4		FAC
6.			
7.			
8.			
9.			
10.			
	79	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	10	x 2 =	20
FAC Species	4	x 3 =	12
FACU Species	53	x 4 =	212
UPL Species	12	x 5 =	60
Column Totals	79 (A)		304 (B)

Prevalence Index (B/A) = 3.85

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: exp_WL-0090_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	7.5YR 3/1	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes _____	**No** ✓	Depth (inches): 0
Water Table Present?	Yes _____	**No** ✓	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes _____	**No** ✓	Depth (inches): 0

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

PEM

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL - Phase IV City/County: Harding Sampling Date: 8/5/10
Applicant/Owner: TransCanada - Trow State: SD Sampling Point: W109HA001
Investigator(s): B109 Section, Township, Range: —
Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 2
Subregion (LRR): Western Great Plains Lat: — Long: — Datum: —
Soil Map Unit Name: — NWI classification: —
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____
Hydric Soil Present?	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____

Is the Sampled Area within a Wetland? Yes X No ____

Remarks: Part of old stream channel, dammed downstream.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: NA)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		

Sapling/Shrub Stratum (Plot size: NA)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		

Herb Stratum (Plot size: 5')			
1. Juncus balticus	60%	Y	OBL
2. Hordeum jubatum	15%	N	FACW
3. Distichlis spicata	30%	Y	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	105 = Total Cover		

Woody Vine Stratum (Plot size: NA)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 10%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
__ 3 - Prevalence Index is ≤3.0[1]
__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

No

PEM

SOIL

Sampling Point: W10a/1A pt1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8"	10YR 4/2	90%	10YR 6/4	10%	C	M	Sil	
8-15"	10YR 4/1	90%	10YR 6/4	10%	C	M	SiCl	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- X Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 1"

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): Surface

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

upland

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL - Phase IV City/County: Harding Sampling Date: 8/5/10

Applicant/Owner: TransCanada - Trow State: SD Sampling Point: W109HAddl

Investigator(s): B109 Section, Township, Range: —

Landform (hillslope, terrace, etc.): hillSlope Local relief (concave, convex, none): slope Slope (%): 8

Subregion (LRR): Western Great Plains Lat: — Long: — Datum: —

Soil Map Unit Name: — NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	Is the Sampled Area within a Wetland? Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: upslope of PEM w/in pasture.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: NA)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: NA)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Nassella viridula	20%	Y	NI
2. Poa pratensis	15%	Y	FacU
3. Heterostipa comata	10%	N	NI
4. Pascopyrum Smithii	10%	Y	FacU
5.			
6.			
7.			
8.			
9.			
10.			
	57 = Total Cover		
Woody Vine Stratum (Plot size: NA)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 10%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ~~X~~ W No X

Remarks:

upland

Sampling Point: W109HA001

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6"	10YR 3/2	100					Sil	
6-12"	10YR 3/1	100					Siel	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (Inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

W302HA001
on CAR-041

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL pipeline City/County: SD/HA Sampling Date: wetland
Applicant/Owner: State: SD Sampling Point: 7.13.12
Investigator(s): Bio 302 Section, Township, Range: No MPS available
Landform (hillslope, terrace, etc.): drainageway Local relief (concave, convex, none): Slope (%): 0-2%
Subregion (LRR): LRR-G W.GP Lat: Long: Datum:
Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes * No (If no, explain in Remarks.)
Are Vegetation No, Soil No, or Hydrology No significantly disturbed? * some disturbance Are "Normal Circumstances" present? Yes * No
Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes *	No
Hydric Soil Present?	Yes *	No
Wetland Hydrology Present?	Yes *	No

Is the Sampled Area within a Wetland? Yes * No

Remarks: * this re-routed CAR-041 crosses PEM adjacent to existing road crossing. CAR-041 width = 100'. Also area of dredged disp.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. none			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2. none			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5' rad.)			
1.			
2. hordeum jubatum	60	*	FacW
3. eleocharis palustris	30	*	OBL
4. Carex nebrascensis	30		OBL
5. ~~agrostis alba~~	5%		NL
6.			
7.			
8.			
9.			
10.			
	110% = Total Cover		
Woody Vine Stratum (Plot size:)			
1. none			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

* 1 - Rapid Test for Hydrophytic Vegetation
__ 2 - Dominance Test is >50%
__ 3 - Prevalence Index is ≤3.0[1]
__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes * No

Remarks: areas of disturbance w/in wetland - existing road + dredged fill area.

(cont.)

W3024A 001

Sampling Point: wetland

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2"								thick roots
2-16"	10YR 3/2	95	10YR 6/5	5%	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks: * Soil/Hydrology a bit disturbed due to existing gravel road + dredged area

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): @ 16"

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: * existing road impacting hydrology

-005 Corps plot

Photos: -001N -003E -006 upland

W302HA001
on CAR-041

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL pipeline City/County: SD/HA Sampling Date: 7.13.12

Applicant/Owner: State: SD Sampling Point: Upland

Investigator(s): Section, Township, Range:

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): Slope (%): 0-2%

Subregion (LRR): LRR-G Lat: Long: Datum:

Soil Map Unit Name: NWI classification: upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	Is the Sampled Area within a Wetland? Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:
@ higher elevation out of drainage, loose dominance of wetland vegetation, soils + hydrology.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. None			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3. None			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1.			
2.			
3. artemesia tridentata	50%		
4. yellow cone flower	10%		
5. bromus inermis	50%		
6.			
7.			
8.			
9.			
10.			
	110 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1. None			
2.			
	____ = Total Cover		
% Bare Ground in Herb Stratum ____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): Ø (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: Ø% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

W302HA001 (Cont)

SOIL

Sampling Point: Upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 321.09 City/County: Harding County Sampling Date: 9/6/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0906620HA002_W1

Investigator(s): J. Beaver, L. Larsen Section, Township, Range: S29, T19N, R05E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): G Lat: 45.5778068216822 Long: -103.544768532677 Datum: WGS84

Soil Map Unit Name: SD063 – Hd NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Broad terrace adjacent to S Fork Grand River - alkaline. Inundated June 2019 as observed from HWY.

Photos: LL395 Associated Plots: W0906620HA001-u2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15' x 25')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 15' x 25')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 15' x 25')			
1. *Distichlis spicata*	20	✓	FACW
2. *Puccinellia nuttalliana*	15	✓	OBL
3. *Salicornia rubra*	3		OBL
4. *Spartina gracilis*	3		FACW
5. *Hordeum jubatum*	2		FACW
6.			
7.			
8.			
9.			
10.			
	43 = Total Cover		
Vine Stratum (Plot size: 15' x 25')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 43

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	18	x 1 =	18
FACW Species	25	x 2 =	50
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	43 (A)		68 (B)

Prevalence Index (B/A) = 1.58

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0906620HA002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 5.5	10YR 4/2	100					SCL	
5.5 - 9	10YR 4/2	95	7.5YR 4/4	5			SC	
9 - 16	10YR 4/4	95	7.5YR 4/4	5			CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☑ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☑ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: B7: observed inundation in June 2019. Fully saturated with standing water.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 321.09 City/County: Harding County Sampling Date: 9/6/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0906620HA002_U1

Investigator(s): J. Beaver, L. Larsen Section, Township, Range: S29, T19N, R05E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): G Lat: 45.5778465806177 Long: -103.544438050657 Datum: WGS84

Soil Map Unit Name: SD063 – Hd NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Topographically higher point in terrace adjacent to S. Fork Grand River.

Photos: LL396 Associated Plots: W0906620HA001_w2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Agropyron smithii*	24	✓	FACU
2. *Symphyotrichum falcatum*	12		FACU
3. *Agropyron cristatum*	10		(UPL)
4. *Distichlis spicata*	9		FACW
5. *Spartina gracilis*	7		FACW
6. *Achillea millefolium*	2		FACU
7. *Bouteloua gracilis*	2		(UPL)
8. *Melilotus officinalis*	2		FACU
9. *Salicornia rubra*	0.5		OBL
10.			
	68.3	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 40

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.5	x 1 =	0.5
FACW Species	16	x 2 =	32
FAC Species		x 3 =	
FACU Species	40	x 4 =	160
UPL Species	12	x 5 =	60
Column Totals	68.5 (A)		252.5 (B)

Prevalence Index (B/A) = 3.69

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0906620HA002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 18	2.5Y 4/2	100					SiC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: slightly higher topographically.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Typical of small areas within terrace that are topographically higher.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 327.49 City/County: Harding County Sampling Date: 5/28/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0528618HA001_W1

Investigator(s): J. Beaver, D. Culwell II, P. Christensen Section, Township, Range: S8, T18N, R6E

Landform (hillslope, terrace, etc.): basin Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): G Lat: 45.5346581326995 Long: -103.421594876388 Datum: WGS84

Soil Map Unit Name: SD063 – He NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Recent heavy rains. Note that existing road already crosses wetland to the west along fencline.

Photos: PC1898 - PC1901 Associated Plots: W0528618HA001_U1, W0528618HA001_U2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Distichlis spicata*	60	✓	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	60 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 40

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	60	x 2 =	120
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	60 (A)		120 (B)

Prevalence Index (B/A) = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Wide saline floodplain either side of Clark Fork Creek.

SOIL

Sampling Point: W0528618HA001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	2.5Y 4/1	80	5YR 4/6	20	C	M	S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☑ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 0
Water Table Present?	Yes ✓	No ____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 327.49 City/County: Harding County Sampling Date: 5/28/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0528618HA001_U1

Investigator(s): J. Beaver, D. Culwell II, P. Christensen Section, Township, Range: S8, T18N, R6E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): undulating Slope (%): 2

Subregion (LRR): G Lat: 45.5347188491521 Long: -103.421601791854 Datum: WGS84

Soil Map Unit Name: SD063 – He NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Recent heavy rains.

Photos: PC1894 - PC1897 Associated Plots: W0528618HA001_W1, W0528618HA001_U2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Poa secunda*	30	✓	FACU
2. *Cirsium flodmanii*	10	✓	FAC
3. *Agropyron smithii*	5		FACU
4. *Artemisia frigida*	5		(UPL)
5. *Calamovilfa longifolia*	3		(UPL)
6. *Taraxacum officinale*	3		FACU
7. *Astragalus missouriensis*	2		(UPL)
8. *Cirsium undulatum*	1		FACU
9. *Galium boreale*	1		FACU
10.			
	60	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	10	x 3 =	30
FACU Species	40	x 4 =	160
UPL Species	10	x 5 =	50
Column Totals	60 (A)		240 (B)

Prevalence Index (B/A) = 4.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0528618HA001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 24	2.5Y 4/2	100					S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes ✓	No _____	Depth (inches): 18
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water table present due to recent flooding.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 327.58 City/County: Harding County Sampling Date: 5/28/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0528618HA001_U2

Investigator(s): J. Beaver, D. Culwell II, P. Christensen Section, Township, Range: S8, T18N, R6E

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): undulating Slope (%): 3

Subregion (LRR): G Lat: 45.5319765333787 Long: -103.421469193015 Datum: WGS84

Soil Map Unit Name: SD063 – ZbC NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Plot is immediately above wetland boundary on south side of crossing.

Photos: PC1902 - PC1905 Associated Plots: W0528618HA001_W1, W0528618HA001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Poa secunda*	40	✓	FACU
2. *Astragalus missouriensis*	10		(UPL)
3. *Agropyron smithii*	5		FACU
4. *Bouteloua gracilis*	5		(UPL)
5. *Taraxacum officinale*	5		FACU
6. *Artemisia frigida*	2		(UPL)
7. *Artemisia ludoviciana*	2		UPL
8. *Carex stenoptila*	2		(UPL)
9. *Juncus balticus*	2		FACW
10. *Cirsium flodmanii*	1		FAC
	74	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	2	x 2 =	4
FAC Species	1	x 3 =	3
FACU Species	50	x 4 =	200
UPL Species	21	x 5 =	105
Column Totals	74 (A)		312 (B)

Prevalence Index (B/A) = 4.22

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0528618HA001_U2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	2.5Y 4/3	100					S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 421.02 City/County: Meade County Sampling Date: 9/19/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0919619ME001_W1

Investigator(s): D. Hagen Section, Township, Range: S27, T8N, R17E

Landform (hillslope, terrace, etc.): base of slope Local relief (concave, convex, none): concave Slope (%): 1-3

Subregion (LRR): G Lat: 44.6327335724214 Long: -102.059989224659 Datum: WGS84

Soil Map Unit Name: SD601 – GaA NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Road gravel overflowed into wetland on south side of road. Moderate grazing impacts on both sides of road.

Photos: DH113 - DH120 Associated Plots: W0919619ME001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Rumex crispus*	15	✓	FAC
2. *Hordeum jubatum*	10	✓	FACW
3. *Juncus balticus*	8	✓	FACW
4. *Poa pratensis*	5		FACU
5. *Arctium minus*	2		FACU
6. *Polygonum amphibium*	1		OBL
7.			
8.			
9.			
10.			
	41 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 55

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	1	x 1 =	1
FACW Species	18	x 2 =	36
FAC Species	15	x 3 =	45
FACU Species	7	x 4 =	28
UPL Species		x 5 =	
Column Totals	41 (A)		110 (B)

Prevalence Index (B/A) = 2.68

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Small wetland surrounding culvert. Veg is highly variable and denser in some areas.

SOIL

Sampling Point: W0919619ME001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 2/1	100					SiL	
8 - 20	10YR 4/2	95	7.5 YR 5/6	5	C		CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☑ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☑ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☑ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 5
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 10

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 421.03 City/County: Meade County Sampling Date: 9/19/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0919619ME001_U1

Investigator(s): D. Hagen Section, Township, Range: S27, T8N, R17E

Landform (hillslope, terrace, etc.): base of slope Local relief (concave, convex, none): convex Slope (%): ____

Subregion (LRR): G Lat: 44.6327346072918 Long: -102.05991845505 Datum: WGS84

Soil Map Unit Name: SD601 – GaA NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks: Upland road margin adjacent to wetland.

Photos: DH111 - DH112 Associated Plots: W0919619ME001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Agropyron intermedium*	40	✓	(UPL)
2. *Agropyron cristatum*	15	✓	(UPL)
3. *Bromus inermis*	10		UPL
4. *Poa pratensis*	5		FACU
5. *Grindelia squarrosa*	3		UPL
6.			
7.			
8.			
9.			
10.			
	73 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 15

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	5	x 4 =	20
UPL Species	68	x 5 =	340
Column Totals	73 (A)		360 (B)

Prevalence Index (B/A) = 4.93

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** ✓

Remarks:

SOIL

Sampling Point: W0919619ME001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 4/4	100					SiL	
10 - 20	10YR 4/3	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 434.56 City/County: Haakon County Sampling Date: 8/8/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0808620HK001_W1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S21, T6N, R18E

Landform (hillslope, terrace, etc.): valley Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): G Lat: 44.4632612088615 Long: -101.941109213602 Datum: WGS84

Soil Map Unit Name: SD055 – Lp NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Low spot in valley. Evidence of inundation and erosion. Salt crust and sparse vegetation.

Photos: KK2344 - KK2345 Associated Plots: W0808620HK001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 10')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 10' x 10')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. *Hordeum jubatum*	10	✓	FACW
2. *Bolboschoenus fluviatilis*	5	✓	OBL
3. *Eleocharis palustris*	5	✓	OBL
4. *Xanthium strumarium*	2		FAC
5. *Agropyron smithii*	1		FACU
6.			
7.			
8.			
9.			
10.			
	23 = Total Cover		
Vine Stratum (Plot size: 10' x 10')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 77

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	10	x 1 =	10
FACW Species	10	x 2 =	20
FAC Species	2	x 3 =	6
FACU Species	1	x 4 =	4
UPL Species		x 5 =	
Column Totals	23 (A)		40 (B)

Prevalence Index (B/A) = 1.74

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Sparsely vegetated area supports dominant hydrophytic vegetation.

SOIL

Sampling Point: W0808620HK001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 2/1	100					CL	with OM
2 - 10	10YR 2/1	55	10YR 3/6	10	C	M	CL	calcium deposits
2 - 10	5PB 2.5/1	35					CL	5% OM

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☑ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☑ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Sparsely vegetated area and significant cracks in soil surface indicate prolonged ununddation and saturation.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 434.55 City/County: Haakon County Sampling Date: 8/8/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0808620HK001_U1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S21, T6N, R18E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): G Lat: 44.4632551137113 Long: -101.941260267956 Datum: WGS84

Soil Map Unit Name: SD055 – Lp NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Water drains to adjacent wetland.

Photos: KK2347 Associated Plots: W0808620HK001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Agropyron smithii*	50	✓	FACU
2. *Xanthium strumarium*	10		FAC
3. *Rumex crispus*	5		FAC
4. *Hordeum jubatum*	2		FACW
5.			
6.			
7.			
8.			
9.			
10.			
	67	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 33

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	2	x 2 =	4
FAC Species	15	x 3 =	45
FACU Species	50	x 4 =	200
UPL Species		x 5 =	
Column Totals	67 (A)		249 (B)

Prevalence Index (B/A) = 3.72

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Upland vegetation was dominant.

SOIL

Sampling Point: W0808620HK001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 2.2	100					CL	
2 - 10	10YR 2/2	97	10YR 3/6	3	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Soil is cracked and displays hydric characteristics, however, vegetation does not meet any hydrophytic indicators and there is only a single secondary indicator of wetland hydrology. The area appears to hold water in very wet years; this has been a particularly wet year.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water drains to adjacent wetland.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 486.13 City/County: Haakon County Sampling Date: 8/10/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0810620HK001_W1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S3, T1N, R25E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): G Lat: 44.0761871219585 Long: -101.104348396487 Datum: WGS84

Soil Map Unit Name: SD055 – Nc NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Depression at base of hill. Surrounding hillsides drain into this area.

Photos: KK77 Associated Plots: W0810620HK001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 10')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 10' x 10')			
1. *Populus deltoides*	10	✓	FAC
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. *Cyperus esculentus*	50	✓	FACW
2. *Xanthium strumarium*	10		FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	60 = Total Cover		
Vine Stratum (Plot size: 10' x 10')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 30

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	50	x 2 =	100
FAC Species	20	x 3 =	60
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	70 (A)		160 (B)

Prevalence Index (B/A) = 2.29

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0810620HK001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 3	10YR 2/1	90	10YR 4/4	10	C	M	C	
3 - 10	10YR 2/1	65	10YR 4/4	7	C	M	CL	
3 - 10	N 2.5/0	25	7.5YR 3/6	3	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☑ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☑ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Very large crackes in sparsely vegetated surface.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 486.13 City/County: Haakon County Sampling Date: 8/10/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: SD Sampling Point: W0810620HK001_U1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S3, T1N, R25E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 7

Subregion (LRR): G Lat: 44.0760383580158 Long: -101.104523688775 Datum: WGS84

Soil Map Unit Name: SD055 – Nc NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Slope of hill with upland vegetation leading into a valley/floodplain.

Photos: KK78 Associated Plots: W0810620HK001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 10')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus pennsylvanica*	20	✓	FAC
2.			
3.			
4.			
	20 = Total Cover		
Shrub Stratum (Plot size: 10' x 10')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. *Agropyron smithii*	40	✓	FACU
2. *Kochia scoparia*	30	✓	FACU
3. *Ambrosia trifida*	5		FAC
4. *Panicum capillare*	1		FAC
5. *Rumex crispus*	1		FAC
6.			
7.			
8.			
9.			
10.			
	77 = Total Cover		
Vine Stratum (Plot size: 10' x 10')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	27	x 3 =	81
FACU Species	70	x 4 =	280
UPL Species		x 5 =	
Column Totals	97 (A)		361 (B)

Prevalence Index (B/A) = 3.72

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: toe of slope

SOIL

Sampling Point: W0810620HK001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 3/2	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

W311KP001

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KKL City/County: NE/KP Sampling Date: 10/05/12

Applicant/Owner: ML-NE-KP-40040.000 State: NE Sampling Point: MP 6.03 B6

Investigator(s): J. Vivosko 311 Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes Y No _____ (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes _____ No Y

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	Is the Sampled Area within a Wetland? Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks:
Wetland in pasture near cattle pond (man-made due to burm)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. none			
2.			
3.			
4.			
	0%	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1. none			
2.			
3.			
4.			
5.			
	0%	= Total Cover	
Herb Stratum (Plot size: _____)			
1. Typha Angustifolia	90%	X	FACW
2. Spartina pectinata	10%	X	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
		= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1. none			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species	90	x 2 = 180
FAC species		x 3 =
FACU species		x 4 =
UPL species	10	x 5 = 50
Column Totals:	100 (A)	(B)

Prevalence Index = B/A = 2.3

Hydrophytic Vegetation Indicators:

N 1 - Rapid Test for Hydrophytic Vegetation

N 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:

SOIL

W311KP001

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
18	10YR 2/1	95	10YR 4/2	5			SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:
18+ inches Light sandy soil

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 18

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland in pasture

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 616.49 City/County: Keya Paha County Sampling Date: 8/19/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0819618KP002_W1

Investigator(s): C. Baker, D. Hagen Section, Township, Range: S14, T34N, R17W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): G Lat: 42.9246106628164 Long: -99.281147724266 Datum: WGS84

Soil Map Unit Name: NE103 – On NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: On All press Reroute on proposed centerline.

Photos: CB322 Associated Plots: W0819618KP002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Eleocharis palustris*	65	✓	OBL
2. *Agrostis stolonifera*	4		FACW
3. *Hordeum jubatum*	0.5		FACW
4. *Polygonum amphibium*	0.5		OBL
5. *Rumex crispus*	0.5		FAC
6.			
7.			
8.			
9.			
10.			
	70.5 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 35

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	65.5	x 1 =	65.5
FACW Species	4.5	x 2 =	9
FAC Species	0.5	x 3 =	1.5
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	70.5 (A)		76 (B)

Prevalence Index (B/A) = 1.08

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Bare ground = open water. Wetland boundary clearly defined by thin band of Hordeum with *Eleocharis palustris* within wetland.

SOIL

Sampling Point: W0819618KP002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	5YR 2/1	100					L	
2 - 18	5YR 2.5/2	25	5GY 4/0	75	RM	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☑ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☑ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: clay

Depth (inches): 2

Hydric Soil Present? Yes ✓ No ____

Remarks: Slight hydrogen sulfide odor.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☑ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 3

Water Table Present? Yes ✓ No ____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 616.48 City/County: Keya Paha County Sampling Date: 8/19/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0819618KP002_U1

Investigator(s): C. Baker, D. Hagen Section, Township, Range: S14, T34N, R17W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): G Lat: 42.9246710297538 Long: -99.2811980894999 Datum: WGS84

Soil Map Unit Name: NE103 – On NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: CB323 Associated Plots: W0819618KP002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	86	✓	UPL
2. *Poa pratensis*	8		FACU
3. *Artemisia ludoviciana*	2		UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	96 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	8	x 4 =	32
UPL Species	88	x 5 =	440
Column Totals	96 (A)		472 (B)

Prevalence Index (B/A) = 4.92

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0819618KP002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 5	5YR 2.5/1	100					L	
5 - 18	5YR 2.5/1	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 616.90 City/County: Keya Paha County Sampling Date: 8/19/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0819618KP003_W1

Investigator(s): C. Baker, D. Hagen Section, Township, Range: S14, T34N, R17W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): G Lat: 42.9187411642432 Long: -99.2807461589668 Datum: WGS84

Soil Map Unit Name: NE103 – Op NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Small linear wetland in overflow channel.

Photos: CB328 Associated Plots: W0819618KP003_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1. *Symphoricarpos albus*	2		UPL
2.			
3.			
4.			
5.			
	2 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Carex utriculata*	45	✓	OBL
2. *Spartina pectinata*	12		FACW
3. *Poa pratensis*	7		FACU
4. *Vernonia fasciculata*	2		FAC
5. *Equisetum arvense*	1		FAC
6.			
7.			
8.			
9.			
10.			
	67 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 40

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	45	x 1 =	45
FACW Species	12	x 2 =	24
FAC Species	3	x 3 =	9
FACU Species	7	x 4 =	28
UPL Species	2	x 5 =	10
Column Totals	69 (A)		116 (B)

Prevalence Index (B/A) = 1.68

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Bare ground mostly standing water.

SOIL

Sampling Point: W0819618KP003_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 5	5YR 2.5/2	100					SL	
5 - 20	5YR 3/1	20	10GY 4/0	80	RM	M	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☑ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 1
Water Table Present?	Yes ✓	No ____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hydrology appears to come more from accumulation of overland flow than from shallow water table.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 616.91 City/County: Keya Paha County Sampling Date: 8/19/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0819618KP003_U1

Investigator(s): C. Baker, D. Hagen Section, Township, Range: S14, T34N, R17W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): convex Slope (%): 1

Subregion (LRR): G Lat: 42.9186303647416 Long: -99.2808211755473 Datum: WGS84

Soil Map Unit Name: NE103 – Op NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Upland between small PEM and Keya Paha active floodplain.

Photos: CB329 Associated Plots: W0819618KP003_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1. *Symphoricarpos albus*			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Poa pratensis*	38	✓	FACU
2. *Melilotus officinalis*	22	✓	FACU
3. *Glyceria grandis*	14		OBL
4. *Cirsium vulgare*	4		UPL
5. *Helianthus pauciflorus*	3		(UPL)
6. *Equisetum arvense*	1		FAC
7. *Monarda fistulosa*	1		UPL
8.			
9.			
10.			
	83 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 9

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	14	x 1 =	14
FACW Species		x 2 =	
FAC Species	1	x 3 =	3
FACU Species	60	x 4 =	240
UPL Species	8	x 5 =	40
Column Totals	83 (A)		297 (B)

Prevalence Index (B/A) = 3.58

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Odd assortment of plants, but also could be due to grazing at site.

SOIL

Sampling Point: W0819618KP003_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	5YR 3/2	100					L	
6 - 21	5YR 4/4	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 617.47 City/County: Keya Paha County Sampling Date: 7/12/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0712702KP001_W3

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S23, T34N, R17W

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): G Lat: 42.9110967189867 Long: -99.2782673190807 Datum: WGS84

Soil Map Unit Name: NE103 – Bd NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Edge of large wetland in Keya Paha floodplain.

Photos: KK2395 Associated Plots: W0712702KP001_U3

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Carex praegracilis*	25	✓	FACW
2. *Agrostis stolonifera*	20	✓	FACW
3. *Carex vulpinoidea*	10	✓	FACW
4. *Eleocharis palustris*	10	✓	OBL
5. *Agropyron smithii*	5		FACU
6. *Glycyrrhiza lepidota*	5		FACU
7. *Helenium autumnale*	5		FACW
8. *Juncus balticus*	5		FACW
9. *Juncus dudleyi*	5		FACW
10. *Poa pratensis*	5		FACU
	97	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 10

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	10	x 1 =	10
FACW Species	72	x 2 =	144
FAC Species		x 3 =	
FACU Species	15	x 4 =	60
UPL Species		x 5 =	
Column Totals	97 (A)		214 (B)

Prevalence Index (B/A) = 2.21

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Supplemental vegetation sheet attached.

SOIL

Sampling Point: W0712702KP001_W3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 9	10YR 2/1	100					SCL	with OM
9 - 11	10YR 4/1	95	2.5YR 6/4	5	C	M	SL	fragmental
11 - 13	10YR 6/3	100					S	
13 - 16	10YR 2/2	100					SiCL	snail shells & calcification

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 10
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 2

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Cattle hoof prints leaving large depressions in moist soil.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 617.34 City/County: Keya Paha County Sampling Date: 7/12/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0712702KP001_U3

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S23, T34N, R17W

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): none Slope (%): 3

Subregion (LRR): G Lat: 42.911946652209 Long: -99.2810657446996 Datum: WGS84

Soil Map Unit Name: NE103 – Mu NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Landscape begins a slight rise.

Photos: KK2398 Associated Plots: W0712702KP001_W3

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1. *Symphoricarpos occidentalis*	30	✓	UPL
2.			
3.			
4.			
5.			
	30	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	50	✓	UPL
2. *Poa pratensis*	30	✓	FACU
3. *Ambrosia psilostachya*	25	✓	FACU
4. *Achillea millefolium*	5		FACU
5.			
6.			
7.			
8.			
9.			
10.			
	110	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	60	x 4 =	240
UPL Species	80	x 5 =	400
Column Totals	140 (A)		640 (B)

Prevalence Index (B/A) = 4.57

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0712702KP001_U3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 2/1	100					SL	
16 - 24	10YR 4/2	100					S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Sandy texture, loamy above and sandy below.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 16

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Part of rising sandy banks in floodplain.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 617.49 City/County: Keya Paha County Sampling Date: 7/12/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0712702KP001_W4

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S23, T34N, R17W

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): G Lat: 42.9112800147094 Long: -99.277551069581 Datum: WGS84

Soil Map Unit Name: NE103 – Bc NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Northeast edge of large wetland at the edge of a sandy rise in the Keya Paha floodplain.

Photos: KK2396 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Agrostis stolonifera*	20	✓	FACW
2. *Carex vulpinoidea*	20	✓	FACW
3. *Trifolium pratense*	15	✓	FACU
4. *Eleocharis palustris*	10		OBL
5. *Juncus dudleyi*	7		FACW
6. *Juncus torreyi*	7		FACW
7. *Poa pratensis*	7		FACU
8. *Glycyrrhiza lepidota*	5		FACU
9. *Vernonia fasciculata*	5		FAC
10. *Symphyotrichum lanceolatum var. lanceolatum*	2		FACW
	99	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	11	x 1 =	11
FACW Species	56	x 2 =	112
FAC Species	5	x 3 =	15
FACU Species	27	x 4 =	108
UPL Species		x 5 =	
Column Totals	99 (A)		246 (B)

Prevalence Index (B/A) = 2.48

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Dominated by hydrophytic vegetation.
Supplemental vegetation sheet attached.

SOIL

Sampling Point: W0712702KP001_W4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 2/1	100					SiL	OM
2 - 9	10YR 2/1	100					SiCL	
9 - 12	10YR 4/2	50					SiL	
9 - 12	10YR 2/1	50					SiL	
12 - 18	10YR 4/2	95	10YR 5/2	5	C	M	SL	
18 - 24	10YR 4/2	100					LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 11
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 8

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 617.50 City/County: Keya Paha County Sampling Date: 7/12/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0712702KP001_W2

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S23, T34N, R17W

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): convex Slope (%): 0

Subregion (LRR): G Lat: 42.9108092555508 Long: -99.277942790293 Datum: WGS84

Soil Map Unit Name: NE103 – Bd NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Wetland edge at toe of forested hillside within Keya Paha floodplain.

Photos: KK2393 Associated Plots: W0712702KP001_U2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 10' x 20')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 10' x 20')			
1. *Carex vulpinoidea*	45	✓	FACW
2. *Poa pratensis*	20	✓	FACU
3. *Agrostis stolonifera*	10		FACW
4. *Trifolium pratense*	10		FACU
5. *Carex pellita*	5		OBL
6. *Symphyotrichum lanceolatum var. lanceolatum*	5		FACW
7. *Juncus dudleyi*	2		FACW
8.			
9.			
10.			
	97 = Total Cover		
Vine Stratum (Plot size: 10' x 20')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	5	x 1 =	5
FACW Species	62	x 2 =	124
FAC Species		x 3 =	
FACU Species	30	x 4 =	120
UPL Species		x 5 =	
Column Totals	97 (A)		249 (B)

Prevalence Index (B/A) = 2.57

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0712702KP001_W2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 2/1	100					SL	OM
2 - 10	10YR 2/1	100					SL	
10 - 16	10YR 4/2	50					SCL	
10 - 16	10YR 2/2	50					SCL	
16 - 24	10YR 4/1	100					SiL	
24 - 32	10YR 4/3	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☑ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 11
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 4

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 617.49 City/County: Keya Paha County Sampling Date: 7/12/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0712702KP001_U2

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S23, T34N, R17W

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): none Slope (%): 3

Subregion (LRR): G Lat: 42.9107983240732 Long: -99.2780662933668 Datum: WGS84

Soil Map Unit Name: NE103 – Bd NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Slight rise from wetland into sandy hillside in Keya Paha floodplain.

Photos: KK2394 Associated Plots: W0712702KP001_W2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	50	✓	UPL
2. *Agrostis stolonifera*	15	✓	FACW
3. *Phleum pratense*	15	✓	FACU
4. *Poa pratensis*	15	✓	FACU
5. *Trifolium hybridum*	10		FACU
6. *Carex brevior*	5		FAC
7. *Achillea millefolium*	1		FACU
8. *Ambrosia psilostachya*	1		FACU
9. *Symphyotrichum lanceolatum var. lanceolatum*	1		FACW
10.			
	113	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	16	x 2 =	32
FAC Species	5	x 3 =	15
FACU Species	42	x 4 =	168
UPL Species	50	x 5 =	250
Column Totals	113 (A)		465 (B)

Prevalence Index (B/A) = 4.12

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Brome dominated.

SOIL

Sampling Point: W0712702KP001_U2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 18	10YR 2/1	100					LS	
18 - 24	10YR 4/2	100					LS	
24 - 26	10YR 3/2	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 16

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Part of sandy rising banks in floodplain.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 617.60 City/County: Keya Paha County Sampling Date: 7/12/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0712702KP001_W1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S24, T34N, R17W

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): convex Slope (%): 3

Subregion (LRR): G Lat: 42.9101216609351 Long: -99.2761099058129 Datum: WGS84

Soil Map Unit Name: NE103 – Bd NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Wetland edge at toe of forested hillside within Keya Paha floodplain.

Photos: KK2392 Associated Plots: W0712702KP001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 10')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1. *Amorpha fruticosa*	10	✓	FACW
2. *Ribes americanum*	10	✓	FACW
3.			
4.			
5.			
	20 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. *Carex vulpinoidea*	25	✓	FACW
2. *Carex pellita*	15	✓	OBL
3. *Agrostis stolonifera*	10	✓	FACW
4. *Carex scopulorum*	10	✓	FACW
5. *Poa pratensis*	10	✓	FACU
6. *Juncus dudleyi*	5		FACW
7. *Boehmeria cylindrica*	2		FACW
8. *Eupatorium perfoliatum*	2		FACW
9. *Symphyotrichum lanceolatum var. lanceolatum*	1		FACW
10.			
	80 = Total Cover		
Vine Stratum (Plot size: 10' x 10')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 86 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	15	x 1 =	15
FACW Species	75	x 2 =	150
FAC Species		x 3 =	
FACU Species	10	x 4 =	40
UPL Species		x 5 =	
Column Totals	100 (A)		205 (B)

Prevalence Index (B/A) = 2.05

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Vegetation is almost entirely hydrophytic. All plots were located on the edges of a large wetland, interior locations included *Typha*, *Bolboschoenus fluviatilis*, and standing water.

SOIL

Sampling Point: W0712702KP001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 2/1	100					SiL	
10 - 20	10YR 2/1	75	10YR 4/6	25	C	M	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 1
Water Table Present?	Yes ✓	No ____	Depth (inches): 4
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Wetland is likely saturated most of the growing season.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 617.61 City/County: Keya Paha County Sampling Date: 7/12/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0712702KP001_U1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S24, T34N, R17W

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 3

Subregion (LRR): G Lat: 42.9099591670284 Long: -99.276080791735 Datum: WGS84

Soil Map Unit Name: NE103 – Bd NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Wetland below wooded hillside fed by runoff and Keya Paha floodplain.

Photos: KK2391 Associated Plots: W0712702KP001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Juniperus virginiana*	30	✓	UPL
2. *Quercus macrocarpa*	20	✓	FACU
3.			
4.			
	50	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1. *Zanthoxylum americanum*	5	✓	UPL
2. *Symphoricarpos occidentalis*	2	✓	UPL
3.			
4.			
5.			
	7	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Elymus virginicus*	50	✓	FAC
2. *Muhlenbergia mexicana*	15		FACW
3. *Poa pratensis*	10		FACU
4. *Trifolium pratense*	10		FACU
5. *Plantago rugelii*	5		FACU
6. *Carex praegracilis*	1		FACW
7.			
8.			
9.			
10.			
	91	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 10

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 20 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	16	x 2 =	32
FAC Species	50	x 3 =	150
FACU Species	45	x 4 =	180
UPL Species	37	x 5 =	185
Column Totals	148 (A)		547 (B)

Prevalence Index (B/A) = 3.70

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Edge of wooded hillside.

SOIL

Sampling Point: W0712702KP001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 14	10YR 2/1	100					SL	
14 - 24	10YR 4/2	100					S	rocky in some areas

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Sandy and rocky soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 16

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Large rain event 4 days ago.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 641.73 City/County: Holt County Sampling Date: 3/16/200

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: exp_WL-0053_W1

Investigator(s): J. Beaver Section, Township, Range: S018 T033N R015W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): G Lat: 42.835 ong: -99.120 Datum: WGS84

Soil Map Unit Name: NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Wetland fringe adjacent to Beaver Creek on south side. No access to site. Desktop field form based on nearby wetlands.

Photos: Associated Plots: exp_WL-0053_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 5' x 20')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5' x 20')			
1. *Carex scopulorum*	70	✓	FACW
2. *Calamagrostis stricta*	25	✓	FACW
3. *Juncus dudleyi*	3		FACW
4. *Eupatorium perfoliatum*	1		FACW
5. *Verbena hastata*	1		FACW
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Vine Stratum (Plot size: 5' x 20')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	100	x 2 =	200
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	100 (A)		200 (B)

Prevalence Index (B/A) = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: exp_WL-0053_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 3	10YR 2/1	100					SL	
3 - 10	10YR 2/1	95	10YR 4/6	5	C	M	SL	
10 - 20	10YR 2/1	100					SL	
20 - 24	10YR 3/2	100					S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☑ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 10
Water Table Present?	Yes ✓	No ____	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 641.73 City/County: Holt County Sampling Date: 3/16/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: exp_WL-0053_U1

Investigator(s): J. Beaver Section, Township, Range: S018 T033N R015W

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 3-5

Subregion (LRR): G Lat: 42.835 Long: -99.120 Datum: WGS84

Soil Map Unit Name: NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Upland site adjacent to Beaver Creek on south ide. No access to site. Desktop field form based on nearby uplands.

Photos: None Associated Plots: exp_WL-0053_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus macrocarpa*	5	✓	FACU
2.			
3.			
4.			
	5 = Total Cover		
Shrub Stratum (Plot size: 5' x 20')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5' x 20')			
1. *Andropogon gerardii*	60	✓	FACU
2. *Poa compressa*	20	✓	FACU
3. *Achillea millefolium*	5		FACU
4. *Potentilla recta*	4		(UPL)
5. *Verbena stricta*	4		(UPL)
6. *Antennaria neglecta*	2		FACU
7. *Koeleria macrantha*	2		(UPL)
8. *Ratibida columnifera*	2		(UPL)
9. *Cirsium undulatum*	1		FACU
10.			
	100 = Total Cover		
Vine Stratum (Plot size: 5' x 20')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	88	x 4 =	352
UPL Species	12	x 5 =	60
Column Totals	100 (A)		412 (B)

Prevalence Index (B/A) = 4.12

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: exp_WL-0053_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 24	10YR 3/2	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 641.73 City/County: Holt County Sampling Date: 3/16/200

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: exp_WL-0082_W1

Investigator(s): J. Beaver Section, Township, Range: S018 T033N R015W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): G Lat: 42.835 ong: -99.120 Datum: WGS84

Soil Map Unit Name: NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Wetland terrace adjacent to Beaver Creek on north side. No access to site. Desktop field form based on nearby wetlands.

Photos: Associated Plots: exp_WL-0082_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 5' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5' x 20')			
1. *Carex scopulorum*	70	✓	FACW
2. *Calamagrostis stricta*	25	✓	FACW
3. *Juncus dudleyi*	3		FACW
4. *Eupatorium perfoliatum*	1		FACW
5. *Verbena hastata*	1		FACW
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	
Vine Stratum (Plot size: 5' x 20')			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	100	x 2 =	200
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	100 (A)		200 (B)

Prevalence Index (B/A) = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: exp_WL-0082_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 3	10YR 2/1	100					SL	
3 - 10	10YR 2/1	95	10YR 4/6	5	C	M	SL	
10 - 20	10YR 2/1	100					SL	
20 - 24	10YR 3/2	100					S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☑ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 10
Water Table Present?	Yes ✓	No ____	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 641.73 City/County: Holt County Sampling Date: 3/16/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: exp_WL-0082_U1

Investigator(s): J. Beaver Section, Township, Range: S018 T033N R015W

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 3-5

Subregion (LRR): G Lat: 42.835 Long: -99.120 Datum: WGS84

Soil Map Unit Name: NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Upland site adjacent to Beaver Creek on north side. No access to site. Desktop field form based on nearby uplands.

Photos: None Associated Plots: exp_WL-0082_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus macrocarpa*	5	✓	FACU
2.			
3.			
4.			
	5 = Total Cover		
Shrub Stratum (Plot size: 5' x 20')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5' x 20')			
1. *Andropogon gerardii*	60	✓	FACU
2. *Poa compressa*	20	✓	FACU
3. *Achillea millefolium*	5		FACU
4. *Potentilla recta*	4		(UPL)
5. *Verbena stricta*	4		(UPL)
6. *Antennaria neglecta*	2		FACU
7. *Koeleria macrantha*	2		(UPL)
8. *Ratibida columnifera*	2		(UPL)
9. *Cirsium undulatum*	1		FACU
10.			
	100 = Total Cover		
Vine Stratum (Plot size: 5' x 20')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	88	x 4 =	352
UPL Species	12	x 5 =	60
Column Totals	100 (A)		412 (B)

Prevalence Index (B/A) = 4.12

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: exp_WL-0082_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 24	10YR 3/2	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 641.73 City/County: Holt County Sampling Date: 7/11/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0711702HT001_W1

Investigator(s): K. Kottas, C. Griffith Section, Township, Range: S03, T031N, R014W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): convex Slope (%): 5

Subregion (LRR): G Lat: 42.6858788312 Long: -98.9389424901 Datum: WGS84

Soil Map Unit Name: NE089 – Ls NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Swale downstream from pond. Wetland fed from pond overflow.

Photos: KK7 Associated Plots: W0711702HT001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 5' x 20')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5' x 20')			
1. *Carex scopulorum*	70	✓	FACW
2. *Calamagrostis stricta*	25	✓	FACW
3. *Juncus dudleyi*	3		FACW
4. *Eupatorium perfoliatum*	1		FACW
5. *Verbena hastata*	1		FACW
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Vine Stratum (Plot size: 5' x 20')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	100	x 2 =	200
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	100 (A)		200 (B)

Prevalence Index (B/A) = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Completely vegetated with occasional ponding.

SOIL

Sampling Point: W0711702HT001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 3	10YR 2/1	100					SL	
3 - 10	10YR 2/1	95	10YR 4/6	5	C	M	SL	
10 - 20	10YR 2/1	100					SL	
20 - 24	10YR 3/2	100					S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☑ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 10
Water Table Present?	Yes ✓	No ____	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Cattle hummocks throughout.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 641.73 City/County: Holt County Sampling Date: 7/11/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0711702HT001_U1

Investigator(s): K. Kottas, C. Griffith Section, Township, Range: S03, T031N, R014W

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 3-5

Subregion (LRR): G Lat: 42.6858644575 Long: -98.9388346947 Datum: WGS84

Soil Map Unit Name: NE089 – Ls NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: KK7 Associated Plots: W0711702HT001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 5' x 20')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5' x 20')			
1. *Andropogon gerardii*	60	✓	FACU
2. *Poa compressa*	20	✓	FACU
3. *Achillea millefolium*	5		FACU
4. *Potentilla recta*	4		(UPL)
5. *Verbena stricta*	4		(UPL)
6. *Antennaria neglecta*	2		FACU
7. *Koeleria macrantha*	2		(UPL)
8. *Ratibida columnifera*	2		(UPL)
9. *Cirsium undulatum*	1		FACU
10.			
	100 = Total Cover		
Vine Stratum (Plot size: 5' x 20')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	88	x 4 =	352
UPL Species	12	x 5 =	60
Column Totals	100 (A)		412 (B)

Prevalence Index (B/A) = 4.12

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0711702HT001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 24	10YR 3/2	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Flat plasture land.

WETLAND DETERMINATION DATA FORM – Great Plains Region

W302HT001

Project/Site: Keystone XL pipeline City/County: HT / NE Sampling Date: 6.8.12

Applicant/Owner: State: NE Sampling Point: wetland

Investigator(s): BIO 302 Section, Township, Range: MP 647.55

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%): 0-2%

Subregion (LRR): G.-W. great Plains Lat: Long: Datum:

Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✗ No (If no, explain in Remarks.)

Are Vegetation NO, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ✗ No

Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✗	No	Is the Sampled Area within a Wetland? Yes ✗ No
Hydric Soil Present?	Yes ✗	No	
Wetland Hydrology Present?	Yes ✗	No	

Remarks: PEM is adjacent to S302HT001 - Eagle Creek; both sides.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. NONE			
3.			
4.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3. NONE			
4.			
5.			
	= Total Cover		

Herb Stratum (Plot size: 5' rad)			
1.			
2. Carex Stipada / Stricta	90%	✗	OBL
3. phalaris arundinacea	10%		FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		

Woody Vine Stratum (Plot size:)			
1.			
2. NONE			
	= Total Cover		

% Bare Ground in Herb Stratum NO

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✗ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✗ No

Remarks:

photos: -001S 004W
-002E 005 corps plot
-003N 006 upland

W302HT001 (cont.)

SOIL

Sampling Point: wetland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12"	7.5YR 3/2	95%	7.5YR 6/6	5%	C	M	Sandy loam	
restrictive clay layer @ 12"								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: clay

Depth (inches): @ 12"

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No @ 12" Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

adjacent to Eagle Creek – both sides.

WETLAND DETERMINATION DATA FORM – Great Plains Region

W302HT001

Project/Site: Keystone XL pipeline City/County: HT/NE Sampling Date: 6.8.12
Applicant/Owner: State: NE Sampling Point: upland
Investigator(s): Bio 302 Section, Township, Range: MP 647.55
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): Slope (%): 0-2%
Subregion (LRR): G- W. great Plains Lat: Long: Datum:
Soil Map Unit Name: NWI classification: upland
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✗ No (If no, explain in Remarks.)
Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ✗ No
Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No ✗	Is the Sampled Area within a Wetland? Yes ___ No ✗
Hydric Soil Present?	Yes	No ✗	
Wetland Hydrology Present?	Yes	No ✗	

Remarks: @ higher elevation terraces above Eagle Creek, lacks dominance of hydrophytic vegetation, hydric soil + hydrology.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5' Rad.)			
1.			
2. Bromus inermis	90%	✗	
3. Bromus tectorum	10%		
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	= Total Cover		
% Bare Ground in Herb Stratum ___			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): D (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✗

Remarks:

W302 HT 001 (cont.)

SOIL

Sampling Point: upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches):	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12"	10YR 4/3	100%					Sandy Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✗

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✗

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

W302HT003

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL pipeline City/County: HT / KP Sampling Date: 6.8.12

Applicant/Owner: State: Sampling Point: wetland

Investigator(s): BIO 302 Section, Township, Range: MP 648.0

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%): 0-2%

Subregion (LRR): G. - W. great Plains Lat: Long: Datum:

Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___	Is the Sampled Area within a Wetland? Yes ✓ No ___
Hydric Soil Present?	Yes ✓	No ___	
Wetland Hydrology Present?	Yes ✓	No ___	

Remarks: narrow carex / Scirpis PEM wetland w/ in drainage swale. Pockets of open water w/ duckweed.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	___ = Total Cover		
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		
Herb Stratum (Plot size: 5' Rad)			
1.			
2. Carex stricta	60	✓	OBL
3. Scirpis spp validus	50	✓	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	110 = Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		
% Bare Ground in Herb Stratum ___			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: used by cattle - heavy in areas. photos: -001 SE -004 SW -002 NE -005 Corps plot -003 NW -006 upland

W302 HT 003

Sampling Point: wetland

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12"	10YR 3/1	90%	Gley2 6/5B	10%	D	M	Sandy clay	
12-18	Gley 1 6/N							

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- * Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- * Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes * No ___

Remarks: cattle pugging

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- * Surface Water (A1)
- * High Water Table (A2)
- * Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes * No ___ Depth (inches): +1' in spots

Water Table Present? Yes * No ___ Depth (inches): +1'

Saturation Present? (includes capillary fringe) Yes * No ___ Depth (inches): @ surface

Wetland Hydrology Present? Yes * No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Drainage swale continues off ROW –

W306 HT005

WETLAND PLOT

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL IV NE 2012 City/County: HOLT Sampling Date: 6/13/12

Applicant/Owner: State: NE Sampling Point:

Investigator(s): 306 Section, Township, Range: S24 T30N R12W

Landform (hillslope, terrace, etc.): HILLSLOPE Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes Y	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes Y	No ____	
Wetland Hydrology Present?	Yes Y	No ____	

Remarks: DRY - SEASONY LOW RAINFALL / DROUGHT LULC = PEM

PEM ML-NE-HT-30350.000 MP: 656.98

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		

Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		

Herb Stratum (Plot size: 0.25m²)			
1. CAREX SCOPARIA	30	Y	OBL
2. TYPHA LATIFOLIA	10	N	OBL
3. SCIRPUS ATROVIRENS	40	Y	OBL
4. PHALARIS ARUNDINACEA	20	Y	FACW
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	100	x 1 = 100
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	100 (A)	100 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-18	2/1 10YR	80	4/6 7.5YR	20	C	M	SCL	
0-17	3/5PB GLEY2	100	5/5PB GLEY2	100	D	M	SANDY	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- X Histosol (A1)
- ___ Histic Epipedon (A2)
- X Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- X Depleted Below Dark Surface (A11)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- X Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 0

Water Table Present? Yes X No ___ Depth (inches): 16

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

W 306 WW008

WETLAND DETERMINATION DATA FORM – Great Plains Region

UPLAND

Project/Site: KXLIV NE 2012 City/County: HOLT Sampling Date: 6/13

Applicant/Owner: State: NE Sampling Point:

Investigator(s): 306 Section, Township, Range: S28 T30N R12W

Landform (hillslope, terrace, etc.): HILLSLOPE Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	Is the Sampled Area within a Wetland? Yes ___ No X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks: DROUGHT

LHLC = PEM

ML-NE-M7-30350.000 MP 656.98

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	___ = Total Cover		

Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		

Herb Stratum (Plot size: 0.25 m²)			
1. BROMUS INERMIS	20	Y	UPL
2. [redacted] SCHIZACHYRIUM SCOPARIUM	40	Y	UPL
3. [redacted] HESPERODIPA CORONOPUS	40	Y	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		

Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 3 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species	100	x 5 = 500
Column Totals:	100 (A)	500 (B)

Prevalence Index = B/A = 5

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	3/3 10YR	100					SANDY LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

W306H7003.

WETLAND PLOT

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL IV NE 2012 City/County: HOLT Sampling Date: 6/7/12

Applicant/Owner: State: NE Sampling Point:

Investigator(s): 306 Section, Township, Range: S11 T28N R9W

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation, Soil, or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No
Hydric Soil Present?	Yes X	No
Wetland Hydrology Present?	Yes X	No
Is the Sampled Area within a Wetland?	**Yes X**	**No**

Remarks:

PFO, ML-NE-H7-30605.000

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: .25 m²)	Absolute % Cover	Dominant Species?	Indicator Status
1. SALIX AMYGDALOIDES	50	Y	FACW
2.			
3.			
4.			
	50 = Total Cover		

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Herb Stratum (Plot size: .25 m²)			
1. PHALARIS ARUNDINACEA	40	Y	FACW+
2. SCIRPUS ATROVIRENS	30	Y	OBL
3. [redacted] LEMNA MINOR	10	N	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	80 = Total Cover		

Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	40	x 1 = 40
FACW species	90	x 2 = 180
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	130 (A)	220 (B)

Prevalence Index = B/A = 1.16

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks:

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	2/1 10YR	50	4/1 10YR	25	D	M	SANDY	
9-12	3/1 10YR	50	4/2 10YR	25	D	M	SANDY	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- X Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- X Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

SATURATED, MOTTLING PRESENT, GLEYING

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- X Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- X Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 0

Water Table Present? Yes X No ___ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

W306H7003

UPLAND PLOT

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL IV NE 2012 City/County: HOLT Sampling Date: 6/7/12

Applicant/Owner: State: NE Sampling Point:

Investigator(s): Section, Township, Range: SU T28N R9W

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification: [redacted]

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation, Soil, or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	Is the Sampled Area within a Wetland? Yes No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Remarks:

ML-NE-HT-30605.000

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Herb Stratum (Plot size: .25m2)			
1. [redacted] AMBROSIA ARTEMISIIFOLIA	70	Y	FACU
2. MENTHA ARVENSIS	5	N	UPL
3. BROMUS INERMIS	25	Y	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		

Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No X

Remarks:

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	3/4 10YR	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (Includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

W306A7001

WETLAND

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL IV NE 2012 City/County: ANTELOPE Sampling Date: 6/8/12

Applicant/Owner: State: NE Sampling Point:

Investigator(s): 306 Section, Township, Range: S20 T28N R8W

Landform (hillslope, terrace, etc.): STREAM BED Local relief (concave, convex, none): CONCAVE Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes Y	No	Is the Sampled Area within a Wetland? Yes X No
Hydric Soil Present?	Yes Y	No	
Wetland Hydrology Present?	Yes Y	No	

Remarks: PEM, FRINGING TO EPH STREAM (S306A7001)

ML-NE-41-30030.000 MP 680.88

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: .25m²)	Absolute % Cover	Dominant Species?	Indicator Status
1. SALIX NIGRA	20	N	FACW
2.			
3.			
4.			
	20 = Total Cover		

Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Herb Stratum (Plot size: .25m²)			
1. JUNCUS EFFUSUS	20	Y	OBL
2. RUMEX CRISPUS	5	N	FACW
3. [redacted] PELTANDRA VIRGINICA	20	Y	OBL
4. [redacted] ALTERNANTHERA ALTISSIMA	20	Y	FACW
5. [redacted] ALLIARIA PETIOLATA	25	Y	FACW
6. TYPHA LATIFOLIA	10	N	OBL
7.			
8.			
9.			
10.			
	= Total Cover		

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	30	x 1 = 30
FACW species	70	x 2 = 140
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	100 (A)	170 (B)

Prevalence Index = B/A = 1.70

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks:

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	3/2 10YR	50	4/1 10YR	50	D	M	SANDY	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ✓ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ✓ 1 cm Muck (A9) (**LRR F, G, H**)
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ✓ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ✓ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 0

Water Table Present? Yes ✓ No ___ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

W306A7 001

UPLAND

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL IV NE 2012 City/County: ANTELOPE Sampling Date: 6/18/12

Applicant/Owner: State: NE Sampling Point:

Investigator(s): 306 Section, Township, Range: S20 T28N R8W

Landform (hillslope, terrace, etc.): HILLSLOPE Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation, Soil, or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	Is the Sampled Area within a Wetland? Yes No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Remarks:

MP: 680.93

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Herb Stratum (Plot size:)			
1. BROMUS INERMIS	70		
2. ASCLEPIAS SYRIACA	20		
3. L. SPICATE	10		
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		

Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): (A)

Total Number of Dominant Species Across All Strata: (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No

Remarks:

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	3/3 10YR	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 684.07 City/County: Antelope County Sampling Date: 7/14/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0714702AT001_W1

Investigator(s): K. Kottas, J. Allewalt, S. Cooper, C. Griffith Section, Township, Range: S28, T028N, R008W

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave Slope (%): 5

Subregion (LRR): G Lat: 42.3775854424 Long: -98.2570782474 Datum: WGS84

Soil Map Unit Name: NE003 – 6320 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: PEM in floodplain of Big Spring Creek.

Photos: KK1444 - KK1445 Associated Plots: W0714702AT001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 5' x 20')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5' x 20')			
1. *Carex hystericina*	50	✓	OBL
2. *Sagittaria latifolia*	35	✓	OBL
3. *Agrostis stolonifera*	25		FACW
4. *Eleocharis palustris*	10		OBL
5. *Leersia oryzoides*	10		OBL
6. *Schoenoplectus tabernaemontani*	10		OBL
7. *Eupatorium maculatum*	5		OBL
8. *Schoenoplectus pungens*	5		OBL
9. *Phleum pratense*	3		FACU
10. *Verbena hastata*	1		FACW
	154 = Total Cover		
Vine Stratum (Plot size: 5' x 20')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 75

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	125	x 1 =	125
FACW Species	26	x 2 =	52
FAC Species		x 3 =	
FACU Species	3	x 4 =	12
UPL Species		x 5 =	
Column Totals	154 (A)		189 (B)

Prevalence Index (B/A) = 1.23

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0714702AT001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 18	10YR 2/1	100					L	not aquic
18 - 24	10YR 2/1	100					SL	
24 - 28	10YR 2/2	100					S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☑ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks: "Difficult" soil, but mucky enough to reach black histic.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 0
Water Table Present?	Yes ✓	No ____	Depth (inches): 10
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Recent rain event very significant. Surface water still standing in depressions.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 684.07 City/County: Antelope County Sampling Date: 7/14/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0714702AT001_U1

Investigator(s): J. Allewalt, K. Kottas Section, Township, Range: S28, T028N, R008W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): G Lat: 42.3775951537 Long: -98.2571273283 Datum: WGS84

Soil Map Unit Name: NE003 – 6320 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Terrace above intermittent stream; receives runoff from pasture above.

Photos: KK1446 Associated Plots: W0714702AT001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 5' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5' x 20')			
1. *Carex brevior*	40	✓	FAC
2. *Phleum pratense*	30	✓	FACU
3. *Panicum virgatum*	20		FAC
4. *Asclepias syriaca*	10		UPL
5. *Verbena hastata*	5		FACW
6. *Bromus inermis*	4		UPL
7.			
8.			
9.			
10.			
	109	= Total Cover	
Vine Stratum (Plot size: 5' x 20')			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	5	x 2 =	10
FAC Species	60	x 3 =	180
FACU Species	30	x 4 =	120
UPL Species	14	x 5 =	70
Column Totals	109 (A)		380 (B)

Prevalence Index (B/A) = 3.49

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Vegetation varies along this terrace with FACW to UPL species present.

SOIL

Sampling Point: W0714702AT001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 2/1	99	10YR 3/6	1	C	PL	CL	
12 - 18	10YR 3/1	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Root masses present in upper 2 inches. Soil was dark above and sandy below.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 689.94 City/County: Antelope County Sampling Date: 7/16/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0716702AT001_W1

Investigator(s): K. Kottas, C. Griffith Section, Township, Range: S08, T027N, R007W

Landform (hillslope, terrace, etc.): bowl Local relief (concave, convex, none): concave

Slope (%): _____ Lat: 42.3349969412 Long: -98.1639405879 Datum: WGS84

Soil Map Unit Name: NE003 – 6636 NWI Classification: PFO

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Recent rains - area is low spot along ditch that may collect water after big rains.

Photos: KK1473 Associated Plots: W0716702AT001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus pennsylvanica*	100	✓	FACW
2. *Juniperus virginiana*	50	✓	FACU
3. *Morus alba*	10		FAC
4.			
5.			
	160	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	20	✓	FACW
2. *Solidago canadensis var. gilvocanescens*	20	✓	FACU
3. *Parthenocissus vitacea*	10		FACU
4. *Toxicodendron rydbergii*	10		FAC
5. *Phleum pratense*	3		FACU
6. *Bromus inermis*	2		FACU
7. *Cirsium arvense*	1		FACU
8.			
9.			
10.			
	66	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	120	x 2 =	240
FAC Species	20	x 3 =	60
FACU Species	86	x 4 =	344
UPL Species		x 5 =	
Column Totals	226 (A)		644 (B)

Prevalence Index (B/A) = 2.85

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Junipers are stressed. Vegetation is marginal, but hydric soils and wetland hydrology are present.

SOIL

Sampling Point: W0716702AT001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 2/2	100					SL	organic - root masses
4 - 8	10YR 4/2	100					S	
8 - 12	10YR 2/2	90	7.5YR 4/6	10	C	M	SL	
12 - 18	10YR 2/2	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: This area may pond after rain storms.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☑ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 0
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 10

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Low area with ponding water after rain.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 689.94 City/County: Antelope County Sampling Date: 7/16/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0716702AT001_U1

Investigator(s): K. Kottas, C. Griffith Section, Township, Range: S08, T027N, R007W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): convex

Slope (%): 3 Lat: 42.3350297477 Long: -98.1639481429 Datum: WGS84

Soil Map Unit Name: NE003 – 6636 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Roadside upland point near wet ditch.

Photos: KK1474 Associated Plots: W0716702AT001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	60	✓	FACU
2. *Agropyron smithii*	10		FACU
3. *Panicum virgatum*	10		FAC
4. *Ambrosia psilostachya*	2		FACU
5. *Dactylis glomerata*	2		FACU
6.			
7.			
8.			
9.			
10.			
	84	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	10	x 3 =	30
FACU Species	74	x 4 =	296
UPL Species		x 5 =	
Column Totals	84 (A)		326 (B)

Prevalence Index (B/A) = 3.88

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0716702AT001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 3/2	100					SL	
10 - 18	10YR 3/2	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Sandy soil with some clay along roadside.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Standing water in lowest parts of ditch and forested edge of field.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 716.1 City/County: Antelope County Sampling Date: 1/20/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: WST-WL-0003_W1

Investigator(s): J. Beaver - Desktop Analysis Section, Township, Range: T024N R 005W S002

Landform (hillslope, terrace, etc.): ancient stream channel Local relief (concave, convex, none): concave

Slope (%): 3 Lat: 42.079 Long: -97.854 Datum: WGS84

Soil Map Unit Name: NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Desktop analysis, data based on proximal wetland sites.

Photos: None Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 10' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 10' x 20')			
1. *Phalaris arundinacea*	60	✓	FACW
2. *Typha angustifolia*	20	✓	OBL
3. *Panicum capillare*	10		FAC
4. *Verbena hastata*	5		FACW
5. *Glycyrrhiza lepidota*	3		FACU
6.			
7.			
8.			
9.			
10.			
	98	= Total Cover	

Woody Vine Stratum (Plot size: 10' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	20	x 1 =	20
FACW Species	65	x 2 =	130
FAC Species	10	x 3 =	30
FACU Species	3	x 4 =	12
UPL Species		x 5 =	
Column Totals	98 (A)		192 (B)

Prevalence Index (B/A) = 1.96

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: WST-WL-0003_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 2/1	100					CL	
16 - 24	10YR 2/1	90	10YR 5/8	10	C	M	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Assume soil is depleted at greater depth and meets A12 based on hydrology and other site conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 1

Water Table Present? Yes ✓ No ____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 716.1 and 716.3 City/County: Antelope County Sampling Date: 1/20/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: WST-WL-0003&0004_U1

Investigator(s): J. Beaver - Desktop Analysis Section, Township, Range: T024N R 005W S002

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none

Slope (%): 3 Lat: 42.079 Long: --97.854 Datum: WGS84

Soil Map Unit Name: NE003 – 6636 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Desktop analysis based on proximal upland plots

Photos: None Associated Plots: WST-WL-0003_W1 and WST-WL-0004_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	60	✓	FACU
2. *Agropyron smithii*	10		FACU
3. *Panicum virgatum*	10		FAC
4. *Ambrosia psilostachya*	2		FACU
5. *Dactylis glomerata*	2		FACU
6.			
7.			
8.			
9.			
10.			
	84	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	10	x 3 =	30
FACU Species	74	x 4 =	296
UPL Species		x 5 =	
Column Totals	84 (A)		326 (B)

Prevalence Index (B/A) = 3.88

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: WST-WL-0003&0004_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 3/2	100					L	
10 - 18	10YR 3/2	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 716.3 City/County: Antelope County Sampling Date: 1/20/20

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: WST-WL-0004_W1

Investigator(s): J. Beaver - Desktop analysis Section, Township, Range: T024N R005W S001

Landform (hillslope, terrace, etc.): ancient stream channel Local relief (concave, convex, none): concave

Slope (%): 3-5 Lat: 42.078 Long: -97.848 Datum: WGS84

Soil Map Unit Name: _____ NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Desktop analysis, data from proximal wetland sites that were sampled.

Photos: None Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 10' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 10' x 20')			
1. *Phalaris arundinacea*	50	✓	FACW
2. *Typha angustifolia*	30	✓	OBL
3. *Panicum capillare*	15		FAC
4. *Ranunculus sceleratus*	2		OBL
5. *Rumex crispus*	2		FAC
6.			
7.			
8.			
9.			
10.			
	99	= Total Cover	

Woody Vine Stratum (Plot size: 10' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	32	x 1 =	32
FACW Species	50	x 2 =	100
FAC Species	17	x 3 =	51
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	99 (A)		183 (B)

Prevalence Index (B/A) = 1.85

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: WST-WL-0004_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 2/1	100					CL	
16 - 20	10YR 2/1	90	10YR 5/8	10	C	M	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Assume soil is depleted at greater depth and meets A12 based on hydrology and other site conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 1

Water Table Present? Yes ✓ No ____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 716.95 City/County: Antelope County Sampling Date: 4/27/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0427703AT001_W1

Investigator(s): J. Beaver, P. Christensen Section, Township, Range: S12, T024N, R005W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave

Slope (%): 2 Lat: 42.068335378 Long: -97.8376315348 Datum: WGS84

Soil Map Unit Name: NE003 – 9999 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Narrow wetland fringe in overflow areas of Elkhorn River and within OHWM. Much of the *Salix exiqua*/*Phalaris arundinacea* here is riparian not wetland as no hydrology or hydric soil. No PFO per NWI mapping.

Photos: JB041 Associated Plots: W0427703AT001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 25')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5' x 25')			
1. *Salix exigua*	3		(FACW)
2.			
3.			
4.			
5.			
	3	= Total Cover	
Herb Stratum (Plot size: 5' x 25')			
1. *Phalaris arundinacea*	95	✓	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	95	= Total Cover	
Woody Vine Stratum (Plot size: 5' x 25')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	98	x 2 =	196
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	98 (A)		196 (B)

Prevalence Index (B/A) = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Trees overhanging, but not rooted in wetland. While not given an indicator status in the Midwest Region, *Salix exigua* has been designated FACW for this survey on the basis of ecological similarity to nearby wetlands crossed by this project in the Great Plains Region.

SOIL

Sampling Point: W0427703AT001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 2/1	100					SiCL	
16 - 22	10YR 4/2	80	10YR 5/6	20	C	M	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☑ Water Marks (B1)
- ☑ Sediment Deposits (B2)
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 8

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Saturation within root zone.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 716.95 City/County: Antelope County Sampling Date: 4/27/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0427703AT001_U1

Investigator(s): J. Beaver, P. Christensen Section, Township, Range: S12, T024N, R005W

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave

Slope (%): 2 Lat: 42.0683103134 Long: -97.8376271959 Datum: WGS84

Soil Map Unit Name: NE003 – 9999 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Similar vegetation, but no hydric soils or hydrology; riparian and not wetland.

Photos: JB042 Associated Plots: W0427703AT001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10' x 20')			
1. *Salix exigua*	40	✓	(FACW)
2.			
3.			
4.			
5.			
	40	= Total Cover	
Herb Stratum (Plot size: 10' x 20')			
1. *Phalaris arundinacea*	95	✓	FACW
2. *Equisetum laevigatum*	2		FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	97	= Total Cover	
Woody Vine Stratum (Plot size: 10' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	137	x 2 =	274
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	137 (A)		274 (B)

Prevalence Index (B/A) = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: Wetland vegetation on riparian terrace, but no hydrology or hydric soils. While not given an indicator status in the Midwest Region, *Salix exigua* has been designated FACW for this survey on the basis of ecological similarity to nearby wetlands crossed by this project in the Great Plains Region.

SOIL

Sampling Point: W0427703AT001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 3/2	100					SL	
4 - 20	10YR 5/3	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Terrace in flood zone, but no other hydrology.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline - MP 721.81 City/County: Madison County Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: WST-WL-0009_W1

Investigator(s): J. Allewalt (Desktop) Section, Township, Range: S33, T24N, R04W

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave

Slope (%): _____ Lat: 42.0138700000 Long: -97.7941800000 Datum: WGS84

Soil Map Unit Name: NE119 -6364 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Wetland adjacent to Tributary to Dry Creek (north side). No site access. Desktop form based on nearby wetland data forms, Web Soil Survey, and aerial imagery. To date, all wetland indicators have not been field verified at this site.

Photos: No Photos Associated Plots: WST-WL-0009_U1, WST-WL-0011_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	65	✓	FACW
2. *Typha latifolia*	40	✓	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	105	= Total Cover	

Woody Vine Stratum (Plot size: n/a)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	40	x 1 =	40
FACW Species	65	x 2 =	130
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	105 (A)		170 (B)

Prevalence Index (B/A) = 1.62

Hydrophytic Vegetation Indicators:

- ☑ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Vegetation based on nearby wetland in ditch to west. Desktop assessment of vegetation was determined to be similar to that of nearby wetlands. Field map notes of plant species were also used to select accurate plant species in the area.

SOIL

Sampling Point: WST-WL-0009_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10 YR 2/1	100					SiCL	
8 - 20	10 YR 2/2	90	7.5 YR 5/6	10	C	M	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Desktop soil determinations were supported by information from nearby wetland features and NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 9
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 1

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of nearby wetlands. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline - MP 721.81 City/County: Madison County Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: WST-WL-0009_U1

Investigator(s): J. Allewalt (Desktop) Section, Township, Range: S33, T24N, R04W

Landform (hillslope, terrace, etc.): field Local relief (concave, convex, none): none

Slope (%): 1 Lat: 42.0129100000 Long: -97.7943500000 Datum: WGS84

Soil Map Unit Name: NE119 -6364 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Field adjacent to wetland fringe of tributary to Dry Creek. No site access. Desktop form based on nearby wetland data forms, Web Soil Survey, and aerial imagery. To date, all wetland indicators have not been field verified at this site.

Photos: No Photos Associated Plots: WST-WL-0009_W1, WST-WL-0011_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	55	✓	FACU
2. *Thlaspi arvense*	30	✓	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	85	= Total Cover	

Woody Vine Stratum (Plot size: n/a)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	85	x 4 =	340
UPL Species		x 5 =	
Column Totals	85 (A)		340 (B)

Prevalence Index (B/A) = 4.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Desktop assessment of vegetation was determined to be similar to that of nearby wetlands. Field map notes of plant species were also used to select accurate plant species in the area.

SOIL

Sampling Point: WST-WL-0009_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10 YR 2/1	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Desktop soil determinations were supported by information from nearby wetland features and NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of nearby wetlands. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline - MP 721.84 City/County: Madison County Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: WST-WL-0011_W1

Investigator(s): J. Allewalt (Desktop) Section, Township, Range: S33, T24N, R04W

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave

Slope (%): 2 Lat: 42.0132200000 Long: -97.7930100000 Datum: WGS84

Soil Map Unit Name: NE119 -6364 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Wetland adjacent to Dry Creek (east side). No site access. Desktop form based on nearby wetland data forms, Web Soil Survey, and aerial imagery. To date, all wetland indicators have not been field verified at this site.

Photos: No Photos Associated Plots: WST-WL-0009_U1, WST-WL-0009_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	68	✓	FACW
2. *Typha latifolia*	35	✓	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	103	= Total Cover	

Woody Vine Stratum (Plot size: n/a)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	35	x 1 =	35
FACW Species	68	x 2 =	136
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	103 (A)		171 (B)

Prevalence Index (B/A) = 1.66

Hydrophytic Vegetation Indicators:

- [x] 1 – Rapid Test for Hydrophytic Vegetation
- [x] 2 – Dominance Test is >50%
- [ ] 3 – Prevalence Index is ≤3.0[1]
- [ ] 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Desktop assessment of vegetation was determined to be similar to that of nearby wetlands. Field map notes of plant species were also used to select accurate plant species in the area.

SOIL

Sampling Point: WST-WL-0011_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10 YR 2/1	100					SiCL	
8 - 20	10 YR 2/2	90	7.5 YR 5/6	10	C	M	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Desktop soil determinations were supported by information from nearby wetland features and NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 1

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of nearby wetlands. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline - MP 721.81 City/County: Madison County Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: WST-WL-0009_U1

Investigator(s): J. Allewalt (Desktop) Section, Township, Range: S33, T24N, R04W

Landform (hillslope, terrace, etc.): field Local relief (concave, convex, none): none

Slope (%): 1 Lat: 42.0129100000 Long: -97.7943500000 Datum: WGS84

Soil Map Unit Name: NE119 -6364 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Field adjacent to wetland fringe of tributary to Dry Creek. No site access. Desktop form based on nearby wetland data forms, Web Soil Survey, and aerial imagery. To date, all wetland indicators have not been field verified at this site.

Photos: No Photos Associated Plots: WST-WL-0009_W1, WST-WL-0011_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	55	✓	FACU
2. *Thlaspi arvense*	30	✓	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	85	= Total Cover	

Woody Vine Stratum (Plot size: n/a)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	85	x 4 =	340
UPL Species		x 5 =	
Column Totals	85 (A)		340 (B)

Prevalence Index (B/A) = 4.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Desktop assessment of vegetation was determined to be similar to that of nearby wetlands. Field map notes of plant species were also used to select accurate plant species in the area.

SOIL

Sampling Point: WST-WL-0009_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10 YR 2/1	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Desktop soil determinations were supported by information from nearby wetland features and NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of nearby wetlands. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 723.81 City/County: Madison County Sampling Date: 4/28/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0428702MA001_W1

Investigator(s): K. Kottas, M. Wirth Section, Township, Range: S03, T023N, R004W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): concave

Slope (%): 3-5 Lat: 41.9907319152 Long: -97.7634978849 Datum: WGS84

Soil Map Unit Name: NE119 – 3545 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: PEM in bottom of swale with an ephemeral stream in middle of PEM. Soybeans/cultivated up to edge of PEM on south side; part of the PEM is cultivated on the north side of the stream.

Photos: KK1008 Associated Plots: W0428702MA001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 10' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 10' x 20')			
1. *Phalaris arundinacea*	50	✓	FACW
2. *Typha angustifolia*	30	✓	OBL
3. *Panicum capillare*	15		FAC
4. *Ranunculus sceleratus*	2		OBL
5. *Rumex crispus*	2		FAC
6.			
7.			
8.			
9.			
10.			
	99	= Total Cover	

Woody Vine Stratum (Plot size: 10' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	32	x 1 =	32
FACW Species	50	x 2 =	100
FAC Species	17	x 3 =	51
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	99 (A)		183 (B)

Prevalence Index (B/A) = 1.85

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: PEM is ≥ 20 feet wide on north and south sides of the stream. Mostly *Phalaris arundinacea* and *Typha angustifolia*. There are trees and shrubs upstream, outside of ROW.

SOIL

Sampling Point: W0428702MA001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 2/1	100					CL	
16 - 20	10YR 2/1	90	10YR 5/8	10	C	M	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 1
Water Table Present?	Yes ✓	No ____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Ponded water on stream fringe.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 723.81 City/County: Madison County Sampling Date: 4/28/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0428702MA001_U1

Investigator(s): K. Kottas, M. Wirth Section, Township, Range: S03, T023N, R004W

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave

Slope (%): 10 Lat: 41.9907189432 Long: -97.763436272 Datum: WGS84

Soil Map Unit Name: NE119 – 3545 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Cultivated slope above swale with ephemeral stream and PEM.

Photos: KK1013 Associated Plots: W0428702MA001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 10' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 10' x 20')			
1. *Thlaspi arvense*	1		FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	1	= Total Cover	

Woody Vine Stratum (Plot size: 10' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	1	x 4 =	4
UPL Species		x 5 =	
Column Totals	1 (A)		4 (B)

Prevalence Index (B/A) = 4.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: cultivated slope

SOIL

Sampling Point: W0428702MA001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 2/2	100					CL	
16 - 24	10YR 3/2	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No wetland hydrology indicators present.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline - MP 724.65 City/County: Madison County Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: WST-WL-0013-0014_W1

Investigator(s): J. Allewalt (Desktop) Section, Township, Range: S11, T23N, R04W

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave

Slope (%): 2 Lat: 41.9859200000 Long: -97.7547600000 Datum: WGS84

Soil Map Unit Name: NE119 - 3545 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Fringe wetland in Buffalo Creek. No site access. Desktop field form based on nearby wetland features. Desktop form based on nearby wetland data forms, Web Soil Survey, and aerial imagery. To date, all wetland indicators have not been field verified at this site.

Photos: No Photos Associated Plots: WST-WL-0013-0014_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	80	✓	FACW
2. *Spartina pectinata*	10		FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	90	= Total Cover	

Woody Vine Stratum (Plot size: n/a)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	90	x 2 =	180
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	90 (A)		180 (B)

Prevalence Index (B/A) = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Desktop assessment of vegetation was determined to be similar to that of nearby wetlands. Field map notes of plant species were also used to select accurate plant species in the area.

SOIL

Sampling Point: WST-WL-0013-0014_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 7	10 YR 2/1	100					SiL	
7 - 20	10 YR 2/2	90	7.5 YR 5/6	10	C	M	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Desktop soil determinations were supported by information from nearby wetland features and NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 10
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of nearby wetlands. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline - MP 724.65 City/County: Madison County Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: WST-WL-0013-0014_U1

Investigator(s): J. Allewalt (Desktop) Section, Township, Range: S11, T23N, R04W

Landform (hillslope, terrace, etc.): bank Local relief (concave, convex, none): none

Slope (%): 1 Lat: 41.9859300000 Long: -97.7546700000 Datum: WGS84

Soil Map Unit Name: NE119 - 3545 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Bank above Buffalo Creek. No site access. Desktop form based on nearby wetland data forms, Web Soil Survey, and aerial imagery. To date, all wetland indicators have not been field verified at this site.

Photos: No Photos Associated Plots: WST-WL-0013-0014_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	65	✓	FACU
2. *Poa pratensis*	35	✓	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: n/a)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	35	x 3 =	105
FACU Species	65	x 4 =	260
UPL Species		x 5 =	
Column Totals	100 (A)		365 (B)

Prevalence Index (B/A) = 3.65

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Desktop assessment of vegetation was determined to be similar to that of nearby wetlands. Field map notes of plant species were also used to select accurate plant species in the area.

SOIL

Sampling Point: WST-WL-0013-0014_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10 YR 2/1	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Desktop soil determinations were supported by information from nearby wetland features and NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of nearby wetlands. Hydrology determinations were supported by plant species were also used to select accurate plant species in the area.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline - MP 727.11 City/County: Madison County Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: WST-WL-0017-0018_W1

Investigator(s): J. Allewalt (Desktop) Section, Township, Range: S18, T23N, R03W

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave

Slope (%): 2 Lat: 41.9657800000 Long: -97.7156800000 Datum: WGS84

Soil Map Unit Name: NE119 - 3545 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Fringe wetland in Deer Creek. No site access. Desktop form based on nearby wetland data forms, Web Soil Survey, and aerial imagery. To date, all wetland indicators have not been field verified at this site.

Photos: No Photos Associated Plots: WST-WL-0017-0018_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	70	✓	FACW
2. *Poa pratensis*	12		FAC
3. *Bromus inermis*	5		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	87	= Total Cover	

Woody Vine Stratum (Plot size: n/a)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	70	x 2 =	140
FAC Species	12	x 3 =	36
FACU Species	5	x 4 =	20
UPL Species		x 5 =	
Column Totals	87 (A)		196 (B)

Prevalence Index (B/A) = 2.25

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Desktop assessment of vegetation was determined to be similar to that of nearby wetlands. Field map notes of plant species were also used to select accurate plant species in the area.

SOIL

Sampling Point: WST-WL-0017-0018_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10 YR 2/1	100					SiL	
8 - 20	10 YR 2/2	90	7.5 YR 5/6	10	C	M	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Desktop soil determinations were supported by information from nearby wetland features and NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 9.5
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of nearby wetlands. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline - MP 727.11 City/County: Madison County Sampling Date: 5/14/2020

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: WST-WL-0017-0018_U1

Investigator(s): J. Allewalt (Desktop) Section, Township, Range: S18, T23N, R03W

Landform (hillslope, terrace, etc.): bank Local relief (concave, convex, none): none

Slope (%): 1 Lat: 41.9657400000 Long: -97.7156500000 Datum: WGS84

Soil Map Unit Name: NE119 - 3545 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Bank above Deer Creek. No site access. Desktop form based on nearby wetland data forms, Web Soil Survey, and aerial imagery. To date, all wetland indicators have not been field verified at this site.

Photos: No Photos Associated Plots: WST-WL-0017-0018_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	60	✓	FACU
2. *Poa pratensis*	38	✓	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	98	= Total Cover	

Woody Vine Stratum (Plot size: n/a)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	38	x 3 =	114
FACU Species	60	x 4 =	240
UPL Species		x 5 =	
Column Totals	98 (A)		354 (B)

Prevalence Index (B/A) = 3.61

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Desktop assessment of vegetation was determined to be similar to that of nearby wetlands. Field map notes of plant species were also used to select accurate plant species in the area.

SOIL

Sampling Point: WST-WL-0017-0018_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10 YR 2/1	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Desktop soil determinations were supported by information from nearby wetland features and NRCS Web Soil Survey data.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Desktop assessment of hydrology was determined to be similar to that of nearby wetlands. Hydrology determinations were supported by aerial imagery and NRCS Web Soil Survey for Depth to Water Table data.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 740.24 City/County: Madison County Sampling Date: 5/1/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0501702MA001_W1

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S07, T022N, R001W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): concave

Slope (%): 3-5 Lat: 41.892819513 Long: -97.4790524826 Datum: WGS84

Soil Map Unit Name: NE119 – 6681 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Swale with intermittent waterbody.

Photos: KK1027 Associated Plots: W0501702MA001_U1, W0501702MA001_W2, W0501702MA001_U2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 10' x 30')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 10' x 30')			
1. *Phalaris arundinacea*	90	✓	FACW
2. *Carex vulpinoidea*	10		FACW
3. *Polygonum amphibium*	5		OBL
4. *Symphyotrichum lanceolatum var. lanceolatum*	5		FAC
5.			
6.			
7.			
8.			
9.			
10.			
	110	= Total Cover	

Woody Vine Stratum (Plot size: 10' x 30')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	5	x 1 =	5
FACW Species	100	x 2 =	200
FAC Species	5	x 3 =	15
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	110 (A)		220 (B)

Prevalence Index (B/A) = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0501702MA001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 3/2	100					SiL	
4 - 10	10YR 4/2	75	7.5YR 4/6	25	C	M	SL	
10 - 20	10YR 3/2	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 2

Water Table Present? Yes ✓ No ____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Ponding around intermittent stream.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 740.24 City/County: Madison County Sampling Date: 5/1/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0501702MA001_U1

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S07, T022N, R001W

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none

Slope (%): 8-10 Lat: 41.8928546225 Long: -97.4790961591 Datum: WGS84

Soil Map Unit Name: NE119 – 6681 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Cultivated slope above swale.

Photos: KK1028 Associated Plots: W0501702MA001_W1, W0501702MA001_W2, W0501702MA001_U2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 10' x 30')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 10' x 30')			
1. *Bromus inermis*	100	✓	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 10' x 30')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	100	x 4 =	400
UPL Species		x 5 =	
Column Totals	100 (A)		400 (B)

Prevalence Index (B/A) = 4.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0501702MA001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 3/3	100					SL	organic component
2 - 14	10YR 3/2	100					SL	
14 - 20	10YR 3/3	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Vegetated hill slope next to cultivated field.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 740.24 City/County: Madison County Sampling Date: 5/1/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0501702MA001_W2

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S07, T022N, R001W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): concave

Slope (%): 3-5 Lat: 41.8927536795 Long: -97.4790263952 Datum: WGS84

Soil Map Unit Name: NE119 – 6681 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: South side of intermittent stream in swale.

Photos: KK1029 Associated Plots: W0501702MA001_W1, W0501702MA001_U1, W0501702MA001_U2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 40')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5' x 40')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 5' x 40')			
1. *Phalaris arundinacea*	90	✓	FACW
2. *Symphyotrichum lanceolatum var. lanceolatum*	10		FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 5' x 40')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	90	x 2 =	180
FAC Species	10	x 3 =	30
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	100 (A)		210 (B)

Prevalence Index (B/A) = 2.10

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0501702MA001_W2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 3/2	100					SiL	
4 - 10	10YR 4/2	70	7.5YR 4/6	30	C	M	SL	
10 - 20	10YR 3/2	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 2

Water Table Present? Yes ✓ No ____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Ponding on edge of intermittent stream.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 740.25 City/County: Madison County Sampling Date: 5/1/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0501702MA001_U2

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S07, T022N, R001W

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex

Slope (%): 25 Lat: 41.892722491 Long: -97.478996829 Datum: WGS84

Soil Map Unit Name: NE119 – 6681 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Hillslope on south side of PEM in bottom of swale with intermittent stream.

Photos: KK1030 Associated Plots: W0501702MA001_W1, W0501702MA001_U1, W0501702MA001_W2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Juniperus communis*	30	✓	UPL
2. *Morus alba*	10	✓	FAC
3.			
4.			
5.			
	40	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10' x 30')			
1. *Prunus virginiana*	40	✓	FACU
2. *Prunus americana*	10	✓	UPL
3.			
4.			
5.			
	50	= Total Cover	
Herb Stratum (Plot size: 10' x 30')			
1. *Bromus inermis*	65	✓	FACU
2. *Symphyotrichum lanceolatum var. lanceolatum*	3		FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	68	= Total Cover	
Woody Vine Stratum (Plot size: 10' x 30')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 20 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	13	x 3 =	39
FACU Species	105	x 4 =	420
UPL Species	40	x 5 =	200
Column Totals	158 (A)		659 (B)

Prevalence Index (B/A) = 4.17

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0501702MA001_U2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 3/3	100					SL	organic component
2 - 14	10YR 3/2	100					SL	
14 - 20	10YR 3/3	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Vegetated steep slope on south side of PEM.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 741.28 City/County: Madison County Sampling Date: 5/1/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0501702MA002_W1

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S17, T022N, R001W

Landform (hillslope, terrace, etc.): valley Local relief (concave, convex, none): concave

Slope (%): 3 Lat: 41.8856887899 Long: -97.4613461171 Datum: WGS84

Soil Map Unit Name: NE119 – 3561 NWI Classification: PFO

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: PFO adjacent to railroad ROW.

Photos: KK1031-1035 Associated Plots: W0501702MA002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	70	✓	FAC
2. *Fraxinus pennsylvanica*	10		FACW
3.			
4.			
5.			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: 20' x 30')			
1. *Prunus virginiana*	5	✓	FACU
2.			
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot size: 20' x 30')			
1. *Phalaris arundinacea*	90	✓	FACW
2. *Typha angustifolia*	5		OBL
3. *Urtica dioica*	5		FACW
4. *Galium aparine*	1		FACU
5.			
6.			
7.			
8.			
9.			
10.			
	101	= Total Cover	
Woody Vine Stratum (Plot size: 20' x 30')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	5	x 1 =	5
FACW Species	105	x 2 =	210
FAC Species	70	x 3 =	210
FACU Species	6	x 4 =	24
UPL Species		x 5 =	
Column Totals	186 (A)		449 (B)

Prevalence Index (B/A) = 2.41

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0501702MA002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 3/1	100					CL	organic matter included
2 - 6	10YR 3/1	85	10YR 4/6	15	C	M	SiCL	
6 - 12	10YR 3/2	90	10YR 5/6	10	C	M	SiCL	
12 - 20	10YR 4/1	80	10YR 3/6	20	C	M	SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 1
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Forested wetland adjacent to stream.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 741.29 City/County: Madison County Sampling Date: 5/1/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0501702MA002_U1

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S17, T022N, R001W

Landform (hillslope, terrace, etc.): hillside Local relief (concave, convex, none): concave

Slope (%): 7 Lat: 41.8856805453 Long: -97.4610709266 Datum: WGS84

Soil Map Unit Name: NE119 – 6778 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: KK1036 Associated Plots: W0501702MA002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 20' x 30')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 20' x 30')			
1. *Zea mays*	100	✓	(UPL)
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 20' x 30')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species	100	x 5 =	500
Column Totals	100 (A)		500 (B)

Prevalence Index (B/A) = 5.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: farmed – cultivated field

SOIL

Sampling Point: W0501702MA002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 14	10YR 3/2	100					SCL	
14 - 20	10YR 4/3	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Farmed boundary of wetland adjacent to stream.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 741.74 City/County: Madison County Sampling Date: 5/1/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0501702MA003_W1

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S17, T022N, R001W

Landform (hillslope, terrace, etc.): valley Local relief (concave, convex, none): concave

Slope (%): 0-5 Lat: 41.8825799082 Long: -97.453475776 Datum: WGS84

Soil Map Unit Name: NE119 – 6364 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Drainage dug through wetland to drain surrounding fields. West side mostly brome with small components of wetland species and saturated soils.

Photos: KK1038 Associated Plots: W0501702MA003_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 15')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5' x 15')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 5' x 15')			
1. *Bromus inermis*	80	✓	FACU
2. *Carex vulpinoidea*	10		FACW
3. *Agrostis stolonifera*	5		FACW
4. *Carex scopulorum*	5		(UPL)
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 5' x 15')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	15	x 2 =	30
FAC Species		x 3 =	
FACU Species	80	x 4 =	320
UPL Species	5	x 5 =	25
Column Totals	100 (A)		375 (B)

Prevalence Index (B/A) = 3.75

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☑ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Moss covered soils; disturbed and drained. Original hydrophytic vegetation has been removed.

SOIL

Sampling Point: W0501702MA003_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 2/1	100					CL	
4 - 12	10YR 2/1	80	10YR 3/6	20	MS	M	SCL	
12 - 20	10YR 2/1	100					CL	saturated

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☑ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 12

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hummocks and depressions of cattle hooves; assume water table below 20" as site is dug for agricultural drainage.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 741.73 City/County: Madison County Sampling Date: 5/1/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0501702MA003_U1

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S17, T022N, R001W

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave

Slope (%): 3-5 Lat: 41.8825786336 Long: -97.4536260893 Datum: WGS84

Soil Map Unit Name: NE119 – 6364 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Hillslope in cornfield adjacent to wetland. Drainage excavation in middle of wetland.

Photos: KK1037 Associated Plots: W0501702MA003_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 5' x 20')			
1. *Zea mays*	100	✓	(UPL)
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 5' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species	100	x 5 =	500
Column Totals	100 (A)		500 (B)

Prevalence Index (B/A) = 5.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: farmed – cultivated field

SOIL

Sampling Point: W0501702MA003_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 3/3						SCL	
6 - 20	10YR 3/2						SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 741.78 City/County: Madison County Sampling Date: 5/1/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0501702MA003_W2

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S17, T022N, R001W

Landform (hillslope, terrace, etc.): valley Local relief (concave, convex, none): concave

Slope (%): 0-3 Lat: 41.8823081014 Long: -97.452657964 Datum: WGS84

Soil Map Unit Name: NE119 – 3561 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Excavated in middle – wetland vegetation on this (east) side, but not on west side.

Photos: MW77 Associated Plots: W0501702MA003_U2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 15')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5' x 15')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 5' x 15')			
1. *Agrostis stolonifera*	60	✓	FACW
2. *Carex vulpinoidea*	20		FACW
3. *Phalaris arundinacea*	20		FACW
4. *Verbena hastata*	5		FACW
5.			
6.			
7.			
8.			
9.			
10.			
	105	= Total Cover	

Woody Vine Stratum (Plot size: 5' x 15')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	105	x 2 =	210
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	105 (A)		210 (B)

Prevalence Index (B/A) = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0501702MA003_W2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 3/2	80	10YR 3/6	20	D	PL	SCL	
6 - 20	7.5Y 3/1	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 2

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 4

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 741.80 City/County: Madison County Sampling Date: 5/1/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0501702MA003_U2

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S17, T022N, R001W

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave

Slope (%): 3-5 Lat: 41.8822665375 Long: -97.4522514354 Datum: WGS84

Soil Map Unit Name: NE119 – 3561 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Drained wetland, ditched in middle, farmed on both sides.

Photos: MW78 Associated Plots: W0501702MA003_W2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 5' x 20')			
1. *Bromus inermis*	95	✓	FACU
2. *Xanthium strumarium*	2		FAC
3. *Taraxacum officinale*	1		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	98	= Total Cover	

Woody Vine Stratum (Plot size: 5' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	2	x 3 =	6
FACU Species	96	x 4 =	384
UPL Species		x 5 =	
Column Totals	98 (A)		390 (B)

Prevalence Index (B/A) = 3.98

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0501702MA003_U2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 3/3	100					SL	
6 - 20	10YR 5/2	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 743.15 City/County: Madison County Sampling Date: 5/1/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0501703MA001_W1

Investigator(s): J. Beaver, P. Christensen Section, Township, Range: S21, T022N, R001W

Landform (hillslope, terrace, etc.): toeslope Local relief (concave, convex, none): concave

Slope (%): 2 Lat: 41.8727014004 Long: -97.4294668536 Datum: WGS84

Soil Map Unit Name: NE119 – 4674 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Northwest side of very large toeslope wetland with stream and springs below Highway 81.

Photos: JB116 Associated Plots: W0501703MA001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Agrostis stolonifera*	55	✓	FACW
2. *Juncus tenuis*	35	✓	FAC
3. *Poa pratensis*	20		FAC
4. *Trifolium repens*	15		FACU
5. *Sisymbrium altissimum*	0.5		FACU
6.			
7.			
8.			
9.			
10.			
	125.5	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	55	x 2 =	110
FAC Species	55	x 3 =	165
FACU Species	15.5	x 4 =	62
UPL Species		x 5 =	
Column Totals	125.5 (A)		337 (B)

Prevalence Index (B/A) = 2.69

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Other area of wetland with *Spartina pectinata* and *Typha latifolia*.

SOIL

Sampling Point: W0501703MA001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 5.5	7.5YR 3/2	80	7.5YR 5/6	20	C	M	SiL	
5.5 - 20	2.5Y 4/1	95	7.5YR 5/6	5	C	M	SiC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water perched above clay level.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 743.14 City/County: Madison County Sampling Date: 5/1/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0501703MA001_U1

Investigator(s): J. Beaver, P. Christensen Section, Township, Range: S21, T022N, R001W

Landform (hillslope, terrace, etc.): toeslope Local relief (concave, convex, none): concave

Slope (%): 2 Lat: 41.8726956468 Long: -97.429615851 Datum: WGS84

Soil Map Unit Name: NE119 – 6570 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Plot is in farmed area with altered vegetation and hydrology. Redox is a remnant feature.

Photos: JB114 Associated Plots: W0501703MA001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	0.5		FACU
2. *Cirsium vulgare*	0.5		FACU
3. *Sisymbrium altissimum*	0.5		FACU
4. *Triticum aestivum*	0.5		(UPL)
5.			
6.			
7.			
8.			
9.			
10.			
	2	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	1.5	x 4 =	6
UPL Species	0.5	x 5 =	2.5
Column Totals	2 (A)		8.5 (B)

Prevalence Index (B/A) = 4.25

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: farmed

SOIL

Sampling Point: W0501703MA001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 9	10YR 3/3	100					SiL	
9 - 20	10YR 5/3	70	10YR 5/3	30	C	M	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: dry

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 743.22 City/County: Madison County Sampling Date: 5/1/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0501703MA001_W2

Investigator(s): J. Beaver, P. Christensen Section, Township, Range: S21, T022N, R001W

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none

Slope (%): 4 Lat: 41.8721597197 Long: -97.42827185 Datum: WGS84

Soil Map Unit Name: NE119 – 6637 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Top edge of southeast side of large wetland.

Photos: JB122 Associated Plots: W501703MA001_U2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Spartina pectinata*	65	✓	FACW
2. *Poa pratensis*	40	✓	FAC
3. *Juncus tenuis*	12		FAC
4. *Typha latifolia*	2		OBL
5. *Bromus inermis*	1		FACU
6. *Helianthus maximiliani*	0.5		UPL
7. *Symphyotrichum lanceolatum var. lanceolatum*	0.5		FAC
8.			
9.			
10.			
	121	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	2	x 1 =	2
FACW Species	65	x 2 =	130
FAC Species	52.5	x 3 =	157.5
FACU Species	1	x 4 =	4
UPL Species	0.5	x 5 =	2.5
Column Totals	121 (A)		296 (B)

Prevalence Index (B/A) = 2.45

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Upper edge with small amounts *Bromus inermis*, but mostly hydrophytic.

SOIL

Sampling Point: W0501703MA001_W2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 2/1	100					SiCL	high root and organic matter
4 - 16	10YR 2/1	100					SCL	
16 - 24	10YR 4/1	90	5YR 4/6	10	C	M	SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 10
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: very wet

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 743.22 City/County: Madison County Sampling Date: 5/1/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0501703MA001_U2

Investigator(s): J. Beaver, P. Christensen Section, Township, Range: S21, T022N, R001W

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex

Slope (%): _____ Lat: 41.8721791236 Long: -97.428177193 Datum: WGS84

Soil Map Unit Name: NE119 – 6637 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: JB121 Associated Plots: W501703MA001_W2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	98	✓	FACU
2. *Lactuca serriola*	0.5		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	98.5	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	98.5	x 4 =	394
UPL Species		x 5 =	
Column Totals	98.5 (A)		394 (B)

Prevalence Index (B/A) = 4.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: upland pasture slope

SOIL

Sampling Point: W0501703MA001_U2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 18	10YR 2/2	100					L	
18 - 20	10YR 2/2	95	10YR 5/6	5	C	M	L	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 743.98 City/County: Madison County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502702MA001_W1

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S22, T022N, R001W

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave

Slope (%): 0 Lat: 41.8652805267 Long: -97.4171103504 Datum: WGS84

Soil Map Unit Name: NE119 – 3561 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Depression in bottom of small valley.

Photos: MW101 Associated Plots: W0502702MA001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Typha angustifolia*	97	✓	OBL
2. *Symphyotrichum lanceolatum var. lanceolatum*	2		FAC
3. *Cirsium arvense*	1		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	97	x 1 =	97
FACW Species		x 2 =	
FAC Species	2	x 3 =	6
FACU Species	1	x 4 =	4
UPL Species		x 5 =	
Column Totals	100 (A)		107 (B)

Prevalence Index (B/A) = 1.07

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Typha dominated depression.

SOIL

Sampling Point: W0502702MA001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 2/1	100					SiL	
16 - 24	10YR 2/1	80	10YR 3/6	20	RM	M	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 6

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 743.97 City/County: Madison County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502702MA001_U1

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S22, T022N, R001W

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex

Slope (%): 5 Lat: 41.8653216014 Long: -97.4171858472 Datum: WGS84

Soil Map Unit Name: NE119 – 6789 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Hillslope above north side of PEM.

Photos: MW100 Associated Plots: W0502702MA001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Juniperus virginiana*	1		FACU
2.			
3.			
4.			
5.			
	1	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	99	✓	FACU
2. *Cirsium arvense*	1		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	101	x 4 =	404
UPL Species		x 5 =	
Column Totals	101 (A)		404 (B)

Prevalence Index (B/A) = 4.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: *Bromus inermis* dominated slope.

SOIL

Sampling Point: W0502702MA001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 3/2	100					SL	organic component
6 - 24	10YR 2/2	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 744.03 City/County: Madison County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502702MA001_W2

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S22, T022N, R001W

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave

Slope (%): 0 Lat: 41.8645030227 Long: -97.4166718957 Datum: WGS84

Soil Map Unit Name: NE119 – 3561 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Depression in bottom of valley. Plot is on south side of PEM.

Photos: KK1042 Associated Plots: W0502702MA001_U2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Typha angustifolia*	75	✓	OBL
2. *Phalaris arundinacea*	25	✓	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	75	x 1 =	75
FACW Species	25	x 2 =	50
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	100 (A)		125 (B)

Prevalence Index (B/A) = 1.25

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Typha dominated PEM with some areas of open water.

SOIL

Sampling Point: W0502702MA001_W2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 2/1	100					SiL	
16 - 24	10YR 2/1	80	10YR 3/6	20	RM	M	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 2

Water Table Present? Yes ✓ No ____ Depth (inches): 12

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: standing water

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 744.04 City/County: Madison County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502702MA001_U2

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S22, T022N, R001W

Landform (hillslope, terrace, etc.): toeslope Local relief (concave, convex, none): convex

Slope (%): 0-1 Lat: 41.8644793858 Long: -97.4164592222 Datum: WGS84

Soil Map Unit Name: NE119 – 3561 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Toe of slope above PEM. Cultivated slope to the south.

Photos: KK1041 Associated Plots: W0502702MA001_W2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1. *Morus alba*	1		FAC
2.			
3.			
4.			
5.			
	1	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	95	✓	FACU
2. *Cirsium arvense*	5		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	1	x 3 =	3
FACU Species	100	x 4 =	400
UPL Species		x 5 =	
Column Totals	101 (A)		403 (B)

Prevalence Index (B/A) = 3.99

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: *Bromus inermis* slope.

SOIL

Sampling Point: W0502702MA001_U2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 3/2	100					SL	
6 - 24	10YR 2/2	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 743.97 City/County: Madison County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502702MA002_W1

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S22, T022N, R001W

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave

Slope (%): 5 Lat: 41.8656528416 Long: -97.416828839 Datum: WGS84

Soil Map Unit Name: NE119 – 3561 NWI Classification: PFO

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Basin wetland with saturated soils. Vegetation on north boundary does not meet hydrophytic status, but hydric soils and hydrology indicate wetland status.

Photos: MW106 Associated Plots: W0502702MA002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' D)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus pennsylvanica*	20	✓	FACW
2. *Salix amygdaloides*	20	✓	FACW
3.			
4.			
5.			
	40	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10' D)			
1. *Prunus americana*	40	✓	UPL
2.			
3.			
4.			
5.			
	40	= Total Cover	
Herb Stratum (Plot size: 5' D)			
1. *Bromus inermis*	80	✓	FACU
2. *Typha angustifolia*	10		OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	90	= Total Cover	
Woody Vine Stratum (Plot size: 5' D)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	10	x 1 =	10
FACW Species	40	x 2 =	80
FAC Species		x 3 =	
FACU Species	80	x 4 =	320
UPL Species	40	x 5 =	200
Column Totals	170 (A)		610 (B)

Prevalence Index (B/A) = 3.59

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☑ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: While vegetation does not meet indicators at this sampling point, hydric soil and wetland hydrology clearly indicate this is a wetland that has been highly invaded by *Bromus inermis* which has out-competed hydrophytic herbaceous vegetation..

SOIL

Sampling Point: W0502702MA002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 3/2	100					SiCL	
4 - 10	10YR 4/2	75	10YR 3/6	25	C	PL	SiL	
10 - 16	10YR 2/2	75	10YR 3/6	25	C	PL	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 10

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Standing water in other positions of wetland.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 743.95 City/County: Madison County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502702MA002_U1

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S22, T022N, R001W

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex

Slope (%): 5 Lat: 41.8657209074 Long: -97.4170878665 Datum: WGS84

Soil Map Unit Name: NE119 – 6789 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Hillslope on south edge of PFO.

Photos: MW107 Associated Plots: W0502702MA002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' D)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5' D)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 5' D)			
1. *Bromus inermis*	100	✓	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 5' D)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	100	x 4 =	400
UPL Species		x 5 =	
Column Totals	100 (A)		400 (B)

Prevalence Index (B/A) = 4.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Brome dominated slope.

SOIL

Sampling Point: W0502702MA002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 3/2	100					SL	
6 - 24	10YR 2/2	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 744.00 City/County: Madison County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502702MA002_W2

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S22, T022N, R001W

Landform (hillslope, terrace, etc.): basin Local relief (concave, convex, none): concave

Slope (%): 0 Lat: 41.8652880563 Long: -97.4164205304 Datum: WGS84

Soil Map Unit Name: NE119 – 6789 NWI Classification: PFO

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Forested wetland adjacent to east side of PEM.

Photos: MW108 Associated Plots: W0502702MA002_U2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix amygdaloides*	80	✓	FACW
2. *Populus deltoides*	10		FAC
3. *Fraxinus pennsylvanica*	5		FACW
4.			
5.			
	95	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 5')			
1. *Bromus inermis*	90	✓	FACU
2. *Polygonum amphibium*	10		OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 5')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	10	x 1 =	10
FACW Species	85	x 2 =	170
FAC Species	10	x 3 =	30
FACU Species	90	x 4 =	360
UPL Species		x 5 =	
Column Totals	195 (A)		570 (B)

Prevalence Index (B/A) = 2.92

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Disturbed vegetation, but meets prevalence index and soil and hydrology indicators are present.

SOIL

Sampling Point: W0502702MA002_W2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 3/2	100					SiL	
6 - 12	10YR 3/2	70	7.5YR 3/4	20	C	M	SiCL	
6 - 12	5G 2.5/1	10					SiCL	
12 - 20	10YR 3/2	85	7.5YR 3/4	15	C	M	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☑ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 2
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 10

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 743.95 City/County: Madison County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502702MA002_U1

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S22, T022N, R001W

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex

Slope (%): 5 Lat: 41.8657209074 Long: -97.4170878665 Datum: WGS84

Soil Map Unit Name: NE119 – 6789 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Hillslope on south edge of PFO.

Photos: MW107 Associated Plots: W0502702MA002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' D)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5' D)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 5' D)			
1. *Bromus inermis*	100	✓	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 5' D)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	100	x 4 =	400
UPL Species		x 5 =	
Column Totals	100 (A)		400 (B)

Prevalence Index (B/A) = 4.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Brome dominated slope.

SOIL

Sampling Point: W0502702MA002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 3/2	100					SL	
6 - 24	10YR 2/2	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 743.98 City/County: Madison County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502702MA001_W1

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S22, T022N, R001W

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave

Slope (%): 0 Lat: 41.8652805267 Long: -97.4171103504 Datum: WGS84

Soil Map Unit Name: NE119 – 3561 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Depression in bottom of small valley.

Photos: MW101 Associated Plots: W0502702MA001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Typha angustifolia*	97	✓	OBL
2. *Symphyotrichum lanceolatum var. lanceolatum*	2		FAC
3. *Cirsium arvense*	1		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	97	x 1 =	97
FACW Species		x 2 =	
FAC Species	2	x 3 =	6
FACU Species	1	x 4 =	4
UPL Species		x 5 =	
Column Totals	100 (A)		107 (B)

Prevalence Index (B/A) = 1.07

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Typha dominated depression.

SOIL

Sampling Point: W0502702MA001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 2/1	100					SiL	
16 - 24	10YR 2/1	80	10YR 3/6	20	RM	M	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 6

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 743.97 City/County: Madison County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502702MA001_U1

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S22, T022N, R001W

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex

Slope (%): 5 Lat: 41.8653216014 Long: -97.4171858472 Datum: WGS84

Soil Map Unit Name: NE119 – 6789 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Hillslope above north side of PEM.

Photos: MW100 Associated Plots: W0502702MA001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Juniperus virginiana*	1		FACU
2.			
3.			
4.			
5.			
	1	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	99	✓	FACU
2. *Cirsium arvense*	1		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	101	x 4 =	404
UPL Species		x 5 =	
Column Totals	101 (A)		404 (B)

Prevalence Index (B/A) = 4.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: *Bromus inermis* dominated slope.

SOIL

Sampling Point: W0502702MA001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 3/2	100					SL	organic component
6 - 24	10YR 2/2	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 744.03 City/County: Madison County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502702MA001_W2

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S22, T022N, R001W

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave

Slope (%): 0 Lat: 41.8645030227 Long: -97.4166718957 Datum: WGS84

Soil Map Unit Name: NE119 – 3561 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Depression in bottom of valley. Plot is on south side of PEM.

Photos: KK1042 Associated Plots: W0502702MA001_U2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Typha angustifolia*	75	✓	OBL
2. *Phalaris arundinacea*	25	✓	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	75	x 1 =	75
FACW Species	25	x 2 =	50
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	100 (A)		125 (B)

Prevalence Index (B/A) = 1.25

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Typha dominated PEM with some areas of open water.

SOIL

Sampling Point: W0502702MA001_W2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 2/1	100					SiL	
16 - 24	10YR 2/1	80	10YR 3/6	20	RM	M	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 2

Water Table Present? Yes ✓ No ____ Depth (inches): 12

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: standing water

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 744.04 City/County: Madison County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502702MA001_U2

Investigator(s): M. Wirth, K. Kottas Section, Township, Range: S22, T022N, R001W

Landform (hillslope, terrace, etc.): toeslope Local relief (concave, convex, none): convex

Slope (%): 0-1 Lat: 41.8644793858 Long: -97.4164592222 Datum: WGS84

Soil Map Unit Name: NE119 – 3561 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Toe of slope above PEM. Cultivated slope to the south.

Photos: KK1041 Associated Plots: W0502702MA001_W2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1. *Morus alba*	1		FAC
2.			
3.			
4.			
5.			
	1	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	95	✓	FACU
2. *Cirsium arvense*	5		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	1	x 3 =	3
FACU Species	100	x 4 =	400
UPL Species		x 5 =	
Column Totals	101 (A)		403 (B)

Prevalence Index (B/A) = 3.99

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: *Bromus inermis* slope.

SOIL

Sampling Point: W0502702MA001_U2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 3/2	100					SL	
6 - 24	10YR 2/2	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 746.67 City/County: Madison County Sampling Date: 5/3/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0503702MA001_W1

Investigator(s): K. Kottas, M. Wirth Section, Township, Range: S36, T022N, R001W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): concave

Slope (%): 3-5 Lat: 41.8374829706 Long: -97.3805567575 Datum: WGS84

Soil Map Unit Name: NE119 – 3561 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Drainage swale in middle of cultivated field with water present 6" deep.

Photos: KK1054 Associated Plots: W0503702MA001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 5' x 20')			
1. *Equisetum hyemale*	75	✓	FACW
2. *Ranunculus sceleratus*	2		OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	77	= Total Cover	

Woody Vine Stratum (Plot size: 5' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	2	x 1 =	2
FACW Species	75	x 2 =	150
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	77 (A)		152 (B)

Prevalence Index (B/A) = 1.97

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Equisetum on either side of swale.

SOIL

Sampling Point: W0503702MA001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 2/1	100					SiCL	
6 - 14	10YR 5/1	100					SiCL	
14 - 20	10YR 2/2	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☑ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 6
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water moving through drainage swale, low position in landscape.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 746.67 City/County: Madison County Sampling Date: 5/3/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0503702MA001_U1

Investigator(s): K. Kottas, M. Wirth Section, Township, Range: S36, T022N, R001W

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave

Slope (%): 5 Lat: 41.8375130896 Long: -97.3805239536 Datum: WGS84

Soil Map Unit Name: NE119 – 3561 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Cultivated land next to drainage swale.

Photos: KK1052 Associated Plots: W0503702MA001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 5' x 20')			
1. *Equisetum hyemale*	20	✓	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	20	= Total Cover	

Woody Vine Stratum (Plot size: 5' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	20	x 2 =	40
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	20 (A)		40 (B)

Prevalence Index (B/A) = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: no hydric soils; cultivated field; remnant of equisetum

SOIL

Sampling Point: W0503702MA001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 3/2	100					SiL	
8 - 20	10YR 3/3	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: no wetland hydrology; in cultivated field, upslope of swale

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 749.07 City/County: Stanton County Sampling Date: 5/22/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0522703ST001_W1

Investigator(s): J. Beaver, S. Cooper Section, Township, Range: S08, T021N, R001E

Landform (hillslope, terrace, etc.): stream Local relief (concave, convex, none): concave

Slope (%): <1 Lat: 41.8129380036 Long: -97.3476138064 Datum: WGS84

Soil Map Unit Name: NE167 – 3545 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Small *Phalaris arundinacea* wetland within stream channel.

Photos: SC711, SC713 Associated Plots: W0522703ST001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 5' x 20')			
1. *Phalaris arundinacea*	60	✓	FACW
2. *Carex emoryi*	40	✓	OBL
3. *Rumex crispus*	2		FAC
4. *Rumex altissimus*	1		FACW
5. *Schoenoplectus pungens*	1		OBL
6.			
7.			
8.			
9.			
10.			
	104	= Total Cover	

Woody Vine Stratum (Plot size: 5' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	41	x 1 =	41
FACW Species	61	x 2 =	122
FAC Species	2	x 3 =	6
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	104 (A)		169 (B)

Prevalence Index (B/A) = 1.63

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0522703ST001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 2/1	100					SiL	
8 - 20	10YR 4/2	85	10YR 5/6	15	C	M	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 1

Water Table Present? Yes ✓ No ____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Seeps present as well, augmenting flow.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 749.07 City/County: Stanton County Sampling Date: 5/22/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0522703ST001_U1

Investigator(s): J. Beaver, S. Cooper Section, Township, Range: S08, T021N, R001E

Landform (hillslope, terrace, etc.): slope and terrace Local relief (concave, convex, none): undulating

Slope (%): 40 Lat: 41.8128661432 Long: -97.3476014828 Datum: WGS84

Soil Map Unit Name: NE167 – 3545 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Small wetland within stream channel. This is upland plot in smooth brome.

Photos: SC712 Associated Plots: W0522703ST001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 20' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 20' x 20')			
1. *Bromus inermis*	90	✓	FACU
2. *Poa pratensis*	20		FAC
3. *Taraxacum officinale*	5		FACU
4. *Thlaspi arvense*	2		FACU
5. *Cirsium arvense*	1		FACU
6. *Convolvulus arvensis*	1		(UPL)
7. *Sisymbrium loeselii*	1		(UPL)
8.			
9.			
10.			
	120	= Total Cover	

Woody Vine Stratum (Plot size: 20' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	20	x 3 =	60
FACU Species	98	x 4 =	392
UPL Species	2	x 5 =	10
Column Totals	120 (A)		462 (B)

Prevalence Index (B/A) = 3.85

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0522703ST001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 3/2	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 749.64 City/County: Stanton County Sampling Date: 5/22/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0522703ST002_W1

Investigator(s): J. Beaver, S. Cooper Section, Township, Range: S08, T021N, R001E

Landform (hillslope, terrace, etc.): drainage bottom w/seep Local relief (concave, convex, none): concave

Slope (%): 01 Lat: 41.8066489313 Long: -97.3404618552 Datum: WGS84

Soil Map Unit Name: NE167 – 6681 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Rather deep, steep draw with mature Pop del on slopes. Wetland from 2 small springs.

Photos: SC718 Associated Plots: W0522703ST002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 5' x 20')			
1. *Phalaris arundinacea*	55	✓	FACW
2. *Carex emoryi*	5		OBL
3. *Prunella vulgaris*	5		FAC
4. *Viola sororia*	4		FAC
5. *Anemone canadensis*	2		(UPL)
6. *Poa pratensis*	2		FAC
7. *Ranunculus sceleratus*	2		OBL
8. *Rumex altissimus*	2		FACU
9. *Veronica peregrina*	2		FACW
10. *Bolboschoenus fluviatilis*	1		OBL
	80	= Total Cover	

Woody Vine Stratum (Plot size: 5' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	8	x 1 =	8
FACW Species	57	x 2 =	114
FAC Species	11	x 3 =	33
FACU Species	2	x 4 =	8
UPL Species	2	x 5 =	10
Column Totals	80 (A)		173 (B)

Prevalence Index (B/A) = 2.16

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: *Populus deltoides* present on slopes adjacent to, but not rooted in wetland.

SOIL

Sampling Point: W0522703ST002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 5	10YR 2/1	100					SiL	
5 - 20	10YR 2/1	80	5YR 5/4	20	C	M	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 1
Water Table Present?	Yes ✓	No ____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water in swale/drainage due to spring seeps - very narrow - 10ft and variable width.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 749.64 City/County: Stanton County Sampling Date: 5/22/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0522703ST002_U1

Investigator(s): J. Beaver, S. Cooper Section, Township, Range: S08, T021N, R001E

Landform (hillslope, terrace, etc.): incised drainage slope Local relief (concave, convex, none): concave

Slope (%): 1 Lat: 41.8066556169 Long: -97.3405091633 Datum: WGS84

Soil Map Unit Name: NE167 – 6681 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Upland slope.

Photos: SC719 Associated Plots: W0522703ST002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	40	✓	FAC
2.			
3.			
4.			
5.			
	40	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1. *Symphoricarpos occidentalis*	10	✓	UPL
2.			
3.			
4.			
5.			
	10	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	80	✓	FACU
2. *Galium aparine*	10		FACU
3. *Anemone canadensis*	5		FACW
4. *Poa pratensis*	5		FAC
5. *Solidago gigantea*	5		FACW
6.			
7.			
8.			
9.			
10.			
	105	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	10	x 2 =	20
FAC Species	45	x 3 =	135
FACU Species	90	x 4 =	360
UPL Species	10	x 5 =	50
Column Totals	155 (A)		565 (B)

Prevalence Index (B/A) = 3.65

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Upland

SOIL

Sampling Point: W0522703ST002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 3/2	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Wetland confined to bottom of drainage.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 750.75 City/County: Stanton County Sampling Date: 5/4/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0504701ST001_W1

Investigator(s): P. Corry, D. Culwell II Section, Township, Range: S16, T021N, R001E

Landform (hillslope, terrace, etc.): ditch bottom Local relief (concave, convex, none): none

Slope (%): 1 Lat: 41.7968300713 Long: -97.3236418082 Datum: WGS84

Soil Map Unit Name: NE167 – 6603 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: PEM along west side of ditch channel bottom.

Photos: PC150 Associated Plots: W0504701ST001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 15')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5' x 15')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 5' x 15')			
1. *Phalaris arundinacea*	55	✓	FACW
2. *Bromus inermis*	0.5		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	55.5	= Total Cover	

Woody Vine Stratum (Plot size: 5' x 15')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	55	x 2 =	110
FAC Species		x 3 =	
FACU Species	0.5	x 4 =	2
UPL Species		x 5 =	
Column Totals	55.5 (A)		112 (B)

Prevalence Index (B/A) = 2.02

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0504701ST001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 2/1	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 0.5
Water Table Present?	Yes ✓	No ____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 750.75 City/County: Stanton County Sampling Date: 5/4/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0504701ST001_U1

Investigator(s): P. Corry, D. Culwell II Section, Township, Range: S16, T021N, R001E

Landform (hillslope, terrace, etc.): field Local relief (concave, convex, none): none

Slope (%): 1 Lat: 41.7968498182 Long: -97.3236574265 Datum: WGS84

Soil Map Unit Name: NE167 – 6603 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Plowed field.

Photos: PC151 Associated Plots: W0504701ST001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 15')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5' x 15')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 5' x 15')			
1. *Bromus inermis*	20	✓	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	20	= Total Cover	

Woody Vine Stratum (Plot size: 5' x 15')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	20	x 4 =	80
UPL Species		x 5 =	
Column Totals	20 (A)		80 (B)

Prevalence Index (B/A) = 4.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Upland is mostly plowed soybean field; currently no live vegetation on it. Plot includes strip of *Bromus inermis* along top of ditch bank.

SOIL

Sampling Point: W0504701ST001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 3/2	100					SiCL	
2 - 20	2.5Y 3/2	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 753.96 City/County: Stanton County Sampling Date: 5/22/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0522703ST003_W1

Investigator(s): J. Beaver, S. Cooper Section, Township, Range: S26, T021N, R001E

Landform (hillslope, terrace, etc.): terrace/bottom Local relief (concave, convex, none): none

Slope (%): 0 Lat: 41.7632539281 Long: -97.2808348498 Datum: WGS84

Soil Map Unit Name: NE167 – 3640 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Herbaceous portion of very wet/saturated wetland.

Photos: SC725 - SC726 Associated Plots: W0522703ST003_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	100	✓	FACW
2. *Urtica dioica*	5		FACW
3. *Helianthus grosseserratus*	2		FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	107	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	107	x 2 =	214
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	107 (A)		214 (B)

Prevalence Index (B/A) = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0522703ST003_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 3/1	85	7.5YR 5/6	15	C	M	SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 11
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 753.96 City/County: Stanton County Sampling Date: 5/22/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0522703ST003_W2

Investigator(s): J. Beaver, S. Cooper Section, Township, Range: S26, T021N, R001E

Landform (hillslope, terrace, etc.): bottom Local relief (concave, convex, none): none

Slope (%): 0 Lat: 41.7634190231 Long: -97.2806010266 Datum: WGS84

Soil Map Unit Name: NE167 – 3640 NWI Classification: PFO

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Forested portion of very wet/saturated wetland.

Photos: SC730 - SC731 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix amygdaloides*	70	✓	FACW
2.			
3.			
4.			
5.			
	70	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	100	✓	FACW
2. *Urtica dioica*	3		FACW
3. *Rumex altissimus*	1		FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	104	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	174	x 2 =	348
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	174 (A)		348 (B)

Prevalence Index (B/A) = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0522703ST003_W2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 2/1	80	7.5YR 4/5	20	C	M	SiCL	more redox with depth

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 1
Water Table Present?	Yes ✓	No ____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Watertable to surface where *Salix amygdaloides* is dominant.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 753.98 City/County: Stanton County Sampling Date: 5/22/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0522703ST003_U1

Investigator(s): J. Beaver, S. Cooper Section, Township, Range: S26, T021N, R001E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): 0 Lat: 41.7632098893 Long: -97.2803490539 Datum: WGS84

Soil Map Unit Name: NE167 – 3640 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Just upslope from wetland that is north on ROW.

Photos: SC728 - SC729 Associated Plots: W0522703ST003_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 20' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 20' x 20')			
1. *Bromus inermis*	100	✓	FACU
2. *Urtica dioica*	2		FACW
3. *Helianthus grosseserratus*	1		FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	103	= Total Cover	

Woody Vine Stratum (Plot size: 20' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	3	x 2 =	6
FAC Species		x 3 =	
FACU Species	100	x 4 =	400
UPL Species		x 5 =	
Column Totals	103 (A)		406 (B)

Prevalence Index (B/A) = 3.94

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0522703ST003_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 7	10YR 3/2	100					SiCL	
7 - 20	10YR 4/2	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Abrupt transition from *Phalaris arundinacea* to *Bromus inermis* dominance allows accurate wetland delineation.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 754.61 City/County: Stanton County Sampling Date: 9/20/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0920702ST001_W1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S35, T021N, R001E

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): concave

Slope (%): 5-7 Lat: 41.7554911198 Long: -97.2753370469 Datum: WGS84

Soil Map Unit Name: NE167 – 6789 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Farmed wetland. Swale between hillslopes.

Photos: KK1689 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 5' x 20')			
1. *Equisetum hyemale*	60	✓	FACW
2. *Ammannia robusta*	10		OBL
3. *Amaranthus tuberculatus*	2		OBL
4. *Bidens cernua*	2		OBL
5. *Glycine max*	2		(UPL)
6. *Typha angustifolia*	2		OBL
7. *Typha latifolia*	2		OBL
8.			
9.			
10.			
	80	= Total Cover	

Woody Vine Stratum (Plot size: 5' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	18	x 1 =	18
FACW Species	60	x 2 =	120
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species	2	x 5 =	10
Column Totals	80 (A)		148 (B)

Prevalence Index (B/A) = 1.85

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0920702ST001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 3	10YR 4/1	98	10YR 5/8	2	C	M	CL	
3 - 24	10YR 2/1	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Tilled soil and planted across swale.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 2
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 754.61 City/County: Stanton County Sampling Date: 9/20/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0920702ST001_U1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S35, T021N, R001E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none

Slope (%): 10 Lat: 41.755529746 Long: -97.2753067336 Datum: WGS84

Soil Map Unit Name: NE167 – 6789 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Soil pit and GPS coordinates could not be completed because surveyors were not allowed to enter soybean field.

Photos: KK1690 - KK1691 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Glycine max*	90	✓	(UPL)
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	90	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species	90	x 5 =	450
Column Totals	90 (A)		450 (B)

Prevalence Index (B/A) = 5.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Soybean field.

SOIL

Sampling Point: W0920702ST001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Soil pit could not be completed; surveyors not allowed into soybean field. Hydric soil not likely.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Surveyors not allowed access into soybean field. Surface water not present. Hydrology indicators not likely based on other field observations.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 756.88 City/County: Platte County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502703PL002_W1

Investigator(s): J. Beaver, P. Christensen Section, Township, Range: S11, T020N, R001E

Landform (hillslope, terrace, etc.): drainage/toeslope Local relief (concave, convex, none): concave

Slope (%): 5 Lat: 41.7228177314 Long: -97.2764096984 Datum: WGS84

Soil Map Unit Name: NE141 – 6778 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Farmed wetland. Spring to east with significant water.

Photos: pc0012 Associated Plots: W0502703PL002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 20' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 20' x 20')			
1. *Agrostis stolonifera*	35	✓	FACW
2. *Zea mays*	3		(UPL)
3. *Chenopodium album*	2		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	40	= Total Cover	

Woody Vine Stratum (Plot size: 20' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	35	x 2 =	70
FAC Species		x 3 =	
FACU Species	2	x 4 =	8
UPL Species	3	x 5 =	15
Column Totals	40 (A)		93 (B)

Prevalence Index (B/A) = 2.33

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0502703PL002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 2/1	100					CL	
4 - 18	10YR 2/1	85	5YR 4/6	15	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 10

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Much wetter just outside ESA.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 756.88 City/County: Platte County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502703PL002_U1

Investigator(s): J. Beaver, P. Christensen Section, Township, Range: S11, T020N, R001E

Landform (hillslope, terrace, etc.): lower slope Local relief (concave, convex, none): convex

Slope (%): 7 Lat: 41.7227641448 Long: -97.2765208922 Datum: WGS84

Soil Map Unit Name: NE141 – 6778 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Farmed area above farmed wetland. Mixed redox in soil, relict hydric, not current.

Photos: pc0013 Associated Plots: W0502703PL002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0 = Total Cover		

Woody Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL Species		x 1 =
FACW Species		x 2 =
FAC Species		x 3 =
FACU Species		x 4 =
UPL Species		x 5 =
Column Totals	0 (A)	0 (B)

Prevalence Index (B/A) = #Num!

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Bare ground – Zea mays litter from last year, nothing planted this year.

SOIL

Sampling Point: W0502703PL002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 2/1	100					CL	
6 - 18	10YR 3/2	80	7.5YR 4/6	20	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 759.01 City/County: Platte County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502703PL004_W1

Investigator(s): J. Beaver, P. Christensen Section, Township, Range: S24, T020N, R001E

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave

Slope (%): 1 Lat: 41.6959124703 Long: -97.2635965449 Datum: WGS84

Soil Map Unit Name: NE141 – 6774 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Wetland fringe around pond. Very small inclusion of *Salix amygdaloides* at north edge of ESA.

Photos: JB125 Associated Plots: W0502703PL004_U1; w0502703PL004_W2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 10')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 10' x 10')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 10' x 10')			
1. *Typha latifolia*	18	✓	OBL
2. *Phalaris arundinacea*	12	✓	FACW
3. *Poa pratensis*	3		FAC
4. *Trifolium pratense*	2		FACU
5. *Cirsium vulgare*	0.5		FACU
6. *Taraxacum officinale*	0.5		FACU
7.			
8.			
9.			
10.			
	36	= Total Cover	

Woody Vine Stratum (Plot size: 10' x 10')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	18	x 1 =	18
FACW Species	12	x 2 =	24
FAC Species	3	x 3 =	9
FACU Species	3	x 4 =	12
UPL Species		x 5 =	
Column Totals	36 (A)		63 (B)

Prevalence Index (B/A) = 1.75

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Mostly open water in north end, mostly *Typha latifolia* in south end.

SOIL

Sampling Point: W0502703PL004_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 18	10YR 2/1	100					SiL	
18 - 20	10YR 2/1	90	7.5YR 4/6	10	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☑ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 8
Water Table Present?	Yes ✓	No ____	Depth (inches): 5
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Deepest part of pond probably 3 feet.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 759.00 City/County: Platte County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502703PL004_U1

Investigator(s): J. Beaver, P. Christensen Section, Township, Range: S24, T020N, R001E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none

Slope (%): 25 Lat: 41.6959482762 Long: -97.2636138174 Datum: WGS84

Soil Map Unit Name: NE141 – 6774 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Pasture above pond.

Photos: JB126 Associated Plots: W0502703PL004_W1, w0502703PL004_W2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Juniperus virginiana*	15	✓	UPL
2.			
3.			
4.			
5.			
	15	= Total Cover	

Sapling/Shrub Stratum (Plot size: 20' x 20')			
1. *Symphoricarpos occidentalis*	1		UPL
2.			
3.			
4.			
5.			
	1	= Total Cover	

Herb Stratum (Plot size: 20' x 20')			
1. *Bromus inermis*	45	✓	FACU
2. *Poa pratensis*	30	✓	FAC
3. *Hyoscyamus niger*	2		(UPL)
4. *Cirsium vulgare*	1		FACU
5. *Taraxacum officinale*	0.5		FACU
6.			
7.			
8.			
9.			
10.			
	78.5	= Total Cover	

Woody Vine Stratum (Plot size: 20' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	30	x 3 =	90
FACU Species	46.5	x 4 =	186
UPL Species	18	x 5 =	90
Column Totals	94.5 (A)		366 (B)

Prevalence Index (B/A) = 3.87

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: heavily grazed

SOIL

Sampling Point: W0502703PL004_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 3/2	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 759.01 City/County: Platte County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502703PL004_W2

Investigator(s): J. Beaver, P. Christensen Section, Township, Range: S24, T020N, R001E

Landform (hillslope, terrace, etc.): draw Local relief (concave, convex, none): concave

Slope (%): 2 Lat: 41.6961947247 Long: -97.2632128664 Datum: WGS84

Soil Map Unit Name: NE141 – 6774 NWI Classification: PFO

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Small PFO below pond and PEM.

Photos: JB128 Associated Plots: W0502703PL004_U2; W0502703PL004_W2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix amygdaloides*	45	✓	FACW
2.			
3.			
4.			
5.			
	45	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1. *Prunus americana*	2		UPL
2. *Juniperus virginiana*	1		FACU
3.			
4.			
5.			
	3	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	60	✓	FACW
2. *Poa pratensis*	25	✓	FAC
3. *Agrostis stolonifera*	5		FACW
4. *Bromus inermis*	2		FACU
5. *Taraxacum officinale*	1		FACU
6.			
7.			
8.			
9.			
10.			
	93	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	110	x 2 =	220
FAC Species	25	x 3 =	75
FACU Species	4	x 4 =	16
UPL Species	2	x 5 =	10
Column Totals	141 (A)		321 (B)

Prevalence Index (B/A) = 2.28

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Salix Amygdaloides removed on adjacent Keystone ROW.

SOIL

Sampling Point: W0502703PL004_W2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 13	10YR 2/1	100					SiL	
13 - 20	10YR 4/2	90	7.5YR 5/6	10	C		SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 1
Water Table Present?	Yes ✓	No ____	Depth (inches): 7
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Standing water in pockets.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 761.74 City/County: Colfax County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502701CO001_W1

Investigator(s): P. Corry, D. Culwell II Section, Township, Range: S32, T020N, R002E

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): concave

Slope (%): 1 Lat: 41.668129678 Long: -97.2298157714 Datum: WGS84

Soil Map Unit Name: NE037 – 6778 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Low wet swale in cornfield. No channel.

Photos: PC118 Associated Plots: W0502701CO001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 20' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 20' x 20')			
1. *Phalaris arundinacea*	90	✓	FACW
2. *Typha latifolia*	2		OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	92	= Total Cover	

Woody Vine Stratum (Plot size: 20' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	2	x 1 =	2
FACW Species	90	x 2 =	180
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	92 (A)		182 (B)

Prevalence Index (B/A) = 1.98

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0502701CO001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 2/1	60	10YR 5/1	20	C	M	SiC	
0 - 20			10YR 4/6	20	C	M	SiC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 0.5

Water Table Present? Yes ✓ No ____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Standing surface water in spots; saturated to surface throughout wetland.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 761.74 City/County: Colfax County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502701CO001_U1

Investigator(s): P. Corry, D. Culwell II Section, Township, Range: S32, T020N, R002E

Landform (hillslope, terrace, etc.): field Local relief (concave, convex, none): none

Slope (%): 2 Lat: 41.6680965924 Long: -97.2297956333 Datum: WGS84

Soil Map Unit Name: NE037 – 6778 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: farmed cornfield

Photos: PC119 Associated Plots: W0502701CO001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	50 = Total Cover		
Woody Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL Species		x 1 =
FACW Species		x 2 =
FAC Species		x 3 =
FACU Species		x 4 =
UPL Species		x 5 =
Column Totals	0 (A)	0 (B)

Prevalence Index (B/A) = #Num!

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Farmed cornfield. Currently no green vegetative cover. *Zea mays* is stubble only (about 50% litter cover).

SOIL

Sampling Point: W0502701CO001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 3/2	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 761.92 City/County: Colfax County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502701CO002_W1

Investigator(s): P. Corry, D. Culwell II Section, Township, Range: S32, T020N, R002E

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): concave

Slope (%): 2 Lat: 41.6655124508 Long: -97.2297759726 Datum: WGS84

Soil Map Unit Name: NE037 – 6778 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Swale within tame pasture. No stream channel.

Photos: PC123 Associated Plots: W0502701CO002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 10' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 10' x 20')			
1. *Phalaris arundinacea*	70	✓	FACW
2. *Bromus inermis*	0.5		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	70.5	= Total Cover	

Woody Vine Stratum (Plot size: 10' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	70	x 2 =	140
FAC Species		x 3 =	
FACU Species	0.5	x 4 =	2
UPL Species		x 5 =	
Column Totals	70.5 (A)		142 (B)

Prevalence Index (B/A) = 2.01

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0502701CO002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 2/1	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 1
Water Table Present?	Yes ✓	No ____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 761.92 City/County: Colfax County Sampling Date: 5/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0502701CO002_U1

Investigator(s): P. Corry, D. Culwell II Section, Township, Range: S32, T020N, R002E

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): convex

Slope (%): 4 Lat: 41.6655364992 Long: -97.229779102 Datum: WGS84

Soil Map Unit Name: NE037 – 6778 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Smooth brome pasture above seep wetland swale.

Photos: PC124 Associated Plots: W0502701CO002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 10' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 10' x 20')			
1. *Bromus inermis*	90	✓	FACU
2. *Taraxacum officinale*	0.5		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	90.5	= Total Cover	

Woody Vine Stratum (Plot size: 10' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	90.5	x 4 =	362
UPL Species		x 5 =	
Column Totals	90.5 (A)		362 (B)

Prevalence Index (B/A) = 4.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0502701CO002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 7	10YR 5/2	75	10YR 4/6	5	C	M	CL	
0 - 7			10YR 2/1	20	C	M	CL	
7 - 20	10YR 2/1	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 775.93 City/County: Colfax County Sampling Date: 5/5/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0505703CO002_W1

Investigator(s): J. Beaver, P. Christensen Section, Township, Range: S09, T017N, R002E

Landform (hillslope, terrace, etc.): basin Local relief (concave, convex, none): concave

Slope (%): 1 Lat: 41.4654333949 Long: -97.2098656452 Datum: WGS84

Soil Map Unit Name: NE037 – 3952 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Vegetated portion of farmed wetland converted to hay, probably because too wet to farm.

Photos: JB192 - JB193 Associated Plots: W0505703CO002_U1, W0505703CO002_U2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Alopecurus pratensis*	65	✓	FACW
2. *Carex praegracilis*	27	✓	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	92	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	92	x 2 =	184
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	92 (A)		184 (B)

Prevalence Index (B/A) = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Highly altered, now pasture; hydric soil and wetland hydrology present.

SOIL

Sampling Point: W0505703CO002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 2/1	95	7.5YR 3/4	5	C	M	SiCL	
6 - 13	10YR 5/1	90	7.5YR 5/4	10	C	M	SiC	
13 - 20	10YR 2/1	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 6

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Open water and saturation ±100' upline towards road; variable saturation in pockets at 6-20 inches.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 775.95 City/County: Colfax County Sampling Date: 5/5/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0505703CO002_U1

Investigator(s): J. Beaver, P. Christensen Section, Township, Range: S09, T017N, R002E

Landform (hillslope, terrace, etc.): basin Local relief (concave, convex, none): concave

Slope (%): 2 Lat: 41.4653041992 Long: -97.2095495335 Datum: WGS84

Soil Map Unit Name: NE037 – 6545 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Upland plot above farmed portion of wetland ±60' to vegetated *Alopecurus pratensis*.

Photos: JB190 - JB191 Associated Plots: W0505703CO002_W1; W0505703CO002_U2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0 = Total Cover		
Woody Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL Species		x 1 =
FACW Species		x 2 =
FAC Species		x 3 =
FACU Species		x 4 =
UPL Species		x 5 =
Column Totals	0 (A)	0 (B)

Prevalence Index (B/A) = #Num!

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: 2017 soybean field; bare ground.

SOIL

Sampling Point: W0505703CO002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 2/2	100					SiL	
12 - 20	10YR 2/2	99	10YR 4/5	1	C	M	SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 775.75 City/County: Colfax County Sampling Date: 5/5/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0505703CO002_U2

Investigator(s): J. Beaver, P. Christensen Section, Township, Range: S04, T017N, R002E

Landform (hillslope, terrace, etc.): basin Local relief (concave, convex, none): concave

Slope (%): 1 Lat: 41.4678488479 Long: -97.2111474807 Datum: WGS84

Soil Map Unit Name: NE037 – 6811 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Upland farmed basin.

Photos: JB198 - JB199 Associated Plots: W0505703CO002_W1; W0505703CO002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0 = Total Cover		
Woody Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL Species		x 1 =
FACW Species		x 2 =
FAC Species		x 3 =
FACU Species		x 4 =
UPL Species		x 5 =
Column Totals	0 (A)	0 (B)

Prevalence Index (B/A) = #Num!

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Bare ground; 2017 *corn*.

SOIL

Sampling Point: W0505703CO002_U2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 2/2	100					SiL	
12 - 20	10YR 2/2	99	10YR 4/5	1	C	M	SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 777.86 City/County: Colfax County Sampling Date: 7/9/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0709702CO001_U3

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S16, T17N, R2E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none

Slope (%): 1 Lat: 41.4434585937791 Long: -97.1994460820547 Datum: WGS84

Soil Map Unit Name: NE037 – 6341 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: KK2342 - KK2343 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Phleum pratense*	30	✓	FACU
2. *Trifolium pratense*	25	✓	FACU
3. *Andropogon gerardii*	15		FAC
4. *Poa pratensis*	15		FAC
5. *Glycyrrhiza lepidota*	5		FACU
6. *Melilotus alba*	5		(UPL)
7. *Panicum virgatum*	5		FAC
8. *Sorghastrum nutans*	5		FACU
9.			
10.			
	105	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	35	x 3 =	105
FACU Species	65	x 4 =	260
UPL Species	5	x 5 =	25
Column Totals	105 (A)		390 (B)

Prevalence Index (B/A) = 3.71

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0709702CO001_U3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 2/1	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Area is wet for short periods of time, but does not exhibit evidence of wetland hydrology.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 777.93 City/County: Colfax County Sampling Date: 7/9/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0709702CO001_U2

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S16, T17N, R2E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none

Slope (%): 0 Lat: 41.4426728476412 Long: -97.1983843121442 Datum: WGS84

Soil Map Unit Name: NE037 – 6341 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: KK2340 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Phleum pratense*	30	✓	FACU
2. *Trifolium pratense*	30	✓	FACU
3. *Melilotus alba*	15		(UPL)
4. *Poa pratensis*	15		FAC
5. *Andropogon gerardii*	10		FAC
6. *Schedonorus arundinaceus*	7		FACU
7. *Apocynum cannabinum*	2		FAC
8. *Helianthus maximiliani*	2		UPL
9.			
10.			
	111	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	27	x 3 =	81
FACU Species	67	x 4 =	268
UPL Species	17	x 5 =	85
Column Totals	111 (A)		434 (B)

Prevalence Index (B/A) = 3.91

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0709702CO001_U2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 22	10YR 2/1	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Area is seasonally wet, but does not exhibit wetland hydrology.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 777.97 City/County: Colfax County Sampling Date: 7/9/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0709702CO001_W1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S16, T17N, R2E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave

Slope (%): 0 Lat: 41.442223235747 Long: -97.1980023817717 Datum: WGS84

Soil Map Unit Name: NE037 – 6341 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Depressional wetland at south end of large wet meadow.

Photos: KK2344 Associated Plots: W1011702CO001_U23

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Apocynum cannabinum*	45	✓	FAC
2. *Spartina pectinata*	20	✓	FACW
3. *Andropogon gerardii*	15		FAC
4. *Bromus inermis*	10		FACU
5. *Poa pratensis*	10		FAC
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	20	x 2 =	40
FAC Species	70	x 3 =	210
FACU Species	10	x 4 =	40
UPL Species		x 5 =	
Column Totals	100 (A)		290 (B)

Prevalence Index (B/A) = 2.90

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0709702CO001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 15	10YR 3/1	100					SiCL	
15 - 18	10YR 4/1	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☑ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks: Significant past soil disturbance from existing pipeline and on-going agriculture. Soils assumed to have redox at depth, but have been mixed from trenching and agriculture.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 12

Wetland Hydrology Present? **Yes** ✓ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Soil surface lacked litter, indicating the presence of standing water earlier in the growing season.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 777.96 City/County: Colfax County Sampling Date: 7/9/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0709702CO001_U1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S16, T17N, R2E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none

Slope (%): 0 Lat: 41.4422632615016 Long: -97.1980930698131 Datum: WGS84

Soil Map Unit Name: NE037 – 6341 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: KK2345 Associated Plots: W1011702CO001_W23

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Phleum pratense*	40	✓	FACU
2. *Bromus inermis*	25	✓	FACU
3. *Melilotus alba*	20		(UPL)
4. *Silphium laciniatum*	15		(UPL)
5. *Trifolium pratense*	10		FACU
6.			
7.			
8.			
9.			
10.			
	110	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	75	x 4 =	300
UPL Species	35	x 5 =	175
Column Totals	110 (A)		475 (B)

Prevalence Index (B/A) = 4.32

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0709702CO001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 22	10YR 2/1	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Site is well-drained.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 779.63 City/County: Colfax County Sampling Date: 7/10/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0718702CO001_W2

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S28, T17N, R2E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none

Slope (%): 0 Lat: 41.4195276488742 Long: -97.1982003783327 Datum: WGS84

Soil Map Unit Name: NE037 – 2100 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Sample taken within a large stream/wetland complex.

Photos: KK2365 - KK2366 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 10')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 10' x 10')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 10' x 10')			
1. *Juncus balticus*	20	✓	OBL
2. *Juncus dudleyi*	20	✓	FACW
3. *Agrostis stolonifera*	10	✓	FACW
4. *Hordeum jubatum*	10	✓	FAC
5. *Schoenoplectus pungens*	10	✓	OBL
6. *Carex praegracilis*	5		FACW
7. *Ranunculus sceleratus*	5		OBL
8. *Trifolium pratense*	5		FACU
9. *Fimbristylis puberula*	2		OBL
10. *Symphyotrichum ericoides*	1		FACU
	88	= Total Cover	

Woody Vine Stratum (Plot size: 10' x 10')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	37	x 1 =	37
FACW Species	35	x 2 =	70
FAC Species	10	x 3 =	30
FACU Species	6	x 4 =	24
UPL Species		x 5 =	
Column Totals	88 (A)		161 (B)

Prevalence Index (B/A) = 1.83

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0718702CO001_W2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 3/3	100					SiL	high OM content
2 - 9	10YR 2/1	100					SiCL	
9 - 16	10YR 5/1	97	10YR 5/6	3	C		VFS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☑ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 16
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Surface water surrounding area. Part of a larger wetland/stream complex.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 779.66 City/County: Colfax County Sampling Date: 7/10/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0718702CO001_W3

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S28, T17N, R2E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none

Slope (%): 0 Lat: 41.4192029503576 Long: -97.198841633328 Datum: WGS84

Soil Map Unit Name: NE037 – 8403 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Sample at drier location within a large stream/wetland complex. Surface water surrounding.

Photos: KK2367 Associated Plots: W0718702CO001_U22

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Agrostis stolonifera*	20	✓	FACW
2. *Hordeum jubatum*	20	✓	FAC
3. *Juncus balticus*	20	✓	OBL
4. *Carex praegracilis*	15		FACW
5. *Carex pellita*	10		OBL
6. *Juncus dudleyi*	10		FACW
7. *Schoenoplectus pungens*	5		OBL
8. *Ranunculus sceleratus*	2		OBL
9.			
10.			
	102	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	37	x 1 =	37
FACW Species	45	x 2 =	90
FAC Species	20	x 3 =	60
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	102 (A)		187 (B)

Prevalence Index (B/A) = 1.83

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0718702CO001_W3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 3/3	100					SiL	
2 - 12	10YR 2/1	100					SiCL	
12 - 32	10YR 5/1	97	10YR 5/6	3	C	M	S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 4

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 779.70 City/County: Colfax County Sampling Date: 7/10/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0718702CO001_U3

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S28, T17N, R2E

Landform (hillslope, terrace, etc.): slight rise Local relief (concave, convex, none): none

Slope (%): 0-3 Lat: 41.4180485500052 Long: -97.198331725886 Datum: WGS84

Soil Map Unit Name: NE037 – 4241 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: The rising surface supports upland vegetation. The sampled area is just adjacent to a ponded wetland.

Photos: KK2373 - KK2374 Associated Plots: W0718702CO001_W22

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 5')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5' x 5')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 5' x 5')			
1. *Schedonorus arundinaceus*	86	✓	FACU
2. *Andropogon gerardii*	10		FAC
3. *Poa pratensis*	10		FAC
4. *Croton texensis*	1		(UPL)
5.			
6.			
7.			
8.			
9.			
10.			
	107	= Total Cover	

Woody Vine Stratum (Plot size: 5' x 5')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	20	x 3 =	60
FACU Species	86	x 4 =	344
UPL Species	1	x 5 =	5
Column Totals	107 (A)		409 (B)

Prevalence Index (B/A) = 3.82

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0718702CO001_U3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 2/1	100					SiCL	
16 - 26	10YR 4/2	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes ✓	No _____	Depth (inches): 14
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 14

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 779.68 City/County: Colfax County Sampling Date: 7/10/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0718702CO001_W4

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S28, T17N, R2E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none

Slope (%): 0 Lat: 41.4185634071737 Long: -97.1988412405051 Datum: WGS84

Soil Map Unit Name: NE037 – 8563 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Photos: KK2369 Associated Plots: W0718702CO001_U23

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 5')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5' x 5')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5' x 5')			
1. *Juncus balticus*	25	✓	OBL
2. *Juncus dudleyi*	20	✓	FACW
3. *Carex praegracilis*	15	✓	FACW
4. *Hordeum jubatum*	15	✓	FAC
5. *Agrostis stolonifera*	10		FACW
6. *Eleocharis palustris*	5		OBL
7. *Schoenoplectus pungens*	5		OBL
8.			
9.			
10.			
	95	= Total Cover	
Woody Vine Stratum (Plot size: 5' x 5')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	35	x 1 =	35
FACW Species	45	x 2 =	90
FAC Species	15	x 3 =	45
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	95 (A)		170 (B)

Prevalence Index (B/A) = 1.79

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0718702CO001_W4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 3/2	100					SiL	
2 - 9	10YR 3/1	100					SiL	
9 - 24	10YR 4/2	95	10YR 4/6	5	C	M	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☑ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 14
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 10

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Sampled area was in driest part of wetland.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 779.50 City/County: Colfax County Sampling Date: 7/10/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0718702CO001_U4

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S28, T17N, R2E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none

Slope (%): 7 Lat: 41.4215471416068 Long: -97.198594328782 Datum: WGS84

Soil Map Unit Name: NE037 – 6508 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Slope edge between cultivated field and lower wetland.

Photos: KK2375 - KK2376 Associated Plots: W0718702CO001_W23

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	95	✓	FACU
2. *Sisymbrium loeselii*	2		(UPL)
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	97	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	95	x 4 =	380
UPL Species	2	x 5 =	10
Column Totals	97 (A)		390 (B)

Prevalence Index (B/A) = 4.02

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Brome dominated field edge sloping to wetland.

SOIL

Sampling Point: W0718702CO001_U4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 22	10YR 2/1	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Dark topsoil; no hydrophytic vegetation or hydrology.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Slope between wetland and cultivated field.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 779.54 City/County: Colfax County Sampling Date: 9/12/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0912702CO002_W1

Investigator(s): J. Beaver, K. Kottas Section, Township, Range: S28, T017N, R002E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none

Slope (%): 0-1 Lat: 41.4165264745 Long: -97.1966731799 Datum: WGS84

Soil Map Unit Name: NE037 – 4241 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Photos: JB851 - JB852 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Schoenoplectus pungens*	60	✓	OBL
2. *Trifolium pratense*	50	✓	FACU
3. *Ambrosia artemisiifolia*	10		FACU
4. *Eleocharis palustris*	10		OBL
5. *Echinochloa crus-galli*	7		FACW
6. *Agropyron elongatum*	5		(UPL)
7. *Spartina pectinata*	5		FACW
8. *Polygonum pensylvanicum*	2		FACW
9.			
10.			
	149	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	70	x 1 =	70
FACW Species	14	x 2 =	28
FAC Species		x 3 =	
FACU Species	60	x 4 =	240
UPL Species	5	x 5 =	25
Column Totals	149 (A)		363 (B)

Prevalence Index (B/A) = 2.44

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0912702CO002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 2/1	100					SC	
8 - 36	10YR 5/1	100					LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): 16
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 8

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 779.53 City/County: Colfax County Sampling Date: 9/12/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0912702CO002_U1

Investigator(s): J. Beaver, K. Kottas Section, Township, Range: S28, T017N, R002E

Landform (hillslope, terrace, etc.): slight rise Local relief (concave, convex, none): none

Slope (%): 1 Lat: 41.4166508276 Long: -97.1966930273 Datum: WGS84

Soil Map Unit Name: NE037 – 4241 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: JB854 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Poa pratensis*	45	✓	FAC
2. *Agropyron elongatum*	10		(UPL)
3. *Trifolium pratense*	5		FACU
4. *Panicum virgatum*	3		FAC
5. *Euthamia gymnospermoides*	1		FACW
6. *Schedonorus arundinaceus*	1		FACU
7.			
8.			
9.			
10.			
	65	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	1	x 2 =	2
FAC Species	48	x 3 =	144
FACU Species	6	x 4 =	24
UPL Species	10	x 5 =	50
Column Totals	65 (A)		220 (B)

Prevalence Index (B/A) = 3.38

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: Vegetation is only marginally hydrophytic.

SOIL

Sampling Point: W0912702CO002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 2/1	100					C	
10 - 30	10YR 4/2	90					SCL	
10 - 30	10YR 5/6	10						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): 16

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.40 City/County: Colfax County Sampling Date: 5/5/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0505702CO001_W1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave

Slope (%): 0 Lat: 41.4043547308 Long: -97.197436434 Datum: WGS84

Soil Map Unit Name: NE037 – 8403 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: This site has been planted to fescue which may have replaced some native species.

Photos: KK1105 Associated Plots: W0505702CO001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Schedonorus pratensis*	40	✓	FACU
2. *Juncus balticus*	25	✓	OBL
3. *Poa pratensis*	20	✓	FAC
4. *Allium canadense*	5		FACU
5. *Carex emoryi*	5		OBL
6. *Eleocharis compressa*	5		FACW
7. *Panicum virgatum*	5		FAC
8. *Equisetum hyemale*	1		FACW
9.			
10.			
	106	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	30	x 1 =	30
FACW Species	6	x 2 =	12
FAC Species	25	x 3 =	75
FACU Species	45	x 4 =	180
UPL Species		x 5 =	
Column Totals	106 (A)		297 (B)

Prevalence Index (B/A) = 2.80

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: The presence of fescue planted for hay suppresses or replaces some of the native hydrophytic vegetation. Many hydrophytic species persist.

SOIL

Sampling Point: W0505702CO001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 2/1	100					SL	
12 - 16	10YR 4/2	85	10YR 4/6	15			S	
16 - 27	10YR 2/1	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 2
Water Table Present?	Yes ✓	No ____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.49 City/County: Colfax County Sampling Date: 5/5/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0505702CO001_U1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): floodplain terrace Local relief (concave, convex, none): none

Slope (%): 0 Lat: 41.4030184998 Long: -97.1973986854 Datum: WGS84

Soil Map Unit Name: NE037 – 2340 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: This upland terrace displayed no evidence of a wetland.

Photos: KK1107 Associated Plots: W0507702CO001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	75	✓	FACU
2. *Poa pratensis*	40	✓	FAC
3. *Andropogon gerardii*	10		FAC
4. *Panicum virgatum*	10		FAC
5. *Achillea millefolium*	2		FACU
6. *Sorghastrum nutans*	2		FACU
7. *Carex inops*	1		(UPL)
8. *Taraxacum officinale*	1		FACU
9.			
10.			
	141	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	60	x 3 =	180
FACU Species	80	x 4 =	320
UPL Species	1	x 5 =	5
Column Totals	141 (A)		505 (B)

Prevalence Index (B/A) = 3.58

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0505702CO001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 2/2	100					SL	
10 - 14	10YR 4/2	100					S	
14 - 20	10YR 3/2	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water drains to adjacent wetland

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.11 City/County: Colfax County Sampling Date: 9/10/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0505702CO001_W4

Investigator(s): J. Beaver, K. Kottas Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none

Slope (%): 0-1 Lat: 41.4085177659 Long: -97.1973307827 Datum: WGS84

Soil Map Unit Name: NE037 – 8403 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Subplot to west (W4A) has same vegetation, hydrology, soils.

Photos: JB741 - JB742 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Schoenoplectus pungens*	25	✓	OBL
2. *Carex vulpinoidea*	20	✓	FACW
3. *Agrostis stolonifera*	15	✓	FACW
4. *Juncus dudleyi*	15	✓	FACW
5. *Spartina pectinata*	15	✓	FACW
6. *Muhlenbergia asperifolia*	5		FACW
7. *Schedonorus pratensis*	5		FACU
8. *Andropogon gerardii*	3		FAC
9. *Apocynum cannabinum*	2		FAC
10. *Asclepias incarnata*	2		OBL
	123	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	35	x 1 =	35
FACW Species	74	x 2 =	148
FAC Species	8	x 3 =	24
FACU Species	6	x 4 =	24
UPL Species		x 5 =	
Column Totals	123 (A)		231 (B)

Prevalence Index (B/A) = 1.88

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0505702CO001_W4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 2/1	100					SiCL	
10 - 12	10YR 3/2	95	10YR 5/8	5	C	PL	SiL	
12 - 36	10YR 5/2	75	10YR 4/6	25	C	M	S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 4
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.28 City/County: Colfax County Sampling Date: 9/10/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0505702CO001_U4

Investigator(s): J. Beaver, K. Kottas Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none

Slope (%): 0-1 Lat: 41.406059379 Long: -97.1981203428 Datum: WGS84

Soil Map Unit Name: NE037 – 8403 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Very marginal/mesic plot; does not meet wetland soils or hydrology criteria.

Photos: Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Andropogon gerardii*	35	✓	FAC
2. *Agrostis stolonifera*	30	✓	FACW
3. *Setaria pumila*	15		FAC
4. *Poa pratensis*	10		FAC
5. *Schedonorus pratensis*	10		FACU
6. *Panicum virgatum*	3		FAC
7. *Bromus inermis*	2		FACU
8. *Dactylis glomerata*	2		FACU
9. *Trifolium pratense*	2		FACU
10. *Achillea millefolium*	1		FACU
	117	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	31	x 2 =	62
FAC Species	63	x 3 =	189
FACU Species	22	x 4 =	88
UPL Species	1	x 5 =	5
Column Totals	117 (A)		344 (B)

Prevalence Index (B/A) = 2.94

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks:

SOIL

Sampling Point: W0505702CO001_U4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 9	7.5YR 2/2	100					SL	
9 - 23	10YR 5/2	100					SL	
23 - 36	2.5YR 5/3	97	10YR 5/8	3	C	M	S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: 9-23" has no redox, so not depleted. 23-36" has redox but chroma value too high to be depleted.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): 32

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Marginal hydrology this time of year; meets FAC-neutral test but no other secondary indicator present. Professional judgment of surveyors is that this is mesic, not wetland.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.20 City/County: Colfax County Sampling Date: 9/10/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0505702CO001_W8

Investigator(s): J. Beaver, K. Kottas Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none

Slope (%): 0-1 Lat: 41.4073046491 Long: -97.1973069238 Datum: WGS84

Soil Map Unit Name: NE037 – 4241 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: South side of sandy ridge. Subplot to west (W8A) has same vegetation, soils, hydrology.

Photos: JB751 - JB753 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Schoenoplectus pungens*	40	✓	OBL
2. *Panicum virgatum*	15	✓	FAC
3. *Juncus nodosus*	10		OBL
4. *Setaria pumila*	10		FAC
5. *Poa pratensis*	7		FAC
6. *Apocynum cannabinum*	5		FAC
7. *Juncus dudleyi*	5		FACW
8. *Phyla lanceolata*	3		OBL
9. *Liatris pycnostachya*	2		FAC
10. *Spartina pectinata*	2		FACW
	104	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	55	x 1 =	55
FACW Species	8	x 2 =	16
FAC Species	39	x 3 =	117
FACU Species	2	x 4 =	8
UPL Species		x 5 =	
Column Totals	104 (A)		196 (B)

Prevalence Index (B/A) = 1.88

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0505702CO001_W8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 11	10YR 2/1	100					SiCL	
11 - 13	10YR 4/2	70					SL	
11 - 13	10YR 2/1	30					SL	
13 - 29	10YR 5/2	95	10YR 4/6	5	C	M	S	
29 - 36	10YR 4/2	90	10YR 4/6	10	C	M	S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 11
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 5

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.33 City/County: Colfax County Sampling Date: 9/11/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0505702CO001_U8

Investigator(s): J. Beaver, K. Kottas Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none

Slope (%): 1 Lat: 41.4053995926 Long: -97.1981908199 Datum: WGS84

Soil Map Unit Name: NE037 – 8403 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: JB779 - JB780 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Schedonorus pratensis*	40	✓	FACU
2. *Andropogon gerardii*	15	✓	FAC
3. *Carex emoryi*	10	✓	OBL
4. *Medicago lupulina*	10	✓	FACU
5. *Panicum virgatum*	10	✓	FAC
6. *Agrostis stolonifera*	5		FACW
7. *Schoenoplectus pungens*	5		OBL
8. *Setaria pumila*	5		FAC
9. *Sporobolus compositus*	5		(UPL)
10. *Spartina pectinata*	3		FACW
	116	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	16	x 1 =	16
FACW Species	9	x 2 =	18
FAC Species	31	x 3 =	93
FACU Species	55	x 4 =	220
UPL Species	5	x 5 =	25
Column Totals	116 (A)		372 (B)

Prevalence Index (B/A) = 3.21

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks:

SOIL

Sampling Point: W0505702CO001_U8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 10.5	10YR 2/1	100					SCL	
10.5 - 36	10YR 4/3	99	10YR 4/6	1	C	M	S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): 27

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): 20

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water table is too low to support wetland hydrology.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.49 City/County: Colfax County Sampling Date: 9/11/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0505702CO001_W12

Investigator(s): J. Beaver, K. Kottas Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave

Slope (%): 1 Lat: 41.4031105054 Long: -97.1983874999 Datum: WGS84

Soil Map Unit Name: NE037 – 8403 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Channel scar in floodplain. Northern toe of slope - ancient river channel.

Photos: JB764 - JB767 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Spartina pectinata*	80	✓	FACW
2. *Schedonorus pratensis*	20		FACU
3. *Schoenoplectus pungens*	20		OBL
4. *Panicum virgatum*	5		FAC
5. *Setaria pumila*	2		FAC
6. *Andropogon gerardii*	1		FAC
7. *Juncus dudleyi*	1		FACW
8. *Juncus nodosus*	1		OBL
9. *Melilotus officinalis*	1		FACU
10.			
	131	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	21	x 1 =	21
FACW Species	81	x 2 =	162
FAC Species	8	x 3 =	24
FACU Species	21	x 4 =	84
UPL Species		x 5 =	
Column Totals	131 (A)		291 (B)

Prevalence Index (B/A) = 2.22

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0505702CO001_W12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 10.5	10YR 2/1	100					C	
10.5 - 14	7.5YR 2.5/1	97	5YR 3/4	3			SC	
14 - 36	10YR 5/2	85	7.5YR 5/6	15			S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☑ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): 20
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): 14

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.46 City/County: Colfax County Sampling Date: 9/10/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0505702CO001_U12

Investigator(s): K. Kottas, J. Beaver Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none

Slope (%): 0-1 Lat: 41.403525221 Long: -97.197986721 Datum: WGS84

Soil Map Unit Name: NE037 – 8403 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Upland inclusion/island in wetland/wet prairie mosaic.

Photos: Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Schedonorus pratensis*	45	✓	FACU
2. *Andropogon gerardii*	35	✓	FAC
3. *Agrostis stolonifera*	20		FACW
4. *Symphyotrichum ericoides*	15		FACU
5. *Poa pratensis*	12		FAC
6. *Solidago canadensis var. gilvocanescens*	3		FACU
7. *Trifolium pratense*	2		FACU
8. *Ambrosia psilostachya*	1		FACU
9. *Dactylis glomerata*	1		FACU
10. *Panicum virgatum*	1		FAC
	135	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	20	x 2 =	40
FAC Species	48	x 3 =	144
FACU Species	67	x 4 =	268
UPL Species		x 5 =	
Column Totals	135 (A)		452 (B)

Prevalence Index (B/A) = 3.35

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0505702CO001_U12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	7.5YR 2/2	100					SL	
8 - 18	10YR 5/2	100					SL	
18 - 30	10YR 5/3	98	10YR 5/6	2	C	M	S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Matrix 5/2 requires redox to be depleted, therefore not A11 or A12.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): 30

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.55 City/County: Colfax County Sampling Date: 5/7/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0507702CO001_W1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): basin Local relief (concave, convex, none): concave

Slope (%): 3-5 Lat: 41.4021382983 Long: -97.1974194202 Datum: WGS84

Soil Map Unit Name: NE037 – 4241 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Basin north of Platte River. Evidence of old sandbars now vegetated which produce fingers of upland through wetland.

Photos: KK1114 Associated Plots: W0507702CO001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Alopecurus aequalis*	50	✓	OBL
2. *Poa pratensis*	30	✓	FAC
3. *Carex emoryi*	10		OBL
4. *Trifolium repens*	10		FACU
5. *Ranunculus abortivus*	2		FACW
6. *Taraxacum officinale*	2		FACU
7. *Viola sororia*	2		FAC
8. *Galium obtusum*	1		FACW
9.			
10.			
	107	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	60	x 1 =	60
FACW Species	3	x 2 =	6
FAC Species	32	x 3 =	96
FACU Species	12	x 4 =	48
UPL Species		x 5 =	
Column Totals	107 (A)		210 (B)

Prevalence Index (B/A) = 1.96

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Dominated by obligate grass with occasional forbs and sedge sp. Many native species are present; however, non-natives are dominant.

SOIL

Sampling Point: W0507702CO001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 2/1	100					SL	organic
2 - 5	10YR 3/1	80					SL	
2 - 5	10YR 6/1	20					SL	
5 - 9	10YR 4/1	70	10YR 4/6	10	C	M	S	
5 - 9	10YR 6/1	20					SL	
9 - 12	10YR 4/2	70	10YR 4/6	10	C		SL	
12 - 14	10YR 3/2	20					SL	
14 - 20	10YR 3/1	80	10YR 3/6	20	C	M	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 0

Water Table Present? Yes ✓ No ____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Floodplain saturated soils and standing water along bank of a creek. Just north of Platte River.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.55 City/County: Colfax County Sampling Date: 5/7/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0507702CO001_U1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): hillside Local relief (concave, convex, none): concave

Slope (%): 8 Lat: 41.4022159804 Long: -97.1973866017 Datum: WGS84

Soil Map Unit Name: NE037 – 4241 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Vegetated berm north of PEM along roadway. Concave below hillside slope.

Photos: KK1112 Associated Plots: W0507702CO001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Juniperus virginiana*	20	✓	FACU
2.			
3.			
4.			
5.			
	20	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5' x 20')			
1. *Schedonorus pratensis*	40	✓	FACU
2. *Bromus tectorum*	30	✓	(UPL)
3. *Achillea millefolium*	10		FACU
4. *Poa pratensis*	10		FAC
5. *Trifolium campestre*	10		(UPL)
6. *Trifolium pratense*	10		FACU
7. *Ambrosia psilostachya*	5		FACU
8. *Carex grisea*	1		FAC
9. *Equisetum hyemale*	1		FACW
10. *Lithospermum incisum*	1		(UPL)
	118	= Total Cover	
Woody Vine Stratum (Plot size: 5' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	1	x 2 =	2
FAC Species	11	x 3 =	33
FACU Species	85	x 4 =	340
UPL Species	41	x 5 =	205
Column Totals	138 (A)		580 (B)

Prevalence Index (B/A) = 4.20

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Dominated by introduced UPL and FACU species.

SOIL

Sampling Point: W0507702CO001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 3/2	100					SL	
10 - 25	10YR 2/2	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Berm between wetland and road ditch.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.73 City/County: Colfax County Sampling Date: 5/7/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0507702CO001_W2

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave

Slope (%): 3-5 Lat: 41.4002860342 Long: -97.1952189005 Datum: WGS84

Soil Map Unit Name: NE037 – 2100 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Hydrophytic vegetation, saturated and hydrophytic soils.

Photos: KK1127 Associated Plots: W0507702CO001_U2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Carex emoryi*	80	✓	OBL
2. *Alopecurus arundinaceus*	10		FACW
3. *Ranunculus sceleratus*	5		OBL
4. *Trifolium repens*	5		FACU
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	85	x 1 =	85
FACW Species	10	x 2 =	20
FAC Species		x 3 =	
FACU Species	5	x 4 =	20
UPL Species		x 5 =	
Column Totals	100 (A)		125 (B)

Prevalence Index (B/A) = 1.25

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Dominated by wetland sedges and grasses.

SOIL

Sampling Point: W0507702CO001_W2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 2/1	100					SCL	
2 - 3	10YR 3/2	100					SL	
3 - 10	10YR 2/1	90	10YR 4/6	10	C	PL	CL	
10 - 20	10YR 1/	100					S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☑ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 6

Water Table Present? Yes ✓ No ____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Saturated soils in floodplain

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.74 City/County: Colfax County Sampling Date: 5/7/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0507702CO001_U2

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): undulating

Slope (%): 3-5 Lat: 41.4001649138 Long: -97.1949859006 Datum: WGS84

Soil Map Unit Name: NE037 – 2100 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Vegetated sandy berm in floodplain.

Photos: KK1128 Associated Plots: W0507702CO001_W2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Poa pratensis*	40	✓	FAC
2. *Schedonorus arundinaceus*	40	✓	FACU
3. *Allium canadense*	10		FACU
4. *Eleocharis compressa*	10		FACW
5. *Equisetum laevigatum*	8		FACW
6. *Viola sororia*	6		FAC
7. *Ambrosia psilostachya*	5		FACU
8. *Taraxacum officinale*	5		FACU
9. *Bromus tectorum*	2		(UPL)
10. *Symphyotrichum lanceolatum var. lanceolatum*	1		FAC
	127	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	18	x 2 =	36
FAC Species	47	x 3 =	141
FACU Species	60	x 4 =	240
UPL Species	2	x 5 =	10
Column Totals	127 (A)		427 (B)

Prevalence Index (B/A) = 3.36

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0507702CO001_U2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 3/1	100					SL	
6 - 12	10YR 3/2	100					SL	
12 - 20	10YR 4/2	100					S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Vegetated sandy berms

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.86 City/County: Colfax County Sampling Date: 5/8/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0508702CO002_W1

Investigator(s): K. Kottas, A. Admiraal, D. Culwell II Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave

Slope (%): 0-5 Lat: 41.3984287794 Long: -97.1955430089 Datum: WGS84

Soil Map Unit Name: NE037 – 2100 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Water ponded between sandy upland ridges.

Photos: KK1134 Associated Plots: W0508702CO002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Carex emoryi*	60	✓	OBL
2. *Poa pratensis*	20		FAC
3. *Eleocharis palustris*	10		OBL
4. *Schedonorus arundinaceus*	10		FACU
5. *Panicum virgatum*	2		FAC
6. *Schoenoplectus pungens*	2		OBL
7. *Spartina pectinata*	2		FACW
8.			
9.			
10.			
	106	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	72	x 1 =	72
FACW Species	2	x 2 =	4
FAC Species	22	x 3 =	66
FACU Species	10	x 4 =	40
UPL Species		x 5 =	
Column Totals	106 (A)		182 (B)

Prevalence Index (B/A) = 1.72

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0508702CO002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 2/1	100					CL	
12 - 14	10YR 4/2	90	10YR 4/6	10	C	M	SCL	
14 - 20	10YR 4/2	100					S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 12
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.87 City/County: Colfax County Sampling Date: 5/8/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0508702CO002_U1

Investigator(s): K. Kottas, A. Admiraal, D. Culwell II Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): floodplain terrace Local relief (concave, convex, none): none

Slope (%): 0-3 Lat: 41.3983302439 Long: -97.1951411224 Datum: WGS84

Soil Map Unit Name: NE037 – 2100 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Slightly higher ridge next to concave surface.

Photos: KK1135 Associated Plots: W0508702CO002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 5')			
1. *Poa pratensis*	60	✓	FAC
2. *Carex blanda*	10		FAC
3. *Eleocharis palustris*	10		OBL
4. *Schedonorus arundinaceus*	10		FACU
5. *Allium canadense*	5		FACU
6. *Ambrosia psilostachya*	5		FACU
7. *Taraxacum officinale*	5		FACU
8.			
9.			
10.			
	105	= Total Cover	

Woody Vine Stratum (Plot size: 5')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	10	x 1 =	10
FACW Species		x 2 =	
FAC Species	70	x 3 =	210
FACU Species	25	x 4 =	100
UPL Species		x 5 =	
Column Totals	105 (A)		320 (B)

Prevalence Index (B/A) = 3.05

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: A mix of wetland and upland vegetation.

SOIL

Sampling Point: W0508702CO002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 5	10YR 2/2	100					SCL	
5 - 20	10YR 4/2	100					S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water drains away from this site.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.89 City/County: Colfax County Sampling Date: 5/8/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0508702CO003_W1

Investigator(s): K. Kottas, A. Admiraal, D. Culwell II Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave

Slope (%): 0-5 Lat: 41.3979801459 Long: -97.195048958 Datum: WGS84

Soil Map Unit Name: NE037 – 2100 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Photos: KK1136 Associated Plots: W0508702CO003_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Poa pratensis*	40	✓	FAC
2. *Carex emoryi*	30	✓	OBL
3. *Eleocharis palustris*	15		OBL
4. *Allium canadense*	10		FACU
5. *Bromus inermis*	2		FACU
6. *Phalaris arundinacea*	2		FACW
7. *Teucrium canadense*	2		FACW
8. *Agropyron smithii*	1		FACU
9. *Schoenoplectus pungens*	1		OBL
10.			
	103	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	46	x 1 =	46
FACW Species	4	x 2 =	8
FAC Species	40	x 3 =	120
FACU Species	13	x 4 =	52
UPL Species		x 5 =	
Column Totals	103 (A)		226 (B)

Prevalence Index (B/A) = 2.19

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0508702CO003_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 2/1	95	10YR 4/6	5	C	M	CL	
12 - 14	10YR 3/2	90	10YR 4/6	10	C	M	SCL	
14 - 20	10YR 4/2	100					S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 6
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: This site receives surface drainage from surrounding higher ground.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.90 City/County: Colfax County Sampling Date: 5/8/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0508702CO003_U1

Investigator(s): K. Kottas, A. Admiraal, D. Culwell II Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave

Slope (%): 0-5 Lat: 41.3978263251 Long: -97.1949601447 Datum: WGS84

Soil Map Unit Name: NE037 – 2100 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: KK1137 Associated Plots: W0508702CO003_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	50	✓	FACU
2. *Poa pratensis*	20	✓	FAC
3. *Eleocharis palustris*	10		OBL
4. *Carex blanda*	5		FAC
5. *Veronica arvensis*	2		FACU
6.			
7.			
8.			
9.			
10.			
	87	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	10	x 1 =	10
FACW Species		x 2 =	
FAC Species	25	x 3 =	75
FACU Species	52	x 4 =	208
UPL Species		x 5 =	
Column Totals	87 (A)		293 (B)

Prevalence Index (B/A) = 3.37

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0508702CO003_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 14	10YR 2/1	100					CL	
14 - 18	10YR 3/2	100					SCL	
18 - 20	10YR 4/3	100					S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.92 City/County: Colfax County Sampling Date: 5/8/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0508702CO004_W1

Investigator(s): K. Kottas, A. Admiraal, D. Culwell II Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave

Slope (%): 0-5 Lat: 41.3975180559 Long: -97.1951120601 Datum: WGS84

Soil Map Unit Name: NE037 – 2100 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Photos: KK1138 Associated Plots: W0508702CO004_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Carex emoryi*	15	✓	OBL
2. *Phalaris arundinacea*	15	✓	FACW
3. *Eleocharis palustris*	10	✓	OBL
4. *Poa pratensis*	10	✓	FAC
5. *Ranunculus sceleratus*	2		OBL
6. *Taraxacum officinale*	2		FACU
7.			
8.			
9.			
10.			
	54	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	27	x 1 =	27
FACW Species	15	x 2 =	30
FAC Species	10	x 3 =	30
FACU Species	2	x 4 =	8
UPL Species		x 5 =	
Column Totals	54 (A)		95 (B)

Prevalence Index (B/A) = 1.76

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Site was sparsely vegetated due to standing water.

SOIL

Sampling Point: W0508702CO004_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 3/1	100					CL	
4 - 12	10YR 5/2	50	10YR 3/6	10	C	M	SCL	
4 - 12	10YR 3/2	40					SCL	
12 - 20	10YR 5/2	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 15
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Site is connected to ditch.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.93 City/County: Colfax County Sampling Date: 5/8/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0508702CO004_U1

Investigator(s): K. Kottas, A. Admiraal, D. Culwell II Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): floodplain terrace Local relief (concave, convex, none): concave

Slope (%): 0-5 Lat: 41.3973286835 Long: -97.1950439728 Datum: WGS84

Soil Map Unit Name: NE037 – 8563 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: KK1142 Associated Plots: W0508702CO004_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Taraxacum officinale*	40	✓	FACU
2. *Capsella bursa-pastoris*	25	✓	FACU
3. *Bromus inermis*	10		FACU
4. *Dactylis glomerata*	5		FACU
5. *Poa pratensis*	5		FAC
6. *Trifolium repens*	5		FACU
7. *Veronica arvensis*	5		FACU
8. *Ambrosia artemisiifolia*	1		FACU
9.			
10.			
	96	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	5	x 3 =	15
FACU Species	91	x 4 =	364
UPL Species		x 5 =	
Column Totals	96 (A)		379 (B)

Prevalence Index (B/A) = 3.95

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0508702CO004_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 5	10YR 3/2	100					SCL	
5 - 20	10YR 4/2	80					SL	
5 - 20	10YR 5/2	20					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Site drains to nearby wetland.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 781.94 City/County: Butler County Sampling Date: 9/13/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0913702BT001_W1

Investigator(s): A. Admiraal, C. Griffith Section, Township, Range: S04, T016N, R002E

Landform (hillslope, terrace, etc.): streambank Local relief (concave, convex, none): concave

Slope (%): 3 Lat: 41.3828057004 Long: -97.1954594438 Datum: WGS84

Soil Map Unit Name: NE037 – 8573 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Fringe wetland along side channel of Platte River.

Photos: AA1603 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 10')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5' x 10')			
1. *Amorpha fruticosa*	20	✓	FACW
2.			
3.			
4.			
5.			
	20	= Total Cover	
Herb Stratum (Plot size: 5' x 10')			
1. *Cyperus fuscus*	50	✓	FAC
2. *Phalaris arundinacea*	50	✓	FACW
3. *Bidens cernua*	5		OBL
4. *Panicum capillare*	5		FAC
5. *Panicum dichotomiflorum*	5		FACW
6. *Solidago gigantea*	5		FACW
7.			
8.			
9.			
10.			
	120	= Total Cover	
Woody Vine Stratum (Plot size: 5' x 10')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	5	x 1 =	5
FACW Species	80	x 2 =	160
FAC Species	55	x 3 =	165
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	140 (A)		330 (B)

Prevalence Index (B/A) = 2.36

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0913702BT001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 3/2	100					SiL	
2 - 6	10YR 4/2	80	10YR 4/6	20	C	PL	CL	
6 - 10	10YR 6/1	50	10YR 5/8	20	C	M	S	
6 - 10	2.5Y 5/1	30					S	
10 - 16	10YR 5/1	100					S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 12

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Adjacent to side channel; gradual slope to water. Occasionally to frequently flooded.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 781.94 City/County: Butler County Sampling Date: 9/13/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0913702BT001_U1

Investigator(s): A. Admiraal, C. Griffith Section, Township, Range: S04, T016N, R002E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave

Slope (%): 3 Lat: 41.3827261709 Long: -97.1956331554 Datum: WGS84

Soil Map Unit Name: NE037 – 9999 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Hydrophytic vegetation is able to persist on this site, but does not meet hydrology or hydric soil criteria for wetland.

Photos: AA1602 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' x 10')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5' x 10')			
1. *Amorpha fruticosa*	10	✓	FACW
2.			
3.			
4.			
5.			
	10	= Total Cover	
Herb Stratum (Plot size: 5' x 10')			
1. *Phalaris arundinacea*	100	✓	FACW
2. *Solidago gigantea*	2		FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	102	= Total Cover	
Woody Vine Stratum (Plot size: 5' x 10')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	112	x 2 =	224
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	112 (A)		224 (B)

Prevalence Index (B/A) = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks:

SOIL

Sampling Point: W0913702BT001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 3/2	100					LS	
6 - 15	10YR 5/2	100					SL	
15 - 18	10YR 5/2	95	10YR 6/6	5	C	M	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Too well-drained for hydric soil development; hydric indicators >12" below surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Some low areas, but apparently drains quickly through sandy soil.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 782.16 City/County: Butler County Sampling Date: 5/7/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0507703BT002_W1

Investigator(s): J. Beaver, P. Christensen, S. Cooper Section, Township, Range: S09, T016N, R002E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none

Slope (%): 1 Lat: 41.3796467349 Long: -97.1955513339 Datum: WGS84

Soil Map Unit Name: NE023 – 6312 NWI Classification: PFO

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Green ash/*Phalaris arundinacea* PFO on floodplain next to Platte River.

Photos: JB206 - JB207 Associated Plots: W0507703BT002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.1 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus pennsylvanica*	80	✓	FACW
2.			
3.			
4.			
5.			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.1 acre)			
1. *Fraxinus pennsylvanica*	8	✓	FACW
2.			
3.			
4.			
5.			
	8	= Total Cover	
Herb Stratum (Plot size: 0.1 acre)			
1. *Phalaris arundinacea*	78	✓	FACW
2. *Carex emoryi*	2		OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	80	= Total Cover	
Woody Vine Stratum (Plot size: 0.1 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	2	x 1 =	2
FACW Species	166	x 2 =	332
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	168 (A)		334 (B)

Prevalence Index (B/A) = 1.99

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0507703BT002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 2/1	100					SiL	
8 - 20	10YR 4/2	80	7.5YR 5/6	20	C	M	S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☑ Water Marks (B1)
- ☑ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 8

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 782.16 City/County: Butler County Sampling Date: 8/7/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0507703BT002_U1

Investigator(s): J. Beaver, P. Christensen, S. Cooper Section, Township, Range: S09, T016N, R002E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): convex

Slope (%): 3 Lat: 41.3796012544 Long: -97.1955758961 Datum: WGS84

Soil Map Unit Name: NE023 – 6312 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Small upland terrace between PFO and creek to south. Riparian, not wetland.

Photos: JB208 - JB209 Associated Plots: W0507703BT002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.1 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus pennsylvanica*	45	✓	FACW
2. *Juniperus virginiana*	20	✓	FACU
3.			
4.			
5.			
	65	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.1 acre)			
1. *Juniperus virginiana*	5	✓	FACU
2. *Ulmus americana*	0.5		FACW
3.			
4.			
5.			
	5.5	= Total Cover	
Herb Stratum (Plot size: 0.1 acre)			
1. *Bromus inermis*	75	✓	FACU
2. *Taraxacum officinale*	8		FACU
3. *Plantago major*	5		FAC
4. *Poa pratensis*	5		FAC
5. *Solidago gigantea*	3		FACW
6. *Panicum virgatum*	1		FAC
7.			
8.			
9.			
10.			
	97	= Total Cover	
Woody Vine Stratum (Plot size: 0.1 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	48.5	x 2 =	97
FAC Species	11	x 3 =	33
FACU Species	108	x 4 =	432
UPL Species		x 5 =	
Column Totals	167.5 (A)		562 (B)

Prevalence Index (B/A) = 3.36

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Upland/riparian vegetation.

SOIL

Sampling Point: W0507703BT002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 2/1	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Within floodplain, but not wetland.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 782.17 City/County: Butler County Sampling Date: 5/7/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0507703BT001_W1

Investigator(s): J. Beaver, S. Cooper, P. Christensen Section, Township, Range: S09, T016N, R002E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none

Slope (%): 1 Lat: 41.3794665904 Long: -97.1959114411 Datum: WGS84

Soil Map Unit Name: NE023 – 6312 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: PEM wetland terrace adjacent to stream.

Photos: SC466 - SC467 Associated Plots: W0507703BT001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 20' x 20')			
1. *Ulmus americana*	0.5		FACW
2.			
3.			
4.			
5.			
	0.5 = Total Cover		
Herb Stratum (Plot size: 20' x 20')			
1. *Phalaris arundinacea*	70	✓	FACW
2. *Carex emoryi*	3		OBL
3. *Ranunculus sceleratus*	1		OBL
4. *Solidago gigantea*	0.5		FACW
5. *Spartina pectinata*	0.5		FACW
6.			
7.			
8.			
9.			
10.			
	75 = Total Cover		
Woody Vine Stratum (Plot size: 20' x 20')			
1.			
2.			
	0 = Total Cover		

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	4	x 1 =	4
FACW Species	71.5	x 2 =	143
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	75.5 (A)		147 (B)

Prevalence Index (B/A) = 1.95

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Invaded by *Phalaris arundinacea*.

SOIL

Sampling Point: W0507703BT001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 2/1	100					SiL	
8 - 20	10YR 4/2	95	7.5YR 5/6	5	C	M	S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 24
Water Table Present?	Yes ✓	No ____	Depth (inches): 4
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Wetland terrace next to stream.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 782.17 City/County: Butler County Sampling Date: 5/7/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0507703BT001_U1

Investigator(s): J. Beaver, S. Cooper Section, Township, Range: S09, T016N, R002E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): undulating

Slope (%): 1 Lat: 41.379445528 Long: -97.1959558799 Datum: WGS84

Soil Map Unit Name: NE023 – 6312 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: SC470 Associated Plots: W0507703BT001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 20' x 20')			
1. *Ulmus americana*	0.5		FACW
2.			
3.			
4.			
5.			
	0.5	= Total Cover	
Herb Stratum (Plot size: 20' x 20')			
1. *Bromus inermis*	55	✓	FACU
2. *Poa pratensis*	15		FAC
3. *Phalaris arundinacea*	7		FACW
4. *Solidago gigantea*	5		FACW
5. *Trifolium repens*	5		FACU
6. *Taraxacum officinale*	2		FACU
7. *Cirsium vulgare*	1		FACU
8.			
9.			
10.			
	90	= Total Cover	
Woody Vine Stratum (Plot size: 20' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	12.5	x 2 =	25
FAC Species	15	x 3 =	45
FACU Species	63	x 4 =	252
UPL Species		x 5 =	
Column Totals	90.5 (A)		322 (B)

Prevalence Index (B/A) = 3.56

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: *Phalaris arundinacea* has invaded and increased.

SOIL

Sampling Point: W0507703BT001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 2/1	100					SiL	
8 - 20	10YR 4/2	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 782.20 City/County: Butler County Sampling Date: 5/7/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0507703BT003_W1

Investigator(s): J. Beaver, S. Cooper, P. Christensen Section, Township, Range: S09, T016N, R002E

Landform (hillslope, terrace, etc.): field Local relief (concave, convex, none): none

Slope (%): <1 Lat: 41.3790018737 Long: -97.1964003 Datum: WGS84

Soil Map Unit Name: NE023 – 6312 NWI Classification: PFO

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Left edge of field.

Photos: SC472 Associated Plots: W0507703BT003_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus pennsylvanica*	30	✓	FACW
2.			
3.			
4.			
5.			
	30	= Total Cover	
Sapling/Shrub Stratum (Plot size: 20' x 20')			
1. *Juniperus virginiana*	1		FACU
2.			
3.			
4.			
5.			
	1	= Total Cover	
Herb Stratum (Plot size: 20' x 20')			
1. *Carex emoryi*	35	✓	OBL
2. *Phalaris arundinacea*	30	✓	FACW
3. *Rumex crispus*	2		FAC
4. *Ranunculus sceleratus*	1		OBL
5.			
6.			
7.			
8.			
9.			
10.			
	68	= Total Cover	
Woody Vine Stratum (Plot size: 20' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	36	x 1 =	36
FACW Species	60	x 2 =	120
FAC Species	2	x 3 =	6
FACU Species	1	x 4 =	4
UPL Species		x 5 =	
Column Totals	99 (A)		166 (B)

Prevalence Index (B/A) = 1.68

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Palustrine, forested wetland with narrow fringe of *Fraxinus pennsylvanica*.

SOIL

Sampling Point: W0507703BT003_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 2/1	100					Si	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☑ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 5
Water Table Present?	Yes ✓	No ____	Depth (inches): 4
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 782.20 City/County: Butler County Sampling Date: 5/7/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0507703BT003_U1

Investigator(s): J. Beaver, S. Cooper, P. Christensen Section, Township, Range: S09, T016N, R002E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none

Slope (%): 1 Lat: 41.3789564439 Long: -97.1964208731 Datum: WGS84

Soil Map Unit Name: NE023 – 6312 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Upland terrace immediately adjacent to cultivated field.

Photos: SC471 Associated Plots: W0507703BT003_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 10')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 20' x 10')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 20' x 10')			
1. *Poa pratensis*	55	✓	FAC
2. *Bromus inermis*	37	✓	FACU
3. *Plantago major*	5		FAC
4. *Trifolium repens*	3		FACU
5. *Solidago gigantea*	1		FACW
6. *Taraxacum officinale*	1		FACU
7. *Cirsium vulgare*	0.5		FACU
8. *Equisetum laevigatum*	0.5		FACW
9. *Verbena stricta*	0.5		(UPL)
10. *Viola sororia*	0.5		FAC
	104	= Total Cover	

Woody Vine Stratum (Plot size: 20' x 10')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	1.5	x 2 =	3
FAC Species	60.5	x 3 =	181.5
FACU Species	41.5	x 4 =	166
UPL Species	0.5	x 5 =	2.5
Column Totals	104 (A)		353 (B)

Prevalence Index (B/A) = 3.39

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0507703BT003_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 2/1	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 787.41 City/County: Butler County Sampling Date: 5/7/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0507701BT001_W1

Investigator(s): J. Allewalt, R. Ruffner Section, Township, Range: S03, T015N, R002E

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): H Lat: 41.3038299511 Long: -97.195830372 Datum: WGS84

Soil Map Unit Name: NE023 – 2835 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Open depression with standing water where keystone main line crosses drainage.

Photos: JA3537 Associated Plots: W0507701BT001_U1; W0507701BT002_W2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	90	✓	FACW
2. *Bolboschoenus fluviatilis*	2		OBL
3. *Carex emoryi*	1		OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	93 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	3	x 1 =	3
FACW Species	90	x 2 =	180
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	93 (A)		183 (B)

Prevalence Index (B/A) = 1.97

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: low species diversity

SOIL

Sampling Point: W0507701BT001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2								vegetative matter
2 - 20	10YR 2/1	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☑ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Soil was stripped and significantly disturbed during pipeline construction. Pipeline construction not long enough ago to allow wetland soil to develop. Hydrophytic vegetation and wetland hydrology indicate development of young wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 1
Water Table Present?	Yes ✓	No ____	Depth (inches): 10
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Ponded at pipeline crossing. Surmise pipeline construction is responsible for wetland development (created low pint in drainage). Edge of wetland coincides with original ROW edge.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 787.41 City/County: Butler County Sampling Date: 5/7/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0507701BT001_U1

Investigator(s): J. Allewalt, R. Ruffner Section, Township, Range: S03, T015N, R002E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 2

Subregion (LRR): H Lat: 41.3038548428 Long: -97.1958754385 Datum: WGS84

Soil Map Unit Name: NE023 – 2835 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Hillslope on north side, adjacent to drainage depression.

Photos: JA3538 Associated Plots: W0507701BT001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1. *Rhus aromatica*	2		UPL
2.			
3.			
4.			
5.			
	2 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	50	✓	UPL
2. *Phalaris arundinacea*	40	✓	FACW
3. *Urtica dioica*	3		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	93 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	40	x 2 =	80
FAC Species	3	x 3 =	9
FACU Species		x 4 =	
UPL Species	52	x 5 =	260
Column Totals	95 (A)		349 (B)

Prevalence Index (B/A) = 3.67

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Clipped sumac, just leaves, could be locust.

SOIL

Sampling Point: W0507701BT001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 18	10YR 3/2	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: On slope above wetland at boundary.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 787.90 City/County: Butler County Sampling Date: 5/7/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0507701BT002_W1

Investigator(s): J. Allewalt, D. Culwell II, R. Ruffner Section, Township, Range: S03, T015N, R002E

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): H Lat: 41.2968680803 Long: -97.194454555 Datum: WGS84

Soil Map Unit Name: NE023 – 2835 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Moderately wide, flat-bottomed drainage with steep edges. Wet across width.

Photos: JA3547 Associated Plots: W0507701BT002_U1; W0507701BT002_W2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Agrostis stolonifera*	40	✓	FACW
2. *Carex douglasii*	1		FAC
3. *Ranunculus glaberrimus*	1		FAC
4. *Agrimonia gryposepala*	0.5		FAC
5. *Smilacina stellata*	0.5		FACU
6.			
7.			
8.			
9.			
10.			
	43 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 60

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	40	x 2 =	80
FAC Species	2.5	x 3 =	7.5
FACU Species	0.5	x 4 =	2
UPL Species		x 5 =	
Column Totals	43 (A)		89.5 (B)

Prevalence Index (B/A) = 2.08

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: All vegetation species listed were clipped. Agrostis has red stem; no inflorescence on carex.

SOIL

Sampling Point: W0507701BT002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 5/2	80	7.5YR 4/6	20	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 1
Water Table Present?	Yes ✓	No ____	Depth (inches): 10
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 787.87 City/County: Butler County Sampling Date: 5/7/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0507701BT002_W2

Investigator(s): J. Allewalt, D. Culwell II, R. Ruffner Section, Township, Range: S03, T015N, R002E

Landform (hillslope, terrace, etc.): toeslope Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): H Lat: 41.2973112241 Long: -97.1942101271 Datum: WGS84

Soil Map Unit Name: NE023 – 2835 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Area in drainage where Keystone mainline crosses.

Photos: JA3549 Associated Plots: W0507701BT002_U1; W0507701BT002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	60	✓	FACW
2. *Poa pratensis*	20		FACU
3. *Sorghastrum nutans*	15		FACU
4. *Andropogon gerardii*	8		FACU
5.			
6.			
7.			
8.			
9.			
10.			
	103	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 15

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	60	x 2 =	120
FAC Species		x 3 =	
FACU Species	43	x 4 =	172
UPL Species		x 5 =	
Column Totals	103 (A)		292 (B)

Prevalence Index (B/A) = 2.83

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks:

SOIL

Sampling Point: W0507701BT002_W2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 5/2	85	7.5YR 4/6	15	C	M	SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 787.89 City/County: Butler County Sampling Date: 5/7/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0507701BT002_U1

Investigator(s): J. Allewalt, D. Culwell II, R. Ruffner Section, Township, Range: S03, T015N, R002E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): H Lat: 41.2969040253 Long: -97.1944937051 Datum: WGS84

Soil Map Unit Name: NE023 – 2835 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: JA3548 Associated Plots: W0507701BT002_W1, W0507701BT002_W2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Setaria viridis*	40	✓	(UPL)
2. *Urtica dioica*	30	✓	FAC
3. *Agrostis stolonifera*	10		FACW
4. *Viola sororia*	4		FAC
5.			
6.			
7.			
8.			
9.			
10.			
	84	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 15

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	10	x 2 =	20
FAC Species	34	x 3 =	102
FACU Species		x 4 =	
UPL Species	40	x 5 =	200
Column Totals	84 (A)		322 (B)

Prevalence Index (B/A) = 3.83

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Unknown elm species and *Fraxinus pennsylvanica* present.

SOIL

Sampling Point: W0507701BT002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 3/2	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Almost vertical slope to terrace above where plot is located. About 6' above drainage.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 788.76 City/County: Butler County Sampling Date: 5/8/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0508701BT001_W1

Investigator(s): J. Allewalt, J. Beaver, R. Ruffner Section, Township, Range: S10, T015N, R002E

Landform (hillslope, terrace, etc.): drainage bottom Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): H Lat: 41.2845695948 Long: -97.1915851261 Datum: WGS84

Soil Map Unit Name: NE023 – 3545 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Reed canary grass dominated wetland adjacent to small stream. Cattails present upstream.

Photos: JA3559 Associated Plots: W0508701BT001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	80	✓	FACW
2. *Lemna minor*	1		OBL
3. *Eleocharis palustris*	0.5		OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	81.5 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 2

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	1.5	x 1 =	1.5
FACW Species	80	x 2 =	160
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	81.5 (A)		161.5 (B)

Prevalence Index (B/A) = 1.98

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Moderately wide drainage bottom dominated by *Phalaris arundinacea*; low species diversity. 20% litter in herb stratum. *Phragmites australis* adjacent on Keystone mainline pipeline.

SOIL

Sampling Point: W0508701BT001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 5	10YR 3/2	100					CL	
5 - 20	10Y 2.5/1	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☑ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☑ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Surface water present in vegetation plot in flowing stream.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 788.75 City/County: Butler County Sampling Date: 5/8/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0508701BT001_U1

Investigator(s): J. Allewalt, J. Beaver, R. Ruffner Section, Township, Range: S10, T015N, R002E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 35

Subregion (LRR): H Lat: 41.2846515842 Long: -97.1916381193 Datum: WGS84

Soil Map Unit Name: NE023 – 3545 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Hillslope adjacent to small stream under ash and elm canopy adjacent to Keystone mainline pipeline.

Photos: JA3560 Associated Plots: W0508701BT001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus pennsylvanica*	50	✓	FAC
2. *Ulmus pumila*	30	✓	UPL
3. *Celtis occidentalis*	10		FACU
4.			
	90	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	75	✓	UPL
2. *Galium aparine*	5		FACU
3. *Taraxacum officinale*	1		FACU
4. *Viola sororia*	0.5		FAC
5.			
6.			
7.			
8.			
9.			
10.			
	81.5	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	50.5	x 3 =	151.5
FACU Species	16	x 4 =	64
UPL Species	105	x 5 =	525
Column Totals	171.5 (A)		740.5 (B)

Prevalence Index (B/A) = 4.32

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: 10% litter in herb stratum. Possibly a different viola species than is recorded.

SOIL

Sampling Point: W0508701BT001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 2/2	100					CL	
12 - 20	10YR 4/2	90	10YR 4/6	10	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Weakly hydric soil, but on a 35% slope with upland vegetation species.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Mesic, but no wetland hydrology indicators.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 792.68 City/County: Butler County Sampling Date: 5/8/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0508703BT001_W1

Investigator(s): S. Cooper, P. Christensen Section, Township, Range: S34, T015N, R002E

Landform (hillslope, terrace, etc.): stream channel Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): H Lat: 41.2284197736 Long: -97.1804852309 Datum: WGS84

Soil Map Unit Name: NE023 – 3870 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Probably result of altered drainage – not natural.

Photos: pc0063 Associated Plots: W0508703BT001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 20' x 20')			
1. *Salix exigua*	7	✓	FACW
2.			
3.			
4.			
5.			
	7 = Total Cover		
Herb Stratum (Plot size: 20' x 20')			
1. *Phalaris arundinacea*	60	✓	FACW
2. *Bolboschoenus fluviatilis*	25	✓	OBL
3. *Typha latifolia*	12		OBL
4. *Carex praegracilis*	10		FACW
5.			
6.			
7.			
8.			
9.			
10.			
	107 = Total Cover		
Vine Stratum (Plot size: 20' x 20')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	37	x 1 =	37
FACW Species	77	x 2 =	154
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	114 (A)		191 (B)

Prevalence Index (B/A) = 1.68

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Was marked as a stream channel, but now totally filled/occluded and has become linear wetland.

SOIL

Sampling Point: W0508703BT001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 2/1	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☑ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Slowly sedimented with clay and silt to become wetland (perched water). No redox, relatively young.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): <1
Water Table Present?	Yes ✓	No ____	Depth (inches): 14
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 792.68 City/County: Butler County Sampling Date: 5/8/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0508703BT001_U1

Investigator(s): S. Cooper, P. Christensen Section, Township, Range: S34, T015N, R002E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): H Lat: 41.228376251 Long: -97.1804070821 Datum: WGS84

Soil Map Unit Name: NE023 – 3870 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: pc0064 Associated Plots: W0508703BT001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Ambrosia psilostachya*	55	✓	FACU
2. *Galium aparine*	45	✓	FACU
3. *Thlaspi arvense*	25	✓	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	125 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	125	x 4 =	500
UPL Species		x 5 =	
Column Totals	125 (A)		500 (B)

Prevalence Index (B/A) = 4.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0508703BT001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 2/1	100					SiCL	deposited by overflow

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Soils result of land manipulation – overwash deposited.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 793.58 City/County: Butler County Sampling Date: 5/8/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0508703BT002_W1

Investigator(s): P. Christensen, S. Cooper Section, Township, Range: S02, T014N, R002E

Landform (hillslope, terrace, etc.): stream terrace Local relief (concave, convex, none): undulating Slope (%): _____

Subregion (LRR): H Lat: 41.2175846869 Long: -97.1752130984 Datum: WGS84

Soil Map Unit Name: NE023 – 3640 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Photos: pc0067 Associated Plots: W0508703BT002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 20' x 20')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 20' x 20')			
1. *Phalaris arundinacea*	96	✓	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	96 = Total Cover		
Vine Stratum (Plot size: 20' x 20')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	96	x 2 =	192
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	96 (A)		192 (B)

Prevalence Index (B/A) = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Wetland dominated by *Phalaris arundinacea* with one *Populus deltoides* (>24" dbh) and one *Fraxinus pennsylvanica* (0-4" dba).

SOIL

Sampling Point: W0508703BT002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 3/1	100					SiCL	
6 - 20	10YR 4/2	90	10Y 5/4	10	C	M	SiC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: In swale, gets surface runoff with every precipitation event.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 6
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Standing water in ditch with pockets elsewhere in stand.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 793.57 City/County: Butler County Sampling Date: 5/8/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0508703BT002_U1

Investigator(s): P. Christensen, S. Cooper Section, Township, Range: S02, T014N, R002E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 3

Subregion (LRR): H Lat: 41.2176872076 Long: -97.1752279745 Datum: WGS84

Soil Map Unit Name: NE023 – 3640 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: pc0068 Associated Plots: W0508703BT002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 20' x 20')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 20' x 20')			
1. *Bromus inermis*	97	✓	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	97 = Total Cover		
Vine Stratum (Plot size: 20' x 20')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species	97	x 5 =	485
Column Totals	97 (A)		485 (B)

Prevalence Index (B/A) = 5.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0508703BT002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 7	10YR 3/2	100					SiCL	
7 - 18	10YR 3/3	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: About 2' vertical above wetland site; switches from *Phalaris arundinacea* to *Bromus inermis*.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 794.20 City/County: Butler County Sampling Date: 5/18/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0518702BT002_W1

Investigator(s): K. Kottas, E. Wilkins Section, Township, Range: S02, T014N, R002E

Landform (hillslope, terrace, etc.): lowland Local relief (concave, convex, none): concave Slope (%): 3-5

Subregion (LRR): H Lat: 41.2086292124 Long: -97.1752547253 Datum: WGS84

Soil Map Unit Name: NE023 – 9971 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Wetland surrounding stream in valley. Dam northeast culvert on dam drains large pond into stream. Entire wetland is likely flooded frequently.

Photos: KK1293 Associated Plots: W0518702BT002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Carex emoryi*	70	✓	OBL
2. *Symphyotrichum laeve*	20	✓	FACU
3. *Carex pellita*	5		OBL
4. *Poa pratensis*	5		FACU
5. *Rumex altissimus*	2		FAC
6.			
7.			
8.			
9.			
10.			
	102 = Total Cover		
Vine Stratum (Plot size: 5')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	75	x 1 =	75
FACW Species		x 2 =	
FAC Species	2	x 3 =	6
FACU Species	25	x 4 =	100
UPL Species		x 5 =	
Column Totals	102 (A)		181 (B)

Prevalence Index (B/A) = 1.77

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Wetland vegetation in plot at northern (driest) edge of wetland.

SOIL

Sampling Point: W0518702BT002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 2/1	100					CL	
4 - 6	5YR 6/2	60	2.5Y 5/6	40	C	M	CL	
6 - 18	5G 5/1	60	2.5Y 5/6	20	C	M	CL	
6 - 18	5Y 6/2	20						
18 - 20	10YR 2/1	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☑ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks: Dark soils, redox and gleyed matrix. Additional probe samples in southeast corner of wetland smelled of sulfur and were saturated.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☑ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Though not at this plot, surface water and saturation were present over 70% of this wetland.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 794.19 City/County: Butler County Sampling Date: 5/18/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0518702BT002_U1

Investigator(s): K. Kottas, E. Wilkins Section, Township, Range: S02, T014N, R002E

Landform (hillslope, terrace, etc.): hillside Local relief (concave, convex, none): concave Slope (%): 20

Subregion (LRR): H Lat: 41.2087365834 Long: -97.1756297349 Datum: WGS84

Soil Map Unit Name: NE023 – 9971 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Plot is on lower edge of dam-like landform - possibly manmade or enhanced.

Photos: KK1285 Associated Plots: W0518702BT002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1. *Symphoricarpos occidentalis*	30	✓	UPL
2.			
3.			
4.			
5.			
	30	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	70	✓	UPL
2. *Poa pratensis*	20		FACU
3. *Vicia americana*	20		FACU
4. *Trifolium pratense*	10		FACU
5.			
6.			
7.			
8.			
9.			
10.			
	120	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	50	x 4 =	200
UPL Species	100	x 5 =	500
Column Totals	150 (A)		700 (B)

Prevalence Index (B/A) = 4.67

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Hillside dominated by exotic upland vegetation.

SOIL

Sampling Point: W0518702BT002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 3/3	100					CL	
10 - 11	10YR 6/3	100					CL	
11 - 20	10YR 3/2	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: This is possibly a manmade or enhanced feature so soils may have been disturbed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Soil was much drier at thish plot than below.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 794.34 City/County: Butler County Sampling Date: 5/18/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0518702BT002_W2

Investigator(s): K. Kottas, E. Wilkins Section, Township, Range: S02, T014N, R002E

Landform (hillslope, terrace, etc.): valley Local relief (concave, convex, none): concave Slope (%): 3-5

Subregion (LRR): H Lat: 41.2065367539 Long: -97.1751547564 Datum: WGS84

Soil Map Unit Name: NE023 – 3640 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Wetland adjacent to stream in low valley.

Photos: KK1288 Associated Plots: W0518702BT002_U2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	100	✓	FACW
2. *Carex emoryi*	25	✓	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	125 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	25	x 1 =	25
FACW Species	100	x 2 =	200
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	125 (A)		225 (B)

Prevalence Index (B/A) = 1.80

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Reed canary grass was the dominant vegetation in the southern half of this wetland.

SOIL

Sampling Point: W0518702BT002_W2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 3	10YR 2/1	100						
3 - 16	5Y 3/1	80	7.5YR 4/6	10	C	M	CL	
3 - 16	10YR 3/1	10					CL	
16 - 20	5Y 3/1	80						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks: Dark saturated soil

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 2

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 8

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Surface water was present in much of this wetland.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 794.34 City/County: Butler County Sampling Date: 5/18/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0518702BT002_U2

Investigator(s): K. Kottas, E. Wilkins Section, Township, Range: S02, T014N, R002E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 5

Subregion (LRR): H Lat: 41.2065933722 Long: -97.1748199285 Datum: WGS84

Soil Map Unit Name: NE023 – 3640 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Plot is in smooth brome on the edge of a cultivated field.

Photos: KK1291 Associated Plots: W0518702BT002_W2

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Morus alba*	40	✓	FACU
2.			
3.			
4.			
	40 = Total Cover		
Shrub Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Bromus inermis*	100	✓	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Vine Stratum (Plot size: 5')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	40	x 4 =	160
UPL Species	100	x 5 =	500
Column Totals	140 (A)		660 (B)

Prevalence Index (B/A) = 4.71

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Plot on higher ground where brome is thick.

SOIL

Sampling Point: W0518702BT002_U2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 2/2	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Sample taken in smooth brome near fenceline of cultivated field.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Slight slope between cultivated field and wetland.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 794.74 City/County: Butler County Sampling Date: 5/9/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0509703BT001_W1

Investigator(s): S. Cooper, P. Christensen Section, Township, Range: S11, T014N, R002E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): H Lat: 41.2009620045 Long: -97.1743381161 Datum: WGS84

Soil Map Unit Name: NE023 – 3640 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Some pugging from livestock. Stream is dry, perhaps ephemeral.

Photos: pc0071 Associated Plots: W0509703BT001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 20' x 20')			
1. *Salix exigua*	5	✓	FACW
2.			
3.			
4.			
5.			
	5 = Total Cover		
Herb Stratum (Plot size: 20' x 20')			
1. *Phalaris arundinacea*	30	✓	FACW
2. *Carex emoryi*	20	✓	OBL
3. *Eleocharis palustris*	10		OBL
4. *Helianthus maximiliani*	10		FACU
5. *Bolboschoenus fluviatilis*	5		OBL
6. *Carex praegracilis*	5		FACW
7. *Rumex crispus*	2		FAC
8. *Solidago gigantea*	2		FAC
9. *Taraxacum officinale*	1		FACU
10.			
	85 = Total Cover		
Vine Stratum (Plot size: 20' x 20')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	35	x 1 =	35
FACW Species	40	x 2 =	80
FAC Species	4	x 3 =	12
FACU Species	11	x 4 =	44
UPL Species		x 5 =	
Column Totals	90 (A)		171 (B)

Prevalence Index (B/A) = 1.90

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Blue on map, but no stream feature. Potentially acts as ephemeral at high water. Forested wetland to west; wetland extends upslope with remnant wetland soils.

SOIL

Sampling Point: W0509703BT001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 2/2	100					SiCL	
6 - 10	10YR 3/2	90	2.5Y 5/4	10	C	M	SiCL	gley
10 - 20	10YR 3/2	80	2.5YR 4/4	20	C	M	SiCL	redox

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): >20
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 20

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Toward head of drainage standing water and surface saturation – this location about 50' removed.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 794.76 City/County: Butler County Sampling Date: 5/9/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0509703BT001_U1

Investigator(s): S. Cooper, P. Christensen Section, Township, Range: S11, T014N, R002E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): none Slope (%): 5

Subregion (LRR): H Lat: 41.2007155412 Long: -97.1743178995 Datum: WGS84

Soil Map Unit Name: NE023 – 3640 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: pc0076 - pc0077 Associated Plots: W0509703BT001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	60	✓	UPL
2. *Rumex crispus*	10		FAC
3. *Phalaris arundinacea*	5		FACW
4. *Taraxacum officinale*	3		FACU
5.			
6.			
7.			
8.			
9.			
10.			
	78 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	5	x 2 =	10
FAC Species	10	x 3 =	30
FACU Species	3	x 4 =	12
UPL Species	60	x 5 =	300
Column Totals	78 (A)		352 (B)

Prevalence Index (B/A) = 4.51

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Water table has dropped; *Phalaris arundinacea* very spotty, probably on decrease at this position.

SOIL

Sampling Point: W0509703BT001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 4/4	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Wetland extends relatively far up slope, almost to crop line, at least in terms of soil and vegetation, but no longer hydrology.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 794.85 City/County: Butler County Sampling Date: 5/9/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0509703BT002_W1

Investigator(s): S. Cooper, P. Christensen Section, Township, Range: S11, T014N, R002E

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): none Slope (%): 1-2

Subregion (LRR): H Lat: 41.1993882917 Long: -97.1742798172 Datum: WGS84

Soil Map Unit Name: NE023 – 3640 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Photos: pc0078 Associated Plots: W0509703BT002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 10')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 20' x 10')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 20' x 10')			
1. *Carex emoryi*	50	✓	OBL
2. *Carex praegracilis*	40	✓	FACW
3. *Eleocharis palustris*	10		OBL
4. *Rumex crispus*	3		FAC
5.			
6.			
7.			
8.			
9.			
10.			
	103 = Total Cover		
Vine Stratum (Plot size: 20' x 10')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	60	x 1 =	60
FACW Species	40	x 2 =	80
FAC Species	3	x 3 =	9
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	103 (A)		149 (B)

Prevalence Index (B/A) = 1.45

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0509703BT002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 2/1	100					SiCL	
4 - 20	10YR 3/2	50	10YR 4/6	50	C	M	SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☑ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☑ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): >20
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 10

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 794.85 City/County: Butler County Sampling Date: 5/9/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0509703BT002_U1

Investigator(s): S. Cooper, P. Christensen Section, Township, Range: S11, T014N, R002E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): none Slope (%): 3

Subregion (LRR): H Lat: 41.1994135831 Long: -97.1742231688 Datum: WGS84

Soil Map Unit Name: NE023 – 3962 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: pc0079 Associated Plots: W0509703BT002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 5')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 10' x 5')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 10' x 5')			
1. *Bromus inermis*	55	✓	UPL
2. *Rumex crispus*	10		FAC
3. *Thlaspi arvense*	10		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	75 = Total Cover		
Vine Stratum (Plot size: 10' x 5')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 65

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	10	x 3 =	30
FACU Species	10	x 4 =	40
UPL Species	55	x 5 =	275
Column Totals	75 (A)		345 (B)

Prevalence Index (B/A) = 4.60

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Very close (<8') to plowed field.

SOIL

Sampling Point: W0509703BT002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 3/2	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Very edge of cropped field; wetland confined to depression to within 1' vertical of field.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 802.51 City/County: Butler County Sampling Date: 5/10/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0510701BT001_W1

Investigator(s): J. Allewalt, R. Ruffner Section, Township, Range: S13, T013N, R002E

Landform (hillslope, terrace, etc.): drainage Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): H Lat: 41.0908496977 Long: -97.1521649663 Datum: WGS84

Soil Map Unit Name: NE023 – 2835 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Wetland in drainage surrounded by corn field. Extends a small distance east up the drainage beyond pipeline survey corridor boundary.

Photos: JA3624 Associated Plots: W0510701BT001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Typha angustifolia*	30	✓	OBL
2. *Rumex crispus*	10	✓	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	40	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	30	x 1 =	30
FACW Species		x 2 =	
FAC Species	10	x 3 =	30
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	40 (A)		60 (B)

Prevalence Index (B/A) = 1.50

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Cattail leaf blades are narrow (≈0.5"); shoots ≈2' tall and poking through litter (70%).

SOIL

Sampling Point: W0510701BT001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	2.5Y 3/1	80	5YR 3/4	20	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Adjacent farming practices have influenced soil in wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): _____
Water Table Present?	Yes ____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): _____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Thick clay layer at ground surface in low spot of drainage holds moisture and contributes to wetland development.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 802.51 City/County: Butler County Sampling Date: 5/10/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0510701BT001_U1

Investigator(s): J. Allewalt, R. Ruffner Section, Township, Range: S13, T013N, R002E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 6

Subregion (LRR): H Lat: 41.0908285477 Long: -97.1521477003 Datum: WGS84

Soil Map Unit Name: NE023 – 2835 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Hillslope in corn field adjacent to drainage. About 10 degrees hotter this week than average. Vegetation and soil are disced and planted.

Photos: JA3625 Associated Plots: W0510701BT001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Rumex crispus*	1		FAC
2. *Taraxacum officinale*	0.5		FACU
3. *Typha angustifolia*	0.5		OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	2 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 40

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0.5	x 1 =	0.5
FACW Species		x 2 =	
FAC Species	1	x 3 =	3
FACU Species	0.5	x 4 =	2
UPL Species		x 5 =	
Column Totals	2 (A)		5.5 (B)

Prevalence Index (B/A) = 2.75

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Remaining corn stalks from last year contribute 20% litter.

SOIL

Sampling Point: W0510701BT001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	2.5Y 5/2	95	10 YR 4/6	5	C	M	C	little silty
12 - 20	10YR 2/1	80	5 Y 3/4	20	C	M, PL	SiCL	some redox in pore lining

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks: Placed soil pit on very edge of cattail growith on hillslope. Hydric soils present, but hydrology and vegetation do not meet indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Moist soil but no hydrology indicators.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 802.86 City/County: Butler County Sampling Date: 5/18/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0518703BT001_W1

Investigator(s): S. Cooper, P. Christensen Section, Township, Range: S24, T013N, R002E

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): _____ Slope (%): <1

Subregion (LRR): H Lat: 41.0859240056 Long: -97.1511451639 Datum: WGS84

Soil Map Unit Name: NE023 – 3561 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Excessively dry spring. Photo 411 shows abrupt transition to field (plowed).

Photos: SC683 Associated Plots: W0518703BT001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 20' x 20')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 20' x 20')			
1. *Phalaris arundinacea*	95	✓	FACW
2. *Typha latifolia*	5		OBL
3. *Asclepias incarnata*	0.5		FACW
4. *Helianthus grosseserratus*	0.5		FACW
5.			
6.			
7.			
8.			
9.			
10.			
	101 = Total Cover		
Vine Stratum (Plot size: 20' x 20')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	5	x 1 =	5
FACW Species	96	x 2 =	192
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	101 (A)		197 (B)

Prevalence Index (B/A) = 1.95

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Very monotonous *Phalaris arundinacea* (with *Typha latifolia*) as continuous wetland along unnamed intermittent creek.

SOIL

Sampling Point: W0518703BT001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 7	10YR 3/1	100					SiCL	copious roots
7 - 20	10YR 3/2	50	N 3/0	40	C	M	SiCL	
7 - 20			5YR 5/6	10	C	M	SiCL	variable content 05-15

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 18
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 802.86 City/County: Butler County Sampling Date: 5/18/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0518703BT001_U1

Investigator(s): S. Cooper, A. Admiraal Section, Township, Range: S24, T013N, R002E

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): _____ Slope (%): <1

Subregion (LRR): H Lat: 41.0859819458 Long: -97.1512042978 Datum: WGS84

Soil Map Unit Name: NE023 – 3561 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Plowed and seeded.

Photos: SC684 Associated Plots: W0518703BT001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL Species		x 1 =
FACW Species		x 2 =
FAC Species		x 3 =
FACU Species		x 4 =
UPL Species		x 5 =
Column Totals	0 (A)	0 (B)

Prevalence Index (B/A) = #Num!

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Cropped to corn, no vegetation at site.

SOIL

Sampling Point: W0518703BT001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 3/2	100					SiCL	
8 - 20	10YR 3/2	97	2.5YR 5/6	3	C	M	SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Redox features, relict featurs in matrix.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☑ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ✓ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 804.41 City/County: Butler County Sampling Date: 5/18/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0518701BT001_W1

Investigator(s): J. Allewalt, R. Ruffner Section, Township, Range: S25, T013N, R002E

Landform (hillslope, terrace, etc.): pond Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): H Lat: 41.0636413514 Long: -97.1482639461 Datum: WGS84

Soil Map Unit Name: NE023 – 2835 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Wetland at east end of grazed pond. Heavily grazed vegetation.

Photos: JA3833 Associated Plots: W0518701BT001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Typha latifolia*	45	✓	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	45 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 15

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	45	x 1 =	45
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	45 (A)		45 (B)

Prevalence Index (B/A) = 1.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: *Typha latifolia* is now emerging and being grazed down so cover is low.

SOIL

Sampling Point: W0518701BT001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 3/1	95	7.5YR 5/6	5			SiC	
10 - 20	10YR 3/1	100					SiC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☑ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Slight water odor, overpowered by 3 dead cows upwind.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☑ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 7
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 7

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 804.41 City/County: Butler County Sampling Date: 5/18/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0518701BT001_U1

Investigator(s): J. Allewalt, R. Ruffner Section, Township, Range: S25, T013N, R002E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 6

Subregion (LRR): H Lat: 41.0635941713 Long: -97.1482405957 Datum: WGS84

Soil Map Unit Name: NE023 – 2835 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Heavily grazed, 90% utilization.

Photos: JA3832 Associated Plots: W0518701BT001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	35	✓	UPL
2. *Poa pratensis*	15	✓	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	50 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 50

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	15	x 4 =	60
UPL Species	35	x 5 =	175
Column Totals	50 (A)		235 (B)

Prevalence Index (B/A) = 4.70

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Heavily grazed, 90% utilization

SOIL

Sampling Point: W0518701BT001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 3/2	100					L	dry compacted

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Terracing by cattle paths

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 806.89 City/County: Seward County Sampling Date: 5/10/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0510702SE001_W1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S02, T012N, R002E

Landform (hillslope, terrace, etc.): in hillslope Local relief (concave, convex, none): concave Slope (%): 8

Subregion (LRR): H Lat: 41.0338158514 Long: -97.1728136786 Datum: WGS84

Soil Map Unit Name: NE159 – 2536 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Vegetated depression on uphill side of a pond with small stream running through it.

Photos: KK1208 Associated Plots: W0510702SE001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Typha angustifolia*	80	✓	OBL
2. *Perideridia montana*	20		FACU
3. *Agropyron smithii*	10		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	110 = Total Cover		
Vine Stratum (Plot size: 5')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	80	x 1 =	80
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	30	x 4 =	120
UPL Species		x 5 =	
Column Totals	110 (A)		200 (B)

Prevalence Index (B/A) = 1.82

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Wetland vegetation dominated by cattails.

SOIL

Sampling Point: W0510702SE001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 18	10YR 3/2	70	5YR 4/6	30	C	M	CL	
18 - 24	2.5YR 4/3	70	7.5YR 4/6	30	C	M	C	
24 - 30	10YR 5/3	80	7.5YR 4/6	20	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☑ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Fields drain toward this spot.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 806.89 City/County: Seward County Sampling Date: 5/10/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0510702SE001_U1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S02, T012N, R002E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 6

Subregion (LRR): H Lat: 41.0338207971 Long: -97.172694099 Datum: WGS84

Soil Map Unit Name: NE159 – 2536 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Grass covered area on downslope from cultivated field.

Photos: KK1209 Associated Plots: W0510702SE001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	75	✓	UPL
2. *Poa pratensis*	25	✓	FACU
3. *Agropyron smithii*	5		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	105 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	30	x 4 =	120
UPL Species	75	x 5 =	375
Column Totals	105 (A)		495 (B)

Prevalence Index (B/A) = 4.71

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Upland vegetation dominated by non-native brome and bluegrass.

SOIL

Sampling Point: W0510702SE001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 3	10YR 5/3	100					C	
3 - 16	10YR 2/2	100					CL	
16 - 24	10YR 3/3	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Thick clay soil just next to cultivated ground.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water drains from this area and surrounding fields into stream and pond.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 833.34 City/County: Seward County Sampling Date: 6/4/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0604702SE001_W1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S29, T009N, R003E

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): H Lat: 40.7195289156 Long: -97.1093778325 Datum: WGS84

Soil Map Unit Name: NE159 – 3963 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Saturated wetland next to excavated pond/ditch.

Photos: KK1345 - KK1346 Associated Plots: W0604702SE001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	92	✓	FACW
2. *Poa pratensis*	7		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	99	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	92	x 2 =	184
FAC Species		x 3 =	
FACU Species	7	x 4 =	28
UPL Species		x 5 =	
Column Totals	99 (A)		212 (B)

Prevalence Index (B/A) = 2.14

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0604702SE001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 7	10YR 2/1	100					SiL	
7 - 20	10YR 4/2	90	7.5YR 4/6	10	C	M	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks: Typical wetland soil for area.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 24
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 8

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water present in pond/ditch adjacent to plot.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 833.35 City/County: Seward County Sampling Date: 6/4/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0604702SE001_U1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S29, T009N, R003E

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): H Lat: 40.7194615942 Long: -97.1091964871 Datum: WGS84

Soil Map Unit Name: NE159 – 3963 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Pasture next to wetland.

Photos: KK1342 Associated Plots: W0604702SE001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Andropogon gerardii*	25	✓	FACU
2. *Panicum virgatum*	20	✓	FAC
3. *Bromus inermis*	10		UPL
4. *Sorghastrum nutans*	10		FACU
5. *Bromus tectorum*	5		(UPL)
6.			
7.			
8.			
9.			
10.			
	70 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	20	x 3 =	60
FACU Species	35	x 4 =	140
UPL Species	15	x 5 =	75
Column Totals	70 (A)		275 (B)

Prevalence Index (B/A) = 3.93

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Old CRP field? Not unplowed prairie.

SOIL

Sampling Point: W0604702SE001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 3/2	100					SiL	
8 - 20	10YR 3/3	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Dry pasture.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 835.38 City/County: Saline County Sampling Date: 5/11/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0511702SA003_W1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S04, T008N, R003E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): concave Slope (%): 5

Subregion (LRR): H Lat: 40.695360704 Long: -97.0934555687 Datum: WGS84

Soil Map Unit Name: NE151 – Hw NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Low area near river covered in phalaris. Lowest spot is right over existing pipeline so may be an artifact of pipeline. Trees would have been here previously and may not have been a wetland at that time.

Photos: KK2064 Associated Plots: W0511702SA003_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1. *Amaranthus blitoides*	2		FAC
2.			
3.			
4.			
5.			
	2 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	100	✓	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	100	x 2 =	200
FAC Species	2	x 3 =	6
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	102 (A)		206 (B)

Prevalence Index (B/A) = 2.02

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0511702SA003_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 2/1	100					SCL	
8 - 16	10YR 2/1	90	10YR 4/6	10	C	M	SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☑ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 1

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Some ponding at lowest point. Rain event the night before inspection.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 835.41 City/County: Saline County Sampling Date: 5/11/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0511702SA003_U1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S04, T008N, R003E

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): _____ Slope (%): 5

Subregion (LRR): H Lat: 40.6949132372 Long: -97.0934491882 Datum: WGS84

Soil Map Unit Name: NE151 – Hw NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: This area is cultivated field surrounded by forested river bank. Open grass covered wetland and cultivated acres.

Photos: KK2066 Associated Plots: W0511702SA003_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL Species		x 1 =
FACW Species		x 2 =
FAC Species		x 3 =
FACU Species		x 4 =
UPL Species		x 5 =
Column Totals	0 (A)	0 (B)

Prevalence Index (B/A) = #Num!

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Cultivated - no vegetation surrounding plot.

SOIL

Sampling Point: W0511702SA003_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 3/2	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Cultivated soils

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Farmed area

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 835.48 City/County: Saline County Sampling Date: 5/11/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0511702SA002_W1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S04, T008N, R003E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): ____

Subregion (LRR): H Lat: 40.6938617661 Long: -97.0936007483 Datum: WGS84

Soil Map Unit Name: NE151 – Hw NWI Classification: PFO

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** **Yes ✓ No ____**
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: Wetland in forested floodplain.

Photos: KK2058 Associated Plots: W0511702SA002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer saccharinum*	60	✓	FAC
2. *Ulmus americana*	0.5		FAC
3.			
4.			
	60.5	= Total Cover	
Shrub Stratum (Plot size: 10' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 10' x 20')			
1. *Polygonum amphibium*	10	✓	OBL
2. *Polygonum hydropiper*	10	✓	OBL
3. *Phalaris arundinacea*	5		FACW
4. *Carex grisea*	2		FACW
5. *Leersia oryzoides*	2		OBL
6.			
7.			
8.			
9.			
10.			
	29	= Total Cover	
Vine Stratum (Plot size: 10' x 20')			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 40

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	22	x 1 =	22
FACW Species	7	x 2 =	14
FAC Species	60.5	x 3 =	181.5
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	89.5 (A)		217.5 (B)

Prevalence Index (B/A) = 2.43

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No ____**

Remarks: Early season vegetation has little total cover, but hydrophytes are dominant.

SOIL

Sampling Point: W0511702SA002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 3/1						SCL	
4 - 20	10YR 5/2	65	10YR 4/6	10			SCL	
4 - 20	10YR 5/1	25	10YR 4/6	10			SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☑ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Sloping natural draw that ponds in forested area

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 835.47 City/County: Saline County Sampling Date: 5/11/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0511702SA002_U1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S04, T008N, R003E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): ____

Subregion (LRR): H Lat: 40.6939553044 Long: -97.0934667443 Datum: WGS84

Soil Map Unit Name: NE151 – Hw NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

Photos: KK2056 Associated Plots: W0511702SA002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer saccharinum*	30	✓	FAC
2. *Populus deltoides*	20	✓	FAC
3. *Ulmus americana*	20	✓	FAC
4.			
	70	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1. *Celtis occidentalis*	15	✓	FACU
2. *Morus alba*	5	✓	FACU
3.			
4.			
5.			
	20	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Sanicula canadensis*	25	✓	FACU
2. *Toxicodendron rydbergii*	25	✓	FACU
3. *Galium aparine*	10		FACU
4. *Rudbeckia laciniata*	10		FAC
5. *Carex grisea*	5		FACW
6. *Elymus virginicus*	5		FAC
7.			
8.			
9.			
10.			
	80	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 15

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 43 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	5	x 2 =	10
FAC Species	85	x 3 =	255
FACU Species	80	x 4 =	320
UPL Species		x 5 =	
Column Totals	170 (A)		585 (B)

Prevalence Index (B/A) = 3.44

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** ✓

Remarks: Vegetation is typical of floodplain forest but does not meet hydrophytic vegetation criteria.

SOIL

Sampling Point: W0511702SA002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 3/2	100					SCL	cultivated soil

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: High point north of PEM in cultivated field.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: This area is a terrace above wetland. Water drains to wetland.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 839.48 City/County: Saline County Sampling Date: 9/14/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0914702SA002_W1

Investigator(s): A. Admiraal, C. Griffith Section, Township, Range: S28, T008N, R003E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 3

Subregion (LRR): H Lat: 40.6358751127 Long: -97.0930176153 Datum: WGS84

Soil Map Unit Name: NE151 – CsC2 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Low-lying area on floodplain of Otoe Creek.

Photos: AA1640 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 12' D)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 12' D)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 12' D)			
1. *Phalaris arundinacea*	95	✓	FACW
2. *Carex pellita*	10		OBL
3. *Apocynum cannabinum*	5		FAC
4. *Elymus virginicus*	2		FAC
5.			
6.			
7.			
8.			
9.			
10.			
	112 = Total Cover		
Vine Stratum (Plot size: 12' D)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	10	x 1 =	10
FACW Species	95	x 2 =	190
FAC Species	7	x 3 =	21
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	112 (A)		221 (B)

Prevalence Index (B/A) = 1.97

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0914702SA002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 2/1	100					SiCL	
6 - 12	10YR 4/6	90	10YR 5/6	10	C	PL	SiCL	
12 - 16	10YR 2/1	70	10YR 4/6	10	C	M	SiCL	
12 - 16	10YR 4/4	20						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☑ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks: Not able to dig deep enough to record depletion, but hydrogen sulfide odor was present and depletion was assumed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☑ Water Marks (B1)
- ☑ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☑ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 2

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: This low-lying area is close to Otoe Creek.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 839.49 City/County: Saline County Sampling Date: 9/14/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0914702SA002_U1

Investigator(s): A. Admiraal, C. Griffith Section, Township, Range: S28, T008N, R003E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 3

Subregion (LRR): H Lat: 40.6358568466 Long: -97.0930930035 Datum: WGS84

Soil Map Unit Name: NE151 – CsC2 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: AA1641 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' D)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 5' D)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5' D)			
1. *Bromus inermis*	100	✓	UPL
2. *Apocynum cannabinum*	1		FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	101 = Total Cover		
Vine Stratum (Plot size: 5' D)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	1	x 3 =	3
FACU Species		x 4 =	
UPL Species	100	x 5 =	500
Column Totals	101 (A)		503 (B)

Prevalence Index (B/A) = 4.98

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0914702SA002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 3/2	100						
6 - 12	10YR 4/2	100						
12 - 14	10YR 3/2	100						
14 - 18	10YR 4/3	60						
14 - 18	10YR 5/3	40						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Slope drains to adjacent wetland.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 839.69 City/County: Saline County Sampling Date: 9/14/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0914702SA003_W1

Investigator(s): A. Admiraal, C. Griffith Section, Township, Range: S28, T008N, R003E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): H Lat: 40.6329036328 Long: -97.093639783 Datum: WGS84

Soil Map Unit Name: NE151 – HtC2 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Photos: AA1645 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' D)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 5' D)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5' D)			
1. *Phalaris arundinacea*	75	✓	FACW
2. *Leersia oryzoides*	20		OBL
3. *Polygonum pensylvanicum*	10		FACW
4. *Polygonum punctatum*	10		OBL
5. *Ambrosia trifida*	5		FAC
6.			
7.			
8.			
9.			
10.			
	120 = Total Cover		
Vine Stratum (Plot size: 5' D)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	30	x 1 =	30
FACW Species	85	x 2 =	170
FAC Species	5	x 3 =	15
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	120 (A)		215 (B)

Prevalence Index (B/A) = 1.79

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0914702SA003_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 2/1	100					SiCL	
6 - 14	10YR 4/2	50	10YR 5/8	10	C	M	SiCL	
6 - 14	10YR 3/2	35	10YR 4/4	5	C	PL	SiCL	
14 - 24	10YR 3/2	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks: Prominent redox concentrations.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☑ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): 18

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Low-lying area where water ponds. Also receives drainage from pond on neighboring property.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 839.68 City/County: Saline County Sampling Date: 9/14/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0914702SA003_U1

Investigator(s): A. Admiraal, C. Griffith Section, Township, Range: S28, T008N, R003E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 3

Subregion (LRR): H Lat: 40.6329761306 Long: -97.0937217301 Datum: WGS84

Soil Map Unit Name: NE151 – Hs NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: AA1648 - AA1649 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' D)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 5' D)			
1. *Ulmus rubra*	2		FACU
2.			
3.			
4.			
5.			
	2 = Total Cover		
Herb Stratum (Plot size: 5' D)			
1. *Bromus inermis*	100	✓	UPL
2. *Asclepias syriaca*	15		UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	115 = Total Cover		
Vine Stratum (Plot size: 5' D)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	2	x 4 =	8
UPL Species	115	x 5 =	575
Column Totals	117 (A)		583 (B)

Prevalence Index (B/A) = 4.98

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0914702SA003_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 3/2	100					SiL	
12 - 14	10YR 3/3	70					SiCL	
12 - 14	10YR 5/3	30					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Upland plot on slope. Drains to adjacent wetland.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 841.92 City/County: Saline County Sampling Date: 5/12/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0512701SA001_W1

Investigator(s): J. Allewalt, R. Ruffner Section, Township, Range: S04, T007N, R003E

Landform (hillslope, terrace, etc.): former channel Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): H Lat: 40.6006001205 Long: -97.0934511735 Datum: WGS84

Soil Map Unit Name: NE151 – Hx NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Shallow depression/swale in what appears to be an old overflow or stream channel between corn fields.

Photos: JA3712 Associated Plots: W0512701SA001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus pennsylvanica*	15	✓	FAC
2.			
3.			
4.			
	15 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	65	✓	FACW
2. *Rudbeckia laciniata*	3		FAC
3. *Urtica dioica*	2		FAC
4. *Convolvulus arvensis*	0.5		(UPL)
5. *Solidago gigantea*	0.5		FAC
6.			
7.			
8.			
9.			
10.			
	71 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	65	x 2 =	130
FAC Species	20.5	x 3 =	61.5
FACU Species		x 4 =	
UPL Species	0.5	x 5 =	2.5
Column Totals	86 (A)		194 (B)

Prevalence Index (B/A) = 2.26

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Litter = 6%

SOIL

Sampling Point: W0512701SA001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 2/1	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks: Assume soil is depleted at greater depth and meets A12 based on hydrology and other site conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 841.93 City/County: Saline County Sampling Date: 5/12/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0512701SA001_U1

Investigator(s): J. Allewalt, R. Ruffner Section, Township, Range: S04, T007N, R003E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): H Lat: 40.6005052229 Long: -97.0935197459 Datum: WGS84

Soil Map Unit Name: NE151 – Hx NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Same elevation as cornfield adjacent, but 2' higher than W0512701SA001_W1. Other choice for plot was implowed and planted corn field.

Photos: JA3713 Associated Plots: W0512701SA001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus pennsylvanica*			FAC
2.			
3.			
4.			
	_____ = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	70	✓	FACW
2. *Rudbeckia laciniata*	2		FAC
3. *Urtica dioica*	1		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	73 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	70	x 2 =	140
FAC Species	3	x 3 =	9
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	73 (A)		149 (B)

Prevalence Index (B/A) = 2.04

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: litter = 20%

SOIL

Sampling Point: W0512701SA001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 2/2	100					CL	little sand at top 6"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 849.08 City/County: Saline County Sampling Date: 8/23/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0823618SA001_W1

Investigator(s): C. Baker, D. Hagen Section, Township, Range: S2, T6N, R3E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): <1

Subregion (LRR): H Lat: 40.5104161381404 Long: -97.0604396293519 Datum: WGS84

Soil Map Unit Name: NE151 – GsF NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil ✓, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Recent heavy rains make site wetter than usual for August. North portion of wetland within existing mainline corridor, this is location of soil disturbance.

Photos: CB426 - CB429 Associated Plots: W0823618SA001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	100	✓	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	100	x 2 =	200
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	100 (A)		200 (B)

Prevalence Index (B/A) = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: Some *Polygonum amphibium* in portions of wetland.

SOIL

Sampling Point: W0823618SA001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 7	10YR 2/1	100					L	
7 - 18	10YR 2/1	100					CL	
18 - 24	10YR 2/2	70					CL	
18 - 24	5GY 4/5	30					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: clay

Depth (inches): 7

Hydric Soil Present? Yes ✓ No ____

Remarks: Wet soil, but change in color at 18" is consistent with characteristics of thick dark surface indicator.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 1

Water Table Present? Yes ✓ No ____ Depth (inches): 7

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Soil fully saturated with shallow water table.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 849.08 City/County: Saline County Sampling Date: 8/23/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0823618SA001_U1

Investigator(s): C. Baker, D. Hagen Section, Township, Range: S2, T6N, R3E

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): none Slope (%): 3

Subregion (LRR): H Lat: 40.5103849879126 Long: -97.0605416301301 Datum: WGS84

Soil Map Unit Name: NE151 – GsF NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Much wetter than normal.

Photos: CB427 - CB430 Associated Plots: W0823618SA001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Juniperus scopulorum*	15	✓	(UPL)
2. *Prunus americana*	3		UPL
3.			
4.			
	18	= Total Cover	
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	80	✓	UPL
2. *Asclepias speciosa*	6		FAC
3. *Verbena hastata*	2		FACW
4. *Euphorbia marginata*	1		FACU
5. *Urtica dioica*	1		FAC
6.			
7.			
8.			
9.			
10.			
	90	= Total Cover	
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	2	x 2 =	4
FAC Species	7	x 3 =	21
FACU Species	1	x 4 =	4
UPL Species	98	x 5 =	490
Column Totals	108 (A)		519 (B)

Prevalence Index (B/A) = 4.81

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0823618SA001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 9	10YR 2/1	100					L	
9 - 10	10YR 2/2	100					L	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 852.51 City/County: Saline County Sampling Date: 7/19/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0719702SA001_W1

Investigator(s): K. Kottas, C. Griffith Section, Township, Range: S26, T006N, R003E

Landform (hillslope, terrace, etc.): bowl Local relief (concave, convex, none): concave Slope (%): 5

Subregion (LRR): H Lat: 40.4561743091 Long: -97.0565559032 Datum: WGS84

Soil Map Unit Name: NE151 – W NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Former pond created by dam in drainage. Culvert drains pond to the east creating this small wetland extension on east side of dam.

Photos: KK1540 Associated Plots: W0719702SA001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' D)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 5' D)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5' D)			
1. *Phalaris arundinacea*	60	✓	FACW
2. *Polygonum lapathifolium*	30	✓	OBL
3. *Polygonum persicaria*	10		FACW
4. *Iva annua*	2		FAC
5. *Helianthus annuus*	1		FACU
6.			
7.			
8.			
9.			
10.			
	103 = Total Cover		
Vine Stratum (Plot size: 5' D)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	30	x 1 =	30
FACW Species	70	x 2 =	140
FAC Species	2	x 3 =	6
FACU Species	1	x 4 =	4
UPL Species		x 5 =	
Column Totals	103 (A)		180 (B)

Prevalence Index (B/A) = 1.75

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0719702SA001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 2/1	100					CL	
8 - 18	10YR 5/2	84	10YR 4/6	3	C	M	C	
8 - 18	10YR 4/1	10	10YR 4/6	3	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks: Clay soils with standing water.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☑ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 2
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water ponding in wetland. Fed by runnoff from surrounding hills and cultivated fields.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 852.51 City/County: Saline County Sampling Date: 7/19/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0719702SA001_U1

Investigator(s): K. Kottas, C. Griffith Section, Township, Range: S26, T006N, R003E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 8

Subregion (LRR): H Lat: 40.4562696683 Long: -97.0564657879 Datum: WGS84

Soil Map Unit Name: NE151 – CsC2 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Edge of field on rim of former pond (now wetland).

Photos: KK1538 Associated Plots: W0719702SA001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' D)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 5' D)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5' D)			
1. *Bromus inermis*	95	✓	UPL
2. *Ulmus pumila*	2		UPL
3. *Verbena stricta*	2		(UPL)
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	99 = Total Cover		
Vine Stratum (Plot size: 5' D)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species	99	x 5 =	495
Column Totals	99 (A)		495 (B)

Prevalence Index (B/A) = 5.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Brome on and surrounding dam. Soy bean field adjacent.

SOIL

Sampling Point: W0719702SA001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 2/2	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Clay is hard-packed on field edge and on dam.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 861.60 City/County: Jefferson County Sampling Date: 5/16/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0516702JE001_W1

Investigator(s): K. Kottas, E. Wilkins Section, Township, Range: S12, T004N, R003E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): concave

Slope (%): 5 Lat: 40.3272266089 Long: -97.0335532009 Datum: WGS84

Soil Map Unit Name: NE095 – CrB2 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: PEM in cultivated field. Water drains off of hillslopes.

Photos: RR376 Associated Plots: W0516702JE001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 10' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 10' x 20')			
1. *Phalaris arundinacea*	50	✓	FACW
2. *Carex pellita*	10		OBL
3. *Polygonum hydropiper*	10		OBL
4. *Typha angustifolia*	10		OBL
5.			
6.			
7.			
8.			
9.			
10.			
	80	= Total Cover	

Woody Vine Stratum (Plot size: 10' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	30	x 1 =	30
FACW Species	50	x 2 =	100
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	80 (A)		130 (B)

Prevalence Index (B/A) = 1.63

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Dominant plants are hydrophytic.

SOIL

Sampling Point: W0516702JE001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 2/1	100					CL	
4 - 8	10YR 2/1	80	10YR 4/6	20	C	M	CL	
8 - 20	10YR 2/1	98	10YR 4/6	2	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☑ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 12

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Drainage through cultivated field.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 861.60 City/County: Jefferson County Sampling Date: 5/16/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0516702JE001_U1

Investigator(s): K. Kottas, E. Wilkins Section, Township, Range: S12, T004N, R003E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave

Slope (%): 8 Lat: 40.3273021154 Long: -97.0336194583 Datum: WGS84

Soil Map Unit Name: NE095 – CrB2 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: RR377 Associated Plots: W0516702JE001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		

Woody Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL Species		x 1 =
FACW Species		x 2 =
FAC Species		x 3 =
FACU Species		x 4 =
UPL Species		x 5 =
Column Totals	0 (A)	0 (B)

Prevalence Index (B/A) = #Num!

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Cultivated corn field.

SOIL

Sampling Point: W0516702JE001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 2/1	100						disturbed – cultivated

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 863.46 City/County: Jefferson County Sampling Date: 5/16/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0516703JE002_W1

Investigator(s): A. Admiraal, S. Cooper Section, Township, Range: S24, T004N, R003E

Landform (hillslope, terrace, etc.): channel Local relief (concave, convex, none): concave

Slope (%): <1 Lat: 40.3004258182 Long: -97.0318713947 Datum: WGS84

Soil Map Unit Name: NE095 – CrB2 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Below impoundment/dam, was a channel with flow - now just sub-irrigated.

Photos: SC649 Associated Plots: W0516703JE002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 8')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 20' x 8')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 20' x 8')			
1. *Polygonum amphibium*	55	✓	OBL
2. *Carex brevior*	28	✓	FAC
3. *Hordeum jubatum*	20		FAC
4. *Phalaris arundinacea*	15		FACW
5. *Veronica peregrina*	10		FACW
6. *Poa pratensis*	5		FAC
7. *Spartina pectinata*	2		FACW
8. *Carex grisea*	1		FAC
9. *Polygonum aviculare*	1		FAC
10. *Scutellaria lateriflora*	1		OBL
	138	= Total Cover	

Woody Vine Stratum (Plot size: 20' x 8')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	56	x 1 =	56
FACW Species	27	x 2 =	54
FAC Species	55	x 3 =	165
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	138 (A)		275 (B)

Prevalence Index (B/A) = 1.99

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0516703JE002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 2/1	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 863.47 City/County: Jefferson County Sampling Date: 5/16/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0516703JE002_U1

Investigator(s): A. Admiraal, S. Cooper Section, Township, Range: S24, T004N, R003E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): <1 Lat: 40.3003213395 Long: -97.0318552766 Datum: WGS84

Soil Map Unit Name: NE095 – CrB2 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Was a wetland (PEM) but hydrology has changed, though the vegetation is remnant of wetter time.

Photos: SC648 Associated Plots: W0516703JE002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 20' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 20' x 20')			
1. *Phalaris arundinacea*	55	✓	FACW
2. *Poa pratensis*	40	✓	FAC
3. *Solidago canadensis var. gilvocanescens*	5		FACU
4. *Bromus inermis*	3		FACU
5. *Spartina pectinata*	3		FACW
6.			
7.			
8.			
9.			
10.			
	106	= Total Cover	

Woody Vine Stratum (Plot size: 20' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	58	x 2 =	116
FAC Species	40	x 3 =	120
FACU Species	8	x 4 =	32
UPL Species		x 5 =	
Column Totals	106 (A)		268 (B)

Prevalence Index (B/A) = 2.53

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: Vegetation is borderline. *Phalaris arundinacea* is probably relict from wetter times. Much of area seems to be going to *Bromus inermis* and *Poa pratensis* as FAC (in MW) is a stretch.

SOIL

Sampling Point: W0516703JE002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 3/2	100					SiL	
8 - 20	10YR 3/3	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Only meets one secondary indicator by virtue of vegetation.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 863.67 City/County: Jefferson County Sampling Date: 5/16/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0516703JE003_W1

Investigator(s): A. Admiraal, S. Cooper Section, Township, Range: S24, T004N, R003E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): _____ Lat: 40.2974442729 Long: -97.03191618 Datum: WGS84

Soil Map Unit Name: NE095 – W NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Dry spring 2 years prior.

Photos: SC652 Associated Plots: W0516703JE003_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20' x 10')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 20' x 10')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 20' x 10')			
1. *Phalaris arundinacea*	90	✓	FACW
2. *Bromus inermis*	2		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	92	= Total Cover	

Woody Vine Stratum (Plot size: 20' x 10')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	90	x 2 =	180
FAC Species		x 3 =	
FACU Species	2	x 4 =	8
UPL Species		x 5 =	
Column Totals	92 (A)		188 (B)

Prevalence Index (B/A) = 2.04

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0516703JE003_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 2/1	100					SiCL	
8 - 20	10YR 2/1	90	10YR 4/6	10	C	M	SiCL	lenses of high chroma

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☑ Sediment Deposits (B2)
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hydrology is a mystery. Can see overflow carries debris, but intermittent - sufficient moisture only due to fine text soil retaining moisture post-precip events.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 863.67 City/County: Jefferson County Sampling Date: 5/16/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0516703JE003_U1

Investigator(s): A. Admiraal, S. Cooper Section, Township, Range: S24, T004N, R003E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none

Slope (%): 2 Lat: 40.2974628336 Long: -97.0319555453 Datum: WGS84

Soil Map Unit Name: NE095 – W NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Dry year and preceding years as well.

Photos: SC653 Associated Plots: W0516703JE003_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	90	✓	FACU
2. *Convolvulus arvensis*	10		(UPL)
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	90	x 4 =	360
UPL Species	10	x 5 =	50
Column Totals	100 (A)		410 (B)

Prevalence Index (B/A) = 4.10

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: *Bromus inermis* is swale between cropped field and *Phalaris arundinacea* dominated PEM.

SOIL

Sampling Point: W0516703JE003_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 2/1	100					SiL	
4 - 20	10YR 3/2	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 868.35 City/County: Jefferson County Sampling Date: 9/20/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0920702JE004_W1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S18, T003N, R004E

Landform (hillslope, terrace, etc.): basin Local relief (concave, convex, none): concave

Slope (%): 0-1 Lat: 40.2320501673 Long: -97.015098807 Datum: WGS84

Soil Map Unit Name: NE095 – 5541 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Wetland on stream edge fed by stream overflow and hillside drainage.

Photos: KK1717 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	85	✓	FACW
2. *Scirpus atrocinctus*	5		OBL
3. *Spartina pectinata*	5		FACW
4. *Typha latifolia*	5		OBL
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	10	x 1 =	10
FACW Species	90	x 2 =	180
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	100 (A)		190 (B)

Prevalence Index (B/A) = 1.90

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0920702JE004_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 2/1	100					CL	
6 - 24	10YR 2/1	55					CL	
6 - 24	10YR 5/2	30	10YR 4/6	10	C	M	CL	
6 - 24	10YR 7/2	5					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 2

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Low spot at confluence of creek branches.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 868.33 City/County: Jefferson County Sampling Date: 9/20/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0920702JE004_U1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S18, T003N, R004E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave

Slope (%): 10 Lat: 40.2324022456 Long: -97.0152093154 Datum: WGS84

Soil Map Unit Name: NE095 – MC3 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Slope on edge of hayfield.

Photos: KK1818 Associated Plots:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	95	✓	FACU
2. *Solidago canadensis var. gilvocanescens*	2		FACU
3. *Solanum carolinense*	2		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	99	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species	99	x 4 =	396
UPL Species		x 5 =	
Column Totals	99 (A)		396 (B)

Prevalence Index (B/A) = 4.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0920702JE004_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 16	10YR 3/2	100					L	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hillside; precipitation runs off into nearby creek.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 868.58 City/County: Jefferson County Sampling Date: 5/15/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0515701JE001_W1

Investigator(s): J. Allewalt, R. Ruffner Section, Township, Range: S18, T003N, R004E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none

Slope (%): 2 Lat: 40.2288578499 Long: -97.0146494663 Datum: WGS84

Soil Map Unit Name: NE095 – 5541 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Saturated outer bend terrace above current stream.

Photos: JA3767 Associated Plots: W0515701JE001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1. *Ribes missouriense*	2		(UPL)
2.			
3.			
4.			
5.			
	2	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	70	✓	FACW
2. *Urtica dioica*	1		FACW
3. *Rumex crispus*	0.5		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	71.5	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	71	x 2 =	142
FAC Species	0.5	x 3 =	1.5
FACU Species		x 4 =	
UPL Species	2	x 5 =	10
Column Totals	73.5 (A)		153.5 (B)

Prevalence Index (B/A) = 2.09

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Litter = 15%

SOIL

Sampling Point: W0515701JE001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 2/1	100					CL	
4 - 8	N 3/0	97	5YR 4/6	3	C	PL	SiC	
8 - 20	10YR 3/1	100					SiC	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): 12
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 6

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 868.57 City/County: Jefferson County Sampling Date: 5/15/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0515701JE001_U1

Investigator(s): J. Allewalt, R. Ruffner Section, Township, Range: S18, T003N, R004E

Landform (hillslope, terrace, etc.): T2 slope Local relief (concave, convex, none): none

Slope (%): 5 Lat: 40.2289480244 Long: -97.0145849983 Datum: WGS84

Soil Map Unit Name: NE095 – 5541 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Slope of former streambank terrace.

Photos: JA3769 Associated Plots: W0515701JE001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Morus alba*	15		FAC
2.			
3.			
4.			
5.			
	15	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1. *Ribes missouriense*	3		(UPL)
2.			
3.			
4.			
5.			
	3	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	80	✓	FACU
2. *Taraxacum officinale*	1		FACU
3. *Toxicodendron rydbergii*	0.5		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	81.5	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	15.5	x 3 =	46.5
FACU Species	81	x 4 =	324
UPL Species	3	x 5 =	15
Column Totals	99.5 (A)		385.5 (B)

Prevalence Index (B/A) = 3.87

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Litter = 5%

SOIL

Sampling Point: W0515701JE001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 15	10YR 2/1	100					CL	
15 - 20	10YR 4/4	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 871.46 City/County: Jefferson County Sampling Date: 5/15/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0515703JE001_W1

Investigator(s): A. Admiraal, S. Cooper Section, Township, Range: S32, T003N, R004E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none

Slope (%): <1 Lat: 40.1874590851 Long: -97.0107483827 Datum: WGS84

Soil Map Unit Name: NE095 – MaaC NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Photos: SC616 - SC617 Associated Plots: W0515703JE001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 5')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10' x 5')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 10' x 5')			
1. *Rumex crispus*	85	✓	FAC
2. *Phalaris arundinacea*	5		FACW
3. *Polygonum amphibium*	5		OBL
4. *Spartina pectinata*	1		FACW
5.			
6.			
7.			
8.			
9.			
10.			
	96	= Total Cover	
Woody Vine Stratum (Plot size: 10' x 5')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	5	x 1 =	5
FACW Species	6	x 2 =	12
FAC Species	85	x 3 =	255
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	96 (A)		272 (B)

Prevalence Index (B/A) = 2.83

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0515703JE001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 2/1	100					SiCL	disturbed by plow and erosion
6 - 14	10YR 4/2	85	10YR 6/6	15			SiCL	disturbed by plow and erosion

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☑ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☑ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ✓	No ____	Depth (inches): >20
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 22

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Adjacent to farmed field with plowing (to east) and channelizing to west (see photos).

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 871.45 City/County: Jefferson County Sampling Date: 5/15/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0515703JE001_U1

Investigator(s): A. Admiraal, S. Cooper Section, Township, Range: S32, T003N, R004E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none

Slope (%): <1 Lat: 40.1874758646 Long: -97.0108195038 Datum: WGS84

Soil Map Unit Name: NE095 – MaaC NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: SC618 Associated Plots: W0515703JE001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 10' x 20')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 10' x 20')			
1. *Bromus inermis*	70	✓	FACU
2. *Poa pratensis*	20		FAC
3. *Convolvulus arvensis*	15		(UPL)
4. *Medicago sativa*	10		FACU
5. *Taraxacum officinale*	10		FACU
6. *Rumex crispus*	5		FAC
7.			
8.			
9.			
10.			
	130	= Total Cover	

Woody Vine Stratum (Plot size: 10' x 20')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	25	x 3 =	75
FACU Species	90	x 4 =	360
UPL Species	15	x 5 =	75
Column Totals	130 (A)		510 (B)

Prevalence Index (B/A) = 3.92

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0515703JE001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 3/2	100					SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: On west side of ephemeral stream - 1 - 1.5ft above "bottom."

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 872.63 City/County: Jefferson County Sampling Date: 5/15/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0515702JE002_W1

Investigator(s): K. Kottas, E. Wilkins Section, Township, Range: S05, T002N, R004E

Landform (hillslope, terrace, etc.): between 2 hillslopes Local relief (concave, convex, none): concave

Slope (%): 8 Lat: 40.1704954942 Long: -97.0100469523 Datum: WGS84

Soil Map Unit Name: NE095 – MaaB2 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: This wetland is in a cultivated field and has been modified by the creation of a dam and dredged waterbody. The wetland includes road ditch on west.

Photos: KK1270 Associated Plots: W0515702JE002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' x 2o')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 10' x 2o')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 10' x 2o')			
1. *Carex pellita*	20	✓	OBL
2. *Zea mays*	15	✓	(UPL)
3. *Phalaris arundinacea*	10	✓	FACW
4. *Polygonum amphibium*	5		OBL
5.			
6.			
7.			
8.			
9.			
10.			
	50	= Total Cover	

Woody Vine Stratum (Plot size: 10' x 2o')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	25	x 1 =	25
FACW Species	10	x 2 =	20
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species	15	x 5 =	75
Column Totals	50 (A)		120 (B)

Prevalence Index (B/A) = 2.40

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Corn has been planted in the wetland boundary but is not doing well in all areas.

SOIL

Sampling Point: W0515702JE002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 3/2	100					CL	
2 - 10	10YR 2/1	95	10YR 5/6	5	C	M	CL	
10 - 12	10YR 2/1	80	10YR 5/8	20	C	M	CL	
12 - 20	10YR 2/1	90	10YR 5/6	10	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☑ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 2
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 6

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water pools between two hillslopes and runs into manmade waterbody and extends into ditch.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 872.61 City/County: Jefferson County Sampling Date: 5/15/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0515702JE002_U1

Investigator(s): K. Kottas, E. Wilkins Section, Township, Range: S05, T002N, R004E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave

Slope (%): _____ Lat: 40.170703834 Long: -97.010491063 Datum: WGS84

Soil Map Unit Name: NE095 – MaaB2 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Upland site in cultivated field.

Photos: KK1271 Associated Plots: W0515702JE002_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Woody Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:
OBL Species		x 1 =
FACW Species		x 2 =
FAC Species		x 3 =
FACU Species		x 4 =
UPL Species		x 5 =
Column Totals	0 (A)	0 (B)

Prevalence Index (B/A) = #Num!

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Cultivated corn field.

SOIL

Sampling Point: W0515702JE002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 3/2	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: On a slope, drains to wetland.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 873.47 City/County: Jefferson County Sampling Date: 5/15/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0515702JE001_W1

Investigator(s): K. Kottas, E. Wilkins Section, Township, Range: S08, T002N, R004E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave

Slope (%): 7 Lat: 40.158394997 Long: -97.0081995513 Datum: WGS84

Soil Map Unit Name: NE095 – 5540 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Wetland along creek bank.

Photos: KK1260 Associated Plots: W0515702JE001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. *Amorpha fruticosa*	10	✓	FACW
2.			
3.			
4.			
5.			
	10	= Total Cover	
Herb Stratum (Plot size: 5')			
1. *Phalaris arundinacea*	75	✓	FACW
2. *Helianthus grosseserratus*	10		FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	85	= Total Cover	
Woody Vine Stratum (Plot size: 5')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	95	x 2 =	190
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	95 (A)		190 (B)

Prevalence Index (B/A) = 2.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0515702JE001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 15	10YR 2/1	100					CL	
15 - 20	10YR 4/1	95	10YR 3/6	5	C	PL	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☑ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 10

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Previously recorded as PEM along perennial creek.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 873.47 City/County: Jefferson County Sampling Date: 5/15/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0515702JE001_U1

Investigator(s): K. Kottas, E. Wilkins Section, Township, Range: S08, T002N, R004E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none

Slope (%): 5-7 Lat: 40.1584607444 Long: -97.0080810179 Datum: WGS84

Soil Map Unit Name: NE095 – 5540 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Upland point in cultivated field next to Big Indian Creek.

Photos: KK1259 Associated Plots: W0515702JE001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 5')			
1. *Zea mays*	5		(UPL)
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	5	= Total Cover	

Woody Vine Stratum (Plot size: 5')			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species		x 3 =	
FACU Species		x 4 =	
UPL Species	5	x 5 =	25
Column Totals	5 (A)		25 (B)

Prevalence Index (B/A) = 5.00

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks: Cultivated field with corn recently planted.

SOIL

Sampling Point: W0515702JE001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 2/2	100					CL	cultivated

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Gradual hillslope.

W306 HT005

WETLAND PLOT

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: KXL IV NE 2012 City/County: HOLT Sampling Date: 6/13/12

Applicant/Owner: State: NE Sampling Point:

Investigator(s): 306 Section, Township, Range: S24 T30N R12W

Landform (hillslope, terrace, etc.): HILLSLOPE Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes Y	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes Y	No ____	
Wetland Hydrology Present?	Yes Y	No ____	

Remarks: DRY - SEASONY LOW RAINFALL / DROUGHT LULC = PEM

PEM ML-NE-HT-30350.000 MP: 656.98

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		

Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		

Herb Stratum (Plot size: 0.25m²)			
1. CAREX SCOPARIA	30	Y	OBL
2. TYPHA LATIFOLIA	10	N	OBL
3. SCIRPUS ATROVIRENS	40	Y	OBL
4. PHALARIS ARUNDINACEA	20	Y	FACW
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	100	x 1 = 100
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	100 (A)	100 (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-18	2/1 10YR	80	4/6 7.5YR	20	C	M	SCL	
0-17	3/5PB GLEY2	100	5/5PB GLEY2	100	D	M	SANDY	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- X Histosol (A1)
- ___ Histic Epipedon (A2)
- X Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- X Depleted Below Dark Surface (A11)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- X Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 0

Water Table Present? Yes X No ___ Depth (inches): 16

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

W 306 WW008

WETLAND DETERMINATION DATA FORM – Great Plains Region

UPLAND

Project/Site: KXLIV NE 2012 City/County: HOLT Sampling Date: 6/13

Applicant/Owner: State: NE Sampling Point:

Investigator(s): 306 Section, Township, Range: S28 T30N R12W

Landform (hillslope, terrace, etc.): HILLSLOPE Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	Is the Sampled Area within a Wetland? Yes ___ No X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks: DROUGHT

LHLC = PEM

ML-NE-M7-30350.000 MP 656.98

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	___ = Total Cover		

Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		

Herb Stratum (Plot size: 0.25 m²)			
1. BROMUS INERMIS	20	Y	UPL
2. [redacted] SCHIZACHYRIUM SCOPARIUM	40	Y	UPL
3. [redacted] HESPERODIPA CORONOPUS	40	Y	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		

Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 3 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species	100	x 5 = 500
Column Totals:	100 (A)	500 (B)

Prevalence Index = B/A = 5

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	3/3 10YR	100					SANDY LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.54 City/County: Colfax County Sampling Date: 5/5/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0505702CO002_W1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): concave

Slope (%): _____ Lat: 41.4023525949 Long: -97.1973063788 Datum: WGS84

Soil Map Unit Name: NE037 – 4241 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Photos: KK1108 Associated Plots: W0505702CO002_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	80	✓	FACW
2. *Anemone canadensis*	20		FACW
3. *Poa pratensis*	10		FAC
4. *Equisetum hyemale*	1		FACW
5. *Symphyotrichum lanceolatum var. lanceolatum*	1		FAC
6.			
7.			
8.			
9.			
10.			
	112	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	101	x 2 =	202
FAC Species	11	x 3 =	33
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	112 (A)		235 (B)

Prevalence Index (B/A) = 2.10

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks:

SOIL

Sampling Point: W0505702CO002_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 4/2	65	10YR 4/6	5	C	M	S	
0 - 10	10YR 5/3	30					S	
10 - 14	10YR 4/2	100					SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 6
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water frequently ponds

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.54 City/County: Colfax County Sampling Date: 5/5/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0505702CO002_U1

Investigator(s): K. Kottas, A. Admiraal Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none

Slope (%): 0 Lat: 41.4023792831 Long: -97.1972953125 Datum: WGS84

Soil Map Unit Name: NE037 – 4241 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: KK1110 Associated Plots: W0505702CO002-W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	75	✓	FACU
2. *Poa pratensis*	40	✓	FAC
3. *Andropogon gerardii*	10		FAC
4. *Panicum virgatum*	10		FAC
5. *Achillea millefolium*	2		FACU
6. *Sorghastrum nutans*	2		FACU
7. *Carex inops*	1		(UPL)
8. *Taraxacum officinale*	1		FACU
9.			
10.			
	141	= Total Cover	

Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	60	x 3 =	180
FACU Species	80	x 4 =	320
UPL Species	1	x 5 =	5
Column Totals	141 (A)		505 (B)

Prevalence Index (B/A) = 3.58

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0505702CO002_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 2/2	100					SL	
10 - 14	10YR 4/2	100					S	
14 - 20	10YR 3/2	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water drains to adjacent wetland.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.92 City/County: Colfax County Sampling Date: 5/8/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0508702CO004_W1

Investigator(s): K. Kottas, A. Admiraal, D. Culwell II Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave

Slope (%): 0-5 Lat: 41.3975180559 Long: -97.1951120601 Datum: WGS84

Soil Map Unit Name: NE037 – 2100 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Photos: KK1138 Associated Plots: W0508702CO004_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Carex emoryi*	15	✓	OBL
2. *Phalaris arundinacea*	15	✓	FACW
3. *Eleocharis palustris*	10	✓	OBL
4. *Poa pratensis*	10	✓	FAC
5. *Ranunculus sceleratus*	2		OBL
6. *Taraxacum officinale*	2		FACU
7.			
8.			
9.			
10.			
	54	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	27	x 1 =	27
FACW Species	15	x 2 =	30
FAC Species	10	x 3 =	30
FACU Species	2	x 4 =	8
UPL Species		x 5 =	
Column Totals	54 (A)		95 (B)

Prevalence Index (B/A) = 1.76

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Site was sparsely vegetated due to standing water.

SOIL

Sampling Point: W0508702CO004_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 3/1	100					CL	
4 - 12	10YR 5/2	50	10YR 3/6	10	C	M	SCL	
4 - 12	10YR 3/2	40					SCL	
12 - 20	10YR 5/2	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☑ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 15
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Site is connected to ditch.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Keystone XL Pipeline – MP 780.93 City/County: Colfax County Sampling Date: 5/8/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0508702CO004_U1

Investigator(s): K. Kottas, A. Admiraal, D. Culwell II Section, Township, Range: S33, T017N, R002E

Landform (hillslope, terrace, etc.): floodplain terrace Local relief (concave, convex, none): concave

Slope (%): 0-5 Lat: 41.3973286835 Long: -97.1950439728 Datum: WGS84

Soil Map Unit Name: NE037 – 8563 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Photos: KK1142 Associated Plots: W0508702CO004_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 0.01 acre)			
1. *Taraxacum officinale*	40	✓	FACU
2. *Capsella bursa-pastoris*	25	✓	FACU
3. *Bromus inermis*	10		FACU
4. *Dactylis glomerata*	5		FACU
5. *Poa pratensis*	5		FAC
6. *Trifolium repens*	5		FACU
7. *Veronica arvensis*	5		FACU
8. *Ambrosia artemisiifolia*	1		FACU
9.			
10.			
	96	= Total Cover	
Woody Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species		x 2 =	
FAC Species	5	x 3 =	15
FACU Species	91	x 4 =	364
UPL Species		x 5 =	
Column Totals	96 (A)		379 (B)

Prevalence Index (B/A) = 3.95

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0508702CO004_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 5	10YR 3/2	100					SCL	
5 - 20	10YR 4/2	80					SL	
5 - 20	10YR 5/2	20					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Site drains to nearby wetland.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 818.63 City/County: Seward County Sampling Date: 9/26/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0926618SE001_W1

Investigator(s): P. Christensen Section, Township, Range: S25, T11N, R1E

Landform (hillslope, terrace, etc.): basin Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): H Lat: 40.8903395252029 Long: -97.262240117521 Datum: WGS84

Soil Map Unit Name: NE159 – 3952 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Actively farmed throughout entire basin. Climatic condition: increased recent precipitation caused flooding and slightly atypical conditions for this time of year.

Photos: PC2066 - PC2070 Associated Plots: W0926618SE001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: n/a)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Echinochloa crus-galli*	35	✓	FAC
2. *Polygonum amphibium*	20	✓	OBL
3. *Sagittaria brevirostra*	10		OBL
4. *Schoenoplectus acutus*	10		OBL
5. *Ammannia robusta*	2		OBL
6. *Cyperus acuminatus*	2		FACW
7. *Typha latifolia*	2		OBL
8.			
9.			
10.			
	81 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 19

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	44	x 1 =	44
FACW Species	2	x 2 =	4
FAC Species	35	x 3 =	105
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	81 (A)		153 (B)

Prevalence Index (B/A) = 1.89

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Actively farmed wetland. AMM ROB is dominant further out in the basin.

SOIL

Sampling Point: W0926618SE001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 2/1	100					CL	cultivated
3 - 16	10 YR 3/1	92	10YR 4/6	8	C	M	CL	cultivated

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☑ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☑ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☑ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 16

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 818.63 City/County: Seward County Sampling Date: 9/26/2019

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0926618SE001_U1

Investigator(s): P. Christensen Section, Township, Range: S25, T11N, R1E

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): convex Slope (%): 3

Subregion (LRR): H Lat: 40.8903479083786 Long: -97.2622977676817 Datum: WGS84

Soil Map Unit Name: NE159 – 3952 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Upland sample point located on slope of man made stock dam, directly adjacent to cultivated field. Climatic condition: increased recent precipitation caused flooding and slightly atypical conditions for this time of year.

Photos: PC2071 Associated Plots: W0926618SE001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Juniperus virginiana*	5		UPL
2.			
3.			
4.			
	5 = Total Cover		
Shrub Stratum (Plot size: n/a)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Bromus inermis*	60	✓	UPL
2. *Setaria pumila*	15		FACU
3. *Asclepias syriaca*	10		UPL
4. *Rumex crispus*	10		FAC
5. *Polygonum amphibium*	5		OBL
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Vine Stratum (Plot size: n/a)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	5	x 1 =	5
FACW Species		x 2 =	
FAC Species	10	x 3 =	30
FACU Species	15	x 4 =	60
UPL Species	75	x 5 =	375
Column Totals	105 (A)		470 (B)

Prevalence Index (B/A) = 4.48

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** ✓

Remarks:

SOIL

Sampling Point: W0926618SE001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 2/1	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 834.68 City/County: Seward County Sampling Date: 6/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0602702SE001_W1

Investigator(s): K. Kottas, E. Wilkins Section, Township, Range: S33, T009N, R003E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 6

Subregion (LRR): H Lat: 40.7055132199 Long: -97.1007488865 Datum: WGS84

Soil Map Unit Name: NE159 – 3553 NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓ No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: PEM located within OHWM of stream.

Photos: KK2138 Associated Plots: W0602702SE001_U1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0.01 acre)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 0.01 acre)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 0.01 acre)			
1. *Phalaris arundinacea*	80	✓	FACW
2. *Amaranthus tuberculatus*	10		FAC
3. *Conium maculatum*	10		FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Vine Stratum (Plot size: 0.01 acre)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	90	x 2 =	180
FAC Species	10	x 3 =	30
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	100 (A)		210 (B)

Prevalence Index (B/A) = 2.10

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No _____**

Remarks: Vegetation laid flat from overnight inundation (1.5" rainfall).

SOIL

Sampling Point: W0602702SE001_W1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 5	10YR 3/2	100					CL	
5 - 12	10YR 3/2	95	10YR 4/6	5	C	M	CL	
12 - 24	10YR 4/2	95	10YR 4/6	5	C	M	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☑ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Keystone XL Pipeline – MP 834.68 City/County: Seward County Sampling Date: 6/2/2018

Applicant/Owner: TransCanada Keystone Pipeline, L. P. State: NE Sampling Point: W0602702SE001_U1

Investigator(s): K. Kottas, E. Wilkins Section, Township, Range: S33, T009N, R003E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): convex Slope (%): 3-5

Subregion (LRR): H Lat: 40.7055383906 Long: -97.1008055801 Datum: WGS84

Soil Map Unit Name: NE159 – 3553 NWI Classification: UPL

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Upland point near PEM on stream edge.

Photos: KK2139 Associated Plots: W0602702SE001_W1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Shrub Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Phalaris arundinacea*	40	✓	FACW
2. *Urtica dioica*	30	✓	FAC
3. *Conium maculatum*	20		FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	90 = Total Cover		
Vine Stratum (Plot size: 5')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species		x 1 =	
FACW Species	60	x 2 =	120
FAC Species	30	x 3 =	90
FACU Species		x 4 =	
UPL Species		x 5 =	
Column Totals	90 (A)		210 (B)

Prevalence Index (B/A) = 2.33

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☑ 2 – Dominance Test is >50%
- ☑ 3 – Prevalence Index is ≤3.0[1]
- ☐ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: Shading from nearby trees allows for woodland herbaceous species. Phalaris is dominant in both wet and dryer areas in understory.

SOIL

Sampling Point: W0602702SE001_U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 24	10YR 4/2	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) **(LRR F, G, H)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: Runoff from nearby fields and good tree cover. Dark, rich soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Soil were moist from 1.5" rainfall 8 hours previous to survey, but no indicators of wetland hydrology.

Appendix H – Wetland Crossing Table

Table H-1: Keystone XL Pipeline Project Wetland Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Wetland ID	Wetland Type[a]	Length Crossed (feet) [b.c]	Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Disturbance (acres)[f,g]	Permanent Disturbance (acres)	Map Page[h]
1	25.27	MT	Phillips	W_UTM13_00385	PSS	17.83	DTL 15	Frenchman	48.723307	-107.208422	0.00	0.00	CL 19; AR 15
2	25.32	MT	Valley	W106VA002	PSS	320.40	DTL 15	Frenchman	48.723179	-107.207274	0.00	0.00	CL 19; CL 20; AR 15
3	25.44	MT	Valley	W304VA001	PEM	943.27	DTL 15	Frenchman	48.722824	-107.204747	0.00	0.00	CL 19; CL 20; AR 15
4	25.56	MT	Valley	W304VA001	PEM	37.94	DTL 15	Frenchman	48.722471	-107.202181	0.00	0.00	CL 20; AR 15
5	89.79	MT	McCone	W7AMC001	PEM	69.69	DTL 15	Prairie Elk-Wolf	48.053603	-106.322568	0.00	0.00	CL 67; AR 46
6	119.65	MT	McCone	W0723619MC001	PEM	17.72	DTL 9	Prairie Elk-Wolf	47.736393	-105.940143	0.26	0.00	CL 89; CL 90
7	119.67	MT	McCone	W0723619MC001	PEM	128.83	DTL 9	Prairie Elk-Wolf	47.736076	-105.939729	See above	0.00	CL 89; CL 90
8	137.81	MT	McCone	W105MC001	PEM	26.65	DTL 9	Redwater	47.559965	-105.669107	0.05	0.00	CL 103
9	139.53	MT	McCone	W105MC003	PEM	14.72	DTL 9	Redwater	47.542129	-105.643834	0.03	0.00	CL 104; AR 61
10	139.99	MT	McCone	W105MC002	PEM	50.31	DTL 9	Redwater	47.536588	-105.639963	0.09	0.00	CL 105
11	168.38	MT	Dawson	W901DA001	PEM	-	DTL 9	Lower Yellowstone	47.225635	-105.290623	0.02	0.00	CL 126
12	180.09	MT	Dawson	W_UTM13_02312	PEM	22.91	DTL 9	Lower Yellowstone	47.088651	-105.158735	0.04	0.00	CL 135; AR 74
13	197.92	MT	Dawson	W_UTM13_06628	PEM	25.66	DTL 15	Lower Yellowstone	46.878254	-104.972003	0.00	0.00	CL 148; AUX 15; AR 77
14	210.10	MT	Prairie	W0729620PR001	PEM	19.17	DTL 9	Lower Yellowstone	46.751433	-104.826185	0.04	0.00	CL 157
15	216.55	MT	Prairie	W106PR001	PEM	19.29	DTL 9	Lower Yellowstone	46.697155	-104.718092	0.03	0.00	CL 162
16	224.21	MT	Fallon	exp-WL-13002	PEM	104.37	DTL 9	O Fallon	46.610666	-104.626772	0.22	0.00	CL 168
17	229.03	MT	Fallon	W121FA004	PEM	33.78	DTL 9	O Fallon	46.555687	-104.567085	0.08	0.00	CL 171
18	253.54	MT	Fallon	W276FA001	PEM	-	DTL 9	O Fallon	46.29763	-104.267103	0.00	0.00	CL 189; CL 190
19	261.14	MT	Fallon	W8AFA004	PEM	23.42	DTL 9	Upper Little Missouri	46.204956	-104.19889	0.04	0.00	CL 195

Table H-1: Keystone XL Pipeline Project Wetland Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Wetland ID	Wetland Type[a]	Length Crossed (feet) [b.c]	Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Disturbance (acres)[f,g]	Permanent Disturbance (acres)	Map Page[h]
20	261.78	MT	Fallon	W106FA002	PEM	253.05	DTL 9	Upper Little Missouri	46.195802	-104.198194	0.43	0.00	CL 195; CL 196
21	270.78	MT	Fallon	W_UTM13_03718	PEM	25.02	DTL 9	Upper Little Missouri	46.075057	-104.154058	0.09	0.00	CL 202
22	270.79	MT	Fallon	W_UTM13_03718	PEM	29.44	DTL 9	Upper Little Missouri	46.074964	-104.153981	See above	0.00	CL 202
23	275.14	MT	Fallon	W901FA001	PEM	61.92	DTL 9	Box Elder	46.018947	-104.117593	0.11	0.00	CL 205; CL 206
24	275.15	MT	Fallon	W901FA001	PEM	14.78	DTL 9	Box Elder	46.018835	-104.117679	See above	0.00	CL 205; CL 206
25	279.07	MT	Fallon	W8AFA001	PEM	25.08	DTL 9	Box Elder	45.962333	-104.115558	0.14	0.00	CL 208; CL 209
26	279.08	MT	Fallon	W8AFA001	PEM	40.28	DTL 9	Box Elder	45.962235	-104.115615	See above	0.00	CL 208; CL 209
27	292.67	SD	Harding	W0002	PEM	5.62	DTL 9	Upper Little Missouri	45.8337	-103.927681	0.06	0.00	CL 218; CL 219; AR 100
28	292.68	SD	Harding	W0002	PEM	45.52	DTL 9	Upper Little Missouri	45.833651	-103.92756	See above	0.00	CL 218; CL 219; AR 100
29	293.64	SD	Harding	W567HA001	PEM	11.01	DTL 9	Upper Little Missouri	45.826882	-103.910409	0.02	0.00	CL 219
30	293.64	SD	Harding	W567HA001	PEM	-	DTL 9	Upper Little Missouri	45.826895	-103.910223	See above	0.00	CL 219
31	295.08	SD	Harding	W_UTM13_04445	PEM	11.06	DTL 15	Upper Little Missouri	45.815808	-103.885084	0.00	0.00	CL 220; AUX 22
32	295.15	SD	Harding	W567HA002	PEM	67.16	DTL 15	Upper Little Missouri	45.815315	-103.883978	0.00	0.00	CL 220; AUX 22
33	298.90	SD	Harding	WWTRVHA001	PEM	15.13	DTL 9	Upper Little Missouri	45.789229	-103.819764	0.03	0.00	CL 223
34	300.41	SD	Harding	WWTRVHA003	PEM	133.50	DTL 9	Upper Little Missouri	45.778391	-103.792845	0.28	0.00	CL 224
35	303.48	SD	Harding	W0004	PEM	8.75	DTL9	Upper Little Missouri	45.75449	-103.740277	0.01	0.00	CL 226; CL 227
36	316.32	SD	Harding	W500HA002	PEM	31.70	DTL 9	South Fork Grand	45.618634	-103.586665	0.33	0.00	CL 236
37	316.34	SD	Harding	W500HA002	PEM	52.65	DTL 9	South Fork Grand	45.618634	-103.586665	See above	0.00	CL 236

Table H-1: Keystone XL Pipeline Project Wetland Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Wetland ID	Wetland Type[a]	Length Crossed (feet) [b.c]	Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Disturbance (acres)[f,g]	Permanent Disturbance (acres)	Map Page[h]
38	332.49	SD	Harding	W302HA002	PEM	5.15	DTL 9	South Fork Grand	45.476118	-103.355476	0.03	0.00	CL 248
39	345.31	SD	Harding	W0806619HA002	PEM	9.24	DTL 9	Upper Moreau	45.328976	-103.224248	0.03	0.00	CL 258; AR 126
40	351.78	SD	Harding	WWTRVHA011A	PEM	22.19	DTL 9	Upper Moreau	45.276688	-103.117071	0.36	0.00	CL 263
41	351.82	SD	Harding	WWTRVHA011A	PEM	195.73	DTL 9	Upper Moreau	45.276591	-103.11625	See above	0.00	CL 263
42	359.33	SD	Butte	W_UTM13_05228	PEM	24.40	DTL 9	Upper Moreau	45.205176	-103.002685	0.04	0.00	CL 268
43	399.96	SD	Meade	W567ME003	PEM	36.57	DTL 9	Cherry.	44.807009	-102.417971	0.07	0.00	CL 299
44	400.28	SD	Meade	W567ME004	PEM	44.25	DTL 9	Cherry.	44.803429	-102.413741	0.07	0.00	CL 299
45	428.28	SD	Meade	W0614618ME001	PEM	64.46	DTL 9	Lower Cheyenne	44.515048	-102.04627	0.11	0.00	CL 320
46	428.38	SD	Meade	W0614618ME002	PEM	29.11	DTL 9	Lower Cheyenne	44.514837	-102.044336	0.05	0.00	CL 320
47	428.38	SD	Meade	W0614618ME002	PEM	-	DTL 9	Lower Cheyenne	44.514975	-102.044189	See above	0.00	CL 320
48	440.68	SD	Haakon	W0614620HK002	PEM	58.09	DTL 9	Lower Cheyenne	44.425073	-101.853232	0.10	0.00	CL 330; AUX 29; AR 162
49	485.59	SD	Haakon	W8AHK002	PEM	-	DTL 9	Bad	44.079223	-101.115429	0.14	0.00	CL 363; CL 364
50	485.61	SD	Haakon	W8AHK002	PEM	84.23	DTL 9	Bad	44.079247	-101.115092	See above	0.00	CL 363; CL 364
51	487.74	SD	Haakon	W0525618HK001	PEM	41.97	DTL 9	Bad	44.062185	-101.080324	0.07	0.00	CL 365
52	497.50	SD	Jones	W308JO001	PEM	19.11	DTL 9	Bad	44.007989	-100.902893	0.03	0.00	CL 372; CL 373
53	507.64	SD	Jones	W308JO002	PEM	35.23	DTL 9	Bad	43.970551	-100.713124	0.07	0.00	CL 380
54	541.64	SD	Tripp	W_UTM14_08449	PSS	136.65	DTL 15	Lower White	43.704739	-100.170128	0.00	0.00	CL 405; CL 406; AUX 42
55	554.18	SD	Tripp	W_UTM14_06217	PEM	11.87	DTL 9	Lower White	43.548052	-100.05776	0.06	0.00	CL 415
56	554.18	SD	Tripp	W_UTM14_06217	PEM	19.89	DTL 9	Lower White	43.547972	-100.057662	See above	0.00	CL 415

Table H-1: Keystone XL Pipeline Project Wetland Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Wetland ID	Wetland Type[a]	Length Crossed (feet) [b.c]	Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Disturbance (acres)[f,g]	Permanent Disturbance (acres)	Map Page[h]
57	557.90	SD	Tripp	W_UTM14_06201	PEM	29.67	DTL 9	Lower White	43.501373	-100.024611	0.06	0.00	CL 418
58	565.03	SD	Tripp	W104TR009	PEM	138.28	DTL 9	Lower White	43.414448	-99.95154	0.28	0.00	CL 423
59	577.33	SD	Tripp	W0611618TR001	PEM	116.52	DTL 9	Lower White	43.270513	-99.812773	0.17	0.00	CL 432
60	578.06	SD	Tripp	exp-WL-0088	PEM	244.33	DTL 9	Lower White	43.262655	-99.803668	0.39	0.00	CL 433
61	578.08	SD	Tripp	exp-WL-0088	PEM	-	DTL 9	Lower White	43.262294	-99.803541	See above	0.00	CL 433
62	599.43	SD	Tripp	exp-WL-0090	PEM	27.80	DTL 9	Keya Paha	43.019246	-99.557909	0.08	0.00	CL 449; AR 187
63	599.44	SD	Tripp	exp-WL-0090	PEM	17.36	DTL 9	Keya Paha	43.019148	-99.557852	See above	0.00	CL 449; AR 187
64	604.24	NE	Keya Paha	W311KP001	PEM	63.28	DTL 9	Keya Paha	42.984542	-99.487054	0.13	0.00	CL 452
65	616.53	NE	Keya Paha	W0819618KP002	PEM	-	DTL 9	Keya Paha	42.924477	-99.281262	0.57	0.00	CL 461
66	616.55	NE	Keya Paha	W0819618KP002	PEM	339.46	DTL 9	Keya Paha	42.924271	-99.280871	See above	0.00	CL 461
67	616.94	NE	Keya Paha	W0819618KP003	PEM	52.28	DTL 9	Keya Paha	42.918701	-99.280602	0.09	0.00	CL 461; CL 462
68	617.54	NE	Keya Paha	W0712702KP001	PEM	990.60	DTL 9	Keya Paha	42.910871	-99.277648	1.94	0.00	CL 462
69	617.64	NE	Keya Paha	W0712702KP001	PEM	-	DTL 9	Keya Paha	42.910042	-99.276022	See above	0.00	CL 462
70	627.43	NE	Holt	exp-WL-0082	PEM	102.99	DTL 9	Middle Niobrara	42.835517	-99.120031	0.12	0.00	CL 469; AR 195
71	627.45	NE	Holt	exp-WL-0053	PEM	20.89	DTL 9	Middle Niobrara	42.835269	-99.120026	0.06	0.00	CL 469; AR 195
72	641.86	NE	Holt	W0711702HT001	PEM	86.13	DTL 9	Lower Niobrara	42.685871	-98.939001	0.17	0.00	CL 480; AR 196
73	649.98	NE	Holt	W302HT001	PEM	6.07	DTL 9	Lower Niobrara	42.604677	-98.826014	0.01	0.00	CL 486
74	650.43	NE	Holt	W302HT003	PEM	17.84	DTL 9	Lower Niobrara	42.60088	-98.818866	0.05	0.00	CL 487
75	659.19	NE	Holt	W306HT005	PEM	39.63	DTL 9	Lower Niobrara	42.555603	-98.667266	0.37	0.00	CL 493; AR 197

Table H-1: Keystone XL Pipeline Project Wetland Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Wetland ID	Wetland Type[a]	Length Crossed (feet) [b.c]	Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Disturbance (acres)[f,g]	Permanent Disturbance (acres)	Map Page[h]
76	659.29	NE	Holt	W306HT005	PEM	65.52	DTL 9	Lower Niobrara	42.555104	-98.66539	See above	0.00	CL 493; AR 197
77	659.30	NE	Holt	W306HT005	PEM	50.70	DTL 9	Lower Niobrara	42.555054	-98.665122	See above	0.00	CL 493; AR 197
78	659.39	NE	Holt	W306HT005	PEM	-	DTL 9	Lower Niobrara	42.554519	-98.66351	See above	0.00	CL 493; AR 197
79	659.42	NE	Holt	W306HT005	PEM	-	DTL 9	Lower Niobrara	42.554389	-98.663067	See above	0.00	CL 493; AR 197
80	679.92	NE	Holt	W306HT003	PFO	49.36	DTL 9	Lower Niobrara	42.411296	-98.325795	0.07	0.00	CL 509
81	683.85	NE	Antelope	W306AT001	PEM	27.39	DTL 9	Lower Niobrara	42.380337	-98.263196	0.05	0.00	CL 511; CL 512
82	684.22	NE	Antelope	W0714702AT001	PEM	27.04	DTL 9	Lower Niobrara	42.377537	-98.257075	0.08	0.00	CL 512
83	684.23	NE	Antelope	W0714702AT001	PEM	9.40	DTL 9	Lower Niobrara	42.377476	-98.25702	See above	0.00	CL 512
84	684.23	NE	Antelope	W0714702AT001	PEM	-	DTL 9	Lower Niobrara	42.377615	-98.25688	See above	0.00	CL 512
85	690.11	NE	Antelope	W0716702AT001	PFO	110.25	DTL 158	Lower Niobrara	42.334864	-98.163489	0.00	0.00	CL 516; AUX 56; AR 202
86	716.04	NE	Antelope	WST-WL-0003	PEM	645.25	DTL 9	Upper Elkhorn	42.078344	-97.853923	1.30	0.00	CL 535; CL 536
87	716.25	NE	Antelope	WST-WL-0004	PEM	-	DTL 9	Upper Elkhorn	42.077637	-97.849893	0.42	0.00	CL 536
88	716.34	NE	Antelope	WST-WL-0004	PEM	124.63	DTL 9	Upper Elkhorn	42.077435	-97.848207	See above	0.00	CL 536
89	717.21	NE	Antelope	W0427703AT001	PEM	10.54	DTL 15	Upper Elkhorn	42.068227	-97.837916	0.00	0.00	CL 536; AR 204; AR 203
90	721.81	NE	Madison	WST-WL-0009	PEM	132.92	DTL 9	Upper Elkhorn	42.014206	-97.793432	0.39	0.00	CL 540
91	721.84	NE	Madison	WST-WL-0011	PEM	116.25	DTL 9	Upper Elkhorn	42.013884	-97.793044	0.32	0.00	CL 540
92	724.07	NE	Madison	W0428702MA001	PEM	59.36	DTL 9	Upper Elkhorn	41.990679	-97.763743	0.21	0.00	CL 541; CL 542
93	724.08	NE	Madison	W0428702MA001	PEM	43.84	DTL 9	Upper Elkhorn	41.990561	-97.763583	See above	0.00	CL 541; CL 542

Table H-1: Keystone XL Pipeline Project Wetland Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Wetland ID	Wetland Type[a]	Length Crossed (feet) [b.c]	Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Disturbance (acres)[f,g]	Permanent Disturbance (acres)	Map Page[h]
94	724.65	NE	Madison	WST-WL-0013	PEM	1.01	DTL 9	Upper Elkhorn	41.985509	-97.754871	0.003	0.00	CL 542
95	724.65	NE	Madison	WST-WL-0014	PEM	1.01	DTL 9	Upper Elkhorn	41.985493	-97.754824	0.003	0.00	CL 542
96	727.11	NE	Madison	WST-WL-0017	PEM	5.00	DTL 9	Upper Elkhorn	41.965777	-97.715552	0.01	0.00	CL 544
97	727.12	NE	Madison	WST-WL-0018	PEM	5.05	DTL 9	Upper Elkhorn	41.96574	-97.715477	0.01	0.00	CL 544
98	740.59	NE	Madison	W0501702MA001	PEM	18.23	DTL 9	Lower Elkhorn	41.892779	-97.479086	0.06	0.00	CL 554
99	740.59	NE	Madison	W0501702MA001	PEM	11.24	DTL 9	Lower Elkhorn	41.892814	-97.478951	See above	0.00	CL 554
100	741.62	NE	Madison	W0501702MA002	PFO	56.02	DTL 158	Lower Elkhorn	41.885646	-97.461466	0.00	0.00	CL 555; AUX 57
101	741.63	NE	Madison	W0501702MA002	PFO	72.21	DTL 158	Lower Elkhorn	41.885548	-97.461245	0.00	0.00	CL 555; AUX 57
102	742.09	NE	Madison	W0501702MA003	PEM	109.77	DTL 9	Lower Elkhorn	41.8824	-97.453473	0.64	0.00	CL 555
103	742.12	NE	Madison	W0501702MA003	PEM	183.39	DTL 9	Lower Elkhorn	41.882217	-97.452967	See above	0.00	CL 555
104	742.15	NE	Madison	W0501702MA003	PEM	0.79	DTL 9	Lower Elkhorn	41.881941	-97.452505	See above	0.00	CL 555
105	743.51	NE	Madison	W0501703MA001	PEM	185.32	DTL 9	Lower Elkhorn	41.872572	-97.429269	0.84	0.00	CL 556; AR 206
106	743.55	NE	Madison	W0501703MA001	PEM	227.21	DTL 9	Lower Elkhorn	41.872261	-97.428547	See above	0.00	CL 556; AR 206
107	744.33	NE	Madison	W0502702MA001	PEM	127.47	DTL 9	Lower Elkhorn	41.865242	-97.416959	0.25	0.00	CL 557; AR 207
108	744.34	NE	Madison	W0502702MA002	PFO	-	NC	Lower Elkhorn	41.865209	-97.416717	0.01	0.00	CL 557; AR 207
109	744.34	NE	Madison	W0502702MA002	PFO	-	NC	Lower Elkhorn	41.865178	-97.416674	See above	0.00	CL 557; AR 207
110	744.35	NE	Madison	W0502702MA001	PEM	118.95	DTL 9	Lower Elkhorn	41.86497	-97.41662	0.25	0.00	CL 557; AR 207
111	747.02	NE	Madison	W0503702MA001	PEM	-	DTL 9	Lower Elkhorn	41.837457	-97.380465	0.03	0.00	CL 559
112	749.42	NE	Stanton	W0522703ST001	PEM	1.92	DTL 9	Lower Elkhorn	41.812927	-97.347726	0.02	0.00	CL 561

Table H-1: Keystone XL Pipeline Project Wetland Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Wetland ID	Wetland Type[a]	Length Crossed (feet) [b.c]	Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Disturbance (acres)[f,g]	Permanent Disturbance (acres)	Map Page[h]
113	749.43	NE	Stanton	W0522703ST001	PEM	7.45	DTL 9	Lower Elkhorn	41.812908	-97.347668	See above	0.00	CL 561
114	749.99	NE	Stanton	W0522703ST002	PEM	5.74	DTL 9	Lower Elkhorn	41.806625	-97.340496	0.01	0.00	CL 561
115	751.10	NE	Stanton	W0504701ST001	PEM	3.21	DTL 9	Lower Elkhorn	41.796822	-97.323652	0.01	0.00	CL 562
116	754.30	NE	Stanton	W0522703ST003	PFO	342.40	DTL 21	Lower Elkhorn	41.763675	-97.280719	0.00	0.00	CL 564
117	754.33	NE	Stanton	W0522703ST003	PEM	-	NC	Lower Elkhorn	41.763255	-97.280474	0.0001	0.00	CL 564
118	754.97	NE	Stanton	W0920702ST001	PEM	13.84	DTL 9	Lower Elkhorn	41.755463	-97.275348	0.04	0.00	CL 565
119	757.23	NE	Platte	W0502703PL002	PEM	25.87	DTL 9	Lower Elkhorn	41.72281	-97.276452	0.05	0.00	CL 566; CL 567
120	759.36	NE	Platte	W0502703PL004	PFO	44.27	DTL 9	Lower Elkhorn	41.696275	-97.263132	0.07	0.00	CL 568
121	762.12	NE	Colfax	W0502701CO001	PEM	47.75	DTL 9	Lower Platte-Shell	41.66816	-97.229855	0.10	0.00	CL 570
122	762.30	NE	Colfax	W0502701CO002	PEM	24.80	DTL 9	Lower Platte-Shell	41.66547	-97.229829	0.05	0.00	CL 570
123	776.16	NE	Colfax	W0505703CO002	PEM	167.60	DTL 21	Lower Platte-Shell	41.46766	-97.210632	0.00	0.00	CL 581
124	776.18	NE	Colfax	W0505703CO002	PEM	-	DTL 21	Lower Platte-Shell	41.467474	-97.210366	0.00	0.00	CL 581
125	776.25	NE	Colfax	W0505703CO002	PEM	702.35	DTL 21	Lower Platte-Shell	41.466427	-97.209994	0.00	0.00	CL 581
126	777.89	NE	Colfax	W0709702CO001	PEM	862.13	DTL 9	Lower Platte-Shell	41.444602	-97.200006	1.84	0.00	CL 582; AR 211; AR 212
127	778.04	NE	Colfax	W0709702CO001	PEM	-	DTL 9	Lower Platte-Shell	41.442867	-97.198415	See above	0.00	CL 582; AR 211; AR 212
128	778.09	NE	Colfax	W0709702CO001	PEM	76.89	DTL 9	Lower Platte-Shell	41.442157	-97.197838	See above	0.00	CL 582; AR 211; AR 212
129	779.69	NE	Colfax	W0718702CO001	PEM	7.58	DTL 9	Lower Platte-Shell	41.419776	-97.195985	1.00	0.00	CL 583
130	779.74	NE	Colfax	W0718702CO001	PEM	483.49	DTL 9	Lower Platte-Shell	41.419072	-97.196324	See above	0.00	CL 583

Table H-1: Keystone XL Pipeline Project Wetland Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Wetland ID	Wetland Type[a]	Length Crossed (feet) [b.c]	Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Disturbance (acres)[f,g]	Permanent Disturbance (acres)	Map Page[h]
131	779.79	NE	Colfax	W0718702CO001	PEM	-	DTL 9	Lower Platte-Shell	41.418332	-97.196779	See above	0.00	CL 583
132	779.84	NE	Colfax	W0912702CO002	PEM	296.80	DTL 9	Lower Platte-Shell	41.417646	-97.196577	0.50	0.00	CL 583; CL 584
133	779.91	NE	Colfax	W0912702CO002	PEM	44.39	DTL 9	Lower Platte-Shell	41.416543	-97.196578	See above	0.00	CL 583; CL 584
134	780.24	NE	Colfax	W0505702CO001	PEM	3399.88	DTL 9	Lower Platte-Shell	41.412114	-97.197688	9.18	0.00	CL 583; CL 584; AR 213
135	780.59	NE	Colfax	W0505702CO001	PEM	210.14	DTL 9	Lower Platte-Shell	41.407061	-97.197385	See above	0.00	CL 584; AR 213
136	780.63	NE	Colfax	W0505702CO001	PEM	-	DTL 9	Lower Platte-Shell	41.406533	-97.197236	See above	0.00	CL 584; AR 213
137	780.66	NE	Colfax	W0505702CO001	PEM	322.79	DTL 9	Lower Platte-Shell	41.406134	-97.197385	See above	0.00	CL 584; AR 213
138	780.79	NE	Colfax	W0505702CO001	PEM	870.39	DTL 9	Lower Platte-Shell	41.404244	-97.197414	See above	0.00	CL 584; AR 214; AR 213
139	780.87	NE	Colfax	W0505702CO001	PEM	-	DTL 9	Lower Platte-Shell	41.403033	-97.197276	See above	0.00	CL 584; AR 214; AR 213
140	780.95	NE	Colfax	W0507702CO001	PEM	120.23	DTL 9	Lower Platte-Shell	41.401998	-97.197195	1.09	0.00	CL 584; AR 214; AR 213
141	781.00	NE	Colfax	W0507702CO001	PEM	370.17	DTL 9	Lower Platte-Shell	41.401413	-97.196563	See above	0.00	CL 584; AR 214; AR 213
142	781.11	NE	Colfax	W0507702CO001	PEM	61.55	DTL 9	Lower Platte-Shell	41.40027	-97.195133	See above	0.00	CL 584; AR 214; AR 213
143	781.23	NE	Colfax	W0508702CO002	PEM	61.70	DTL 9	Lower Platte-Shell	41.398496	-97.195142	0.14	0.00	CL 584; AR 214; AR 213
144	781.27	NE	Colfax	W0508702CO003	PEM	6.52	DTL 9	Lower Platte-Shell	41.397961	-97.195045	0.02	0.00	CL 584; CL 585; AR 214; AR 213
145	781.30	NE	Colfax	W0508702CO004	PEM	-	DTL 9	Lower Platte-Shell	41.39752	-97.195	0.06	0.00	CL 584; CL 585;

Table H-1: Keystone XL Pipeline Project Wetland Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Wetland ID	Wetland Type[a]	Length Crossed (feet) [b.c]	Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Disturbance (acres)[f,g]	Permanent Disturbance (acres)	Map Page[h]
													AR 214; AR 213
146	781.30	NE	Colfax	W0508702CO004	PEM	36.21	DTL 9	Lower Platte-Shell	41.397487	-97.195154	See above	0.00	CL 584; CL 585; AR 214; AR 213
147	782.31	NE	Butler	W0913702BT001	PEM	-	DTL 15	Lower Platte-Shell	41.382912	-97.19559	0.00	0.00	CL 585; AR 214
148	782.32	NE	Butler	W0913702BT001	PEM	-	DTL 15	Lower Platte-Shell	41.382801	-97.19547	0.00	0.00	CL 585; AR 214
149	782.51	NE	Butler	W0507703BT002	PFO	275.65	DTL 15	Lower Platte-Shell	41.380057	-97.195657	0.00	0.00	CL 585
150	782.56	NE	Butler	W0507703BT001	PEM	13.48	DTL 15	Lower Platte-Shell	41.379366	-97.195705	0.00	0.00	CL 585
151	782.59	NE	Butler	W0507703BT003	PFO	134.04	DTL 15	Lower Platte-Shell	41.378935	-97.195709	0.00	0.00	CL 585; CL 586
152	787.79	NE	Butler	W0507701BT001	PEM	50.76	DTL 9	Lower Platte-Shell	41.303721	-97.19589	0.10	0.00	CL 589; AR 216
153	788.25	NE	Butler	W0507701BT002	PEM	27.27	DTL 9	Lower Platte-Shell	41.297193	-97.194267	0.06	0.00	CL 590; AR 216
154	789.13	NE	Butler	W0508701BT001	PEM	-	DTL 9	Lower Platte-Shell	41.28465	-97.191805	0.26	0.00	CL 590
155	789.14	NE	Butler	W0508701BT001	PEM	2.72	DTL 9	Lower Platte-Shell	41.284551	-97.191651	See above	0.00	CL 590
156	789.15	NE	Butler	W0508701BT001	PEM	125.36	DTL 9	Lower Platte-Shell	41.284411	-97.191474	See above	0.00	CL 590
157	793.08	NE	Butler	W0508703BT001	PEM	-	DTL 158	Upper Big Blue	41.228729	-97.179919	0.00	0.00	CL 593
158	793.09	NE	Butler	W0508703BT001	PEM	56.43	DTL 158	Upper Big Blue	41.228792	-97.179693	0.00	0.00	CL 593
159	794.00	NE	Butler	W0508703BT002	PEM	125.11	DTL 9	Upper Big Blue	41.217309	-97.17582	0.61	0.00	CL 594
160	794.73	NE	Butler	W0518702BT002	PEM	205.44	DTL 9	Upper Big Blue	41.206749	-97.176067	See above	0.00	CL 594; CL 595
161	795.13	NE	Butler	W0509703BT001	PEM	-	DTL 9	Upper Big Blue	41.20113	-97.174309	0.07	0.00	CL 595
162	795.13	NE	Butler	W0509703BT001	PEM	42.15	DTL 9	Upper Big Blue	41.200984	-97.174447	See above	0.00	CL 595

Table H-1: Keystone XL Pipeline Project Wetland Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Wetland ID	Wetland Type[a]	Length Crossed (feet)[b,c]	Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Disturbance (acres)[f,g]	Permanent Disturbance (acres)	Map Page[h]
163	795.16	NE	Butler	W0509703BT002	PEM	-	DTL 9	Upper Big Blue	41.200589	-97.174534	0.37	0.00	CL 595
164	795.27	NE	Butler	W0509703BT002	PEM	170.85	DTL 9	Upper Big Blue	41.199129	-97.174112	See above	0.00	CL 595
165	802.87	NE	Butler	W0510701BT001	PEM	47.60	DTL 9	Upper Big Blue	41.091526	-97.1527	0.19	0.00	CL 601
166	802.93	NE	Butler	W0510701BT001	PEM	46.36	DTL 9	Upper Big Blue	41.09091	-97.152213	See above	0.00	CL 601
167	803.28	NE	Butler	W0518703BT001	PEM	30.90	DTL 9	Upper Big Blue	41.085937	-97.15116	0.19	0.00	CL 601
168	803.29	NE	Butler	W0518703BT001	PEM	63.42	DTL 9	Upper Big Blue	41.085789	-97.151134	See above	0.00	CL 601
169	803.30	NE	Butler	W0518703BT001	PEM	-	DTL 9	Upper Big Blue	41.08558	-97.151318	See above	0.00	CL 601
170	804.56	NE	Butler	W0518701BT001	PEM	34.94	DTL 9	Upper Big Blue	41.067517	-97.14822	0.10	0.00	CL 602
171	804.59	NE	Butler	W0518701BT001	PEM	-	DTL 9	Upper Big Blue	41.06705	-97.148372	See above	0.00	CL 602
172	804.60	NE	Butler	W0518701BT001	PEM	-	DTL 9	Upper Big Blue	41.066986	-97.148309	See above	0.00	CL 602
173	804.82	NE	Butler	W0518701BT001	PEM	63.23	DTL 9	Upper Big Blue	41.063745	-97.148167	0.12	0.00	CL 602
174	807.29	NE	Seward	W0510702SE001	PEM	-	DTL 9	Upper Big Blue	41.03401	-97.172422	0.02	0.00	CL 604
175	807.32	NE	Seward	W0510702SE001	PEM	-	DTL 9	Upper Big Blue	41.033634	-97.172777	0.03	0.00	CL 604
176	833.76	NE	Seward	W0604702SE001	PEM	27.68	DTL 9	West Fork Big Blue	40.71956	-97.109693	0.03	0.00	CL 624; AR 222
177	835.84	NE	Saline	W0511702SA003	PEM	197.13	DTL 9	West Fork Big Blue	40.695252	-97.093461	0.14	0.00	CL 625; CL 626
178	835.94	NE	Saline	W0511702SA002	PFO	34.66	DTL 9	West Fork Big Blue	40.693824	-97.093552	0.06	0.00	CL 625; CL 626
179	839.97	NE	Saline	W0914702SA002	PEM	-	DTL 9	Middle Big Blue	40.635534	-97.093172	0.03	0.00	CL 629
180	840.15	NE	Saline	W0914702SA003	PEM	-	NC	Middle Big Blue	40.632951	-97.093521	0.0003	0.00	CL 629
181	840.15	NE	Saline	W0914702SA003	PEM	-	NC	Middle Big Blue	40.632946	-97.093522	See above	0.00	CL 629

Table H-1: Keystone XL Pipeline Project Wetland Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Wetland ID	Wetland Type[a]	Length Crossed (feet) [b.c]	Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Disturbance (acres)[f,g]	Permanent Disturbance (acres)	Map Page[h]
182	842.40	NE	Saline	W0512701SA001	PEM	50.65	DTL 9	Turkey	40.600574	-97.093438	0.11	0.00	CL 630; AR 224
183	849.19	NE	Saline	W0823618SA001	PEM	123.55	DTL 9	Turkey	40.510509	-97.060366	0.24	0.00	CL 635; CL 636
184	853.03	NE	Saline	W0719702SA001	PEM	26.94	DTL 9	Turkey	40.455851	-97.056235	0.03	0.00	CL 638
185	862.12	NE	Jefferson	W0516702JE001	PEM	35.47	DTL 9	Turkey	40.327215	-97.033622	0.06	0.00	CL 645
186	863.98	NE	Jefferson	W0516703JE002	PEM	-	DTL 9	Middle Big Blue	40.300414	-97.03177	0.003	0.00	CL 647
187	863.98	NE	Jefferson	W0516703JE002	PEM	10.08	DTL 9	Middle Big Blue	40.300313	-97.031583	See above	0.00	CL 647
188	864.18	NE	Jefferson	W0516703JE003	PEM	31.84	DTL 9	Middle Big Blue	40.297495	-97.031756	0.06	0.00	CL 647
189	868.85	NE	Jefferson	W0920702JE004	PEM	29.03	DTL 9	Middle Big Blue	40.232313	-97.015323	0.30	0.00	CL 650; AR 227
190	868.85	NE	Jefferson	W0920702JE004	PEM	-	NC	Middle Big Blue	40.232304	-97.01517	See above	0.00	CL 650; AR 227
191	868.87	NE	Jefferson	W0920702JE004	PEM	161.78	DTL 9	Middle Big Blue	40.232102	-97.015215	See above	0.00	CL 650; AR 227
192	868.87	NE	Jefferson	W0920702JE004	PEM	-	NC	Middle Big Blue	40.232054	-97.015061	See above	0.00	CL 650; AR 227
193	868.96	NE	Jefferson	W0515701JE001	PEM	179.78	DTL 9	Middle Big Blue	40.230765	-97.014663	0.57	0.00	CL 650; CL 651; AR 227
194	868.98	NE	Jefferson	W0515701JE001	PEM	-	DTL 9	Middle Big Blue	40.230559	-97.01444	See above	0.00	CL 650; CL 651; AR 227
195	869.03	NE	Jefferson	W0515701JE001	PEM	19.71	DTL 9	Middle Big Blue	40.229654	-97.014454	See above	0.00	CL 650; CL 651; AR 227
196	869.05	NE	Jefferson	W0515701JE001	PEM	49.97	DTL 9	Middle Big Blue	40.229654	-97.014454	See above	0.00	CL 650; CL 651; AR 227
197	869.10	NE	Jefferson	W0515701JE001	PEM	-	DTL 9	Middle Big Blue	40.228801	-97.014621	See above	0.00	CL 650; CL 651; AR 227
198	871.86	NE	Jefferson	W0515703JE001	PEM	-	DTL 9	Middle Big Blue	40.189144	-97.010482	0.11	0.00	CL 653

Table H-1: Keystone XL Pipeline Project Wetland Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Wetland ID	Wetland Type[a]	Length Crossed (feet) [b.c]	Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Disturbance (acres)[f,g]	Permanent Disturbance (acres)	Map Page[h]
199	871.94	NE	Jefferson	W0515703JE001	PEM	-	DTL 9	Middle Big Blue	40.187878	-97.010473	See above	0.00	CL 653
200	871.98	NE	Jefferson	W0515703JE001	PEM	64.58	DTL 9	Middle Big Blue	40.187238	-97.010781	See above	0.00	CL 653
201	873.14	NE	Jefferson	W0515702JE002	PEM	53.69	DTL 9	Middle Big Blue	40.170469	-97.010217	0.12	0.00	CL 654
202	873.99	NE	Jefferson	W0515702JE001	PEM	65.05	DTL 9	Middle Big Blue	40.158445	-97.008193	0.22	0.00	CL 654
203	874.00	NE	Jefferson	W0515702JE001	PEM	48.63	DTL 9	Middle Big Blue	40.158236	-97.008149	See above	0.00	CL 654

Notes:
a: PEM - palustrine emergent wetland; PSS- palustrine scrub-shrub wetland; and PFO - palustrine forested wetland.
b: Crossing distance is measured along the proposed pipeline ROW centerline.
c: "-" Indicates the wetland is not cross the proposed pipeline ROW centerline, but is encroached upon by ROW workspace.
d: DTL 9 – Standard Wetland Crossing Method; DTL 15 - Typical HDD Crossing Method; DTL 158 – Typical Cased Crossing; DTL 21- Typical Uncased Road/Railroad Crossing Bore Detail . Corresponding Crossing Method Typical Drawing and Details are included in the CMRP (Attachment B of the Federal Dredge and Fill Permit Application).
e: “NC” Indicates the wetland is not crossed by the pipeline ROW centerline. In these instances, the feature would be used for temporary construction workspace, but would not be trenched for the installation of the pipeline.
f : Due to the orientation and shape of certain wetland features, some are crossed multiple times by the pipeline centerline. Each individual crossing is listed so that some features are listed multiple times. Due to the short distance between separate crossings of the same feature, it is expected that during construction these features will be treated as a single crossing. Impact acreage is provided for the entire feature and is not repeated for multiple crossings of the same feature. The note 'See Above' is used in these instances.
g: For wetlands crossed by HDD (DTL 15) or bore (DTL 158 or DLT 21), impact acreage is shown as 0.00 because impacts will be avoided due to the crossing method.
h: This column identifies the specific page(s) of the corresponding mapbook (Appendix J of this Federal Dredge and Fill Application) that depicts the wetland. The abbreviations are: CL – centerline, AR – access road, AUX – auxiliary site

Table H-2: Keystone XL Pipeline Project Wetland Crossings by Access Roads within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Wetland ID	Wetland Type[a]	Access Road ID	Access Road Type	Length Crossed (feet)[b,c]	Subbasin Name	Latitude	Longitude	Temporary Disturbance[d]	Permanent Disturbance	Map Page[e]
1	149.26	MT	McCone	W0725619MC001	PEM	CAR-439	Temporary	2.27	Redwater	47.446986	-105.514454	0.03	0.00	AR 66
2	149.27	MT	McCone	W0725619MC001	PEM	CAR-439	Temporary	NC	Redwater	47.447001	-105.514097	See above	0.00	AR 66
3	198.37	MT	Dawson	W1023620DA002	PEM	CAR-128	Permanent	10.74	Lower Yellowstone	46.876414	-104.955603	0.04	0.024	AR 78
4	198.37	MT	Dawson	W1023620DA002	PEM	CAR-128	Permanent	6.87	Lower Yellowstone	46.87634	-104.955636	See above	0.018	AR 78
5	199.86	MT	Dawson	W1023620DA001	PEM	CAR-128	Permanent	14.10	Lower Yellowstone	46.874525	-104.936281	0.02	0.014	AR 79
6	199.87	MT	Dawson	W1023620DA001	PEM	CAR-128	Permanent	4.26	Lower Yellowstone	46.87454	-104.936229	See above	0.008	AR 79
7	289.04	SD	Harding	W109HA001	PEM	CAR-163	Permanent	45.75	Upper Little Missouri	45.863552	-103.989438	0.06	0.059	CL 216; AR 97
8	289.11	SD	Harding	W109HA001	PEM	CAR-163	Permanent	NC	Upper Little Missouri	45.863519	-103.987676	See above	0.001	CL 216; AR 97
9	296.14	SD	Harding	W302HA001	PEM	CAR-041	Temporary	56.60	Upper Little Missouri	45.801494	-103.87182	0.04	0.00	AR 101
10	321.12	SD	Harding	W0906620HA002	PEM	CAR-469	Temporary	240.40	South Fork Grand	45.577767	-103.545045	0.18	0.00	AR 115
11	321.13	SD	Harding	W0906620HA002	PEM	CAR-469	Temporary	312.01	South Fork Grand	45.577964	-103.543593	0.23	0.00	AR 115
12	327.52	SD	Harding	W0528618HA001	PEM	CAR-231	Temporary	NC	South Fork Grand	45.534826	-103.421649	0.60	0.00	AR 118
13	327.52	SD	Harding	W0528618HA001	PEM	CAR-231	Temporary	144.60	South Fork Grand	45.534468	-103.421696	See above	0.00	AR 118
14	327.55	SD	Harding	W0528618HA001	PEM	CAR-231	Temporary	223.82	South Fork Grand	45.533755	-103.421673	See above	0.00	AR 118
15	327.58	SD	Harding	W0528618HA001	PEM	CAR-231	Temporary	489.82	South Fork Grand	45.532729	-103.421558	See above	0.00	AR 118
16	421.05	SD	Meade	W09196198ME001	PEM	CAR-471	Temporary	NC	Lower Cheyenne	44.632848	-102.059908	0.00	0.00	AR 148
17	434.59	SD	Haakon	W0808620HK001	PEM	CAR-313-ALT	Temporary	54.43	Lower Cheyenne	44.463294	-101.941166	0.08	0.00	AR 156
18	486.16	SD	Haakon	W0810620HK001	PEM	CAR-462	Temporary	70.29	Bad	44.076185	-101.104368	See above	0.00	CL 364; AR 173
19	659.18	NE	Holt	W306HT005	PEM	CAR-293	Temporary	22.09	Lower Niobrara	42.555484	-98.667553	0.02	0.00	CL 493; AR 197
20	780.92	NE	Colfax	W0505702CO002	PEM	VAR-46G	Permanent	5.73	Lower Platte-Shell	41.402361	-97.197366	0.01	0.01	CL 584; AR 214; AR 213
21	781.16	NE	Colfax	W0508702CO004	PEM	CAR-374	Temporary	NC	Lower Platte-Shell	41.399544	-97.194577	0.00	0.00	CL 584; AR 214; AR 213

Table H-2: Keystone XL Pipeline Project Wetland Crossings by Access Roads within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Wetland ID	Wetland Type[a]	Access Road ID	Access Road Type	Length Crossed (feet)[b,c]	Subbasin Name	Latitude	Longitude	Temporary Disturbance[d]	Permanent Disturbance	Map Page[e]
22	818.74	NE	Seward	W0926618SE001	PEM	CAR-435	Temporary	237.15	West Fork Big Blue	40.890346	-97.262183	0.16	0.00	CL 613; AR 220
23	834.73	NE	Seward	W0602702SE001	PEM	CAR-395	Temporary	0.46	West Fork Big Blue	40.705479	-97.100753	0.01	0.00	CL 625; AR 223

a: PEM - palustrine emergent wetland; **PSS**- palustrine scrub-shrub wetland; and **PFO** - palustrine forested wetland.
b: Crossing distance is measured along the proposed access road centerline
c: "-" Indicates the wetland or waterbody is not cross the proposed access road centerline, but is encroached upon by access road workspace.
d: Due to the orientation and shape of certain wetland features, some are crossed multiple times by the access road centerline. Each individual crossing is listed so that some features are listed multiple times. Due to the short distance between separate crossings of the same feature, it is expected that during construction these features will be treated as a single crossing. Impact acreage is provided for the entire feature and is not repeated for multiple crossings of the same feature. The note 'See Above' is used in these instances.
E: This column identifies the specific page(s) of the corresponding mapbook (Appendix J of this Federal Dredge and Fill Application) that depicts the wetland. The abbreviations are: CL – centerline, AR – access road.

Appendix I – Waterbody Crossing Table

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
1	9.04	MT	Phillips	Unnamed Tributary to Dunham Coulee	EPH	S_UTM13_06675	61.46	DTL 11	Whitewater	48.895072	-107.427991	0.15	0.00	CL 7
2	9.12	MT	Phillips	Dunham Coulee	EPH	S_UTM13_06677	46.82	DTL 161	Whitewater	48.894506	-107.426473	0.15	0.00	CL 7
3	11.26	MT	Phillips	Unnamed Tributary to East Fork Whitewater River	EPH	S_MDEQ_0016	2.33	DTL 161	Whitewater	48.867129	-107.406096	0.01	0.00	CL 9
4	13.75	MT	Phillips	Unnamed Tributary to Cottonwood Creek 01	INT	S_UTM13_00263	48.69	DTL 11	Frenchman	48.843605	-107.36591	0.15	0.00	CL 11
5	13.82	MT	Phillips	Unnamed Tributary to Cottonwood Creek 02	INT	S_UTM13_00263_1	48.27	DTL 11	Frenchman	48.843017	-107.3645	0.11	0.00	CL 11
6	14.64	MT	Phillips	Unnamed Tributary to Cottonwood Creek 03	EPH	S_UTM13_00271	23.75	DTL 161	Frenchman	48.835641	-107.350494	0.07	0.00	CL 11; CL 12; AR 6
7	16.43	MT	Phillips	Unnamed Tributary to Cottonwood Creek 04	EPH	S_UTM13_00280	32.40	DTL 11	Frenchman	48.818281	-107.32249	0.07	0.00	CL 13; AR 8
8	25.28	MT	Phillips	Frenchman Creek	PER	S106PH013	98.93	DTL 15	Frenchman	48.723301	-107.208132	0.00	0.00	CL 19; AR 15
9	32.26	MT	Valley	East Fork Cache Creek	EPH	S_UTM13_06100	13.22	DTL 161	Rock	48.654927	-107.10216	0.06	0.00	CL 25; AR 19
10	32.31	MT	Valley	Unnamed Tributary to East Fork Cache Creek 01	EPH	S_Trow_00900	53.52	DTL 161	Rock	48.654394	-107.1014	0.13	0.00	CL 25; AR 19

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
11	32.48	MT	Valley	Unnamed Tributary to East Fork Cache Creek 02	EPH	S_MDEQ_0027	2.39	DTL 11	Rock	48.652538	-107.098846	0.01	0.00	CL 25; AR 19
12	33.01	MT	Valley	Papoose Creek	EPH	S_MDEQ_0028	15.79	DTL 161	Rock	48.646745	-107.090878	0.06	0.00	CL 25; AR 20
13	33.07	MT	Valley	Papoose Creek	EPH	S_MDEQ_0028	6.49	DTL 161	Rock	48.64621	-107.090119	See above	0.00	CL 25; AR 20
14	33.68	MT	Valley	Unnamed Tributary to Papoose Creek	EPH	S711VA001	6.20	DTL 11	Rock	48.639719	-107.081366	0.02	0.00	CL 26
15	39.02	MT	Valley	Rock Creek	PER	S106VA009	49.88	DTL 13/14	Rock	48.584692	-107.002154	0.10	0.00	CL 30
16	40.39	MT	Valley	Willow Creek	PER	S_UTM13_13796	47.27	DTL 13/14	Rock	48.576529	-106.978697	0.09	0.00	CL 31
17	43.26	MT	Valley	Unnamed Tributary to Lime Creek 01	EPH	S_MDEQ_0036	4.60	DTL 161	Lower Milk	48.545781	-106.941961	0.02	0.00	CL 33
18	43.69	MT	Valley	Unnamed Tributary to Lime Creek 02	EPH	S_MDEQ_0038	4.01	DTL 161	Lower Milk	48.541617	-106.93514	0.01	0.00	CL 33; AR 24
19	44.12	MT	Valley	Unnamed Tributary to Lime Creek 03	INT	S126VA001-1	6.56	DTL 11	Lower Milk	48.537378	-106.928277	0.02	0.00	CL 33; AR 24
20	45.01	MT	Valley	Lime Creek	INT	S126VA002	37.04	DTL 11	Lower Milk	48.528089	-106.915266	0.09	0.00	CL 34
21	49.76	MT	Valley	Unnamed Tributary to Bear Creek	EPH	S31VA002	10.99	DTL 11	Lower Milk	48.476262	-106.848045	0.10	0.00	CL 38; AR 26
22	49.83	MT	Valley	Unnamed Tributary to Bear Creek	EPH	S31VA002	25.47	DTL 161	Lower Milk	48.475495	-106.846991	See above	0.00	CL 38; AR 26

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
23	51.20	MT	Valley	Brush Fork	INT	S5AVA004	18.09	DTL 11	Lower Milk	48.460482	-106.827794	0.04	0.00	CL 39
24	52.38	MT	Valley	Bear Creek	Seasonal	S14VA002	9.00	DTL 11	Lower Milk	48.447887	-106.810586	0.03	0.00	CL 40
25	53.41	MT	Valley	Unger Coulee	INT	S14VA003	3.30	DTL 11	Lower Milk	48.436728	-106.795958	0.03	0.00	CL 40
26	55.37	MT	Valley	Buggy Creek	Seasonal	S14VA004	41.98	DTL 11	Lower Milk	48.416422	-106.766739	0.07	0.00	CL 42
27	57.06	MT	Valley	Alkali Coulee	EPH	S14VA005	8.03	DTL 11	Lower Milk	48.398752	-106.744448	0.03	0.00	CL 43; AR 32
28	57.61	MT	Valley	Unnamed Tributary to Alkali Coulee	INT	S_UTM13_00780	17.34	DTL 161	Lower Milk	48.392771	-106.73632	0.05	0.00	CL 43; CL 44; AR 32
29	59.42	MT	Valley	Wire Grass Coulee	EPH	S14VA006	9.00	DTL 11	Lower Milk	48.371861	-106.714155	0.03	0.00	CL 45
30	59.93	MT	Valley	Spring Creek	INT	S14VA007	15.60	DTL 11	Lower Milk	48.366808	-106.70578	0.04	0.00	CL 45
31	61.77	MT	Valley	Mooney Coulee	EPH	S_UTM13_08744	31.46	DTL 11	Lower Milk	48.350881	-106.675893	0.08	0.00	CL 47
32	66.03	MT	Valley	Cherry Creek	EPH	S_UTM13_15972	13.20	DTL 11	Lower Milk	48.310541	-106.611283	0.02	0.00	CL 50
33	69.52	MT	Valley	Spring Coulee	EPH	S_UTM13_15973	11.06	DTL 11	Lower Milk	48.287683	-106.546259	0.03	0.00	CL 52
34	71.85	MT	Valley	East Fork Cherry Creek	EPH	S106VA011	10.57	DTL 11	Lower Milk	48.259029	-106.527951	0.03	0.00	CL 54
35	71.90	MT	Valley	Unnamed Tributary to East Fork Cherry Creek 01	EPH	S_MDEQ_0301	7.67	DTL 161	Lower Milk	48.258324	-106.527727	0.02	0.00	CL 54; AR 37
36	72.33	MT	Valley	Unnamed Tributary to East Fork Cherry Creek 02	EPH	S_MDEQ_0300	23.61	DTL 161	Lower Milk	48.252305	-106.524996	0.06	0.00	CL 54; CL 55; AR 37
37	78.59	MT	Valley	Espeil Coulee	INT	S_UTM13_06354	11.50	DTL 11	Lower Milk	48.187399	-106.437165	0.03	0.00	CL 59; AR 39

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
38	80.20	MT	Valley	Unnamed Tributary to Milk River	EPH	S_MDEQ_0056	7.65	DTL 11	Lower Milk	48.173046	-106.410167	0.02	0.00	CL 60; AR 40
39	83.45	MT	Valley	Milk River	PER	S14VA008	113.34	DTL 15	Lower Milk	48.131411	-106.389174	0.00	0.00	CL 63
40	85.00	MT	Valley	Bor - Main Drain No. Vw22 Canal	INT	S567VA005	20.92	DTL 158	Lower Milk	48.111468	-106.376538	0.00	0.00	CL 64; AR 43
41	85.10	MT	Valley	Bor - Lateral V-235 Canal	EPH	S567VA006	15.22	DTL 158	Lower Milk	48.110037	-106.375685	0.00	0.00	CL 64; AR 43
42	85.53	MT	Valley	Bor - Vandalia Canal	EPH	S276VA001	27.02	DTL 158	Lower Milk	48.104549	-106.371551	0.00	0.00	CL 64; AR 43
43	89.68	MT	McCone	Missouri River	PER	S7AMC001	1024.93	DTL 15	Prairie Elk-Wolf	48.054884	-106.323766	0.00	0.00	CL 67; AR 45; AR 46
44	94.55	MT	McCone	Unnamed Tributary to Struple Coulee	PER	S7AMC002	16.04	DTL 13/14	Prairie Elk-Wolf	47.994946	-106.283862	0.04	0.00	CL 71
45	94.70	MT	McCone	Struple Coulee	EPH	S31MC002	10.91	DTL 11	Prairie Elk-Wolf	47.992677	-106.282912	0.04	0.00	CL 71
46	95.58	MT	McCone	Unnamed Tributary to Jorgensen Coulee 01	PER	S7AMC004	14.43	DTL 13/14	Prairie Elk-Wolf	47.981974	-106.275066	0.03	0.00	CL 72
47	95.80	MT	McCone	Jorgensen Coulee	INT	S7AMC005	27.55	DTL 11	Prairie Elk-Wolf	47.979322	-106.272258	0.06	0.00	CL 72
48	96.37	MT	McCone	Unnamed Tributary to Jorgensen Coulee 02	EPH	S14MC001	33.64	DTL 11	Prairie Elk-Wolf	47.972617	-106.265084	0.05	0.00	CL 72
49	97.58	MT	McCone	Unnamed Tributary to Colman Coulee 01	EPH	S_MDEQ_0067	7.72	DTL 11	Prairie Elk-Wolf	47.960613	-106.246408	0.02	0.00	CL 73
50	97.62	MT	McCone	Unnamed Tributary to	EPH	S31MC003	18.14	DTL 161	Prairie Elk-Wolf	47.960101	-106.245832	0.08	0.00	CL 73

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
				Colman Coulee 02										
51	99.57	MT	McCone	Unnamed Tributary to West Fork Hungry Creek	EPH	S0121	18.41	DTL 15	Prairie Elk-Wolf	47.93743	-106.221705	0.00	0.00	CL 75
52	99.62	MT	McCone	Unnamed Tributary to West Fork Hungry Creek	EPH	S0121	25.80	DTL 15	Prairie Elk-Wolf	47.936985	-106.220837	0.00	0.00	CL 75
53	100.08	MT	McCone	West Fork Hungry Creek	EPH	S0124	15.31	DTL 161	Prairie Elk-Wolf	47.932838	-106.213209	0.09	0.00	CL 75
54	100.54	MT	McCone	Unnamed Tributary to Beaver Coulee	EPH	S0125	26.10	DTL 11	Prairie Elk-Wolf	47.928794	-106.205331	0.09	0.00	CL 75
55	101.57	MT	McCone	Scotsman Coulee	INT	S_UTM13_01407	39.04	DTL 11	Prairie Elk-Wolf	47.920979	-106.1866	0.09	0.00	CL 76; AR 49
56	102.35	MT	McCone	Unnamed Tributary to Cheer Creek 01	EPH	S31MC001	19.03	DTL 11	Prairie Elk-Wolf	47.913657	-106.174817	0.06	0.00	CL 77
57	102.39	MT	McCone	Unnamed Tributary to Cheer Creek 01	EPH	S31MC001	8.00	DTL 11	Prairie Elk-Wolf	47.913095	-106.174368	See above	0.00	CL 77
58	103.42	MT	McCone	Unnamed Tributary to Bear Creek 02	EPH	S_UTM13_05094	61.49	DTL 161	Fort Peck Reservoir	47.899062	-106.167146	0.15	0.00	CL 77; CL 78; AR 50
59	103.47	MT	McCone	Unnamed Tributary to Bear Creek 03	EPH	S_UTM13_05096	18.92	DTL 11	Fort Peck Reservoir	47.898353	-106.166925	0.06	0.00	CL 78; AR 50

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
60	103.87	MT	McCone	Unnamed Tributary to Bear Creek 04	EPH	S0133	31.72	DTL 11	Fort Peck Reservoir	47.895119	-106.160912	0.06	0.00	CL 78; AR 50
61	106.29	MT	McCone	Bear Creek	EPH	S14MC003	12.82	DTL 161	Fort Peck Reservoir	47.881075	-106.113784	0.05	0.00	CL 80
62	106.59	MT	McCone	Unnamed Tributary to Bear Creek 05	EPH	S802MC001	-	DTL 161	Fort Peck Reservoir	47.877411	-106.110235	0.01	0.00	CL 80
63	106.59	MT	McCone	Unnamed Tributary to Bear Creek 05	EPH	S802MC001	12.11	DTL 161	Fort Peck Reservoir	47.877346	-106.110331	See above	0.00	CL 80
64	106.59	MT	McCone	Unnamed Tributary to Bear Creek 05	EPH	S802MC001	-	DTL 161	Fort Peck Reservoir	47.877264	-106.110439	See above	0.00	CL 80
65	107.66	MT	McCone	Unnamed Tributary to North Prong Shade Creek 01	EPH	S_UTM13_06120	36.61	DTL 161	Prairie Elk-Wolf	47.86529	-106.096669	0.10	0.00	CL 81
66	108.30	MT	McCone	Unnamed Tributary to North Prong Shade Creek 02	EPH	S304MC001	14.71	DTL 161	Prairie Elk-Wolf	47.857668	-106.088364	0.34	0.00	CL 81
67	108.52	MT	McCone	Unnamed Tributary to North Prong Shade Creek 02	EPH	S304MC001	-	DTL 11	Prairie Elk-Wolf	47.855369	-106.085621	See above	0.00	CL 81
68	108.53	MT	McCone	Unnamed Tributary to North Prong Shade Creek 02	EPH	S304MC001	85.04	DTL 11	Prairie Elk-Wolf	47.855385	-106.085374	See above	0.00	CL 81

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
69	109.29	MT	McCone	North Prong Shade Creek	EPH	S802MC003	324.32	DTL 11	Prairie Elk-Wolf	47.845905	-106.077128	0.81	0.00	CL 82
70	111.51	MT	McCone	Shade Creek	INT	S113MC001	17.73	DTL 11	Prairie Elk-Wolf	47.822406	-106.044725	0.06	0.00	CL 83; CL 84
71	111.56	MT	McCone	Unnamed Tributary to Shade Creek 01	EPH	S_UTM13_01557	22.17	DTL 11	Prairie Elk-Wolf	47.821815	-106.044502	0.06	0.00	CL 84
72	111.59	MT	McCone	Unnamed Tributary to Shade Creek 02	EPH	S_MDEQ_0073	2.59	DTL 161	Prairie Elk-Wolf	47.82134	-106.044295	0.01	0.00	CL 84
73	112.47	MT	McCone	Unnamed Tributary to Shade Creek 03	EPH	S113MC002	5.41	DTL 161	Prairie Elk-Wolf	47.812023	-106.031488	0.01	0.00	CL 84
74	112.48	MT	McCone	Unnamed Tributary to Shade Creek 04	EPH	S113MC003	6.79	DTL 161	Prairie Elk-Wolf	47.81189	-106.031317	0.01	0.00	CL 84
75	112.68	MT	McCone	Unnamed Tributary to Shade Creek 05	EPH	S_UTM13_01569	29.55	DTL 161	Prairie Elk-Wolf	47.809764	-106.028548	0.08	0.00	CL 84; CL 85
76	114.83	MT	McCone	Unnamed Tributary to South Fork Shade Creek 01	EPH	S_UTM13_06126	48.47	DTL 11	Prairie Elk-Wolf	47.784274	-106.005195	0.13	0.00	CL 86
77	115.31	MT	McCone	South Fork Shade Creek	INT	S113MC004	29.78	DTL 11	Prairie Elk-Wolf	47.779943	-105.997363	0.05	0.00	CL 86
78	115.72	MT	McCone	Unnamed Tributary to South Fork Shade Creek 02	EPH	exp-WB-13540	14.28	DTL 11	Prairie Elk-Wolf	47.777927	-105.988883	0.03	0.00	CL 87
79	116.89	MT	McCone	Unnamed Tributary to	EPH	S110MC002	47.62	DTL 11	Prairie Elk-Wolf	47.767889	-105.974612	0.11	0.00	CL 87

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
				South Fork Shade Creek 03										
80	121.48	MT	McCone	Unnamed Tributary to Flying V Creek 01	EPH	S_UTM13_01697	8.70	DTL 161	Prairie Elk-Wolf	47.717591	-105.912735	0.02	0.00	CL 91
81	121.58	MT	McCone	Unnamed Tributary to Flying V Creek 02	EPH	S_UTM13_01702	21.74	DTL 11	Prairie Elk-Wolf	47.716235	-105.911584	0.06	0.00	CL 91
82	123.70	MT	McCone	Figure Eight Creek	INT	S5AMC001	9.71	DTL 11	Prairie Elk-Wolf	47.693022	-105.883229	0.04	0.00	CL 92; CL 93
83	124.43	MT	McCone	Elk Creek 01	EPH	S901MC002_1	-	DTL 11	Prairie Elk-Wolf	47.684966	-105.873798	0.08	0.00	CL 93
84	124.46	MT	McCone	Elk Creek 01	EPH	S901MC002_1	28.40	DTL 11	Prairie Elk-Wolf	47.684724	-105.873464	See above	0.00	CL 93
85	124.52	MT	McCone	Elk Creek 02	EPH	S901MC002	35.97	DTL 11	Prairie Elk-Wolf	47.683956	-105.872433	0.09	0.00	CL 93
86	125.92	MT	McCone	Unnamed Tributary to East Fork Prairie Elk Creek 01	EPH	S0166	34.32	DTL 11	Prairie Elk-Wolf	47.666868	-105.856976	0.09	0.00	CL 94
87	126.02	MT	McCone	Unnamed Tributary to East Fork Prairie Elk Creek 02	EPH	S0167	13.81	DTL 11	Prairie Elk-Wolf	47.665673	-105.855739	0.03	0.00	CL 94
88	126.99	MT	McCone	Unnamed Tributary to East Fork Prairie Elk Creek 03	EPH	S_UTM13_06128	13.22	DTL 161	Prairie Elk-Wolf	47.656372	-105.840531	0.03	0.00	CL 95
89	127.27	MT	McCone	Unnamed Tributary to East Fork	EPH	S_UTM13_06130	30.77	DTL 11	Prairie Elk-Wolf	47.652678	-105.837346	0.10	0.00	CL 95

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
				Prairie Elk Creek 04										
90	127.50	MT	McCone	Unnamed Tributary to East Fork Prairie Elk Creek 05	INT	S_UTM13_01767	-	DTL 11	Prairie Elk-Wolf	47.650003	-105.834646	0.14	0.00	CL 95
91	127.54	MT	McCone	Unnamed Tributary to East Fork Prairie Elk Creek 05	INT	S_UTM13_01767	22.33	DTL 11	Prairie Elk-Wolf	47.649597	-105.834574	See above	0.00	CL 95
92	128.09	MT	McCone	Unnamed Tributary to East Fork Prairie Elk Creek 06	EPH	S_UTM13_06132	10.35	DTL 11	Prairie Elk-Wolf	47.642156	-105.830088	0.03	0.00	CL 96
93	128.46	MT	McCone	Unnamed Tributary to East Fork Prairie Elk Creek 07	EPH	S_UTM13_06135_1	16.98	DTL 11	Prairie Elk-Wolf	47.637056	-105.827471	0.04	0.00	CL 96
94	129.01	MT	McCone	East Fork Prairie Elk Creek	PER	S7AMC008	17.53	DTL 13/14	Prairie Elk-Wolf	47.632325	-105.818952	0.04	0.00	CL 96
95	129.66	MT	McCone	Unnamed Tributary to East Fork Prairie Elk Creek 08	EPH	S0186	16.21	DTL 11	Prairie Elk-Wolf	47.628426	-105.806497	0.06	0.00	CL 97; AR 57
96	129.76	MT	McCone	Unnamed Tributary to East Fork Prairie Elk Creek 09	EPH	S0187	31.83	DTL 11	Prairie Elk-Wolf	47.627871	-105.805002	0.14	0.00	CL 97; AR 57
97	134.15	MT	McCone	Lost Creek 01	EPH	S105MC004	20.00	DTL 11	Redwater	47.594944	-105.724275	0.05	0.00	CL 100

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
98	136.66	MT	McCone	Lost Creek 02	PER	S105MC001	24.84	DTL 13/14	Redwater	47.572175	-105.683628	0.05	0.00	CL 102
99	137.82	MT	McCone	Lost Creek 03	PER	S105MC002	14.50	DTL 11	Redwater	47.559919	-105.669061	0.03	0.00	CL 103
100	142.26	MT	McCone	Unnamed Tributary to Lost Creek 01	EPH	S_MDEQ_0154	18.38	DTL 11	Redwater	47.5069	-105.627222	0.05	0.00	CL 106
101	142.70	MT	McCone	Unnamed Tributary to Lost Creek 02	EPH	S105MC010	15.70	DTL 11	Redwater	47.502081	-105.621046	0.04	0.00	CL 107
102	142.94	MT	McCone	Unnamed Tributary to Lost Creek 03	EPH	S_MDEQ_0153	24.23	DTL 11	Redwater	47.499368	-105.617592	0.07	0.00	CL 107
103	148.59	MT	McCone	Redwater River	PER	S276MC001	71.52	DTL 13/14	Redwater	47.44224	-105.538797	0.14	0.00	CL 111
104	151.89	MT	McCone	Gyp Creek	EPH	S106MC003	25.32	DTL 11	Redwater	47.408817	-105.489934	0.07	0.00	CL 114
105	154.72	MT	McCone	Unnamed Tributary to Cottonwood Creek 01	EPH	S802MC005	61.18	DTL 161	Redwater	47.381823	-105.445311	0.20	0.00	CL 116; AR 69
106	156.52	MT	McCone	Unnamed Tributary to Cottonwood Creek 02	EPH	S105MC007	23.52	DTL 11	Redwater	47.364718	-105.416564	0.07	0.00	CL 117
107	158.43	MT	Dawson	Cottonwood Creek	INT	S567DA001	60.53	DTL 11	Redwater	47.348934	-105.383138	0.17	0.00	CL 118; CL 119
108	165.06	MT	Dawson	Hay Creek	EPH	S121DA001	12.06	DTL 11	Lower Yellowstone	47.26883	-105.312794	0.05	0.00	CL 123; CL 124

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	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
109	168.18	MT	Dawson	Upper Seven Mile Creek	INT	S8ADA001	22.45	DTL 11	Lower Yellowstone	47.228497	-105.291065	0.05	0.00	CL 126; AR 72
110	168.37	MT	Dawson	Unnamed Tributary to Upper Seven Mile Creek	EPH	S901DA002	26.97	DTL 11	Lower Yellowstone	47.225804	-105.290464	0.06	0.00	CL 126
111	173.16	MT	Dawson	Unnamed Tributary to Clear Creek	EPH	S0247	30.98	DTL 11	Lower Yellowstone	47.164693	-105.2474	0.08	0.00	CL 130
112	177.36	MT	Dawson	Clear Creek	INT	S567DA002	-	DTL 11	Lower Yellowstone	47.120398	-105.193	0.07	0.00	CL 133
113	177.37	MT	Dawson	Clear Creek	INT	S567DA002	59.36	DTL 11	Lower Yellowstone	47.120143	-105.192874	See above	0.00	CL 133
114	177.58	MT	Dawson	Unnamed Tributary to Clear Creek 01	INT	S567DA003	8.28	DTL 11	Lower Yellowstone	47.118078	-105.189923	0.02	0.00	CL 133
115	178.41	MT	Dawson	Unnamed Tributary to Clear Creek 02	EPH	S_UTM13_06137	25.59	DTL 11	Lower Yellowstone	47.108197	-105.179948	0.07	0.00	CL 133; CL 134
116	179.33	MT	Dawson	Unnamed Tributary to Clear Creek 03	INT	S_UTM13_02285	15.90	DTL 11	Lower Yellowstone	47.097195	-105.168901	0.05	0.00	CL 134; AR 74
117	180.10	MT	Dawson	Unnamed Tributary to Clear Creek 04	INT	S_UTM13_07661	16.33	DTL 11	Lower Yellowstone	47.088601	-105.158704	0.03	0.00	CL 135; AR 74
118	181.78	MT	Dawson	Unnamed Tributary to Clear Creek 05	EPH	S_UTM13_06328	47.81	DTL 161	Lower Yellowstone	47.067978	-105.140095	0.12	0.00	CL 136

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
119	182.34	MT	Dawson	Unnamed Tributary to Clear Creek 06	EPH	S_UTM13_06331	26.54	DTL 161	Lower Yellowstone	47.062208	-105.131725	0.06	0.00	CL 136; CL 137
120	182.89	MT	Dawson	Unnamed Tributary to Clear Creek 07	INT	S802DA001	40.05	DTL 11	Lower Yellowstone	47.05686	-105.123112	0.09	0.00	CL 137
121	190.28	MT	Dawson	Cracker Box Creek	INT	S105DA002	5.38	DTL 11	Lower Yellowstone	46.97648	-105.02604	0.01	0.00	CL 142
122	194.90	MT	Dawson	Unnamed Tributary to Yellowstone River	EPH	S_UTM13_02520	39.11	DTL 161	Lower Yellowstone	46.916098	-105.000562	0.12	0.00	CL 146
123	197.33	MT	Dawson	Bor - Glendive Open Drain	EPH	S105DA003	50.18	DTL 158	Lower Yellowstone	46.885742	-104.977413	0.00	0.00	CL 148; AUX 15
124	197.91	MT	Dawson	Side Channel of Yellowstone River	PER	S23DA002	51.45	DTL 15	Lower Yellowstone	46.878348	-104.972065	0.00	0.00	CL 148; AUX 15; AR 77
125	198.21	MT	Dawson	Yellowstone River	PER	S23DA001	717.61	DTL 15	Lower Yellowstone	46.874477	-104.969325	0.00	0.00	CL 148; AR 77; AR 78
126	198.54	MT	Dawson	Unnamed Tributary to Yellowstone River	INT	S_UTM13_08692	39.47	DTL 11	Lower Yellowstone	46.870161	-104.967408	0.10	0.00	CL 149; AR 78
127	203.74	MT	Prairie	Spring Creek	INT	S_UTM13_15735	37.12	DTL 11	Lower Yellowstone	46.829385	-104.881707	0.10	0.00	CL 152
128	204.45	MT	Prairie	Unnamed Tributary to Spring Creek 01	INT	S_UTM13_15737	19.51	DTL 11	Lower Yellowstone	46.822113	-104.872316	0.05	0.00	CL 153

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
129	207.84	MT	Prairie	Unnamed Tributary to Spring Creek 02	EPH	S_MDEQ_0119	10.96	DTL 11	Lower Yellowstone	46.781096	-104.844472	0.03	0.00	CL 155
130	209.37	MT	Prairie	Unnamed Tributary to Hay Creek 01	EPH	S_UTM13_06145	29.44	DTL 11	Lower Yellowstone	46.760159	-104.833579	0.07	0.00	CL 157
131	211.10	MT	Prairie	Hay Creek	INT	S14PR001	11.24	DTL 11	Lower Yellowstone	46.741843	-104.810223	0.03	0.00	CL 158
132	211.15	MT	Prairie	Tributary to Hay Creek	EPH	S901PR001	45.78	DTL 11	Lower Yellowstone	46.741407	-104.809403	0.09	0.00	CL 158
133	211.17	MT	Prairie	Tributary to Hay Creek	EPH	S901PR001	-	DTL 11	Lower Yellowstone	46.74112	-104.809246	See above	0.00	CL 158
134	213.65	MT	Prairie	Unnamed Tributary to Hay Creek 02	EPH	S_UTM13_06147	23.28	DTL 11	Lower Yellowstone	46.7184	-104.768876	0.06	0.00	CL 160
135	214.32	MT	Prairie	Mcnaney Creek	EPH	S_UTM13_02780	24.36	DTL 11	Lower Yellowstone	46.712179	-104.758019	0.06	0.00	CL 160
136	214.41	MT	Prairie	Unnamed Tributary to Cabin Creek 01	EPH	S_MDEQ_0121	11.65	DTL 11	Lower Yellowstone	46.711481	-104.756447	0.03	0.00	CL 160
137	215.86	MT	Prairie	Unnamed Tributary to Cabin Creek 02	EPH	S_UTM13_11525	16.24	DTL 11	Lower Yellowstone	46.699165	-104.731885	0.04	0.00	CL 161; CL 162
138	216.54	MT	Prairie	Unnamed Tributary to Cabin Creek 03	EPH	S_UTM13_15755	51.88	DTL 11	Lower Yellowstone	46.697144	-104.718175	0.07	0.00	CL 162

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
139	217.08	MT	Prairie	Unnamed Tributary to Cabin Creek 04	EPH	S106PR001	5.90	DTL 11	Lower Yellowstone	46.691984	-104.710564	0.01	0.00	CL 162
140	219.01	MT	Prairie	Unnamed Tributary to Cabin Creek 05	INT	S_UTM13_02889	37.27	DTL 11	Lower Yellowstone	46.670356	-104.68649	0.08	0.00	CL 164
141	219.56	MT	Prairie	Unnamed Tributary to Cabin Creek 06	EPH	S_UTM13_06167	15.54	DTL 11	Lower Yellowstone	46.664572	-104.67851	0.04	0.00	CL 164
142	222.07	MT	Fallon	Unnamed Tributary to Deer Creek	EPH	S_MDEQ_0126	42.98	DTL 11	Lower Yellowstone	46.638233	-104.64553	0.11	0.00	CL 166
143	224.22	MT	Fallon	Unnamed Tributary to Pennel Creek	EPH	exp-WB-13562	15.70	DTL 11	O Fallon	46.610492	-104.626766	0.03	0.00	CL 168
144	226.55	MT	Fallon	Unnamed Tributary to Dry Fork Creek 01	EPH	S_MDEQ_0127	32.22	DTL 11	O Fallon	46.581284	-104.602212	0.08	0.00	CL 169
145	228.72	MT	Fallon	Lawrence Creek	INT	S_UTM13_15768	25.25	DTL 11	O Fallon	46.559042	-104.570692	0.07	0.00	CL 171
146	229.02	MT	Fallon	Dry Fork Creek	INT	S_UTM13_15773	16.56	DTL 11	O Fallon	46.555786	-104.567144	0.05	0.00	CL 171
147	230.34	MT	Fallon	Unnamed Tributary to Dry Fork Creek 02	EPH	S_UTM13_06172	32.80	DTL 11	O Fallon	46.543256	-104.548397	0.08	0.00	CL 172; AR 87
148	230.71	MT	Fallon	Unnamed Tributary to Dry Fork Creek 03	EPH	exp-WB-13563	28.18	DTL 11	O Fallon	46.541267	-104.54132	0.07	0.00	CL 172; CL 173; AR 87

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
149	233.88	MT	Fallon	Unnamed Tributary to Pennel Creek 01	INT	S_UTM13_15783	49.04	DTL 11	O Fallon	46.510586	-104.493758	0.10	0.00	CL 175
150	235.49	MT	Fallon	Pennel Creek	PER	S110FA002	-	DTL 13/14	O Fallon	46.489624	-104.48153	0.03	0.00	CL 176
151	235.50	MT	Fallon	Pennel Creek	PER	S110FA002	14.27	DTL 13/14	O Fallon	46.489647	-104.481763	See above	0.00	CL 176
152	235.59	MT	Fallon	Unnamed Tributary to Pennel Creek 02	EPH	exp-WB-13592	-	DTL 11	O Fallon	46.488366	-104.481161	0.08	0.00	CL 176
153	235.60	MT	Fallon	Unnamed Tributary to Pennel Creek 02	EPH	exp-WB-13592	19.05	DTL 11	O Fallon	46.488109	-104.481193	See above	0.00	CL 176
154	238.73	MT	Fallon	Unnamed Tributary to Pennel Creek 03	EPH	S110FA001	34.59	DTL 11	O Fallon	46.462451	-104.442722	0.09	0.00	CL 178; CL 179
155	243.58	MT	Fallon	Unnamed Tributary to Sandstone Creek 01	INT	S_UTM_13_034587	77.61	DTL 161	O Fallon	46.416145	-104.372177	0.21	0.00	CL 182
156	244.91	MT	Fallon	Unnamed Tributary to Sandstone Creek 02	INT	S_UTM_13_4575	50.91	DTL 11	O Fallon	46.400706	-104.355689	0.12	0.00	CL 183
157	245.15	MT	Fallon	Unnamed Tributary to Sandstone Creek 03	INT	S_UTM13_03284	19.03	DTL 11	O Fallon	46.397935	-104.35286	0.05	0.00	CL 183
158	246.37	MT	Fallon	Unnamed Tributary to Sandstone Creek 04	EPH	S_MDEQ_0133	30.99	DTL 11	O Fallon	46.383668	-104.337713	0.08	0.00	CL 184

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
159	247.14	MT	Fallon	Sandstone Creek	EPH	S8AFA007	20.97	DTL 11	O Fallon	46.374278	-104.331673	0.05	0.00	CL 185
160	249.00	MT	Fallon	Unnamed Tributary to Red Butte Creek 01	EPH	S_MDEQ_0136	4.72	DTL 11	O Fallon	46.349432	-104.321018	0.01	0.00	CL 186
161	249.07	MT	Fallon	Red Butte Creek	INT	S9AFA003	25.80	DTL 11	O Fallon	46.348724	-104.320014	0.06	0.00	CL 186
162	249.20	MT	Fallon	Unnamed Tributary to Red Butte Creek 02	EPH	S_UTM13_05771	10.94	DTL 11	O Fallon	46.347272	-104.318181	0.06	0.00	CL 186
163	250.52	MT	Fallon	Unnamed Tributary to Red Butte Creek 03	EPH	S_MDEQ_0137-1	18.50	DTL 11	O Fallon	46.333992	-104.298687	0.05	0.00	CL 187
164	253.54	MT	Fallon	Unnamed Tributary to Red Butte Creek 04	EPH	S_MDEQ_0138	16.75	DTL 11	O Fallon	46.297575	-104.267321	0.04	0.00	CL 189; CL 190
165	253.95	MT	Fallon	Unnamed Tributary to Red Butte Creek 05	INT	S_UTM13_06956	36.24	DTL 11	O Fallon	46.292995	-104.261741	0.08	0.00	CL 190; AR 90
166	254.93	MT	Fallon	Unnamed Tributary to Red Butte Creek 06	INT	S_UTM13_06963	26.35	DTL 11	O Fallon	46.281384	-104.251574	0.06	0.00	CL 190; CL 191; AR 91
167	260.23	MT	Fallon	Unnamed Tributary to Hidden Water Creek	EPH	S_UTM13_06439	33.08	DTL 11	Upper Little Missouri	46.216509	-104.205538	0.08	0.00	CL 194; CL 195; AUX 18
168	261.15	MT	Fallon	Hidden Water Creek	EPH	S8AFA006	13.85	DTL 11	Upper Little Missouri	46.204838	-104.198838	0.04	0.00	CL 195

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
169	265.38	MT	Fallon	Little Beaver Creek	PER	S304FA001	29.78	DTL 13/14	Upper Little Missouri	46.150448	-104.1726	0.07	0.00	CL 198
170	267.41	MT	Fallon	Unnamed Tributary to Little Beaver Creek	EPH	S_UTM13_15801	30.00	DTL 161	Upper Little Missouri	46.121344	-104.171719	0.07	0.00	CL 200
171	270.40	MT	Fallon	Unnamed Tributary to Mud Creek 01	INT	S_UTM13_03717	29.39	DTL 11	Upper Little Missouri	46.079988	-104.1576	0.07	0.00	CL 202
172	270.79	MT	Fallon	Unnamed Tributary to Mud Creek 02	INT	S_UTM13_03722	20.24	DTL 11	Upper Little Missouri	46.07499	-104.15404	0.04	0.00	CL 202
173	271.47	MT	Fallon	Unnamed Tributary to Mud Creek 03	INT	S_TROW_0711	5.12	DTL 11	Upper Little Missouri	46.065537	-104.149767	0.02	0.00	CL 203
174	275.14	MT	Fallon	Soda Creek	INT	S31FA001	6.13	DTL 11	Box Elder	46.018874	-104.117645	0.01	0.00	CL 205; CL 206
175	278.13	MT	Fallon	Unnamed Tributary to North Fork Coal Bank Creek 01	INT	S_UTM13_15815	16.89	DTL 11	Box Elder	45.975899	-104.115723	0.04	0.00	CL 208
176	278.26	MT	Fallon	Unnamed Tributary to North Fork Coal Bank Creek 02	EPH	exp-WB-13564	17.47	DTL 11	Box Elder	45.974006	-104.115389	0.05	0.00	CL 208
177	278.37	MT	Fallon	Unnamed Tributary to North Fork Coal Bank Creek 03	EPH	exp-WB-13565	14.58	DTL 11	Box Elder	45.972462	-104.115383	0.04	0.00	CL 208

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
178	279.08	MT	Fallon	North Fork Coal Bank Creek	INT	S23FA001	4.27	DTL 11	Box Elder	45.962303	-104.115582	0.01	0.00	CL 208; CL 209
179	279.33	MT	Fallon	Unnamed Tributary to North Fork Coal Bank Creek 04	INT	S_UTM13_03868	31.91	DTL 11	Box Elder	45.958576	-104.115378	0.07	0.00	CL 209
180	280.87	MT	Fallon	Unnamed Tributary to North Fork Coal Bank Creek 05	EPH	S_UTM13_06190	24.09	DTL 11	Box Elder	45.941997	-104.09728	0.06	0.00	CL 210
181	282.26	MT	Fallon	South Fork Coal Bank Creek	EPH	S106FA006	8.08	DTL 11	Box Elder	45.927214	-104.079666	0.02	0.00	CL 211
182	284.48	MT	Fallon	Boxelder Creek	PER	S106FA007	62.64	DTL 13/14	Box Elder	45.901718	-104.062621	0.16	0.00	CL 212
183	284.98	MT	Fallon	Unnamed Tributary to Boxelder Creek 01	EPH	S_UTM13_03953	38.50	DTL 11	Box Elder	45.896184	-104.056682	0.10	0.00	CL 213
184	286.66	SD	Harding	Unnamed Tributary to Boxelder Creek 02	EPH	S275HA001	27.30	DTL 11	Box Elder	45.88294	-104.027598	0.07	0.00	CL 214
185	292.68	SD	Harding	Shaw Creek	INT	S29HA001	23.93	DTL 11	Upper Little Missouri	45.833683	-103.927597	0.02	0.00	CL 218; CL 219; AR 100
186	293.64	SD	Harding	Unnamed Tributary to Little Missouri River	EPH	S_UTM13_04433	16.19	DTL 11	Upper Little Missouri	45.826858	-103.910339	0.02	0.00	CL 219
187	295.09	SD	Harding	Little Missouri River	PER	S312HA001	92.80	DTL 15	Upper Little Missouri	45.815722	-103.884886	0.00	0.00	CL 220; AUX 22

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
188	296.66	SD	Harding	Unnamed Tributary to Kimble Creek 01	EPH	exp-WB-13566	34.64	DTL 161	Upper Little Missouri	45.803236	-103.858378	0.09	0.00	CL 221; CL 222
189	296.92	SD	Harding	Unnamed Tributary to Kimble Creek 02	EPH	S302HA001	7.52	DTL 11	Upper Little Missouri	45.800277	-103.855105	0.02	0.00	CL 222
190	297.29	SD	Harding	Unnamed Tributary to Kimble Creek 03	EPH	exp-WB-13567	42.05	DTL 161	Upper Little Missouri	45.798207	-103.848403	0.09	0.00	CL 222
191	297.68	SD	Harding	Unnamed Tributary to Kimble Creek 04	INT	S_UTM13_04476	11.46	DTL 11	Upper Little Missouri	45.797525	-103.840441	0.03	0.00	CL 222
192	298.44	SD	Harding	Unnamed Tributary to Kimble Creek 05	EPH	S500HA001	5.10	DTL 11	Upper Little Missouri	45.792366	-103.827531	0.02	0.00	CL 223
193	299.19	SD	Harding	Unnamed Tributary to Kimble Creek 06	EPH	exp-WB-13568	12.95	DTL 11	Upper Little Missouri	45.787454	-103.814262	0.04	0.00	CL 223
194	299.46	SD	Harding	Unnamed Tributary to Kimble Creek 07	EPH	exp-WB-13569	29.92	DTL 161	Upper Little Missouri	45.785684	-103.809427	0.05	0.00	CL 223; CL 224
195	299.61	SD	Harding	Unnamed Tributary to Kimble Creek 07	EPH	exp-WB-13570	16.18	DTL 161	Upper Little Missouri	45.784609	-103.806608	0.05	0.00	CL 224
196	300.04	SD	Harding	Unnamed Tributary to Kimble Creek	INT	SWTRVHA001	4.08	DTL 11	Upper Little Missouri	45.781731	-103.798742	0.02	0.00	CL 224

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
197	303.48	SD	Harding	Dry House Creek	INT	S_UTM13_07045	16.82	DTL 11	Upper Little Missouri	45.754453	-103.740272	0.03	0.00	CL 226; CL 227
198	303.49	SD	Harding	Dry House Creek	INT	S_UTM13_07045	-	DTL 11	Upper Little Missouri	45.754259	-103.74012	See above	0.00	CL 226; CL 227
199	303.50	SD	Harding	Dry House Creek	INT	S_UTM13_07045	-	DTL 11	Upper Little Missouri	45.754176	-103.740054	See above	0.00	CL 227
200	305.21	SD	Harding	Unnamed Tributary to Jones Creek 01	EPH	S0346	27.85	DTL 161	South Fork Grand	45.742813	-103.709731	0.04	0.00	CL 228
201	306.98	SD	Harding	Unnamed Tributary to Jones Creek 02	INT	S902HA001	9.47	DTL 11	South Fork Grand	45.721901	-103.689983	0.03	0.00	CL 229
202	307.70	SD	Harding	Unnamed Tributary to Jones Creek 03	INT	S902HA002	6.38	DTL 11	South Fork Grand	45.713541	-103.681579	0.03	0.00	CL 230; AR 109
203	309.79	SD	Harding	Unnamed Tributary to Jones Creek 04	EPH	exp-WB-13571	19.08	DTL 11	South Fork Grand	45.687963	-103.662572	0.05	0.00	CL 231
204	311.83	SD	Harding	Unnamed Tributary to Rush Creek 01	EPH	exp-WB-13572	22.84	DTL 161	South Fork Grand	45.663243	-103.642604	0.06	0.00	CL 233
205	312.79	SD	Harding	Unnamed Tributary to Rush Creek 02	INT	S500HA011	28.87	DTL 161	South Fork Grand	45.649538	-103.642696	0.07	0.00	CL 233; CL 234; AR 110
206	320.18	SD	Harding	Slick Creek	EPH	S802HA001	46.68	DTL 161	South Fork Grand	45.596201	-103.520204	0.13	0.00	CL 239; AR 114

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
207	321.47	SD	Harding	Unnamed Tributary to South Fork Grand River 01	EPH	S0359	19.50	DTL 161	South Fork Grand	45.578185	-103.513215	0.06	0.00	CL 240; AR 116
208	321.70	SD	Harding	South Fork Grand River	PER	S123HA006	32.52	DTL 12	South Fork Grand	45.574973	-103.512002	0.08	0.00	CL 240; AR 116
209	321.74	SD	Harding	Unnamed Tributary to South Fork Grand River 02	EPH	S0360	13.58	DTL 11	South Fork Grand	45.574371	-103.511789	0.04	0.00	CL 240; AR 116
210	326.48	SD	Harding	Clarks Fork Creek	PER	S124HA008	9.99	DTL 12	South Fork Grand	45.527903	-103.449906	0.03	0.00	CL 244
211	328.07	SD	Harding	Unnamed Tributary to Clarks Fork Creek	INT	exp-WB-13577	98.47	DTL 11	South Fork Grand	45.518393	-103.420253	0.21	0.00	CL 245; AR 119
212	332.36	SD	Harding	West Squaw Creek 01	INT	S_UTM13_04896	15.11	DTL 11	South Fork Grand	45.477292	-103.357482	0.04	0.00	CL 248
213	332.49	SD	Harding	West Squaw Creek 02	PER	S_UTM13_07391	14.39	DTL 12	South Fork Grand	45.476125	-103.355408	0.04	0.00	CL 248
214	332.50	SD	Harding	West Squaw Creek 02	PER	S_UTM13_07391	-	DTL 12	South Fork Grand	45.476165	-103.355173	See above	0.00	CL 248
215	332.78	SD	Harding	Unnamed Tributary to West Squaw Creek 01	EPH	S_UTM13_07396	18.70	DTL 161	South Fork Grand	45.473164	-103.351739	0.05	0.00	CL 248; CL 249; AR 120
216	334.05	SD	Harding	Unnamed Tributary to West Squaw Creek 02	INT	S304HA001	13.30	DTL 11	South Fork Grand	45.455697	-103.34667	0.05	0.00	CL 249; CL 250

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
217	335.57	SD	Harding	Unnamed Tributary to Double X Creek	EPH	exp-WB-13578	20.66	DTL 11	South Fork Grand	45.434411	-103.344189	0.05	0.00	CL 251
218	337.47	SD	Harding	Unnamed Tributary to Wolf Creek 01	EPH	exp-WB-13579	23.96	DTL 11	Upper Moreau	45.408253	-103.334219	0.06	0.00	CL 252; AR 122
219	338.88	SD	Harding	Unnamed Tributary to Wolf Creek 02	INT	S500HA009	20.88	DTL 11	Upper Moreau	45.390058	-103.32148	0.06	0.00	CL 253
220	339.30	SD	Harding	Wolf Creek	EPH	S304HA002	11.99	DTL 11	Upper Moreau	45.385164	-103.316031	0.04	0.00	CL 253
221	340.87	SD	Harding	Unnamed Tributary to Wolf Creek 03	INT	S500HA007	38.26	DTL 11	Upper Moreau	45.367782	-103.295472	0.15	0.00	CL 255
222	343.15	SD	Harding	Red Butte Creek	INT	S_UTM13_07104	12.10	DTL 11	Upper Moreau	45.348611	-103.257571	0.03	0.00	CL 256
223	344.13	SD	Harding	Giannonatti Creek	INT	S902HA004	6.72	DTL 11	Upper Moreau	45.340548	-103.242044	0.03	0.00	CL 257
224	346.89	SD	Harding	Little Cowboy Creek	EPH	S316HA002	49.04	DTL 11	Upper Moreau	45.312604	-103.202176	0.13	0.00	CL 259
225	351.79	SD	Harding	Spring Creek	PER	SWTRVHA003	104.02	DTL 12	Upper Moreau	45.27665	-103.116814	0.19	0.00	CL 263
226	352.31	SD	Harding	Unnamed Tributary to Spring Creek 01	EPH	exp-WB-13580	15.78	DTL 161	Upper Moreau	45.271925	-103.109121	0.05	0.00	CL 263
227	352.57	SD	Harding	Unnamed Tributary to	INT	S_UTM13_04876	4.11	DTL 11	Upper Moreau	45.269466	-103.105058	0.01	0.00	CL 263

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
				Spring Creek 02										
228	353.07	SD	Harding	Unnamed Tributary to Spring Creek 03	EPH	exp-WB-13581	100.80	DTL 11	Upper Moreau	45.26508	-103.09703	0.27	0.00	CL 264
229	355.08	SD	Harding	Dry Creek	INT	S_UTM13_05016	13.11	DTL 11	Upper Moreau	45.245993	-103.066528	0.03	0.00	CL 265
230	356.36	SD	Harding	Unnamed Tributary to North Fork Moreau River 01	EPH	exp-WB-13582	17.91	DTL 161	Upper Moreau	45.233918	-103.04693	0.07	0.00	CL 266
231	357.33	SD	Harding	Unnamed Tributary to North Fork Moreau River 02	EPH	S302HA002	4.59	DTL 11	Upper Moreau	45.223744	-103.033557	0.02	0.00	CL 267; AR 130
232	361.17	SD	Butte	North Fork Moreau River	PER	S275BU001	109.05	DTL 12	Upper Moreau	45.187384	-102.974796	0.27	0.00	CL 270; AUX 25; AR 131
233	361.81	SD	Butte	Unnamed Tributary to North Fork Moreau River 03	INT	S_UTM13_05257	27.68	DTL 11	Upper Moreau	45.18168	-102.964873	0.07	0.00	CL 270; AR 131
234	366.56	SD	Perkins	Unnamed Tributary to South Fork Moreau River	EPH	S567PE001	14.81	DTL 11	South Fork Moreau	45.134214	-102.896611	0.04	0.00	CL 274
235	369.13	SD	Perkins	South Fork Moreau River	PER	S5APE002	118.10	DTL 12	South Fork Moreau	45.109277	-102.858167	0.35	0.00	CL 276
236	370.80	SD	Perkins	Beverly Creek	INT	S312PE001	18.60	DTL 11	South Fork Moreau	45.091613	-102.83513	0.06	0.00	CL 277

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
237	383.40	SD	Meade	West Branch Pine Creek	INT	S6AME001	20.64	DTL 161	Cherry	44.976672	-102.648715	0.05	0.00	CL 286; CL 287
238	388.06	SD	Meade	Middle Branch Pine Creek	PER	s7ame001	44.20	DTL 12	Cherry	44.923588	-102.590742	0.08	0.00	CL 290
239	388.33	SD	Meade	Tributary to East Branch Pine Creek	INT	S0529618ME001	4.17	DTL 161	Cherry	44.920784	-102.586949	0.01	0.00	CL 290
240	389.62	SD	Meade	Unnamed Tributary to Pine Creek 01	EPH	S_UTM13_07429	7.00	DTL 161	Cherry	44.910548	-102.565533	0.03	0.00	CL 291
241	397.49	SD	Meade	Unnamed Tributary to Pine Creek 02	EPH	exp-WB-13587	22.38	DTL 161	Cherry	44.828859	-102.456763	0.06	0.00	CL 297
242	401.17	SD	Meade	Unnamed Tributary to Pine Creek 03	EPH	S_UTM13_05171	81.23	DTL 161	Cherry	44.793684	-102.401926	0.22	0.00	CL 300
243	401.45	SD	Meade	Unnamed Tributary to Pine Creek 04	EPH	S_UTM13_05178	19.65	DTL 11	Cherry	44.790756	-102.397832	0.05	0.00	CL 300
244	401.90	SD	Meade	Unnamed Tributary to Sulphur Creek 01	EPH	exp-WB-13588	37.17	DTL 11	Cherry	44.786305	-102.391331	0.10	0.00	CL 300
245	402.45	SD	Meade	Unnamed Tributary to Sulphur Creek 02	EPH	S_UTM13_05196	11.26	DTL 11	Cherry	44.780964	-102.383018	0.02	0.00	CL 301
246	403.00	SD	Meade	Unnamed Tributary to Sulphur Creek 03	EPH	S_UTM13_04258	10.35	DTL 161	Cherry	44.774971	-102.37579	0.03	0.00	CL 301

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
247	403.58	SD	Meade	Unnamed Tributary to Sulphur Creek 04	EPH	S275ME005	62.23	DTL 11	Cherry	44.767705	-102.37026	0.15	0.00	CL 302
248	404.30	SD	Meade	Sulphur Creek	PER	S275ME006	68.55	DTL 12	Cherry	44.758684	-102.36319	0.14	0.00	CL 302
249	411.18	SD	Meade	Unnamed Tributary to Spring Creek	INT	S106ME008	6.38	DTL 11	Cherry	44.684829	-102.276916	0.02	0.00	CL 307
250	412.18	SD	Meade	Unnamed Tributary to Red Owl Creek 01	INT	S_UTM13_14774	26.67	DTL 11	Cherry	44.678479	-102.258585	0.07	0.00	CL 308
251	413.31	SD	Meade	Red Owl Creek	PER	S128ME001	32.24	DTL 12	Cherry	44.669742	-102.239193	0.08	0.00	CL 309; AR 145
252	413.32	SD	Meade	Red Owl Creek	PER	S128ME001	-	DTL 12	Cherry	44.669565	-102.23918	See above	0.00	CL 309; AR 145
253	414.06	SD	Meade	Unnamed Tributary to Red Owl Creek 02	INT	S_UTM13_14787	38.06	DTL 11	Cherry	44.664203	-102.226037	0.11	0.00	CL 310
254	424.12	SD	Meade	Narcelle Creek	INT	s7ame004	12.17	DTL 11	Lower Cheyenne	44.561041	-102.087671	0.04	0.00	CL 317
255	424.29	SD	Meade	West Branch Narcelle Creek	INT	s7ame005	16.46	DTL 11	Lower Cheyenne	44.55928	-102.085565	0.05	0.00	CL 317
256	425.71	SD	Meade	Unnamed Tributary to Narcelle Creek 01	INT	S312ME006	26.23	DTL 11	Lower Cheyenne	44.541951	-102.074357	0.06	0.00	CL 318
257	425.85	SD	Meade	Narcelle Creek 01	INT	S312ME001	30.29	DTL 11	Lower Cheyenne	44.540358	-102.072687	0.23	0.00	CL 318

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
258	425.89	SD	Meade	Narcelle Creek 01	INT	S312ME001	-	DTL 11	Lower Cheyenne	44.539848	-102.072369	See above	0.00	CL 318
259	425.89	SD	Meade	Narcelle Creek 01	INT	S312ME001	-	DTL 11	Lower Cheyenne	44.539814	-102.072256	See above	0.00	CL 318
260	425.90	SD	Meade	Narcelle Creek 01	INT	S312ME001	-	DTL 11	Lower Cheyenne	44.53971	-102.072212	See above	0.00	CL 318
261	425.99	SD	Meade	Narcelle Creek 01	INT	S312ME001	72.18	DTL 11	Lower Cheyenne	44.538606	-102.07157	See above	0.00	CL 318
262	426.00	SD	Meade	Narcelle Creek 01	INT	S312ME001	-	DTL 161	Lower Cheyenne	44.538518	-102.071348	See above	0.00	CL 318
263	426.00	SD	Meade	Narcelle Creek 01	INT	S312ME001	8.30	DTL 161	Lower Cheyenne	44.538428	-102.07138	See above	0.00	CL 318
264	427.97	SD	Meade	Unnamed Tributary to Narcelle Creek 02	EPH	S312ME007	34.60	DTL 11	Lower Cheyenne	44.515931	-102.052359	0.10	0.00	CL 320
265	429.40	SD	Meade	Negro Creek	INT	S312ME015	63.21	DTL 11	Lower Cheyenne	44.51392	-102.02387	0.14	0.00	CL 321
266	429.87	SD	Meade	Narcelle Creek 02	INT	S0531618ME001	42.60	DTL 15	Lower Cheyenne	44.51116	-102.01586	0.00	0.00	CL 321; AR 151
267	430.17	SD	Meade	Cheyenne River	PER	exp-WB-13552	1006.30	DTL 15	Lower Cheyenne	44.507456	-102.012726	0.00	0.00	CL 321; AR 151
268	431.06	SD	Pennington	Ash Creek	INT	S312PN001	33.68	DTL 11	Lower Cheyenne	44.497688	-102.001795	0.15	0.00	CL 322; CL 323; AR 152; AR 153
269	433.82	SD	Haakon	Bridger Creek	INT	S8AHK003	-	DTL 15	Lower Cheyenne	44.482291	-101.955096	0.00	0.00	CL 324; AR 155

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
270	433.82	SD	Haakon	Bridger Creek	PER	S8AHK003	34.39	DTL 15	Lower Cheyenne	44.482335	-101.955023	0.00	0.00	CL 324; AR 155
271	443.38	SD	Haakon	Unnamed Tributary to Haxby Draw	EPH	S_UTM14_04948	12.59	DTL 11	Lower Cheyenne	44.392641	-101.823134	0.03	0.00	CL 332
272	448.59	SD	Haakon	West Plum Creek	PER	S308HK002	48.19	DTL 12	Lower Cheyenne	44.345171	-101.74295	0.13	0.00	CL 336; AR 165
273	448.70	SD	Haakon	Unnamed Tributary to West Plum Creek 01	INT	S308HK001	12.68	DTL 11	Lower Cheyenne	44.343709	-101.742114	0.04	0.00	CL 336; AR 165
274	453.12	SD	Haakon	Unnamed Tributary to West Plum Creek 02	EPH	S275HK003	82.00	DTL 11	Lower Cheyenne	44.305134	-101.672969	0.18	0.00	CL 339; AUX 31
275	465.56	SD	Haakon	Unnamed Tributary to Witcher Holes Creek 01	INT	S_UTM13_15946	3.59	DTL 11	Bad	44.198661	-101.473001	0.01	0.00	CL 348
276	465.56	SD	Haakon	Witcher Holes Creek	EPH	S108HK001	27.60	DTL 11	Bad	44.198512	-101.472754	0.25	0.00	CL 348; CL 349
277	465.58	SD	Haakon	Witcher Holes Creek	EPH	S108HK001	54.26	DTL 11	Bad	44.198512	-101.472754	See above	0.00	CL 348; CL 349
278	466.27	SD	Haakon	Unnamed Tributary to Witcher Holes Creek 02	EPH	S_UTM14_08959	10.76	DTL 11	Bad	44.192544	-101.461723	0.03	0.00	CL 349
279	473.09	SD	Haakon	Nowlin Creek	EPH	S567HK002	12.04	DTL 11	Bad	44.139144	-101.347881	0.02	0.00	CL 354

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
280	473.94	SD	Haakon	Unnamed Tributary to Nowlin Creek	EPH	exp-WB-0283	28.92	DTL 161	Bad	44.133663	-101.332673	0.15	0.00	CL 355
281	474.00	SD	Haakon	Unnamed Tributary to Nowlin Creek	EPH	exp-WB-0283	28.62	DTL 161	Bad	44.133316	-101.331666	See above	0.00	CL 355
282	475.44	SD	Haakon	Mud Creek	EPH	S275HK001	86.01	DTL 11	Bad	44.123725	-101.306502	0.14	0.00	CL 356
283	475.62	SD	Haakon	Unnamed Tributary to Mud Creek	EPH	S_UTM14_05033	10.90	DTL 161	Bad	44.123027	-101.302999	0.02	0.00	CL 356
284	477.40	SD	Haakon	Jack Dailey Creek	EPH	S567HK003	24.02	DTL 11	Bad	44.118088	-101.26808	0.07	0.00	CL 357
285	478.94	SD	Haakon	Unnamed Tributary to Jack Dailey Creek 01	INT	S_UTM14_06829	10.27	DTL 161	Bad	44.112301	-101.23842	0.03	0.00	CL 358; CL 359
286	479.48	SD	Haakon	Unnamed Tributary to Jack Dailey Creek 02	EPH	S_UTM14_08970	13.25	DTL 11	Bad	44.110966	-101.227666	0.03	0.00	CL 359
287	483.97	SD	Haakon	Mitchell Creek	PER	S8AHK006	30.64	DTL 12	Bad	44.088301	-101.144296	0.07	0.00	CL 362
288	486.24	SD	Haakon	Bad River	PER	S8AHK008	52.00	DTL 15	Bad	44.074481	-101.104583	0.00	0.00	CL 364; AR 173
289	486.64	SD	Haakon	Unnamed Tributary to Bad River	EPH	S_UTM14_08075	8.56	DTL 11	Bad	44.070991	-101.098021	0.02	0.00	CL 364; AR 174
290	490.38	SD	Jones	Unnamed Tributary to South Creek 01	INT	S_UTM14_06745	32.04	DTL 11	Bad	44.040802	-101.037257	0.08	0.00	CL 367

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
291	491.42	SD	Jones	South Creek	EPH	S_UTM14_06741	12.76	DTL 11	Bad	44.035454	-101.01783	0.03	0.00	CL 368
292	492.89	SD	Jones	Unnamed Tributary to South Creek 02	INT	S_UTM14_06735	12.89	DTL 11	Bad	44.027725	-100.990118	0.14	0.00	CL 369
293	492.94	SD	Jones	Unnamed Tributary to South Creek 02	INT	S_UTM14_06735	18.82	DTL 11	Bad	44.027476	-100.989168	See above	0.00	CL 369
294	493.11	SD	Jones	Unnamed Tributary to South Creek 02	INT	S_UTM14_06735	18.46	DTL 11	Bad	44.02654	-100.986061	See above	0.00	CL 369
295	498.61	SD	Jones	Dry Creek	INT	S313JO001	20.83	DTL 11	Bad	44.002886	-100.882116	0.05	0.00	CL 373
296	501.50	SD	Jones	Unnamed Tributary to Ash Draw 01	INT	S_UTM14_08974	27.38	DTL 11	Bad	43.98382	-100.831361	0.07	0.00	CL 375; CL 376
297	502.11	SD	Jones	Ash Draw	PER	S103JO001	11.29	DTL 12	Bad	43.980888	-100.819935	0.03	0.00	CL 376
298	502.67	SD	Jones	Unnamed Tributary to Dry Creek	EPH	exp-WB-0285	127.63	DTL 161	Bad	43.980284	-100.80877	0.32	0.00	CL 376
299	503.62	SD	Jones	Unnamed Tributary to Ash Draw 02	EPH	exp-WB-0286	40.83	DTL 161	Bad	43.977758	-100.790444	0.10	0.00	CL 377
300	506.45	SD	Jones	White Clay Creek	INT	S23JO001	13.23	DTL 11	Bad	43.977641	-100.734391	0.05	0.00	CL 379
301	511.53	SD	Jones	Unnamed Tributary to East Branch White Clay Creek 01	EPH	exp-WB-0292	79.93	DTL 161	Bad	43.949455	-100.642647	0.17	0.00	CL 383

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
302	512.58	SD	Jones	Unnamed Tributary to East Branch White Clay Creek 02	EPH	exp-WB-0293	23.91	DTL 11	Bad	43.942726	-100.623839	0.04	0.00	CL 384
303	513.28	SD	Jones	Unnamed Tributary to East Branch White Clay Creek 03	EPH	exp-WB-0294	27.51	DTL 161	Bad	43.938406	-100.610995	0.07	0.00	CL 384
304	517.00	SD	Jones	Unnamed Tributary to Medicine Creek 01	EPH	exp-WB-0295	23.94	DTL 161	Medicine	43.904106	-100.561921	0.06	0.00	CL 387
305	522.02	SD	Jones	Unnamed Tributary to Medicine Creek 02	INT	S_UTM14_08534	20.66	DTL 161	Medicine	43.868198	-100.475298	0.05	0.00	CL 391
306	523.56	SD	Jones	UNNAMED TRIBUTARY TO Williams CREEK 01	EPH	exp-WB-0296	15.58	DTL 11	Lower White	43.858013	-100.447954	0.05	0.00	CL 392
307	523.98	SD	Jones	Unnamed Tributary to Williams Creek 02	INT	S_UTM14_06515	8.20	DTL 11	Lower White	43.855279	-100.440356	0.04	0.00	CL 392
308	525.17	SD	Jones	Williams Creek	EPH	S_UTM14_06510	8.18	DTL 11	Lower White	43.847073	-100.420028	0.020	0.00	CL 393; AUX 40
309	526.87	SD	Jones	Unnamed Tributary to Williams Creek 03	INT	S_UTM14_06503	12.52	DTL 11	Lower White	43.834962	-100.39005	0.048	0.00	CL 394; CL 395
310	534.70	SD	Lyman	Sedlano Creek	INT	S6ALY002	15.44	DTL 11	Lower White	43.781055	-100.253818	0.03	0.00	CL 400; AR 177

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
311	534.85	SD	Lyman	Unnamed Tributary to Sedlano Creek 01	EPH	S567LY002	8.19	DTL 11	Lower White	43.780744	-100.25092	0.02	0.00	CL 400; CL 401; AR 177
312	535.48	SD	Lyman	Unnamed Tributary to Sedlano Creek 02	INT	S_UTM14_06408	7.81	DTL 11	Lower White	43.775099	-100.241363	0.02	0.00	CL 401
313	537.80	SD	Lyman	Unnamed Tributary to Sedlano Creek 03	INT	S902LY001	107.46	DTL 11	Lower White	43.750638	-100.210715	0.26	0.00	CL 403
314	541.59	SD	Tripp	White River	PER	S7ALY001	488.03	DTL 15	Lower White	43.705592	-100.170194	0.00	0.00	CL 405; CL 406; AUX 42
315	543.54	SD	Tripp	Unnamed Tributary to Little Dog Creek 01	EPH	S567TR001	-	DTL 161	Lower White	43.679904	-100.159954	0.07	0.00	CL 407; AR 180
316	543.55	SD	Tripp	Unnamed Tributary to Little Dog Creek 01	EPH	S567TR001	18.36	DTL 161	Lower White	43.679785	-100.160012	See above	0.00	CL 407; AR 180
317	543.82	SD	Tripp	Little Dog Creek	PER	S567TR002	95.68	DTL 11	Lower White	43.676721	-100.156521	0.23	0.00	CL 407; AR 180
318	543.98	SD	Tripp	Unnamed Tributary to Little Dog Creek 02	EPH	S567TR003	8.10	DTL 161	Lower White	43.674863	-100.154678	0.02	0.00	CL 407; AR 180
319	547.07	SD	Tripp	Unnamed Tributary to Cottonwood Creek 01	INT	S_UTM14_06292	12.00	DTL 161	Lower White	43.63663	-100.124168	0.03	0.00	CL 410
320	547.62	SD	Tripp	Cottonwood Creek	INT	S7ATR002	33.85	DTL 11	Lower White	43.62918	-100.120626	0.12	0.00	CL 410

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
321	549.28	SD	Tripp	Unnamed Tributary to Cottonwood Creek 01	EPH	exp-WB-0301	10.71	DTL 161	Lower White	43.611038	-100.09996	0.03	0.00	CL 411
322	554.18	SD	Tripp	Unnamed Tributary to Owl Creek 01	INT	S_UTM14_08559	7.91	DTL 161	Lower White	43.54802	-100.057703	0.01	0.00	CL 415
323	556.02	SD	Tripp	Unnamed Tributary to Owl Creek 02	EPH	exp-WB-0304	30.95	DTL 11	Lower White	43.525766	-100.03929	0.10	0.00	CL 416
324	556.22	SD	Tripp	Unnamed Tributary to Owl Creek 03	EPH	S_UTM14_06206	5.68	DTL 161	Lower White	43.522995	-100.038374	0.01	0.00	CL 416; CL 417; AUX 44
325	557.91	SD	Tripp	Owl Creek	INT	S_UTM14_08586	34.18	DTL 11	Lower White	43.501308	-100.024543	0.06	0.00	CL 418
326	562.07	SD	Tripp	Unnamed Tributary to Owl Creek 04	EPH	S_UTM14_06175	7.87	DTL 11	Lower White	43.450469	-99.981145	0.02	0.00	CL 421
327	564.95	SD	Tripp	Hollow Creek	INT	S_UTM14_14369	6.82	DTL 11	Lower White	43.41551	-99.952074	0.02	0.00	CL 423
328	565.16	SD	Tripp	Tributary to Hollow Creek	PER	S0611618TR002	8.81	DTL 21	Lower White	43.413461	-99.949467	0.00	0.00	CL 423
329	570.50	SD	Tripp	Dog Ear Creek	INT	S7ATR004	14.70	DTL 11	Lower White	43.351318	-99.888969	0.03	0.00	CL 427
330	570.95	SD	Tripp	Muddy Creek	INT	S7ATR003	15.21	DTL 11	Lower White	43.345993	-99.883603	0.04	0.00	CL 428
331	572.36	SD	Tripp	Unnamed Tributary to Mud Creek	EPH	exp-WB-0307	16.83	DTL 11	Lower White	43.328721	-99.869336	0.04	0.00	CL 429

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
332	577.34	SD	Tripp	Sand Creek	PER	S0611618TR001	7.74	DTL 11	Lower White	43.270348	-99.812486	0.02	0.00	CL 432
333	584.82	SD	Tripp	Unnamed Tributary to Ponca Creek	EPH	exp-WB-0309	22.75	DTL 11	Ponca	43.185127	-99.727479	0.02	0.00	CL 438
334	593.09	SD	Tripp	Unnamed Tributary to Lute Creek 01	EPH	exp-WB-0311	11.11	DTL 11	Keya Paha	43.091217	-99.632429	0.03	0.00	CL 444
335	593.79	SD	Tripp	Unnamed Tributary to Lute Creek 02	EPH	exp-WB-0312	9.95	DTL 11	Keya Paha	43.083481	-99.623928	0.05	0.00	CL 445
336	595.69	SD	Tripp	Lute Creek	INT	S275TR001	5.80	DTL 11	Keya Paha	43.061107	-99.602641	0.02	0.00	CL 446
337	596.74	SD	Tripp	Unnamed Tributary to Lute Creek 03	INT	S_UTM14_05998	10.08	DTL 11	Keya Paha	43.05089	-99.588554	0.03	0.00	CL 447
338	598.95	SD	Tripp	Unnamed Tributary to Buffalo Creek 01	EPH	S_UTM14_05977	13.83	DTL 11	Keya Paha	43.025066	-99.563092	0.03	0.00	CL 448; CL 449; AR 187
339	599.44	SD	Tripp	Unnamed Tributary to Buffalo Creek 02	EPH	exp-WB-0315	14.99	DTL 11	Keya Paha	43.019194	-99.557877	0.02	0.00	CL 449; AR 187
340	600.34	SD	Tripp	Buffalo Creek	EPH	S5ATR005	60.13	DTL 11	Keya Paha	43.008298	-99.548477	0.14	0.00	CL 450
341	602.41	NE	Keya Paha	Unnamed Tributary to Buffalo Creek	EPH	S311KP002	4.87	DTL 11	Keya Paha	42.987545	-99.521376	0.02	0.00	CL 451

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
342	604.71	NE	Keya Paha	Dry Creek	INT	S311KP001	16.69	DTL 11	Keya Paha	42.986173	-99.478222	0.04	0.00	CL 453
343	606.04	NE	Keya Paha	Indian Creek	INT	S311KP005	6.10	DTL 11	Keya Paha	42.983737	-99.452427	0.02	0.00	CL 454
344	608.11	NE	Keya Paha	Shingle Creek	PER	S311KP009	24.62	DTL 12	Keya Paha	42.968526	-99.419224	0.10	0.00	CL 455
345	611.02	NE	Keya Paha	Wolf Creek	INT	S316KP007	25.88	DTL 11	Keya Paha	42.948467	-99.372461	0.06	0.00	CL 457
346	613.66	NE	Keya Paha	Unnamed Tributary to Keya Paha River	INT	S316KP002	-	DTL 11	Keya Paha	42.941771	-99.325307	0.06	0.00	CL 459; AR 188
347	613.66	NE	Keya Paha	Unnamed Tributary to Keya Paha River	INT	S316KP002	16.53	DTL 11	Keya Paha	42.941933	-99.325299	See above	0.00	CL 459; AR 188
348	613.94	NE	Keya Paha	Spotted Tail Creek 01	PER	S316KP001	-	DTL 12	Keya Paha	42.940462	-99.320308	0.00	0.00	CL 459; AR 189; AR 188
349	614.02	NE	Keya Paha	Spotted Tail Creek 02	PER	S316KP001_1	18.95	DTL 12	Keya Paha	42.940127	-99.318827	0.06	0.00	CL 459; AR 189; AR 188
350	615.61	NE	Keya Paha	Dry Run Creek	int	S316KP005	60.26	DTL 11	Keya Paha	42.935211	-99.290069	0.15	0.00	CL 460; CL 461
351	617.10	NE	Keya Paha	Keya Paha River	PER	S0819618KP001	162.25	DTL 15	Keya Paha	42.91641	-99.280483	0.00	0.00	CL 462
352	617.69	NE	Keya Paha	Tributary to Keya Paha River	INT	S0712702KP001	5.19	DTL 11	Keya Paha	42.909357	-99.275239	0.03	0.00	CL 462
353	617.73	NE	Keya Paha	Tributary to Keya Paha River	INT	S0712702KP001	-	DTL 11	Keya Paha	42.909023	-99.275174	See above	0.00	CL 462

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
354	618.86	NE	Keya Paha/Boyd	Oak Creek	PER	S0627618KP001	14.29	DTL 11	Keya Paha	42.899185	-99.257879	0.05	0.00	CL 463
355	618.97	NE	Boyd	Tributary to Oak Creek	INT	S0712702BD001	6.24	DTL 11	Keya Paha	42.898183	-99.256143	0.02	0.00	CL 463; AR 190
356	621.77	NE	Boyd	Big Creek	EPH	S311BD001	6.64	DTL 11	Keya Paha	42.876433	-99.210368	0.04	0.00	CL 465
357	626.70	NE	Holt	Niobrara River	PER	exp-WB-0235	1213.37	DTL 15	Middle Niobrara	42.844621	-99.126857	0.00	0.00	CL 469; AR 193
358	627.11	NE	Holt	Unnamed Tributary to Niobrara River 01	PER	exp-WB-0250	10.00	DTL 12	Middle Niobrara	42.839721	-99.122286	0.03	0.00	CL 469
359	627.40	NE	Holt	Beaver Creek	PER	exp-WB-0228	-	DTL 12	Middle Niobrara	42.835758	-99.120442	0.11	0.00	CL 469; AR 195
360	627.41	NE	Holt	Beaver Creek	PER	exp-WB-0228	-	DTL 12	Middle Niobrara	42.835726	-99.120399	See above	0.00	CL 469; AR 195
361	627.44	NE	Holt	Beaver Creek	PER	exp-WB-0228	51.22	DTL 12	Middle Niobrara	42.835377	-99.120071	See above	0.00	CL 469; AR 195
362	630.15	NE	Holt	Unnamed Tributary to Niobrara River 02	PER	exp-WB-0248	10.11	DTL 12	Middle Niobrara	42.799403	-99.101604	0.03	0.00	CL 471
363	632.28	NE	Holt	Unnamed Tributary to Big Sandy Creek 01	EPH	exp-WB-0370	34.21	DTL 11	Lower Niobrara	42.775943	-99.074596	0.13	0.00	CL 473
364	633.31	NE	Holt	Big Sandy Creek	PER	exp-WB-0230	10.95	DTL 12	Lower Niobrara	42.766459	-99.059469	0.03	0.00	CL 474

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
365	635.68	NE	Holt	Unnamed Tributary to Big Sandy Creek 02	PER	exp-WB-0239	21.85	DTL 12	Lower Niobrara	42.744478	-99.027143	0.07	0.00	CL 475; CL 476
366	640.62	NE	Holt	Unnamed Tributary to Brush Creek 01	INT	exp-WB-0024	10.62	DTL 11	Lower Niobrara	42.697282	-98.957527	0.03	0.00	CL 479
367	640.92	NE	Holt	Unnamed Tributary to Brush Creek 02	INT	exp-WB-0025	-	DTL 11	Lower Niobrara	42.694327	-98.95339	0.05	0.00	CL 479
368	640.93	NE	Holt	Unnamed Tributary to Brush Creek 02	INT	exp-WB-0025	10.03	DTL 11	Lower Niobrara	42.694108	-98.953214	See above	0.00	CL 479
369	647.48	NE	Holt	North Branch Eagle Creek	PER	exp-WB-0031	21.79	DTL 12	Lower Niobrara	42.62946	-98.860541	0.03	0.00	CL 484
370	649.98	NE	Holt	Middle Branch Eagle Creek	PER	S302HT001	13.81	DTL 12	Lower Niobrara	42.604689	-98.826053	0.03	0.00	CL 486
371	653.75	NE	Holt	East Branch of Eagle Creek	INT	S0713702HT001	15.33	DTL 11	Lower Niobrara	42.592487	-98.759578	0.06	0.00	CL 489
372	659.30	NE	Holt	Blackbird Creek	EPH	S306HT003	12.06	DTL 11	Lower Niobrara	42.555087	-98.665236	0.02	0.00	CL 493; AR 197
373	659.85	NE	Holt	Unnamed Tributary to Blackbird Creek	EPH	S301HT001	14.54	DTL 11	Lower Niobrara	42.553326	-98.654696	0.03	0.00	CL 494
374	663.72	NE	Holt	Redbird Creek	PER	exp-WB-0039	11.79	DTL 11	Lower Niobrara	42.536317	-98.585672	0.13	0.00	CL 496; CL 497
375	663.73	NE	Holt	Redbird Creek	PER	exp-WB-0039	6.33	DTL 11	Lower Niobrara	42.536317	-98.585672	See above	0.00	CL 496; CL 497

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
376	663.73	NE	Holt	Redbird Creek	PER	exp-WB-0039	11.66	DTL 11	Lower Niobrara	42.536317	-98.585672	See above	0.00	CL 496; CL 497
377	671.96	NE	Holt	Unnamed Tributary to Elkhorn River	EPH	S316HT001	25.89	DTL 161	Lower Niobrara	42.470385	-98.458558	0.06	0.00	CL 503
378	673.68	NE	Holt	Unnamed Tributary to Middle Branch Verdigre Creek	INT	exp-WB-0049	13.03	DTL 11	Lower Niobrara	42.459245	-98.428494	0.03	0.00	CL 504
379	676.01	NE	Holt	Middle Branch Verdigre Creek	INT	exp-WB-0050	14.03	DTL 11	Lower Niobrara	42.439753	-98.391302	0.03	0.00	CL 506
380	676.71	NE	Holt	Unnamed Tributary to Middle Branch Verdigre Creek	INT	exp-WB-0051	10.08	DTL 161	Lower Niobrara	42.433984	-98.380063	0.03	0.00	CL 506
381	680.76	NE	Holt	South Branch Verdigre Creek	INT	S301HT005	14.20	DTL 11	Lower Niobrara	42.403568	-98.314042	0.03	0.00	CL 509
382	683.85	NE	Antelope	Big Springs Creek	EPH	S306AAT001	24.15	DTL 11	Lower Niobrara	42.380373	-98.263271	0.04	0.00	CL 511; CL 512
383	684.23	NE	Antelope	Tributary to Big Springs Creek	INT	S0714702AT001	1.01	DTL 161	Lower Niobrara	42.377505	-98.257051	0.00	0.00	CL 512
384	688.72	NE	Antelope	Hathaway Slough	EPH	S316AT001	14.42	DTL 11	Lower Niobrara	42.346061	-98.184712	0.03	0.00	CL 515

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
385	713.45	NE	Antelope	Trueblood Creek	PER	S0427701AT001	3.33	DTL 12	Upper Elkhorn	42.087617	-97.902346	0.01	0.00	CL 534
386	715.03	Nebraska	Antelope	Tributary to Elkhorn River	EPH	WST-WB-0003	4.00	DTL 11	Upper Elkhorn	42.0813	-97.873019	0.01	0.00	CL 535
387	717.23	NE	Antelope	Elkhorn River	PER	S0427703AT001	210.71	DTL 15	Upper Elkhorn	42.067947	-97.837759	0.00	0.00	CL 536; AR 204; AR 203
388	717.28	NE	Antelope	Giles Creek	PER	S0427703AT002	9.33	DTL 15	Upper Elkhorn	42.067339	-97.837425	0.00	0.00	CL 536; AR 204; AR 203
389	718.53	NE	Madison	Tributary to Elkhorn River	INT	EXP-WB-MA-0001	8.00	DTL 161	Upper Elkhorn	42.054663	-97.820996	0.02	0.00	CL 537
390	721.83	Nebraska	Madison	Dry Creek	INT	WST-WB-0007	6.07	DTL 11	Upper Elkhorn	42.014054	-97.793221	0.02	0.00	CL 540
391	724.07	NE	Madison	Unnamed Tributary to Buffalo Creek	EPH	S0428702MA001	3.19	DTL 161	Upper Elkhorn	41.990626	-97.763664	0.01	0.00	CL 541; CL 542
392	724.65	Nebraska	Madison	Buffalo Creek	PER	WST-WB-0009	12.48	DTL 12	Upper Elkhorn	41.985501	-97.754848	0.03	0.00	CL 542
393	727.11	Nebraska	Madison	Deer Creek	INT	WST-WB-0011	17.48	DTL 11	Upper Elkhorn	41.965758	-97.715515	0.04	0.00	CL 544
394	731.18	NE	Madison	Unnamed Tributary to Battle Creek	EPH	S0501701MA001	7.94	DTL 11	Upper Elkhorn	41.932289	-97.65145	0.02	0.00	CL 547
395	732.67	NE	Madison	Battle Creek	PER	S0521703MA001	22.32	DTL 12	Upper Elkhorn	41.924748	-97.6243	0.055	0.00	CL 548
396	738.50	NE	Madison	Unnamed Tributary to North Taylor Creek 01	PER	S0501703MA001	4.26	DTL 12	Lower Elkhorn	41.904151	-97.515525	0.014	0.00	CL 552

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
397	740.59	NE	Madison	Unnamed Tributary to North Taylor Creek 02	INT	S0501702MA001	3.06	DTL 11	Lower Elkhorn	41.892775	-97.479032	0.01	0.00	CL 554
398	741.62	NE	Madison	Unnamed Tributary to Taylor Creek 01	INT	S0501702MA002	1.00	DTL 21	Lower Elkhorn	41.885608	-97.461376	0.00	0.00	CL 555; AUX 57
399	742.10	NE	Madison	Unnamed Tributary to Taylor Creek 02	MAN-MADE DITCH	S0501702MA003	16.79	DTL 11	Lower Elkhorn	41.882315	-97.453274	0.03	0.00	CL 555
400	743.53	NE	Madison	Unnamed Tributary to Union Creek 03	PER	S0501703MA004	5.19	DTL 12	Lower Elkhorn	41.872437	-97.428964	0.01	0.00	CL 556; AR 206
401	744.34	NE	Madison	Unnamed Tributary to Union Creek 04	INT	S0502702MA001	1.06	DTL 11	Lower Elkhorn	41.865114	-97.416787	0.00	0.00	CL 557; AR 207
402	747.05	NE	Madison	Unnamed Tributary to Union Creek 05	INT	S0503702MA001	18.03	DTL 11	Lower Elkhorn	41.837113	-97.379811	0.03	0.00	CL 559
403	748.13	NE	Stanton	Union Creek	PER	S0502701MA001	45.05	DTL 15	Lower Elkhorn	41.826179	-97.365275	0.00	0.00	CL 560; AR 208
404	749.42	NE	Stanton	Unnamed Tributary to Meridian Creek 01	PER	S0522703ST001	9.04	DTL 12	Lower Elkhorn	41.812917	-97.347706	0.02	0.00	CL 561
405	751.11	NE	Stanton	Unnamed Tributary to Meridian Creek 02	MAN-MADE DITCH	S0504701ST002	11.50	DTL 11	Lower Elkhorn	41.796839	-97.323613	0.01	0.00	CL 562
406	751.66	NE	Stanton	Tributary to Meridian Creek	INT	S0822618ST001	50.72	DTL 11	Lower Elkhorn	41.791363	-97.315869	0.11	0.00	CL 562

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
407	764.75	NE	Colfax	Unnamed Tributary to Loseke Creek 01	INT	S0504702CO001	16.14	DTL 161	Lower Platte-Shell	41.630087	-97.229833	0.04	0.00	CL 572
408	764.82	NE	Colfax	Unnamed Tributary to Loseke Creek 02	INT	S0504702CO002	11.28	DTL 161	Lower Platte-Shell	41.629013	-97.229993	0.03	0.00	CL 572
409	764.96	NE	Colfax	Unnamed Tributary to Loseke Creek 02	INT	S0504702CO002	10.01	DTL 21	Lower Platte-Shell	41.62692	-97.230004	0.00	0.00	CL 572
410	772.42	NE	Colfax	Shell Creek	PER	S0505701CO002	34.25	DTL 12	Lower Platte-Shell	41.519295	-97.227568	0.10	0.00	CL 578
411	778.11	NE	Colfax	Barnholdt Ditch	MAN-MADE DITCH	S1010702CO001	23.31	DTL 11	Lower Platte-Shell	41.441971	-97.197775	0.06	0.00	CL 582; AR 211; AR 212
412	779.69	NE	Colfax	Lost Creek	PER	S0505703CO001	18.95	DTL 12	Lower Platte-Shell	41.419749	-97.196011	0.03	0.00	CL 583
413	780.96	NE	Colfax	Unnamed Tributary to Platte River	INT	S0507702CO001	32.26	DTL 11	Lower Platte-Shell	41.401805	-97.197055	0.05	0.00	CL 584; AR 214; AR 213
414	782.07	NE	Colfax	Platte River	PER	S0913702BT002	741.26	DTL 15	Lower Platte-Shell	41.38639	-97.195372	0.00	0.00	CL 585; AR 214
415	782.21	NE	Butler	Platte River	PER	S0913702BT002	783.58	DTL 15	Lower Platte-Shell	41.384298	-97.195465	0.00	0.00	CL 585; AR 214
416	782.31	NE	Butler	Platte River Side Channel	PER	S0913702BT001	57.14	DTL 15	Lower Platte-Shell	41.382867	-97.195526	0.00	0.00	CL 585; AR 214
417	782.56	NE	Butler	Unnamed Tributary to Platte River	PER	S0507703BT001	10.81	DTL 15	Lower Platte-Shell	41.379308	-97.195682	0.00	0.00	CL 585

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
418	784.50	NE	Butler	Deer Creek	PER	S0507703BT002	16.27	DTL 12	Lower Platte-Shell	41.350994	-97.196357	0.04	0.00	CL 587
419	787.28	NE	Butler	Unnamed Tributary to Deer Creek	PER	S0507701BT001	5.00	DTL 12	Lower Platte-Shell	41.31112	-97.196852	0.02	0.00	CL 589; AR 215
420	789.14	NE	Butler	Unnamed Tributary to Deer Creek	PER	S0508701BT001	2.14	DTL 12	Lower Platte-Shell	41.284537	-97.191563	See above	0.00	CL 590
421	791.00	NE	Butler	Unnamed Tributary to Little Blue River 01	PER	S0508701BT002	17.07	DTL 12	Upper Big Blue	41.25884	-97.183954	0.05	0.00	CL 592
422	794.77	NE	Butler	Unnamed Tributary to Little Blue River 02	PER	S0508703BT001	21.62	DTL 21	Upper Big Blue	41.20603	-97.176069	0.00	0.00	CL 595
423	799.72	NE	Butler	Unnamed Tributary to Little Blue River 03	PER	S0509703BT002	-	DTL 12	Upper Big Blue	41.135644	-97.164324	0.14	0.00	CL 598; AR 217
424	799.75	NE	Butler	Unnamed Tributary to Little Blue River 03	PER	S0509703BT002	25.61	DTL 12	Upper Big Blue	41.135168	-97.16401	See above	0.00	CL 598; AR 217
425	800.66	NE	Butler	Tributary to North Branch Little Blue River	PER	S0914702BT001	12.39	DTL 12	Upper Big Blue	41.122648	-97.159075	0.03	0.00	CL 599
426	801.26	NE	Butler	Unnamed Tributary to Little Blue River 04	PER	S0510703BT001	7.06	DTL 12	Upper Big Blue	41.114449	-97.155783	0.01	0.00	CL 599; CL 600; AR 218
427	803.28	NE	Butler	Unnamed Tributary to Big Blue River 01	INT	S0518703BT001	6.50	DTL 161	Upper Big Blue	41.08589	-97.151151	0.01	0.00	CL 601

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
428	803.60	NE	Butler	Unnamed Tributary to Big Blue River 02	INT	S0510701BT001	3.39	DTL 11	Upper Big Blue	41.081319	-97.150339	0.01	0.00	CL 601
429	807.28	NE	Seward	Unnamed Tributary to Big Blue River 03	INT	S0510702SE001	3.56	DTL 161	Upper Big Blue	41.033999	-97.172201	0.01	0.00	CL 604
430	808.32	NE	Seward	Unnamed Tributary to Big Blue Creek 04	INT	S0518701SE001	9.44	DTL 11	Upper Big Blue	41.021595	-97.183439	0.02	0.00	CL 605; AR 219
431	808.75	NE	Seward	Big Blue River	PER	S0509702SE001	67.84	DTL 15	Upper Big Blue	41.016161	-97.187079	0.00	0.00	CL 605; AR 219
432	811.76	NE	Seward	Cottonwood Creek	INT	S0509701SE001	6.16	DTL 11	Upper Big Blue	40.983994	-97.225867	0.02	0.00	CL 607
433	813.11	NE	Seward	Lincoln Creek	PER	S0509701SE003	15.66	DTL 12	Upper Big Blue	40.967455	-97.239012	0.06	0.00	CL 608
434	833.76	NE	Seward	Unnamed Tributary to West Fork Big Blue River	INT	S0511703SE002	-	NC	West Fork Big Blue	40.7196	-97.109749	0.01	0.00	CL 624; AR 222
435	833.77	NE	Seward	Unnamed Tributary to West Fork Big Blue River	INT	S0511703SE002	-	NC	West Fork Big Blue	40.719436	-97.109802	See above	0.00	CL 624; AR 222
436	835.81	NE	Saline	West Fork Big Blue River	PER	S0511702SA001	55.55	DTL 12	West Fork Big Blue	40.695614	-97.093548	0.15	0.00	CL 625; CL 626
437	839.98	NE	Saline	Otoe Creek	INT	S0511701SA002	8.99	DTL 11	Middle Big Blue	40.635491	-97.09335	0.03	0.00	CL 629

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
438	840.15	NE	Saline	Unnamed Tributary to Otoe Creek	INT	S0511701SA001	1.00	DTL 161	Middle Big Blue	40.632966	-97.093339	0.003	0.00	CL 629
439	842.17	NE	Saline	Turkey Creek	PER	S0512701SA001	24.13	DTL 12	Turkey	40.603844	-97.09298	0.059	0.00	CL 630; AR 224
440	843.60	NE	Saline	Spring Creek	PER	S0512703SA001	12.20	DTL 12	Turkey	40.583145	-97.094605	0.035	0.00	CL 631
441	845.09	NE	Saline	Unnamed Tributary to Spring Creek 01	INT	S0512703SA003	4.90	DTL 11	Turkey	40.561653	-97.094839	0.01	0.00	CL 632; CL 633
442	848.24	NE	Saline	Brush Creek	INT	S0719701SA002	10.49	DTL 11	Turkey	40.522134	-97.069746	0.04	0.00	CL 635
443	849.85	NE	Saline	Unnamed Tributary to Dry Creek	EPH	S0514703SA001	12.71	DTL 11	Turkey	40.501972	-97.055873	0.04	0.00	CL 636
444	850.47	NE	Saline	Side Channel of Dry Creek	PER	S0602703SA002A	3.00	DTL 11	Turkey	40.4929	-97.055745	0.01	0.00	CL 636; CL 637
445	850.48	NE	Saline	Side Channel of Dry Creek	PER	S0602703SA002A	-	DTL 11	Turkey	40.492738	-97.055934	See above	0.00	CL 636; CL 637
446	850.50	NE	Saline	Dry Creek	PER	S0602703SA002	8.67	DTL 11	Turkey	40.492465	-97.055774	0.04	0.00	CL 636; CL 637
447	850.79	NE	Saline	Unnamed Tributary to Dry Creek 02	INT	S0602703SA001	5.01	DTL 11	Turkey	40.488512	-97.055718	0.04	0.00	CL 637
448	851.51	NE	Saline	Plummers Branch	INT	S0514703SA002	3.00	DTL 11	Turkey	40.477799	-97.055678	0.01	0.00	CL 637
449	852.41	NE	Saline	Unnamed Tributary to Plummers Branch 01	INT	S0602703SA003	13.09	DTL 11	Turkey	40.46489	-97.056203	0.03	0.00	CL 638

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
450	853.04	NE	Saline	Tributary to Plummers Branch	EPH	S0619702SA002	-	NC	Turkey	40.455717	-97.056063	0.00	0.00	CL 638
451	854.42	NE	Saline	Unnamed Tributary to Plummers Branch 02	INT	S0514701SA002	6.55	DTL 11	Turkey	40.435739	-97.056972	0.02	0.00	CL 639; CL 640
452	854.61	NE	Saline	Unnamed Tributary to Plummers Branch 03	INT	S0514701SA001	12.16	DTL 11	Turkey	40.432954	-97.056875	0.03	0.00	CL 640
453	855.72	NE	Saline	Unnamed Tributary to Swan Creek 01	INT	S0514701SA003	2.00	DTL 11	Turkey	40.416957	-97.056644	0.01	0.00	CL 640; CL 641
454	855.92	NE	Saline	Unnamed Tributary to Swan Creek 02	EPH	S0514701SA004	4.11	DTL 11	Turkey	40.414065	-97.056201	0.01	0.00	CL 641
455	857.75	NE	Saline	Swan Creek	PER	S0517703SA001	16.99	DTL 12	Turkey	40.389399	-97.043944	0.05	0.00	CL 642
456	859.54	NE	Saline	Unnamed Tributary to Swan Creek 03	INT	S0517703SA002	11.41	DTL 21	Turkey	40.364344	-97.036464	0.00	0.00	CL 643
457	859.56	NE	Saline	Unnamed Tributary to Swan Creek 03	INT	S0517703SA002	-	DTL 21	Turkey	40.364052	-97.036674	0.00	0.00	CL 643
458	863.98	NE	Jefferson	Tributary to Cub Creek	INT	S0915702JE001	-	DTL 161	Middle Big Blue	40.300375	-97.031681	0.01	0.00	CL 647
459	863.99	NE	Jefferson	Tributary to Cub Creek	INT	S0915702JE001	4.03	DTL 161	Middle Big Blue	40.300275	-97.031507	See above	0.00	CL 647

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
460	866.31	NE	Jefferson	Unnamed Tributary to Cub Creek 01	INT	S0516701JE002	5.66	DTL 161	Middle Big Blue	40.267828	-97.024768	0.02	0.00	CL 648; CL 649; AR 226
461	867.12	NE	Jefferson	Cub Creek	PER	S0516701JE001	20.06	DTL 12	Middle Big Blue	40.257096	-97.01937	0.05	0.00	CL 649
462	868.06	NE	Jefferson	Unnamed Tributary to Cub Creek 02	INT	S0516702JE002	15.32	DTL 11	Middle Big Blue	40.243623	-97.017276	0.04	0.00	CL 650
463	868.62	NE	Jefferson	Unnamed Tributary to Cub Creek 03	INT	S0516702JE001	4.55	DTL 161	Middle Big Blue	40.235671	-97.016173	0.01	0.00	CL 650; AR 227
464	868.85	NE	Jefferson	Unnamed Tributary to Cub Creek 04	INT	S0515701JE004	1.10	DTL 161	Middle Big Blue	40.232277	-97.015239	0.00	0.00	CL 650; AR 227
465	868.87	NE	Jefferson	Unnamed Pond on Tributary to Cub Creek	MAN-MADE WATERBODY	S0515701JE002	-	NC	Middle Big Blue	40.231957	-97.015276	0.00	0.00	CL 650; AR 227
466	868.98	NE	Jefferson	Unnamed Tributary to Cub Creek 05	PER	S0515701JE001	7.35	DTL 11	Middle Big Blue	40.230517	-97.014569	0.06	0.00	CL 650; CL 651; AR 227
467	869.04	NE	Jefferson	Unnamed Tributary to Cub Creek 05	PER	S0515701JE001	69.07	DTL 11	Middle Big Blue	40.229788	-97.014496	See above	0.00	CL 650; CL 651; AR 227
468	871.78	NE	Jefferson	Unnamed Tributary to Big Indian Creek 01	INT	S0515703JE001	-	NC	Middle Big Blue	40.190277	-97.010557	0.02	0.00	CL 653
469	871.82	NE	Jefferson	Unnamed Tributary to	INT	S0515703JE001	-	NC	Middle Big Blue	40.18962	-97.01055	See above	0.00	CL 653

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
				Big Indian Creek 01										
470	872.03	NE	Jefferson	Unnamed Tributary to Big Indian Creek 01	INT	S0515703JE001	-	NC	Middle Big Blue	40.186562	-97.010848	See above	0.00	CL 653
471	873.99	NE	Jefferson	Big Indian Creek	PER	S0515702JE001	16.28	DTL 11	Middle Big Blue	40.158339	-97.008183	0.03	0.00	CL 654
472	875.72	NE	Jefferson	Unnamed Tributary to Big Indian Creek 02	INT	S00012	7.35	DTL 11	Middle Big Blue	40.133805	-97.002046	0.02	0.00	CL 655; CL 656
473	878.03	NE	Jefferson	Unnamed Tributary to Big Indian Creek 03	INT	S_UTM14_05590	12.60	DTL 11	Middle Big Blue	40.100296	-97.001831	0.06	0.00	CL 657
474	878.06	NE	Jefferson	Unnamed Tributary to Big Indian Creek 03	INT	S_UTM14_05590	9.70	DTL 11	Middle Big Blue	40.099883	-97.001836	See above	0.00	CL 657
475	878.55	NE	Jefferson	Unnamed Tributary to Big Indian Creek 04	EPH	exp-WB-0346	13.75	DTL 11	Middle Big Blue	40.092808	-97.001862	0.04	0.00	CL 658
476	879.12	NE	Jefferson	Unnamed Tributary to Big Indian Creek 05	EPH	exp-WB-0347	43.17	DTL 11	Middle Big Blue	40.084598	-97.001894	0.10	0.00	CL 658
477	879.38	NE	Jefferson	Unnamed Tributary to Big Indian Creek 06	EPH	exp-WB-0348	16.60	DTL 11	Middle Big Blue	40.080777	-97.001955	0.04	0.00	CL 658
478	881.06	NE	Jefferson	Unnamed Tributary to Little Blue River 01	EPH	S301JF002	11.21	DTL 11	Lower Little Blue	40.056399	-97.002346	0.03	0.00	CL 660

Table I-1: Keystone XL Pipeline Project Waterbody Crossings by the Pipeline ROW within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Crossing Length (feet)[b,c]	Crossing Method[d,e]	Subbasin Name	Latitude	Longitude	Temporary Impacts (acres)[f,g]	Permanent Impacts (acres)	Map Page[h]
479	881.18	NE	Jefferson	Unnamed Tributary to Little Blue River 02	EPH	S301JF001	15.57	DTL 11	Lower Little Blue	40.05466	-97.002357	0.03	0.00	CL 660
480	882.04	NE	Jefferson	Unnamed Tributary to Little Blue River 03	INT	S101JE002	6.47	DTL 11	Lower Little Blue	40.042436	-97.000564	0.02	0.00	CL 660; CL 661

a: EPH – ephemeral; INT – intermittent; PER – perennial
b: Crossing distance is measured along the proposed pipeline ROW centerline between the ordinary high water mark
c: "-" Indicates the waterbody is not crossed by the proposed pipeline ROW, but is encroached upon by ROW workspace.
d: DTL 11 - Typical open cut in non-flowing waterbody; DTL 12 - Typical open cut in flowing waterbody; DTL 13 - Typical Dry Flume Crossing Method; DTL 14 - Typical Dam and Pump Crossing Method; DTL 15 - Typical HDD Crossing Method; DTL 21 Typical Uncased Road/Railroad Crossing Bore Detail; DTL 158 – Typical Cased Crossing; and DTL 161-Conveyance Crossing Method. Corresponding Crossing Method Typical Drawing and Details are included in the CMRP (Attachment B of the Federal Dredge and Fill Permit Application).
e: “NC” Indicates the waterbody is not crossed by the pipeline centerline. In these instances, the feature would be used for temporary construction workspace, but would not be trenched for the installation of the pipeline.
f: Due to the orientation and shape of certain waterbody features, some are crossed multiple times by the pipeline centerline. Each individual crossing is listed so that some features are listed multiple times. Due to the short distance between separate crossings of the same feature, it is expected that during construction these features will be treated as a single crossing. Impact acreage is provided for the entire feature and is not repeated for multiple crossings of the same feature. The note 'See Above' is used in these instances.
g: For waterbodies crossed by HDD (DTL 15) or bore (DTL 158 or DLT 21), impact acreage is shown as 0.00 because impacts will be avoided due to the crossing method.
h: This column identifies the specific page(s) of the corresponding mapbook (Appendix J of this Federal Dredge and Fill Application) that depicts the wetland. The abbreviations are: CL – centerline, AR – access road, AUX – auxiliary site

Table I-2: Keystone XL Pipeline Project Waterbody Crossings by the Access Roads within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Access Road ID	Type of Access Road	Crossing Length (feet)[b,c]	Subbasin	Latitude	Longitude	Temporary Impacts (acres)[d]	Permanent Impacts (acres)	Map Page[e]
1	20.41	MT	Phillips	Corral Coulee	EPH	S112PH001	CAR-004A	Permanent	11.66	Frenchman	48.767917	-107.287414	0.00	0.01	AR 9
2	24.78	MT	Phillips	Frenchman Creek	PER	S0903620PH002	CAR-327	Temporary	75.07	Frenchman	48.69125	-107.24346	0.05	0.00	AR 16
3	33.07	MT	Valley	Papoose Creek	EPH	S_MDEQ_0028	CAR-008	Temporary	NC	Rock	48.646058	-107.090427	0.01	0.00	CL 25; AR 20
4	33.08	MT	Valley	Papoose Creek	EPH	S_MDEQ_0028	CAR-008	Temporary	NC	Rock	48.64593	-107.090342	See above	0.00	CL 25; AR 20
5	39.44	MT	Valley	Rock Creek	PER	S109VA002-1	CAR-010A	Temporary	27.51	Rock	48.570921	-107.004852	0.02	0.00	AR 22
6	59.16	MT	Valley	Spring Creek	INT	S802VA001	CAR-084	Temporary	24.35	Lower Milk	48.370044	-106.739497	0.02	0.00	AR 33; AR 34
7	129.87	MT	McCone	Unnamed Tributary to East Fork Prairie Elk Creek	INT	S32MC001	CAR-025	Temporary	78.93	Prairie Elk-Wolf	47.6163	-105.811039	0.05	0.00	AR 58
8	130.13	MT	McCone	East Fork Prairie Elk Creek	INT	S32MC002	CAR-025	Temporary	51.27	Prairie Elk-Wolf	47.615782	-105.805137	0.04	0.00	AR 58
9	131.09	MT	McCone	Pond on Tributary to East Fork Prairie Elk Creek	Man-Made Waterbody	S0725618MC001	CAR-025A	Temporary	NC	Prairie Elk-Wolf	47.609724	-105.788236	0.00003	0.00	AR 59
10	153.14	MT	McCone	Gyp Creek 01	INT	S105MC005	CAR-109	Temporary	NC	Redwater	47.394388	-105.47397	0.00	0.00	CL 114; CL 115; AR 68
11	153.14	MT	McCone	Gyp Creek 02	INT	S105MC006	CAR-109	Temporary	73.20	Redwater	47.394357	-105.473932	0.04	0.00	CL 114; CL 115; AR 68
12	198.37	MT	Dawson	Tributary to The Yellowstone River 01	PER	S1023620DA004	CAR-128	Permanent	5.28	Lower Yellowstone	46.876364	-104.955618	0.00	0.01	AR 78
13	198.42	MT	Dawson	Tributary to The Yellowstone River 02	EPH	S1023620DA002	CAR-128	Permanent	1.74	Lower Yellowstone	46.873366	-104.962073	0.00	0.004	CL 148; AR 78

Table I-2: Keystone XL Pipeline Project Waterbody Crossings by the Access Roads within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Access Road ID	Type of Access Road	Crossing Length (feet)[b,c]	Subbasin	Latitude	Longitude	Temporary Impacts (acres)[d]	Permanent Impacts (acres)	Map Page[e]
14	198.45	MT	Dawson	Tributary to The Yellowstone River 03	EPH	S1023620DA003	CAR-128	Permanent	4.09	Lower Yellowstone	46.873932	-104.958907	0.00	0.01	AR 78
15	199.87	MT	Dawson	Tributary to The Yellowstone River 04	PER	S1023620DA001	CAR-128	Permanent	2.05	Lower Yellowstone	46.874524	-104.936252	0.00	0.003	AR 79
16	258.21	MT	Fallon	Pond on Tributary to Little Beaver Creek	Man-Made Waterbody	S0731620FA001	CAR-452	Temporary	NC	Upper Little Missouri	46.247478	-104.205041	0.0006	0.00	AR 93
17	258.21	MT	Fallon	Pond on Tributary to Little Beaver Creek	Man-Made Waterbody	S0731620FA001	CAR-452	Temporary	NC	Upper Little Missouri	46.247416	-104.204988	See above	0.00	AR 93
18	258.22	MT	Fallon	Pond on Tributary to Little Beaver Creek	Man-Made Waterbody	S0731620FA001	CAR-452	Temporary	NC	Upper Little Missouri	46.247315	-104.205	See above	0.00	AR 93
19	262.80	MT	Fallon	Gravel Pit on Tributary to Dry Creek	Man-Made Waterbody	S0905620FA001	CAR-467	Temporary	11.51	Upper Little Missouri	46.139157	-104.330699	0.02	0.00	AR 94
20	289.82	SD	Harding	Unnamed Tributary to Wagoneer Creek	INT	S500HA012	CAR-163	Permanent	67.89	Upper Little Missouri	45.863566	-103.970169	0.00	0.14	AR 97; AR 98
21	292.61	SD	Harding	Shaw Creek	PER	S109HA002	CAR-150	Temporary	52.89	Upper Little Missouri	45.833189	-103.929441	0.03	0.00	CL 218; CL 219; AR 99; AR 100
22	296.13	SD	Harding	Kimble Creek	INT	S104HA004	CAR-041	Temporary	29.29	Upper Little Missouri	45.801513	-103.872007	0.02	0.00	AR 101
23	321.13	SD	Harding	South Fork Grand River	PER	S0906620HA004	CAR-469	Temporary	NC	South Fork Grand	45.577753	-103.544897	0.00	0.00	AR 115

Table I-2: Keystone XL Pipeline Project Waterbody Crossings by the Access Roads within USACE Omaha District – Montana, South Dakota, and Nebraska

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24	327.56	SD	Harding	Clark Fork Creek	PER	S0528618HA001	CAR-231	Temporary	20.46	South Fork Grand	45.53343	-103.421631	0.01	0.00	AR 118
25	342.47	SD	Harding	Unnamed Tributary to Red Butte Creek	PER	exp-WB-13034	CAR-232	Temporary	8.36	Upper Moreau	45.357573	-103.265116	0.01	0.00	CL 256; AR 124
26	382.00	SD	Meade	Maurine Lake	Man-Made Waterbody	S0807620ME001	CAR-447	Temporary	66.07	Upper Moreau	45.029876	-102.605665	0.05	0.00	AR 139
27	408.63	SD	Meade	Pond on Tributary to Spring Creek	Man-Made Waterbody	S0907620ME001	CAR-454	Temporary	5.25	Cherry	44.708139	-102.316297	0.004	0.00	CL 305; CL 306; AR 144
28	429.72	SD	Meade	Tributary to Luis Creek 01	INT	S1010620ME001	CAR-434	Temporary	5.07	Lower Cheyenne	44.555548	-102.001667	0.01	0.00	AR 149
29	429.73	SD	Meade	Tributary to Luis Creek	INT	S1010620ME003	CAR-434	Temporary	NC	Lower Cheyenne	44.541481	-102.003136	0.01	0.00	AR 149; AR 150
30	429.73	SD	Meade	Tributary to Luis Creek	EPH	S1010620ME002	CAR-434	Temporary	12.91	Lower Cheyenne	44.549559	-102.001399	0.02	0.00	AR 149
31	430.79	SD	Pennington	Unnamed Tributary to Cheyenne River	PER	S307PN001	CAR-079A	Temporary	22.66	Lower Cheyenne	44.50158	-102.002042	0.05	0.00	CL 322; AR 152; AR 153
32	434.22	SD	Haakon	Tributary to Bridger Creek	EPH	S0808620HK001	CAR-313-ALT	Temporary	4.11	Lower Cheyenne	44.462009	-101.948739	0.00	0.00	AR 157; AR 156
33	434.49	SD	Haakon	Bridger Creek	INT	S0808620HK002	CAR-313-ALT	Temporary	36.36	Lower Cheyenne	44.461903	-101.943311	0.04	0.00	AR 156
34	440.33	SD	Haakon	Pond Above Elm Tree Draw	Man-Made Waterbody	S0809620HK002	CAR-451	Temporary	2.50	Lower Cheyenne	44.428952	-101.858069	0.00	0.00	CL 329; AUX 29; AR 161
35	453.36	SD	Haakon	Tributary to West Plum Creek	PER	S0531620HK002	CAR-449	Temporary	4.20	Lower Cheyenne	44.314107	-101.657592	0.01	0.00	AR 166; AR 167

Table I-2: Keystone XL Pipeline Project Waterbody Crossings by the Access Roads within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Access Road ID	Type of Access Road	Crossing Length (feet)[b,c]	Subbasin	Latitude	Longitude	Temporary Impacts (acres)[d]	Permanent Impacts (acres)	Map Page[e]
36	453.77	SD	Haakon	Pond	Man-Made Waterbody	S0531620HK003	CAR-449	Temporary	NC	Lower Cheyenne	44.311075	-101.650459	0.01927	0.00	AR 166; AR 167
37	453.77	SD	Haakon	Pond	Man-Made Waterbody	S0531620HK003	CAR-449	Temporary	NC	Lower Cheyenne	44.310965	-101.650544	See above	0.00	AR 166; AR 167
38	453.77	SD	Haakon	Pond	Man-Made Waterbody	S0531620HK003	CAR-449	Temporary	NC	Lower Cheyenne	44.310682	-101.650765	See above	0.00	AR 166; AR 167
39	453.89	SD	Haakon	Pond	Man-Made Waterbody	S0531620HK003	CAR-449	Temporary	1.07	Lower Cheyenne	44.309908	-101.648588	See above	0.00	AR 167
40	486.24	SD	Haakon	Tributary to Bad River	EPH	S0810620HK001	CAR-462	Temporary	1.18	Bad	44.076229	-101.102063	0.001	0.00	CL 364; AR 173
41	544.02	SD	Tripp	Little Dog Creek	INT	S106TR001	CAR-236	Temporary	21.59	Lower White	43.675418	-100.152315	0.02	0.00	CL 407; AR 180
42	834.73	NE	Seward	Unnamed Tributary to West Fork Big Blue River 01	EPH	S0602702SE002	CAR-395	Temporary	NC	West Fork Big Blue	40.705462	-97.100397	0.01	0.00	CL 625; AR 223
43	835.14	NE	Seward	Unnamed Tributary to West Fork Big Blue River 01	EPH	S0602702SE002	CAR-395	Temporary	NC	West Fork Big Blue	40.705445	-97.099134	See above	0.00	CL 625; AR 223
44	834.73	NE	Seward	Unnamed Tributary to West Fork Big Blue River 02	INT	S0602702SE001	CAR-395	Temporary	3.68	West Fork Big Blue	40.705474	-97.100698	0.004	0.00	CL 625; AR 223

a: EPH – ephemeral; INT – intermittent; PER – perennial
b: Crossing distance is measured along the proposed access road centerline between the ordinary high water mark
c: "NC" Indicates the waterbody is not crossed by the access road centerline. In these instances, the feature would be used for temporary construction workspace.
D: Due to the orientation and shape of certain waterbody features, some are crossed multiple times by the access road. Each individual crossing is listed so that some features are listed multiple times. Due to the short distance between separate crossings of the same feature, it is expected that during construction these features will be treated as a single crossing. Impact acreage is provided for the entire feature and is not repeated for multiple crossings of the same feature. The note 'See Above' is used in these instances.

Table I-2: Keystone XL Pipeline Project Waterbody Crossings by the Access Roads within USACE Omaha District – Montana, South Dakota, and Nebraska

	Milepost	State	County	Waterbody Name	Waterbody Type[a]	Waterbody ID	Access Road ID	Type of Access Road	Crossing Length (feet)[b,c]	Subbasin	Latitude	Longitude	Temporary Impacts (acres)[d]	Permanent Impacts (acres)	Map Page[e]
e: This column identifies the specific page(s) of the corresponding mapbook (Appendix J of this Federal Dredge and Fill Application) that depicts the wetland. The abbreviations are: CL – centerline, AR – access road, AUX – auxiliary site															

Table I-3: Keystone XL Pipeline Project Waterbody Crossings by the Additional Temporary Workspace within USACE Omaha District – Montana, South Dakota, and Nebraska

Milepost	State	County	Waterbody Name	Waterbody Type	Waterbody ID	Project Feature	Subbasin	Latitude	Longitude	Temporary Impacts (acres)	Permanent Impacts (acres)	Map Page[a]
24.79	MT	Phillips	Frenchman Reservoir	Man-Made Waterbody	S0903620PH001	Additional Temporary Workspace for Waterline	Frenchman	48.69398	-107.23739	0.02	0.00	AR 16

Notes:
a: This column identifies the specific page(s) of the corresponding mapbook (Appendix J of this Federal Dredge and Fill Application) that depicts the wetland. The abbreviation AR is for access road

Appendix J – Keystone XL Wetland and Waterbody Mapbooks

Due to size of the mapbooks, the mapbooks for Montana, South Dakota, and Nebraska are provided under separate cover.

Appendix K – Biological Opinion

United States Department of the Interior

FISH AND WILDLIFE SERVICE
134 Union Blvd
Lakewood, Colorado 80228

In Reply Refer to:
FWS/R6

DEC 23 2019

Ms. Kim Prill
Bureau of Land Management
Montana Dakotas State Office
5001 Southgate Drive
Billings, Montana 59101

Dear Ms. Prill:

On September 30, 2019, the Bureau of Land Management (BLM), in coordination with the Western Area Power Administration (WAPA), the Rural Utilities Service (RUS), and the U.S. Army Corps of Engineers (USACE) (Federal agencies), requested initiation of formal consultation for the effects of the proposed Keystone XL pipeline Project (Project), proposed by TC Energy (formerly known as TransCanada) Keystone Pipeline, LP (Keystone), under section 7 of the Endangered Species Act (ESA) of 1973 (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.) for the federally listed endangered American burying beetle (ABB) (Nicrophorus americanus). The Project involves the proposed construction and operation of an 882-mile-long pipeline, including ancillary facilities, temporary workspaces, construction camps, access roads, and other aboveground facilities, including powers stations and power lines. Accordingly, this memo transmits the final Biological Opinion (BO) on the effects of the Federal agencies' actions as described in the November 26, 2019 amended Biological Assessment (BA) (BLM 2019, entire). The Federal agencies intend to rely on this document to fulfill their obligations under section 7 of the ESA.

In its BA, the Federal agencies have considered the effects of the Project on 10 federally listed species and designated critical habitat and has made several preliminary determinations of effect based on: (1) correspondence with the U.S. Fish and Wildlife Service (Service), participating Federal agencies, and state wildlife agencies; (2) habitat requirements and the known distribution of these species within the Project area; (3) habitat analyses and field surveys that were conducted for these species from 2008 through 2019; (4) conservation measures committed to in the BA and BO, and (5) the Service whooping crane (Grus americana) public sightings database (Service 2019), and telemetry data collected by the U.S. Geological Survey and provided by the Nebraska Ecological Services Office in December of 2018 (Service 2017). Potential effects associated with electrical infrastructure for the proposed pipeline have also been assessed within the BA, based on the best available data.

Areas along proposed power line routes have not yet been field surveyed for the presence of protected species or their habitats; therefore, the potential for each species to occur along power line routes was evaluated based on a review of aerial imagery and on reviews of species occurrence records in state databases (NNHP 2019, entire; SDNHP 2019, entire). In addition to areas having documented occurrences, an area was determined to have potential for presence of a listed species where it contains one or more land cover type(s) serving as potentially suitable habitat for the species (forest, sandbar, etc., depending on species) and is within the known current range of that species. A summary of the species included in the analysis and an effects determination is provided below (Table 1).

The Service concurs with the determinations (see p. 9, Table 1.4-1 of the BA) made by the Federal agencies that the Project may affect but is not likely to adversely affect the endangered black-footed ferret (Mustela nigripes), interior least tern (Sterna antillarum), whooping crane, pallid sturgeon (Scaphirhynchus albus), and topeka shiner (Notropis topeka); and the threatened piping plover (Charadrius melodus), rufa red knot (Calidris canutus rufa), and western prairie fringed orchid (Platanthera praeclara). A detailed discussion of factors contributing to our concurrence with the above not likely to adversely affect (NLAA) and may affect determinations is included within the BA and are also summarized in the table below (Table 1). A summary of species habitat surveys conducted for the Project is included page 10-11 in Table 1.4-2 of the BA (BLM 2019).

Additionally, the Federal agencies determined that the proposed project may affect the threatened Northern long-eared bat (Myotis septentrionalis), but rely on the Service's January 5, 2016, Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions to fulfill its section 7(a)(2) consultation obligation. Additional information for this species and consultation is described in Introduction section of the BO.

Table 1. ESA Section 7 Determinations and Service Concurrence.

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
Interior least tern	Not Likely to Adversely Affect	Yes	This determination is based on Keystone's plan to use horizontal directional drill (HDD) when crossing the Missouri, Platte, Elkhorn, Niobrara, Cheyenne, and Yellowstone rivers and Keystone's and electric power providers' commitment to follow conservation measures identified by the Service. Specifically, pre-construction surveys to identify nesting least terns within 0.25 miles of the proposed river crossings and the commitment to halt construction should nesting individuals be identified, would avoid effects on nesting interior least terns. While migrating least terns may encounter construction activities during spring and fall migration, effects on potentially suitable habitat are not expected due to the use of HDD. Although new electric power lines would increase the collision and predation potential for interior least terns, none of the proposed power lines would overlap suitable nesting or foraging habitat, and only a small portion of one power line, co-located on existing structures, would approach within 1 mile of potentially suitable habitat. Installation of bird flight diverters (BFDs) may incidentally	• Keystone will complete crossings of major rivers and riverine habitat using HDD, resulting in a pipeline burial depth of 25 feet or greater, regardless of the season. • Keystone will implement measures identified in the HDD contingency plan, including monitoring of the HDD bore, monitoring downstream of the HDD site for evidence of drilling fluids, and mitigation measures should a frac-out occur. Frac-out is the unintentional return of drilling fluids to the surface during HDD. • Where practicable, Keystone will maintain vegetative screening at HDD sites to prevent disturbance of interior least terns. • Should HDD activities occur at night, Keystone will down-shield lights when the site is within 0.25 mile of potentially suitable habitat and vegetative screening is lacking. • Keystone will conduct pre-construction presence/probable absence surveys of pipeline crossings within 0.25 mile of potentially suitable breeding habitat at the Platte, Elkhorn, and Niobrara rivers in Nebraska; the Cheyenne River in South Dakota; and the Yellowstone River in Montana during the interior least tern nesting season (April 15 to September 1) to ensure that there are no nesting pairs within 0.25 mile of the construction area. If interior least tern nests are found at the crossings, Keystone will: (1) adhere to a 0.25-mile buffer of no pipeline construction activity and (2) continue to monitor nests if any are within 0.25 mile of the construction footprint until young have fledged.

[1] Conservation Measures will be implemented by Keystone and/or the electric power providers, as specified, as part of its Project

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
			reduce the risk of other bird species, including interior least terns.	• Keystone will conduct daily surveys for nesting terns during the nesting season when construction activities occur within 0.25 mile of potential nesting habitat. • If nesting terns are present, Keystone will make minor adjustments to the pipeline corridor, if practicable, to avoid nesting interior least terns, in coordination with the Service. This may involve shifting the pipeline corridor away from nests to avoid disturbances to interior least tern nests or other modifications depending on the circumstances. • To the extent practicable, Keystone will conduct construction activities mostly during daytime hours and will comply with any local noise regulations. • Keystone will properly equip construction equipment with mufflers to lessen noise impacts. • Keystone will implement a project-specific Spill Prevention, Control, and Countermeasure (SPCC) Plan (Appendix D of the BA). • Keystone will mark and maintain a 100-foot buffer from river crossings, free from hazardous materials, fuel storage, and vehicle fuel transfers. These buffers will be maintained during construction except when fueling and refueling the water pump near the river edge, which is required for the HDD crossing and hydrostatic test water withdrawal. Water pump fueling will be completed by trained personnel and will use secondary containment; a spill kit will be onsite. • Keystone will conduct refueling and lubrication of construction equipment in uplands and greater than 100 feet from streams and wetlands. Where this is not possible, designated personnel with special training in refueling, spill containment, and cleanup will conduct these activities.

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
				• Keystone will perform all equipment maintenance and repairs in upland locations at least 100 feet from waterbodies and wetlands. • Keystone will park all equipment at least 100 feet from a watercourse or wetland overnight, if possible. • Keystone will not wash equipment in streams or wetlands. • Keystone will conduct construction and restoration activities to allow for prompt and effective cleanup of spills of fuel and other hazardous materials. • Keystone will ensure each construction crew and cleanup crew will have sufficient tools and materials on hand to stop leaks, including supplies of absorbent and barrier materials that will allow for rapid containment and recovery of spilled materials. • Keystone will ensure water withdrawal for hydrostatic testing will be less than 10 percent of the baseline daily flow. • Keystone will minimize temporary water reductions by withdrawing only the volume of water needed for hydrostatic testing as outlined in its permits. Water will be returned to its source within a 30-day period except where the hydrostatic test water is used to test multiple spreads. At the conclusion of hydrostatic testing, the remaining water will be returned to the source. • During Keystone's aerial surveillance, aircraft will maintain at least 1,000 feet of elevation. • If construction of power lines occurs during the interior least tern nesting season, Keystone will conduct surveys of potentially suitable riverine and/or sand pit nesting habitat within 0.25 mile of new power lines within 2 weeks of construction to determine presence of nesting pairs. If nesting interior least terns are present, Keystone will cease construction until chicks fledge from the site.

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
				• Electric power providers will install anti-perching measures on all structures within 0.1 mile of either side of the proposed crossings of the Platte, Elkhorn, Niobrara, Cheyenne, Yellowstone, Milk and Missouri rivers.
Piping plover	Not Likely to Adversely Affect	Yes	This determination is based on Keystone's plan to use HDD when crossing the Missouri, Platte, Elkhorn, Niobrara, Cheyenne, and Yellowstone rivers and Keystone's and electric power providers' commitment to follow conservation measures identified by the Service. Specifically, pre-construction surveys to identify nesting piping plovers within 0.25 miles of the proposed river crossings and the commitment to halt construction should nesting individuals be identified, would avoid effects on nesting piping plovers. While migrating piping plovers may encounter construction activities during spring and fall migration, effects on potentially suitable habitat are not expected due to the use of HDD. Although new electric power lines would increase the collision and predation potential for piping plovers, none of the proposed power lines would overlap suitable nesting or foraging habitat, and only a small portion of one power line, co-located on existing structures, would approach within 1 mile of potentially suitable habitat. Installation of BFDs may incidentally	• Keystone will complete crossings of major rivers and riverine habitat using HDD, resulting in a pipeline burial depth of 25 feet or greater, regardless of the season. • Keystone will implement measures identified in the HDD contingency plan, including monitoring of the HDD bore, monitoring downstream of the HDD site for evidence of drilling fluids, and mitigation measures should a frac-out occur. • Where practicable, Keystone will maintain vegetative screening at HDD sites to prevent disturbance of piping plovers. • Should HDD activities occur at night, Keystone will down-shield lights when the site is within 0.25 miles of potentially suitable habitat and vegetative screening is lacking. • Keystone will conduct pre-construction presence/probable absence surveys of pipeline crossings within 0.25 mile of potentially suitable breeding habitat at the Platte, Elkhorn, and Niobrara rivers in Nebraska; the Cheyenne River in South Dakota; and the Yellowstone River in Montana during the piping plover nesting season (April 15 to September 1) to ensure that there are no nesting pairs within 0.25 mile of the construction area. If piping plover nests are found at the crossings, Keystone will: (1) adhere to a 0.25-mile buffer of no pipeline construction activity and (2) continue to monitor nests if any are within 0.25 mile of the construction footprint until young have fledged.

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
			reduce the risk of other bird species, including piping plovers.	• Keystone will conduct daily surveys for nesting piping plovers during the nesting season when construction activities occur within 0.25 mile of potential nesting habitat. • If nesting piping plovers are present, Keystone will make minor adjustments to the pipeline corridor, if practicable, to avoid nesting plovers, in coordination with the Service. This may involve shifting the pipeline corridor away from nests to avoid disturbances to piping plover nests or other modifications depending on the circumstances. • To the extent practicable, Keystone's construction within 0.25 mile of a piping plover nest will occur mostly during daytime hours and will comply with any local noise regulations. • Keystone's construction equipment will be properly equipped with mufflers to lessen noise impacts. • Keystone will implement a project-specific SPCC Plan. • Keystone will mark and maintain a 100-foot buffer from river crossings, free from hazardous materials, fuel storage, and vehicle fuel transfers. These buffers will be maintained during construction except when fueling and refueling the water pump near the river edge that is required for the HDD crossing and hydrostatic test water withdrawal. Water pump fueling will be completed by trained personnel and will use secondary containment and a spill kit will be onsite. • Keystone will conduct refueling and lubrication of construction equipment in uplands and greater than 100 feet from streams and wetlands. Where this is not possible, designated personnel with special training in refueling, spill containment, and cleanup will conduct these activities.

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
				• Keystone will perform all equipment maintenance and repairs will be performed in upland locations at least 100 feet from waterbodies and wetlands. • Keystone will park all equipment will be parked at least 100 feet from a watercourse or wetland overnight, if possible. • Keystone will ensure equipment will not be washed in streams or wetlands. • Keystone's Construction and restoration activities will be conducted to allow for prompt and effective cleanup of spills of fuel and other hazardous materials. • Keystone will ensure that each construction crew and cleanup crew will have sufficient tools and materials on hand to stop leaks, including supplies of absorbent and barrier materials that will allow for rapid containment and recovery of spilled materials. • Keystone will ensure that water withdrawal for hydrostatic testing will be less than 10 percent of the baseline daily flow. • Keystone will minimize temporary water reductions by withdrawing only the volume of water needed for hydrostatic testing as outlined in its permits. Water will be returned to its source within a 30-day period except where the hydrostatic test water is used to test multiple spreads. At the conclusion of hydrostatic testing, the remaining water will be returned to the source. • During aerial surveillance, Keystone's aircraft will maintain at least 1,000 feet of elevation. • If construction of power lines occurs during the piping plover nesting season, Keystone or the electric power providers will conduct surveys of potentially suitable riverine and/or sand pit plover nesting habitat within 0.25 mile of new power lines within 2 weeks of construction to

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
				determine presence of nesting pairs. If nesting plovers are present, construction will cease until all chicks fledge from the site. • Electric power providers will install anti-perching measures on all structures within 0.1 mile of either side of the proposed crossings of the Platte, Elkhorn, Niobrara, Cheyenne, Yellowstone, Milk and Missouri rivers. • Should potentially suitable breeding or foraging habitat for piping plover be identified near the proposed Project at a later time, power lines near breeding habitat (and within 0.25 mile of each side) and lines that will be built between rivers and sand and gravel mining areas, electric power providers will mark power lines with BFDs to reduce potential injury or mortality to piping plovers. • Electric power providers will route power lines to avoid construction within 0.50 mile of potentially suitable piping plover nesting habitat in alkali wetlands in Montana. • NorVal Electric Cooperative will install BFDs in all locations where the power line to PS-10 comes within 0.25 mile of either side of the Milk River. Additionally, BFDs will be installed for 0.25 mile on either side of two unnamed reservoirs crossed by the proposed power line to PS-10.
Rufa red knot	Not Likely to Adversely Affect	Yes	Adverse effects on rufa red knot are unlikely based on (1) the proposed pipeline would not affect stopover habitat; (2) there is very little potentially suitable stopover habitat proximal to the proposed power lines; (3) rufa red knot are extremely uncommon in the Central Flyway; and (4) the increase in power lines	• Keystone will complete crossings of major rivers and riverine habitat using HDD, resulting in a pipeline burial depth of 25 feet or greater, regardless of the season. • Keystone will implement measures identified in the HDD contingency plan, including monitoring of the HDD bore, monitoring downstream of the HDD site for evidence of drilling fluids, and mitigation measures should a frac-out occur.

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
			associated with pump stations is 0.1 percent of existing large power lines. Therefore, no measurable effects are anticipated for the rufa red knot as a result of the Project.	• Keystone will implement a project-specific SPCC Plan. • To the extent practicable, Keystone's construction will occur mostly during daytime hours and will comply with any local noise regulations. • Keystone's construction equipment will be properly equipped with mufflers to lessen noise impacts. • Keystone will mark and maintain a 100-foot buffer from river crossings, free from hazardous materials, fuel storage, and vehicle fuel transfers. These buffers will be maintained during construction except when fueling and refueling the water pump near the river edge that is required for the HDD crossing and hydrostatic test water withdrawal. Water pump fueling will be completed by trained personnel and will use secondary containment and a spill kit will be onsite. • Keystone will refuel or lubricate construction equipment in uplands and greater than100feet from streams and wetlands. Where this is not possible, designated personnel with special training in refueling, spill containment, and cleanup will conduct these activities. • Keystone will perform all equipment maintenance and repairs in upland locations at least 100 feet from waterbodies and wetlands. • Keystone will park all equipment at least 100 feet from a watercourse or wetland overnight, if possible. • Keystone will not wash equipment in streams or wetlands. • Keystone's construction and restoration activities will be conducted to allow for prompt and effective cleanup of spills of fuel and other hazardous materials. • Keystone will ensure each construction crew and cleanup crew will have sufficient tools and materials on hand to stop leaks, including supplies of absorbent and barrier materials that will allow for rapid containment and

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
				recovery of spilled materials. • Keystone will ensure water withdrawal for hydrostatic testing will be less than 10 percent of the baseline daily flow. • Keystone will minimize temporary water reductions by withdrawing only the volume of water needed for hydrostatic testing as outlined in their permits. Water will be returned to its source within a 30-day period except where hydrostatic test water is used to test multiple spreads. At the conclusion of hydrostatic testing, the remaining water will be returned to the source.
Whooping crane	Not Likely to Adversely Affect	Yes	No documented whooping crane historical or telemetry observations have been identified within 1.5 miles of the action area and only one record is within 3.5 miles. Given (1) the limited number of individuals, (2) the lack of historical or recent telemetry records in the action area despite the long-term nature of the historical data and the fact that the telemetry data are not dependent on human observation, (3) the low probability of a collision during migration, and (4) the proposed conservation measures developed in conjunction with the Service, adverse effects are unlikely. BLM used the Service's "A Review and Critique of Risk Assessments Considered by the U.S. Fish and Wildlife Service Regarding the Collision Risk for Whooping Cranes with NPPD's R-Project"	• Keystone will complete crossings of major rivers and riverine habitat using HDD, resulting in a pipeline burial depth of 25 feet or greater, regardless of the season. • Keystone will implement measures identified in the HDD contingency plan, including monitoring of the HDD bore, monitoring downstream of the HDD site for evidence of drilling fluids, and mitigation measures should a frac-out occur. • Should HDD activities occur at night, Keystone will down-shield lights during the spring and fall whooping crane migration seasons in areas that provide potentially suitable habitat. • Where practicable, Keystone will maintain vegetative screening at HDD sites to prevent disturbance of whooping cranes. • During spring (March–May) and fall (October–November) whooping crane migration periods, Keystone's environmental monitors will complete a daily brief survey of any wetland or riverine habitat areas potentially used by whooping cranes in the morning and afternoon before starting equipment and following the Whooping Crane Survey Protocol previously developed

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
			(https://www.fws.gov/mountain-prairie/es/nebraska/library/USFWS-Whooping-Crane-Whitepaper-final-w-Attachments.pdf), dated January 30, 2019 to develop a collision risk assessment and determined risks to whooping cranes would be very low.	by the Service and Nebraska Game and Parks Commission [NGPC] (NGPC and Service 2017). If whooping cranes are sighted, the environmental monitor will immediately contact the Service and respective state agency in Nebraska, South Dakota, and/or Montana for further instruction and require that all human activity and equipment start-up be delayed. Work could proceed if whooping crane(s) leave the area. The compliance manager will record the sighting, bird departure time, and work start time on the survey form. The Service will notify the compliance manager of whooping crane migration locations during the spring and fall migrations through information gathered from the whooping crane tracking program. • Keystone will re-vegetate disturbed areas (particularly within riparian zones and in wetland habitats) in accordance with the Construction, Mitigation, and Reclamation Plan (CMRP) and U.S. Army Corps of Engineers (USACE) permit requirements. • Keystone's use of helicopters within 0.5 mile of any whooping crane(s) will be prohibited. • Keystone will prepare and implement a project-specific SPCC Plan. • Keystone will mark and maintain a 100-foot buffer from river crossings, free from hazardous materials, fuel storage, and vehicle fuel transfers. These buffers will be maintained during construction except when fueling and refueling the water pump near the river edge that is required for the HDD crossing and hydrostatic test water withdrawal. Water pump fueling will be completed by trained personnel and will use secondary containment and a spill kit will be onsite.

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
				• Keystone will refuel and lubricate construction equipment in uplands and greater than 100 feet from streams and wetlands. Where this is not possible, designated personnel with special training in refueling, spill containment, and cleanup will conduct these activities. • Keystone will perform all equipment maintenance and repairs in upland locations at least 100 feet from waterbodies and wetlands. • Keystone will park all equipment at least 100 feet from a watercourse or wetland overnight, if possible. • Keystone's equipment will not be washed in streams or wetlands. • Keystone's construction and restoration activities will be conducted to allow for prompt and effective cleanup of spills of fuel and other hazardous materials. • Keystone will ensure each construction crew and cleanup crew will have sufficient tools and materials on hand to stop leaks, including supplies of absorbent and barrier materials that will allow for rapid containment and recovery of spilled materials. • Keystone will ensure water withdrawal for hydrostatic testing will be less than 10 percent of the baseline daily flow. • Keystone will minimize temporary water reductions by withdrawing only the volume of water needed for hydrostatic testing as outlined in its permits. Water will be returned to its source within a 30-day period except where the hydrostatic test water is used to test multiple spreads. At the conclusion of hydrostatic testing, the remaining water will be returned to the source. • During aerial surveillance, Keystone's aircraft will maintain at least 1,000 feet of elevation.

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
				• Should power lines be adjusted, the electric power provider will site them greater than 5 miles from Designated Critical Habitat and/or documented high-use areas. • Electric Power providers will mark new lines with BFDs within 1 mile of potentially suitable habitat within the 95-percent migration corridor. • Electric Power providers will mark new lines with BFDs near potentially suitable habitat outside the 95-percent migration corridor at the discretion of the local Service Ecological Services Field Office, based on the biological needs of the whooping crane. Thus far, this will include the following: -The power line to PS-09 will be marked with BFDs within 0.25 mile of crossings of the Milk River. -The power line to PS-10 will be marked with BFDs within 0.25 mile of crossings of the Milk River and within 0.25 mile of two unnamed reservoirs crossed by the line. -The power line to PS-12 will be marked with BFDs within 0.25 mile of crossings of the Redwater River and Buffalo Springs Creek. -The power line to PS-14 will be marked with BFDs within 0.25 mile of crossings of Pennel Creek and an unnamed pond in the northwest corner of section 35, township 9 north, range 58 east, in Fallon County, Montana. • Keystone will develop a compliance monitoring plan that requires written confirmation that the power lines have been marked with BFDs and that the markers are maintained in working condition. • Electric power providers will complete daily presence/probable absence surveys in potentially suitable habitat according to the Project's protocol described

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
				above if construction occurs during the spring and fall migration periods. Should a whooping crane be sighted within 0.5 mile of a work area, all work will cease until the whooping crane leaves that immediate area. Service and NGPC will be contacted immediately and notified of the presence of whooping crane.
Northern long-eared bat	May Affect, Likely to Adversely Affect, relying on Service's 2016 Programmatic Biological Opinion on the Final 4(d) Rule for the NLEB and Activities Excepted from Take Prohibitions to fulfill its section 7(a)(2) consultation obligation	See Introduction Section of BO for more information	Only known presence of northern long-eared bat (NLEB) in the action area was from four NLEBs fitted with transmitters within 1 mile of Fort Peck spillway. However, these were not maternity roosts. There are no known occupied maternity roost trees, or known occupied hibernacula occur within 1 mile of the action area. The proposed Project "may affect" the northern long-eared bat due to the alteration of approximately 81 acres of potentially suitable habitat. However, the proposed Project relies on the Service's January 5, 2016, Programmatic Biological Opinion on the Final 4(d) Rule for the NLEB and Activities Excepted from Take Prohibitions to fulfill its section 7(a)(2) consultation obligation.	• Keystone will implement measures identified in the HDD contingency plan, including monitoring of the HDD bore, monitoring downstream of the HDD site for evidence of drilling fluids, and mitigation measures should a frac-out occur. • Should HDD activities occur at night, Keystone will down-shield lights. • Where practicable, Keystone will maintain vegetative screening at HDD sites to prevent disturbance of northern long-eared bats. • Keystone will ensure that no tree removal will occur within 0.25 miles of a known occupied hibernaculum. • Keystone will ensure that no tree removal will occur within 150 feet of a known occupied maternity roost tree during the pup season (June 1-July 31) • Keystone will complete pre-construction presence/absence surveys if there is a need to remove trees within potentially suitable habitat within the Project area during the pup season (June 1 to July 31). If required, surveys will be conducted pursuant to local Service field office and state resource agency requirements. The need for additional season tree-clearing restrictions, if any, will be determined in coordination with applicable state and Federal resource agencies, pending survey results. • During aerial surveillance, Keystone's aircraft will maintain at least 1,000 feet of elevation.

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
				• Keystone will prepare and implement a project-specific SPCC Plan.
Topeka shiner	Not Likely to Adversely Affect	Yes	Keystone has committed to implementing conservation measures, conducting pre-construction surveys, and avoiding effects on individuals within occupied streams.	• Keystone's crossing of Union Creek will be completed using HDD, resulting in a pipeline burial depth of 25 feet or greater. • Keystone will implement measures identified in the HDD contingency plan, including monitoring of the HDD bore, monitoring downstream of the HDD site for evidence of drilling fluids, and mitigation measures should a frac-out occur. • Keystone will complete pre-construction presence/probable absence surveys of Union and Taylor creeks will be completed during the year of construction. • Keystone will use a dry crossing method or HDD if the Topeka shiner is identified during pre-construction surveys. • Keystone will ensure that water required for HDD operations or hydrostatic testing will be sourced from locations without Topeka shiner presence. • Keystone will maintain at least a 100-foot setback from the water's edge for any HDD drill pads, should the HDD method be used. • Keystone will implement best management practices (BMPs) outlined in the CMRP to prevent and minimize sediment runoff from construction areas from entering receiving streams that may provide potentially suitable Topeka shiner habitat. • Keystone will avoid use of broadcast applications of pesticides or herbicides near water bodies. • Keystone will avoid water depletions within occupied river basins. • Keystone will maintain upstream and downstream fish passage during any stream habitat disturbance.

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
				• Keystone will screen the intake end of any water withdrawal pump with mesh having openings no larger than 0.125 inch. Water velocity at the screen will not exceed 0.5 feet per second, and the intake screens will be checked periodically for fish impingement. Should a Topeka shiner become impinged against the screen, all pumping operations will immediately cease and the compliance manager for Keystone will immediately contact the Service to determine if additional protection measures will be required. An environmental inspector will be present every day during water withdrawals to ensure compliance with permit conditions and to ensure that Keystone's commitments are met.
Western prairie fringed orchid	Not Likely to Adversely Affect	Yes	Surveys in 2019 and previous years have demonstrated the probable absence of this species from the pipeline construction corridor. Desktop studies have indicated that it is unlikely that individuals or high-quality habitat would occur in power line corridors. Given that pre-construction surveys will occur and Keystone has committed to implement avoidance and conservation measures, adverse effects are unlikely.	• Keystone or the electric power providers will conduct pre-construction presence/probable absence surveys within potentially suitable habitat that was not previously surveyed, including the power line route to PS-21. Survey results will be submitted to the Service for review. Species presence will be assumed in potentially suitable habitat if surveys cannot be conducted during the flowering period. • Keystone or the electric power providers will conduct pre-construction presence/probable absence surveys in potentially suitable habitat along the power line routes to PS-22 through PS-25, during the appropriate flowering period. The NPPD will delineate and designate areas where western prairie fringed orchid habitat is present as "avoidance areas" where placement of structures and construction traffic will not occur. • Keystone's Project alignment will be adjusted to avoid any identified populations as practicable and/or approved by the landowner.

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
				• To the greatest extent practicable, Keystone will reduce the width of the construction ROW in areas where western prairie fringed orchid populations have been identified. • Keystone will implement a noxious and invasive weed control program consistent with the CMRP to reduce the potential for spread or invasion of weeds. • Keystone will conduct any necessary herbicide application by spot spraying. • Keystone will restrict use of herbicides within 100 feet of documented western prairie fringed orchid occurrence. • Keystone will minimize the potential for altered hydrology (e.g., surface water flow, infiltration and groundwater levels) in potentially suitable habitat through BMPs outlined in the CMRP. • Keystone will salvage and segregate topsoil appropriately where populations have been identified to preserve native seed sources in the soil for use in revegetation efforts in the ROW. • Keystone will restore wet meadow habitat using a Service- and NGPC-approved seed mix. • Keystone will restore potentially suitable wet meadow habitats following Project construction. • Keystone will monitor restoration of construction-related impacts on wet meadow habitats identified as potentially suitable for the western prairie fringed orchid for a 5-year period. • Keystone has sited aboveground facilities to avoid potentially suitable western prairie fringed orchid wetland habitat. • Keystone will implement a project-specific SPCC Plan. • Keystone will mark and maintain a 100-foot buffer from river crossings, free from hazardous materials, fuel storage, and vehicle fuel transfers.

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
				These buffers will be maintained during construction except when fueling and refueling the water pump near the river edge that is required for the HDD crossing and hydrostatic test water withdrawal. Water pump fueling will be completed by trained personnel and will use secondary containment and a spill kit will be onsite. • Keystone will refuel and lubricate construction equipment in uplands and greater than100 feet from streams and wetlands. Where this is not possible, designated personnel with special training in refueling, spill containment, and cleanup will conduct these activities. • Keystone will perform all equipment maintenance and repairs in upland locations at least 100 feet from waterbodies and wetlands. • Keystone will park all equipment at least 100 feet from a watercourse or wetland overnight, if possible. • Keystone will not wash equipment in streams or wetlands. • Keystone will conduct construction and restoration activities to allow for prompt and effective cleanup of spills of fuel and other hazardous materials. • Keystone will ensure each construction crew and cleanup crew will have sufficient tools and materials on hand to stop leaks, including supplies of absorbent and barrier materials that will allow for rapid containment and recovery of spilled materials. • Keystone will ensure water withdrawal for hydrostatic testing will be less than 10 percent of the baseline daily flow. • Keystone will minimize temporary water reductions by withdrawing only the volume of water needed for hydrostatic testing as outlined in its permits.

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
				Water will be returned to its source within a 30-day period except where hydrostatic test water is used to test multiple spreads. At the conclusion of hydrostatic testing, the remaining water will be returned to the source.
Black-footed ferret	Not Likely to Adversely Affect	Yes	No presence of black-footed ferrets (BFF) within the action area; little or no suitable habitat (prairie dog towns) which BFF depend upon would be affected, the Service determined effects on prairie dogs do not effect BFF where its known to occur; BFF is not known to exist outside of known re-introduced locations and surveys are no longer required; closest known reintroduction site is 19 miles from the action area, where a protected reintroduced population exists; there is little to no possibility of the species presence within the action area. Black-tailed prairie dog towns in all of South Dakota have been block-cleared by the Service's Pierre Ecological Services Field Office, meaning the towns no longer contain any wild, free-ranging black-footed ferrets, and activities within these areas that result in the removal of the black-tailed prairie dogs and/or their habitat would no longer be required to meet the Service survey guidelines for black-footed ferrets or undergo consultations under section 7 of the ESA.	• Keystone will provide the Service with the results of Montana prairie dog town surveys and continue to coordinate with the Montana Ecological Services Office to determine the need for black-footed ferret surveys, in accordance with the Black-footed Ferret Survey Guidelines (USFWS 1989). • Keystone will prohibit workers from keeping domestic pets in construction camps and/or worksites. • Keystone will make workers aware of how canine distemper and sylvatic plague diseases are spread (domestic pets and fleas). • Keystone will prohibit workers from feeding wildlife. • Keystone will report concentrations of dead and/or apparently diseased animals (prairie dogs, ground squirrels, others) to the appropriate state and Federal agencies. • Keystone will implement a Project-specific SPCC Plan. • Electrical power providers will implement protection measures to minimize raptor (BFF predators) perching, in accordance with the Avian Power Line Interaction Committee (APLIC), Suggested Practices for Avian Protection on Power Lines (APLIC 1996, 2012). • Big Flat Electric Cooperative will provide immediate notification to the Service in the unlikely event that a black-footed ferret is sighted during construction of the power line to PS-09.

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
Pallid Sturgeon	Not Likely to Adversely Affect	Yes	Adverse effects to pallid sturgeon are unlikely based on Keystone's plan to use the HDD crossing method for large rivers and Keystone's commitment to follow conservation measures, including restrictions on water withdrawals. None of the potential effects would occur on or near Federal lands, except possibly where the BLM and USACE are involved with the crossing under the Missouri River just below the Fort Peck Project.	• Keystone will use HDD under the Milk, Missouri, Yellowstone, and Platte rivers. • Keystone will use at least a 100-foot setback from the water's edge for the HDD drill pads at the HDD crossings at the Milk, Yellowstone, Missouri, and Platte rivers. • Keystone will contain potential releases during HDD (frac-outs) by BMPs that are described within the HDD contingency plans required for drilled crossings. • Keystone will avoid broadcast applications of pesticides or herbicides within 0.25 miles of water bodies. • Keystone will maintain upstream and downstream fish passage during any stream habitat disturbance. • Keystone will screen the intake end of any water withdrawal pump with mesh having openings no larger than 0.125 inch, a floating surface intake would be used to avoid the benthic habitat used by the sturgeon; water velocity at the screen would not exceed 12 centimeters per second to prevent entrainment of larval fish, and the intake screens would be periodically checked for fish impingement. Should a sturgeon become impinged against the screen, all pumping operations would immediately cease and the compliance manager for Keystone would immediately contact the Service to determine if additional protection measures would be required. • Keystone will avoid water withdrawal from the Milk, Missouri, and Yellowstone rivers for any purpose from May 15 through July 15 of any year to avoid pallid spawning periods and the impingement and entrainment of free embryos and larval pallid sturgeon that drift with the current during that time of year. • Keystone will avoid water withdrawal from the Platte River for any purpose from March 1 through June 30 of any year to avoid pallid spawning periods and the

Species	ESA Section 7 Determination	Service Concurs	Rationale	Summary of Conservation Measures[1]
				impingement and entrainment of free embryos and larval pallid sturgeon that drift with the current during that time of year. • Keystone would take care during the discharge to prevent erosion or scouring of the waterbody bed and banks to avoid impacts to spawning habitat for the species. Hydrostatic test discharge would be in upland locations near the source of the water. Water would be discharged over several days and through a hay bale apparatus or other velocity reduction and erosion control device. • Keystone will avoid temporary water reductions based on Keystone's plan to withdraw the volume needed and to return water back to its source within a 30-day period for the Platte River. • Keystone will cross major rivers using the HDD method with a pipeline burial depth of 25 feet or greater below the river bed to avoid direct impacts to habitat. • Proposed HDD entry and exit points are more than 600 feet from the Platte River; if these points are changed, Keystone would maintain at least a 100-foot setback from the water's edge. • Keystone will implement measures identified in a required HDD contingency plan, including monitoring of the directional drill bore, monitoring downstream for evidence of drilling fluids and mitigation measures to address a frac-out should one occur. • Keystone's major river crossings are subject to an intensive integrity management program stipulated by the USDOT (Integrity Management Rule, 49 CFR 195) and require heavier wall pipe be used for the HDD method.

The Service anticipates that the Project may result in minor or temporary disturbance to the listed species or their habitat described in Table 1 within the action area. However, adverse effects to these species are not anticipated due to: (1) the avoidance of the species' suitable habitat; (2) the low likelihood of disturbance that may occur as a result of the proposed project; and (3) the application of conservation measures intended to avoid/minimize impacts for each of these species and associated compliance monitoring by Keystone (BLM 2019, Appendix D). Therefore, these species will not be addressed further in the attached Biological Opinion.

The Service concurs with the determination that the Project may affect and is likely to adversely affect the ABB. Therefore, the final BO analyzes the effects of the entire Project on the ABB. This includes all consequences to ABB that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. No critical habitat has been designated for the ABB. The ITS serves to enumerate or identify the amount or extent of take "caused by" all the effects of the action and exempts the action agencies from the prohibitions against that take under section 9 of the ESA. Here, take of ABB would not occur "but for" the proposed Federal actions. Given the scope of the effects of the Federal actions, it follows that the majority of the take exempted for the Federal agencies is occurring on lands that are outside the jurisdiction of the Federal agencies, or is related to activities undertaken by the applicant not under the authority of a Federal agency.

Because the majority of take associated with the proposed Project will occur on non-federal lands and is outside the jurisdiction of the Federal agencies, Keystone has elected to apply for an incidental take permit and develop a habitat conservation plan for the ABB. Therefore, the incidental take permit will authorize the incidental take that results from Keystone's covered activities. As appropriate, the Service may utilize the analysis in this BO when it processes the application for an incidental take permit for Keystone.

If you have any questions regarding this matter, please contact me at the letterhead address or by phone at (303) 236-4774.

Sincerely,

Colorado and Nebraska Field Supervisor

Enclosure

cc: Rebecca Latka, Regulatory Field Support, U.S. Army Corps of Engineers
Heath Kruger, Chief of Natural Resources, U.S. Army Corps of Engineers
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Jody Sundsted, Senior Vice President and Regional Manager, Upper Great Plains Region, Western Area Power Administration
Dennis Rankin, Environmental Protection Specialist, Rural Utilities Service

Literature Cited

Avian Power Line Interaction Committee (APLIC). 1996. *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996.* Edison Electric Institute and the Raptor Research Foundation. Washington, D.C.

Avian Power Line Interaction Committee. 2006. *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006.* Edison Electric Institute, APLIC, and the California Energy Commission. Washington, D.C. and Sacramento, CA.

Nebraska Game and Parks and U.S. Fish and Wildlife Service. 2017. Interior Least Tern and Piping Plover Survey Protocol, February 2017.

Nebraska Natural Heritage Program (NNHP). 2019. Conservation and Environmental Review Tool (CERT) Project Report and GIS files. Received January 11, 2019.

South Dakota Natural Heritage Program (SDNHP). 2019. Element Occurrence GIS Shapefile. Received January 8, 2019.

United States Fish and Wildlife Service (Service). 2019. Whooping Crane Tracking Project. Nebraska Ecological Services Field Office.

United States Fish and Wildlife Service. 2017. Nebraska Ecological Services Field Office, Provisional Whooping Crane Telemetry Project Database 2010-2016.

United States Fish and Wildlife Service. 2016. Programmatic Biological Opinion on the "Final 4(d) Rule for the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions, January 5, 2016. Available at: https://www.fws.gov/midwest/endangered/section7/batbo/16_NLEBRange_Final4d01052016.pdf

United States Fish and Wildlife Service. 1989. Black-Footed Ferret Survey Guidelines for Compliance with the Endangered Species Act. U.S. Fish and Wildlife Service. Denver, Colorado and Albuquerque, New Mexico. 10 pp. + Appendices.

United States Bureau of Land Management. 2019. Amended Biological Assessment for the Keystone XL Project. November 26, 2019. Received by the Service on November 27, 2019.

BIOLOGICAL OPINION ON THE EFFECTS OF THE PROPOSED KEYSTONE XL PIPELINE TO THE FEDERALLY ENDANGERED AMERICAN BURYING BEETLE
Nicrophorus americanus

TAILS No. 06E22000-2020-F-0052

Consulting Agencies:
Bureau of Land Management
Western Area Power Administration
Rural Utilities Service
U.S. Army Corps of Engineers

Biological Opinion Prepared by:
U.S. Fish and Wildlife Service

Project Leader, Colorado and Nebraska Field Office

Date DEC 23 2019

TABLE OF CONTENTS

TABLE OF CONTENTS 2
INTRODUCTION 3
CONSULTATION HISTORY 4
BIOLOGICAL OPINION 5
DESCRIPTION OF PROPOSED ACTION 5
Action Area 10
Description of the Proposed Project 10
Conservation Measures for the American Burying Beetle 13
Mitigation Measures Proposed for the American Burying Beetle 16
STATUS OF THE SPECIES AND CRITICAL HABITAT RANGEWIDE 17
Status and Distribution 17
Threats 19
Reproduction/Active Periods 19
Feeding 19
Habitat 20
ENVIRONMENTAL BASELINE FOR THE ACTION AREA 20
Status of the Species within the Action Area 20
Factors Affecting Species Environment within the Action Area 25
EFFECTS OF THE ACTION 27
Species Response to the Proposed Action 31
CUMULATIVE EFFECTS 35
JEOPARDY DISCUSSION AND CONCLUSION 35
INCIDENTAL TAKE STATEMENT 38
AMOUNT OR EXTENT OF TAKE ANTICIPATED 39
EFFECT OF THE TAKE 40
REASONABLE AND PRUDENT MEASURES 40
Procedures for Handling and Disposing of American Burying Beetles 40
REINITIATION NOTICE 41
LITERATURE CITED 42

INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (BO) on the proposed Keystone XL Pipeline Project (Project) under section 7 of the Endangered Species Act (ESA) based on our review of the Bureau of Land Management's (BLM) Biological Assessment for all Federal agency actions associated with the Project proposed by the applicant, TC Energy (formerly known as TransCanada) Keystone Pipeline, LP (Keystone). A Biological Assessment (hereafter referred to as the BA) was submitted by the BLM on September 30, 2019. An amended BA was submitted by BLM on November 27, 2019 (BLM 2019). This BO is prepared in accordance with section 7 of the ESA (16 U.S.C. 1531-1544, 87 Stat. 884), as amended).

The purpose of section 7 consultation is to ensure that any action authorized, funded, or carried out by the Federal government is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat of the species. Consistent with the regulations at 50 C.F.R. §402.12(f), the BA analyzed the effects of the entire action, regardless of whether the actions are Federal or non-federal. For this Project, the Federal actions are by BLM, Western Area Power Administration (WAPA), Rural Utilities Service (RUS), and the U.S. Army Corps of Engineers (USACE). Although this BO evaluates effects on the federally listed American burying beetle [*Nicrophorus americanus*], (hereafter referred to as "ABB" or "beetle") described in the BA for the entire Project, the area where the adverse effects and incidental take of the ABB occurs is on non-federal lands and primarily outside the scope of Federal agency authority. Keystone has decided to develop a Habitat Conservation Plan (HCP) to support its application to the Service for a section 10(a)(1)(B) incidental take permit for the ABB for their activities on non-federal lands or lands without a Federal nexus. Keystone has submitted a draft HCP to the Service for review and technical assistance. The HCP and section 10 process is separate from this BO, though the Service might utilize the analysis in this BO, as appropriate, when it processes the permit application.

The Federal agencies determined that the Project may affect the threatened northern long-eared bat (NLEB; *Myotis septentrionalis*). The Service's 2016 final 4(d) rule for NLEB (81 FR 1900) prohibits incidental take only under the following circumstances: 1) if it occurs within a hibernaculum, or 2) if it results from tree removal activities and the activity occurs within 0.25 mile (0.4 km) of a known hibernaculum; or, the activity cuts or destroys a known, occupied maternity roost tree or other trees within a 150 foot radius from the maternity roost tree during the pup season from June 1 through July 31. No actions or impacts from the Project are anticipated to NLEB hibernaculum. Keystone has committed that 1) no tree removal will occur within 0.25 miles of a known occupied NLEB hibernaculum, 2) no tree removal will occur within 150 feet of a known occupied NLEB roost tree during the pup season (June 1-July 31), and 3) if there is a need to remove trees during the pup season, pre-construction presence/absence surveys will be completed by Keystone, pursuant to local Service field office and state resource agency requirements (see NLEB row in Table 1 of the BO Transmittal Letter). Therefore, the actions associated with the Project would not cause prohibited incidental take to the NLEB. To fulfill the Federal agencies' section 7(a)(2) consultation obligation, this Project relies on Service's January 5, 2016, Programmatic Biological Opinion on the "Final 4(d) Rule

for the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions (Programmatic Biological Opinion) (Service 2016, entire)." The Programmatic Biological Opinion provides a framework for streamlined section 7 consultation for other Federal actions that may affect the NLEB and are consistent with the provisions of the 4(d) rule. The Service has determined that the Federal agencies have appropriately utilized the framework within the Programmatic Biological Opinion, and therefore does not further discuss NLEB in this BO.

This BO is based on best scientific and commercial data available including information provided in the BA (BLM 2019), the Supplemental Draft Environmental Impact Statement (SDEIS), draft HCP (Keystone 2019), telephone conversations, meetings, field investigations, and other sources of information.

CONSULTATION HISTORY

The Service's Colorado/Nebraska Ecological Services Office in Lakewood, Colorado, is delegated the lead office to conduct the consultation with BLM. However, other Service Ecological Services Field Offices in Nebraska, Montana, North Dakota, South Dakota, and Kansas have been actively participating as part of the Project team during part or all of the informal and formal consultation, and assisted in drafting or reviewing consultation documents throughout the consultation. Consultation for the Project has been ongoing over an extended time period, and included a previous BA submitted by the Department of State in June 2012 (Department 2012), and a BO issued by the Service in 2013 (Service 2013, entire). The 2013 BO and 2012 BA on which it was based, and subsequent analysis for additional species, are no longer in effect; the Department of State and the Service withdrew the 2012 BA and 2013 Biological Opinion on May 6, 2019. For a complete list summarizing agency correspondence, species-specific survey information, and continued coordination with the Service regarding biological surveys and determination of biological effects for the Project, see section 1.3, Consultation History, and Appendix A, Letters of section 7 Consultation and Supporting Communications of the BA (BLM 2019, pp. 1-8; Appendix A).

Since May 2019, the Service, BLM, WAPA, RUS, USACE, and the Department of State has held twice weekly conference calls to discuss the consultation. A meeting with the Service, BLM, WAPA, RUS, and USACE was held on September 19-20, 2019, to discuss remaining issues associated with the development of a BA. On September 30, 2019, BLM and the additional Federal agencies submitted a BA to the Service with a letter requesting initiation of formal consultation. On November 27, 2019, BLM submitted an amended BA (BLM 2019) to the Service to update information provided in the previous BA.

Updates to the Project and Analysis

Since the 2013 BO, several issues related to the Project have been modified. The Department of State no longer has an action requiring section 7 consultation. However, Federal actions involving the BLM, WAPA, RUS, and the USACE, still require section 7 consultation. When a particular action involves more than one Federal agency, the consultation and conference responsibilities may be fulfilled through a lead agency for section 7 consultation. The Service is notified of the designation in writing by the lead agency (50 CFR 402.07). The BLM has not

notified the Service in writing that it is assuming the designation of lead agency, but has provided the Service the information necessary to complete section 7 consultation for the Federal actions associated with this Project (BLM 2019). A portion of the Project in Nebraska has been rerouted to avoid impacts to sensitive areas and to maximize the use of existing rights of way (ROWs). This new route segment, designated as the Mainline Alternative Route (MAR), is discussed in detail in the 2018 MAR Draft SEIS (Department 2018, entire). The Project footprint through Montana and South Dakota, and the 60-acre pipe yard in North Dakota, are essentially the same as that reviewed and assessed in the 2012 BA and 2013 BO for the previously proposed project.

The BA (BLM 2019) includes the most recent species survey information. This also included additional whooping crane public sightings and telemetry data, and assessment of effects to any listed species as a result of new information. The Project includes updated standard practices related to ABB conservation measures based on the Service's most recent recommendations. Efforts to "capture and relocate" ABB near the Project footprint are no longer considered a beneficial practice for reducing harm to ABB (see additional detail in CONSERVATION MEASURES section of this BO). While this practice was proposed and incorporated into the 2013 BO and 2012 BA to reduce ABB mortality (anticipated as harassment instead), it is no longer proposed as part of this Project.

The BA (BLM 2019, pp. 116-118) also considered updated information from Hoback and Conley (2014, entire) which suggested changes in temperature could impact ABB overwintering behavior and survival. In the 2013 BO, incidental take was estimated as a one-time permanent impact for the pipeline's operations in the right-of-way. However, the BA (BLM 2019, p. 124) anticipated and estimated annual mortality from temperature changes due to pipeline operations over the entire duration of the 46 years of the Project after restoration is completed (four years). This results in take estimates during operations 46 times larger than those that would be expected using similar data and methods from the 2013 BO. Additionally, methods of calculating ABB density from survey efforts have been updated since the 2013 BO. ABB density calculations no longer include a habitat quality weighting factor (i.e., a multiplier used to account for habitat quality at location of survey), as densities are calculated using trapping results in mostly high-quality habitats (prime and good). The Service therefore determined that ABB densities are already conservatively high and do not require additional weighting based on habitat quality. The estimate of individuals affected per acre is intended to be conservative. Further information on the type of effects and estimates for take are provided in the EFFECTS OF THE ACTION and INCIDENTAL TAKE STATEMENT in this BO.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

As defined in the ESA section 7 regulations (50 CFR 402.02), "action" means "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas." Examples of Federal actions include, but are not limited to: (a) actions intended to conserve listed species or their habitat; (b) the promulgation of

regulations; (c) the granting of licenses, contracts, leases, easements, rights-of-way, permits, or grants-in-aid; or (d) actions directly or indirectly causing modifications to the land, water, or air.

Proposed Federal Actions

Several Federal agencies are involved in some capacity with the Project. The BLM, the WAPA, the RUS, and the USACE intend to rely on this document to comply with section 7 of the ESA. The following sections describe the proposed Federal actions associated with the Federal agencies described above. Figure 1 indicates the currently known approximate locations that are subject to the proposed Federal actions.

BLM

The BLM's proposed Federal action evaluated in this BO is the BLM's decision to issue a ROW grant and Temporary Use Permit to construct, operate, maintain and decommission a crude oil pipeline and related facilities on Federal lands in compliance with the Mineral Leasing Act, BLM ROW regulations, and other applicable Federal laws. In coordination and concurrence with USACE. The BLM will decide whether to approve, approve with modification, or deny issuance of a ROW grant and Temporary Use Permit for the proposed Keystone XL pipeline system, and if approved, under what terms and conditions. The proposed pipeline ROW would cross approximately 44.4 miles of BLM land in Montana and would also cross approximately 1.88 miles of USACE land at the Missouri River at Fort Peck, Montana.

WAPA

Part of WAPA's mission is to provide open access to transmission services across the Federal power transmission system so that energy producers can transmit power to their customers. Any entity requesting transmission services across the Federal grid system must submit an application for interconnection. WAPA has received interconnection applications from local power cooperatives to serve the electrical needs of Pump Station (PS)-09 through PS-13 and PS-17 through PS-19, as well as PS-21.

The proposed interconnections to WAPA's transmission system are Federal actions. As a result, WAPA must evaluate the environmental impacts of entering into an interconnection agreement and completing any necessary work to WAPA's infrastructure to accommodate the interconnections as well as any interrelated non-federal actions (e.g., construction of power lines). The following provides a summary of WAPA's Federal activities:

- PS-09—Construction and ownership of a new substation (the Bowdoin Substation) and interconnection;
- PS-10—An expansion of the existing Fort Peck Substation and interconnection;
- PS-11—Construction and ownership of a new substation and interconnection;
- PS-12—Interconnection and minimal work within the existing Circle Substation footprint to accommodate the interconnection;
- PS-13—An expansion of the existing O'Fallon Substation and interconnection;

- PS-17—Interconnection and minimal work within the existing Maurine Substation footprint to accommodate the interconnection;
- PS-18—Interconnection and minimal work within the existing Philip Substation footprint to accommodate the interconnection;
- PS-19—Expansion of the existing Midland Substation and interconnection; and
- PS-21—Rebuilding of the existing Gregory Substation and interconnection.

Additional information and analysis related to the power lines that would connect to the above-mentioned substations is provided in the analysis to follow.

RUS

RUS administers programs that provide rural areas with infrastructure and infrastructure improvements, including water and wastewater treatment, telecommunications services, and electric power. For electric power, RUS provides financing through loans and loan guarantees for the construction, operation, and improvement of electric transmission and generation facilities in rural areas. Power cooperatives in South Dakota have applied for RUS financing for the construction of power lines to deliver power to PS-15 through PS-21. The South Dakota power cooperatives include Grand Electric Cooperative (PS-15, 16, and 17), West Central Electric Cooperative (PS-18 and 19) and Rosebud Electric Cooperative (PS-20 and 21). RUS's action is to determine whether to provide Federal financing to these electric cooperatives, thus allowing them to construct and operate the transmission line facilities necessary to supply the Project's pump stations with power.[1]

[1] The power cooperatives could identify and secure alternate financing if RUS decides not to provide financing.

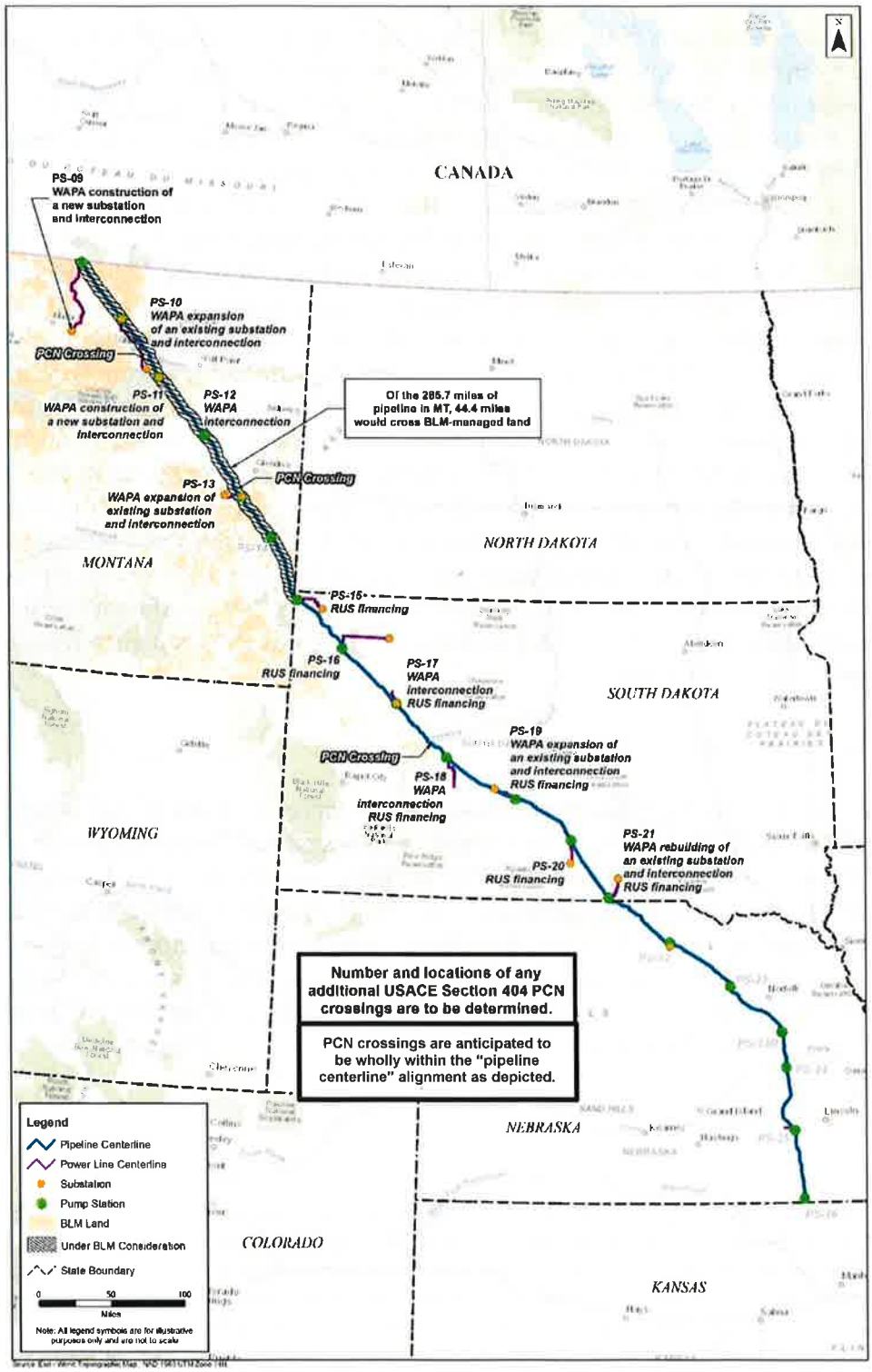

Figure 1. Location of Proposed Federal Decisions as presented in the BA (BLM 2019, p. 13)

USACE

The Project, as described in section 2.6 of the BA (BLM 2019, p. 15) would cross Federal lands administered by the BLM, as well as Federal land administered by the USACE for the Fort Peck Project. As required by 33 USC 408, the USACE must give permission for the BLM to include the Fort Peck Project lands in a ROW granted to Keystone the Project on Federal land administered by both agencies. The USACE may also consider, whether to issue general permit verifications or permit approvals under section 10 of the Rivers and Harbors Appropriation Act of 1899 (33 USC 403) for any pipeline or power line construction over, under, or through navigable waters listed under section 10, and/or under section 404 of the Clean Water Act (33 USC 1344) for Project activities involving dredging or filling in rivers, streams, or wetlands.[2] Based on pre-application meetings held with the applicant, USACE anticipates receiving pre-construction notifications (PCNs) along with a request for permit review from Keystone once section 7 ESA consultation is completed with Service. The USACE expects PCNs for pipeline crossings at the Missouri River, and the Yellowstone River, which are both section 10 rivers, as well as other rivers not subject to section 10 but within the general alignment of the Project. Additional PCNs may be submitted for USACE review along other portions of the Project. If any PCNs are submitted for activities in Nebraska, USACE's decisions on potential section 404 verifications would be the only Federal decisions made in the state of Nebraska for the Project. However, submittal of new PCNs within the current pipeline ROW should not impact the USACE's compliance with ESA section 7 or the analysis in this BO, as it encompasses all USACE-related permitting decisions.

Summary of Proposed Federal Activities

Collectively, the proposed Federal actions comprise the decisions of the BLM, WAPA, RUS, and the USACE as described above. The Federal agencies are not proposing to construct or manage the Project; however, under section 7 of the ESA, any effects on ESA-listed species resulting from the construction and operation of the Project could be considered consequences of the proposed Federal actions. Therefore, the effects of the Project on protected species are evaluated as part of the effects of the proposed Federal action. Consistent with the regulations at 50 C.F.R. §402.02, the action area encompasses all areas affected by the Project, as described in section 2.6 of the BA and Appendix C of the BA (BLM 2019, p. 16; Appendix C).

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[2] USACE regulates the discharge of dredged or fill material into waters of the United States under section 404 of the Clean Water Act, and the construction of structures and work in navigable waters of the United States under section 10 Rivers and Harbors Act. Therefore, typically USACE does not have authority for the operations phase of a project. Furthermore, per 33 C.F.R., 2017 Issuance and Reissuance of Nationwide Permits, Final Rule, USACE does not directly regulate oil and gas pipelines, or other types of pipelines. For utility lines, including oil and gas pipelines, USACE's legal authority is limited to regulating discharges of dredged or fill material into waters of the United States and structures or work in navigable waters of the United States, under section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act of 1899, respectively. USACE does not have the authority to regulate the operation of oil and gas pipelines, and does not have the authority to address spills or leaks from oil and gas pipelines.

Action Area

The action area is defined as "…all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR 402.02). For the purposes of this BO, the Service determined that the action area is the pipeline ROW (temporary and permanent) and all areas encompassing the pipeline construction, operation, and maintenance activities, ancillary facilities, temporary workspaces, pipe stockpile sites, railroad sidings, contractor yards, construction camps, access roads, and other aboveground facilities, including pump stations and power lines.

The action area begins where the Project crosses the United States border from north to south near Morgan, Montana, and continues southeast to Steele City, Nebraska (Figure 2) (BLM 2019, pp. 17-20).

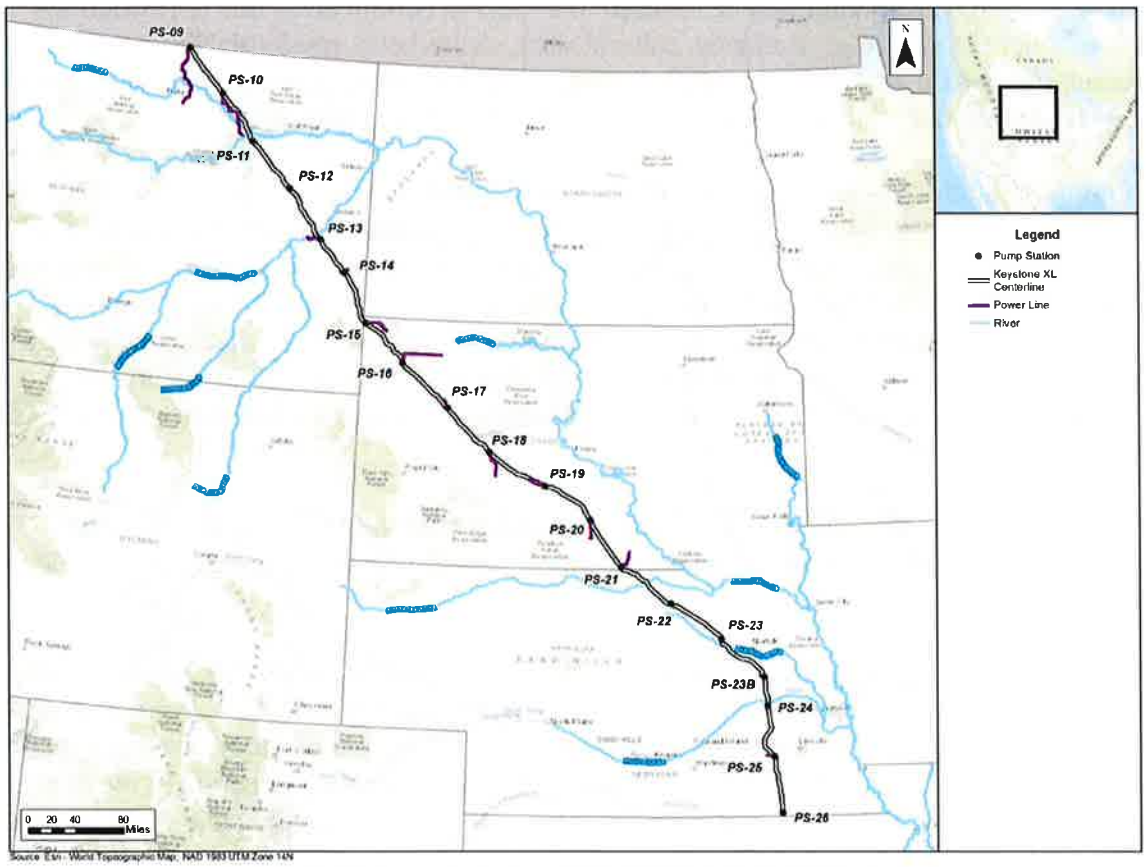

Figure 2- Proposed Project Overview (BLM 2019, p. 17)

Description of the Proposed Project

Keystone proposes to construct and operate a crude oil transmission system from an oil supply hub near Hardisty, Alberta, Canada, to destinations in the United States. In total, the Project would consist of approximately 882 miles of 36-inch diameter pipeline in the United States. The Project would have the capacity to deliver up to 830,000 barrels per day of crude oil.

As acknowledged in the 2014 Final SEIS, after completion of the analyses required under National Environmental Policy Act and under section 7 of the ESA, "Keystone will make minor adjustments to the proposed pipeline alignment during final design based on additional information obtained from field surveys or landowners. These minor route variations (microalignments) could be implemented to address specific landowner concerns, avoid certain features (such as structures, wells, or irrigation systems), minimize effects to environmental resources, or facilitate construction in such areas as steep terrain or waterbody crossings" (Department 2014, p. 2.1-2).

Proposed activities and a summary of Federal and non-federal lands where activities occur are summarized Tables 2.6-1 and 2.6-2 of the BA (BLM 2019, pp. 21-23). The installation of the proposed 36-inch diameter pipeline would occur within a 110-foot-wide construction ROW, consisting of a 60-foot temporary construction ROW surrounding a 50-foot permanent ROW. The ROW during construction will be reduced to 85 feet in certain areas due to restrictions regarding other features (e.g., wetlands, cultural sites, shelterbelts, residential areas, and commercial/industrial areas). Descriptions of additional temporary workspaces, construction camps, and access roads are included in Appendix C of the BA (BLM 2019).

The amount of land affected during construction would total approximately 13,090 acres, of which approximately 8,304 acres would be overlapped by permanent ROW and/or occupied by permanent facilities. After construction, the temporary ROW would be restored and returned to its previous land use. All disturbed acreage would be restored and returned to its previous aboveground land use after construction, except for the approximately 37 acres occupied by electrical substations and switching stations and the approximately 282 acres occupied by permanent access roads and aboveground facilities, including pump stations and valves, for the life of the Project.

Almost all of the land affected by the construction and operation of the Project would be privately owned. BLM oversees the management of the majority of the federally owned lands affected by the Project.

Keystone will use Environmental Inspectors on each construction spread. The Environmental Inspectors will review the Project activities daily for compliance with state, Federal and local regulatory requirements. The Environmental Inspectors will have the authority to stop specific tasks as approved by the Chief Inspector. They can also order corrective action in the event that construction activities violate the provisions of the Construction Mitigation and Reclamation Plan (BLM 2019, Appendix B), landowner requirements, or any applicable permit requirements. The compliance manager for Keystone would be the point person for communication with the USFWS as required. The monitors that would be used in the field would be reporting to the environmental inspectors, who in turn report to the compliance manager. If required, the monitors would discuss any required interpretation or issues with the USFWS and the compliance manager. More information is provided in the CONSTRUCTION MITIGATION AND RECLAMATION PLAN (BLM 2019, Appendix B) and the PROPOSED PROJECT DESCRIPTION (BLM 2019, Appendix C).

Electrical Transmission and Distribution Lines and Substations

Local, non-federal power providers (typically called utilities or cooperatives) will provide electrical service to the Project. In some instances, new and/or upgraded electrical transmission and distribution lines (power lines) and substations would be needed in order to deliver power. The local utility or cooperative will be responsible for constructing any such power lines or substations, as well as obtaining the necessary permits, approvals, or authorizations from Federal, state, and local governments. Further coordination between local power providers and applicable resource management agencies may be required to ensure the conservation of protected species and to obtain the necessary permits and approvals to construct and operate the power lines.

WAPA may need to construct new substation facilities or upgrade existing substation facilities to support the electrical service to for the Project. This BO evaluates the conservation measures that WAPA has committed to implement, as well as potential effects of WAPA Federal actions, including construction and upgrading substation facilities, on ABB. Table 2.6-3 in the BA provides a summary of the power line and substation information (BLM 2019, pp. 24-25). See Figure 1 for the location of these pump stations. Additional details are included in Appendix C of the BA (BLM 2019). Microalignments may change the lengths of pipeline and/or power line, areas of ROW, and the number of power line support structures, but would not likely result in a meaningful increase in these aspects of the Project.

Pipeline Incident Analysis and Emergency Response Plan

The likelihood of potential accidental or unexpected oil releases from the pipeline during operation was analyzed in the 2014 Final SEIS. This analysis has subsequently been updated using more recent information. A description of the updated pipeline incident analysis can be found in Appendix C of the BA (BLM 2019). However, the potential effects on ABB from potential spills are not reasonably certain to occur (50 C.F.R. §402.17) for reasons stated below (see Exposure to Potential Oil Spill and Emergency Repairs section of this BO).

A Project-specific Emergency Response Plan (ERP) will be prepared for the Project, which would be submitted to the Pipeline and Hazardous Materials Safety Administration (PHMSA) for approval prior to commencing system operations. A comprehensive ERP for the existing Keystone Pipeline Project has been reviewed and approved by PHMSA. The publicly available portion of the Keystone Oil Pipeline System ERP is included as BA Appendix D, Spill Prevention, Control and Countermeasure Plan and Emergency Response Plan (parts of the ERP and the Pipeline Spill Response Plan are considered confidential by PHMSA and the U.S. Department of Homeland Security). As described in section 4.13 of the 2014 Final SEIS, the existing Keystone Oil Pipeline Project documents would be used as templates for the plans for the Project. Project-specific information would be inserted into the plans as it becomes available. More information on emergency response procedures is described in section 12, Emergency Response Procedures, Appendix C of the BA (BLM 2019).

Conservation Measures for the American Burying Beetle

Keystone, the electrical power providers, or WAPA, where specified below, will apply the following conservation measures to the extent practicable and allowed by landowners to avoid, minimize, and mitigate effects on the ABB and potentially suitable habitat for the species.

The following conservation measures will be implemented for the Project:

- Construction areas with ABB habitat will be mowed[3] such that the vegetation is as low as possible without causing erosion (less than eight inches), in accordance with Nebraska Game and Parks Commission (NGPC) guidance (NGPC 2019a, entire). Mowing and raking away grass clippings allows the ground to dry out. Mowing will occur when the ABB is active, so depending on the ground disturbance timeframe, the period when these procedures will be implemented is from March 15 through October 31, based on NGPC guidance. For winter construction activities (October 31 to March 31) mowing would occur by October 15. Hand clearing or mechanical mowing will be used to mow uplands. Forested uplands will not be cleared ahead of mainline construction and wetlands and streams will also be avoided. This short vegetation height will be maintained for the duration of active construction during the ABB overall active period (until October 31) or until construction in the vicinity is completed, whichever is earlier. Mowing will be completed every few weeks, if necessary, to ensure vegetation is kept less than eight inches tall until grading commences. Once mowed, clippings will be removed. Possible methods include raking, windrowing (cutting rows of vegetation), or baling. If the grass has stopped growing, or grading commences, mowing can stop. All construction work vehicles, and personal vehicles will be staged in mowed areas. If it is not possible to maintain vegetation under eight inches in height, construction will avoid such areas until the vegetation can be mowed to less than eight inches in height. For power line construction in potentially suitable ABB habitat, the electric power providers will mow only in construction areas with soil disturbance (pole installation), as recommended by the Service and NGPC. Once mowing procedures have been initiated, weekly reports will be kept and submitted to the Service, NGPC, and South Dakota Game, Fish, and Parks (SDGFP). These reports will demonstrate that the conservation measures are being implemented and become part of the records. Weekly reports are only required during the ABB active period (April 1 to October 31) while construction on the Project is active. Photos documenting grass heights will be provided.
    - For the above mowing conservation measure, Keystone will implement in pipeline construction ROW, the electric power providers will implement in power line ROW,

[3] The purpose of mowing construction areas is to ensure that ABBs are not attracted to the active construction site. NGPC recommends mowing construction areas 2 weeks prior to the commencement of ground disturbing activities between these dates. Willemssens (2015, entire) conducted numerous experimental tests and found burying beetles were significantly less likely to bury in construction zones and concluded that mowing as a pre-work conservation measure should reduce the number of ABBs present.

and WAPA will implement for the substation that would serve PS-21 in South Dakota.

- The work areas in ABB habitat will be prepared by removing any and all carcasses[4] prior to construction, in accordance with NGPC guidance (NGPC 2019a, entire). Carcasses as small as songbirds, snakes, and rodents are ideal food for the ABB; therefore, this removal activity will be thorough. Carcass removal will occur between March 15 and October 31 or until construction is completed, whichever is earlier. Personnel will survey the ROW daily to remove carrion. Carcass removal can be done at any time throughout the day; however, the preferred timing is in the late afternoon, since the ABB is active at night. This will ensure that ABBs are not drawn to the area by roadkill caused by daytime traffic. Disposal of carcasses will be at least 0.5 miles away from the work site. For power line construction in potentially suitable ABB habitat, electric power providers will remove carrion only in construction areas with soil disturbance (pole installation), as recommended by the Service and NGPC. Carrion removal reports will be submitted as with the mowing reports. Once carrion removal procedures have been initiated, weekly reports will be kept and submitted to the Service, NGPC, and SDGFP. These reports demonstrate that the conservation measures are being implemented and become part of the records. Weekly reports are only required during the ABB active period (April 1 to October 31) while construction on the Project is active. If the number and species of carrion can be easily identified (for example, deer carcass, bull snake, mouse, etc.), this information will be included in the report. Photo documentation of carrion removed will be provided.
    - For the above carrion removal conservation measure, Keystone will implement in pipeline construction ROW, the electric power providers will implement in power line ROW, and WAPA will implement for the substation that would serve PS-21 in South Dakota.
- During the construction phase, most of Keystone's construction activity will take place in daylight hours. Construction activities taking place at night would require artificial lighting and could thereby have an effect on ABB by disruption of normal behavior patterns. Construction at night and the use of lights will be limited to specific situations requiring this activity such as critical tie-ins (connection of a pipeline to a facility, other pipeline systems, or different sections of a pipeline), Horizontal Directional Drilling (HDD) sites, and during certain weather conditions. Where such activities require lighting, the lights will be down shielded and utilize warm amber-colored lights with a color temperature of 3000 K or less and intensity no greater than 70,000 lumens. Lighting required for contractor yards and pump stations will also be down shielded (to prevent unnecessary upward illumination), except where required for safety and security, and will utilize sodium vapor or LED lighting meeting the above specifications.

[4] Removing carrion (essential for ABB feeding and reproduction) will make the work area less attractive to the ABB. By removing carrion in areas where construction would occur, this ensures that ABB would not be feeding or burying carcasses in an area where they could encounter construction equipment.

- Keystone will implement an education program for construction personnel engaged in the Project. This will include a presentation focused on identifying the ABB, explaining its life history, its current range, and its habitat requirements. Pipeline construction personnel will be instructed to report any sightings of ABB or brood chambers if encountered. Education cards will be provided to all construction personnel. Signs will be placed at construction entrances identifying the area as potential ABB habitat.
- Immediately following construction, Keystone will rip (mechanically break up) soils in disturbed areas on the temporary pipeline ROW to a depth of 24 inches to relieve soil compaction existing at the site from the use of heavy equipment. This effort will improve or enhance ABB habitat by making soils easier for ABBs to bury in. Keystone's Construction, Mitigation, and Reclamation Plan (CMRP) in Appendix B of BLM (2019) provides further details with regard to relief of soil compaction within ROWs following construction.
- Keystone will implement erosion control techniques such as silt fencing, hay bales, water bars, and other efforts to prevent washing away of topsoil, formation of gullies, or other erosion that could negatively affect ABB habitat through the action of surface water. Keystone's CMRP (BLM 2019, Appendix B) provides further details with regard to erosion control following construction.
- Immediately following pipeline construction, Keystone will temporarily stabilize disturbed areas by broadcasting cool season species such as annual rye grass or wheat seed. Where necessary, clean, weed-free wheat straw will be used as mulch to protect seed and increase soil moisture. These grasses are annual species that senesce when temperatures warm during summer; they will not become permanently established. During the spring, a mixture of native warm season grasses will be planted within the ROW. This will include species such as little bluestem, big bluestem, Indiangrass, and switchgrass. Natural recruitment of other native grasses and forbs will also occur. It should be noted that some portions of the ROW, in response to landowner requirements, will be revegetated using non-native species such as smooth brome. This type of re-vegetation will likely be restricted to areas that are currently dominated by improved grass pastures and will therefore not lead to a reduction of habitat dominated by native species. In the limited circumstance where landowners request re-vegetation of previously native vegetation to non-native vegetation, Keystone will consider this as a permanent effect on habitat and will provide appropriate mitigation for those areas, unless those areas are subject to other conditions from USACE. Keystone's CMRP (BLM 2019, Appendix B) provides further details with regard to restoration of pipeline ROWs following construction.
- Keystone is committed to habitat restoration following construction. The ABB monitoring program will provide assurances that the acres disturbed would be restored appropriately. Failure is unlikely due to Keystone's commitment to re-seed in subsequent years if unsuccessful after the first growing season. Criteria for successful reclamation are: 1) reclamation will be measured four years after the commencement of construction; 2) for reclamation to be deemed successful, native grasslands restored on the ROW must be

comparable to those on adjacent undisturbed lands; 3) 70 percent of the dominant species on the ROW must be the same as those that occur on adjacent off-ROW lands.

- The Nebraska Public Power District (NPPD) and Rosebud Electric Cooperative will schedule power line and switching station construction activities during the ABB dormant or inactive time[5] (October 31 to March 31). The power providers will coordinate with Service and NGPC to determine appropriate measures to minimize potential effects if such scheduling cannot be accomplished due to unexpected circumstances, including weather delays.

The Service previously recommended project proponents "capture and relocate" ABB near a project footprint to remove ABBs from the project area prior to project implementation and associated impacts. However, this conservation measure is no longer considered a beneficial practice for reducing harm to ABB. Hoback and Conley (2014, p. 56) found that capturing and relocating burying beetles near the project site may not remove all beetles prior to impacts, as other beetles may recolonize the project site following the capture and relocation effort. The risks associated with attracting additional ABB to a project site, as well as handling them during the trapping and relocating (can result in additional adverse effects), may outweigh the benefits (Hoback and Conley 2014, p. 61).

Mitigation Measures Proposed for the American Burying Beetle

Keystone is committing to mitigate the impacts to ABB as part of the proposed action. However, because the take of ABB will occur on private lands, Keystone has submitted a draft HCP in support of an application for an incidental take permit to minimize and mitigate the impacts to ABB to the maximum extent practicable (a permit issuance criteria). Goal 2 of Keystone's draft HCP (Keystone 2019, p.110) is to provide permanent compensatory mitigation of ABB impacts not avoided by other conservation measures. To achieve this goal, Keystone aims to protect, in perpetuity, an amount of occupied ABB habitat based on the mitigation ratios described in the draft HCP (Keystone 2019, p. 114) via an approved conservation bank; or, if conservation banks are not available, provide funds to third-party for: (1) purchase of land to provide habitat for ABBs; and (2) restoration and long-term management of the property. Keystone agrees to mitigate impacts of the taking of ABB by acquiring and protecting suitable habitat lands in perpetuity prior to start of construction. Keystone is in the process of retaining the Conservation Fund to work with the Service and Keystone to identify lands for either a conservation easement or purchase.

ABBs are nocturnal (Service 1991, p 11) and have a limited active season (Service 2019a, p. 10), making them difficult to detect (see Status and Distribution section below in the BO). Therefore, rather than use ABB survey data to determine ABB presence, Keystone selected to use a conservative approach and assumes that ABBs may occupy all suitable habitat within the documented ABB range, for all habitats rated marginal to prime (only poor habitat rating

[5] Construction during the dormant or inactive season minimizes impacts to ABB due to reduced frozen soils compacting less and ABB being underground, further from the soil surface. This reduces the potential for crushing and disturbing individuals.

excluded). Keystone will provide mitigation in perpetuity for temporary and permanent impacts to habitat. Mitigation for temporary impacts offset the impacts of lost habitat during the time period habitat restoration is occurring at the impact site. Additional mitigation is also provided to cover the unlikely event of unsuccessful restoration as described in section 9.3.3 (Keystone 2019, p. 114). Based on the mitigation ratios presented in the HCP (Keystone 2019, p. 114), the calculated total of mitigation acres is 1,034.03 acres (Keystone 2019, p. 116). This measure is intended to offset the impacts of take from the Project, including temporary and permanent loss, degradations, and fragmentation of ABB habitat. Table 25 in the draft HCP (Keystone 2019, p. 115) details the number of impacted and mitigation acres for permanent and temporary impacts and by state. Table 26 includes mitigation for power line impacts (Keystone 2019, p. 116).

STATUS OF THE SPECIES AND CRITICAL HABITAT RANGEWIDE

Status and Distribution

The ABB was listed as endangered on July 13, 1989 (54 FR 29652; Service 1989, entire) based on a drastic decline and extirpation over nearly its entire range. The Service prepared a recovery plan in 1991 (Service 1991, entire) and a Species Status Assessment Report in 2019 (SSA report; Service 2019a, entire). On May 3, 2019, the Service published a proposed rule and 12-month petition finding to reclassify the ABB from endangered to threatened with a 4(d) rule (84 FR 19013). The Service has not designated critical habitat for this species. During the 20th century, the ABB disappeared from over 90 percent of its historical range (Lomolino et al. 1995, p. 606) which covered most of temperate eastern North America. The species was formerly distributed throughout 35 states and three Canadian provinces (Ratcliffe 1996, p. 60) but is believed to be extirpated from all but nine states in the U.S. and likely from Canada. The ABB is now known to occur in portions of Arkansas, Kansas, Oklahoma, Nebraska, South Dakota, Texas (not documented since 2008), on Block Island off the coast of Rhode Island; and reintroduced populations on Nantucket Island off the coast of Massachusetts, southwest Missouri, and Ohio. A potential report of an ABB in Michigan in 2017 is being investigated to determine if the area supports ABBs (Service 2019a, p. 7). Figure 3 shows the current range of the ABB. The Species Status Assessment Report defined populations as analysis areas based on broad geographic and ecological patterns to use in the evaluation of the species (Service 2019a, pp. 21–23).

Due to the severity of the decline and uncertainty regarding the causes, the recovery actions in the 1991 recovery plan focused on preventing the extinction of the species rather than developing actions and criteria for recovery. Recovery criteria were developed for downlisting, not for recovery. The objectives of the recovery program are: (1) Reduce the immediacy of the threat of extinction to the ABB and (2) improve its status so that it can be reclassified from endangered to threatened (Service 1991, p. 31). The Service's 2008 five year status review found that the ABB should remain as endangered because threats to the species had not been abated sufficiently to show that the ABB is no longer in danger of extinction (Service 2008, p. 35). The Service's 2019 proposed rule indicated that the threats to the species have been reduced to the point that it no longer meets the definition of an endangered species under the Act, but is likely to become endangered within the foreseeable future (84 FR 19013).

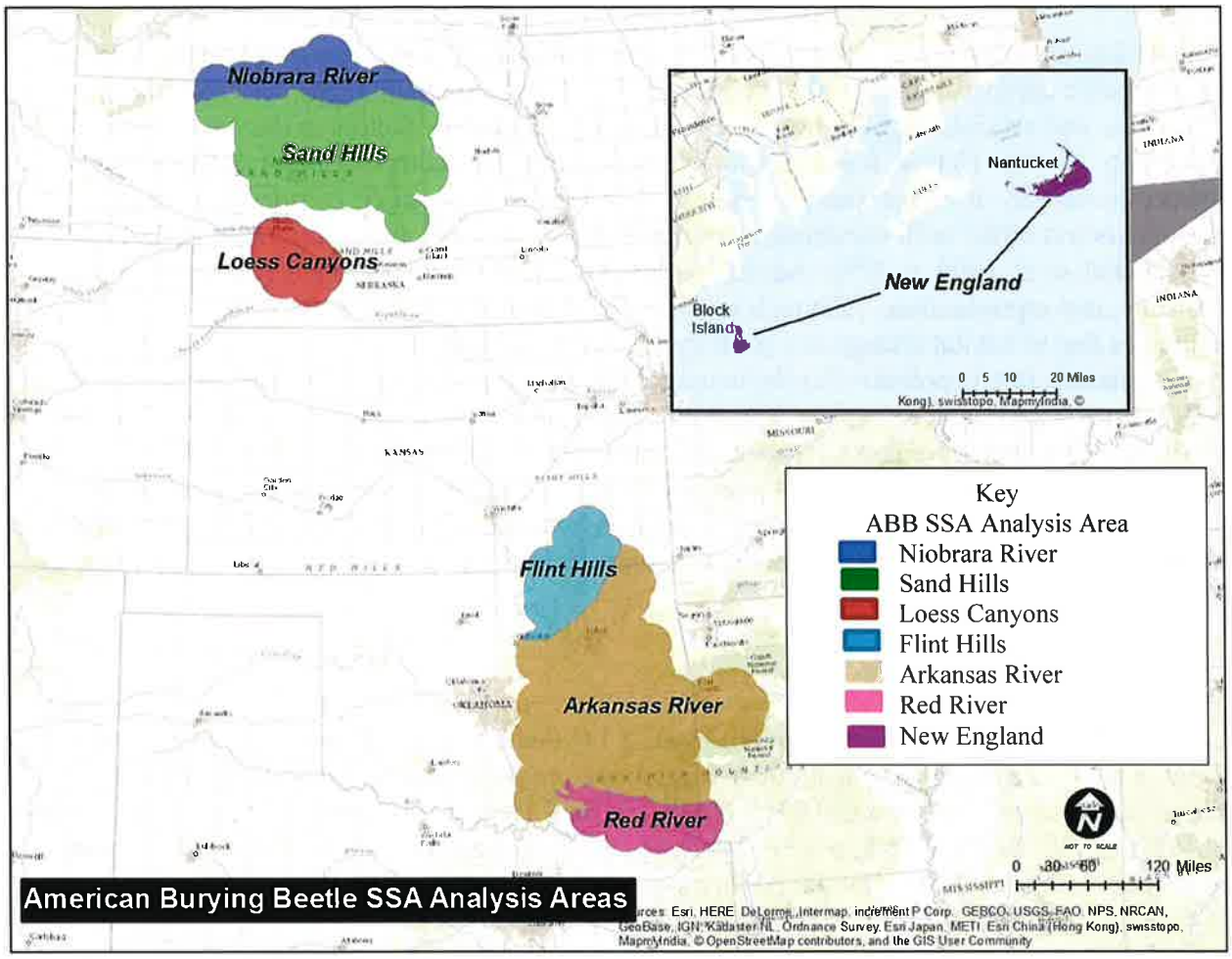

Figure 3. American Burying Beetle Species Status Assessment Analysis areas (Service 2019a, p. ES-2).

The populations in Nebraska/South Dakota, Kansas/Oklahoma, Oklahoma/Arkansas, and central Arkansas were all estimated to be greater than 1,000 individuals in 2005 with a total estimated rangewide population of approximately 50,000 individuals (Amaral et al. 2005, p. 37). However, populations of the ABB fluctuate annually due to the weather, carrion availability, and other factors; thus, these population estimates have little utility unless managers conduct consistent surveys over the course of several years so that we can evaluate trends (Service 2008, p. 14). Such rangewide surveys are not currently conducted for this species and we have limited information by which to measure ABB population abundance (Service 2019a, p. 71). Jurzenski et al. (2011, pp. 137-138) also noted that it is necessary to carefully interpret mark and recapture data due to the assumptions that emigration and immigration do not occur and that all individuals are available for recapture during the sampling timeframe. For the above reasons, the Service used the ratio of positive to negative ABB surveys to determine ABB relative abundance in the population analysis areas, rather than population estimates (Service 2019a, p. 71).

Threats

Habitat loss and alteration, availability of carrion, competition with meso-carnivores, inter and intra-specific competition, loss of genetic diversity, disease and pathogens, climate change, pesticides, and artificial lighting were identified as potential risk factors to the ABB (Service 2019a, pp. 25-49). Habitat fragmentation changes the species composition in ABB habitat, lowers the density of indigenous prey species, and results in increased competition for prey (mammals and birds) with vertebrate scavengers (Ratcliffe 1996, p 64; Amaral et al. 1997, p. 124; Bedick et al. 1999, p. 179). Adults and larvae depend on dead animals (carrion) for food, moisture, and reproduction. Although much of the evidence suggesting the reduction of carrion resources due to habitat change as a primary mechanism driving the decline of the ABB is circumstantial, this hypothesis fits the temporal and geographical pattern of the disappearance of ABBs; and, is sufficient to explain why ABBs declined while related species did not (Service 2019a, p. 174). Some remaining populations have risks associated with areas of urban development, but most current ABB populations are in rural areas and have potential risks associated with soil disturbance activities. Risks associated with the effects of changing climate, including increasing temperatures, are now a significant threat for some analysis areas (Service 2019a, p. 50).

Reproduction/Active Periods

The ABB is a nocturnal species (Service 1991, p 11) that lives for only one year (Bedick et al. 1999, p. 178). ABBs emerge from their winter inactive period when ambient nighttime air temperatures consistently exceed 59° F (15 °C) (Kozol 1988, p. 11; Kozol 1990, p. 4; Bedick et al.1999, p. 179; Service 2008, p. 13). Typically, ABBs are active from May through September in southern portions of their range, but in more northern latitudes of their range, the active period is June through August (Service 2019a, p. 10). ABBs are active at night during their active period; they are most active from two to four hours after sunset (Service 2019a, p. 10). During the daytime, ABBs are believed to bury under soil or vegetation litter (Jurzenski 2012, p. 76.)

Reproduction occurs in the spring to early summer. ABB's require vertebrate carcasses of sufficient size (80-200g) for breeding (Holloway and Schnell 1997, p. 145). The female lays eggs in the soil adjacent to the carcass where they incubate for about 6 days before becoming larvae (Service 2019a, p.18). New adult ABBs or offspring (called tenerals), usually emerge in summer, over-winter (hibernate) as adults, and comprise the breeding population the following summer (Kozol 1988, p 2; Amaral et al. 2005, pp. 30, 35).

Feeding

Individual ABBs must fly to find food, a mate, and an appropriate sized carcass on or near suitable soils for burial (Service 2019a, p. 11). When not involved with brood rearing, adults' food sources can include selection of an array of available carrion species and sizes, as well as feeding through capturing and consuming live insects (Service 1991, p. 11). In a lab, the ABB was attracted to both avian and mammalian carcasses (Kozol et al. 1988, p. 170), reptiles, amphibians, and fish (Bedick et al. 1999, p. 174).

Habitat

The ABB is considered a generalist in terms of the vegetation types where it is found, as it has been successfully live-trapped in a wide range of habitats, including wet meadows, partially forested loess canyons, oak-hickory forests, shrub land and grasslands, lightly grazed pasture, riparian zones, coniferous forest, and deciduous forests with open understory (Walker 1957, entire; Service 1991, pp.14-17; Service 2008, pp.8-11; Creighton et al. 1993, entire; Lomolino et al. 1995, entire; Lomolino & Creighton 1996, entire; Jurzenski 2012, pp.47-72; Willemssens 2015, pp. 5–6). Individuals do not appear to be limited by vegetation types as long as food, shelter, and moisture are available; ABBs have been recorded moving between and among these habitat types (Holloway and Schnell 1997, entire; Creighton and Schnell 1998, entire). Trapping success was higher at sites where small mammals were abundant (Holloway and Schnell 1997, p. 151). The Service believes that preserving large areas of suitable habitat is a conservation strategy that contributes to maintaining viable ABB populations (Service 2014, entire).

A more detailed life history account of the ABB is on our website: *https://www.fws.gov/southwest/es/oklahoma/Documents/ABB/Listing/ABBSSA_Final_V1.0_Feb2019.pdf*

ENVIRONMENTAL BASELINE FOR THE ACTION AREA

"*Environmental baseline* refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline" (50 C.F.R. §402.02). The environmental baseline below describes the condition of the ABB and its habitat in the action area to provide the context for analyzing the effects of the action now under consultation.

Status of the Species within the Action Area

The ABB occurs within South Dakota and Nebraska and has been described as occurring in two, or three distinct populations, within different literature sources. In Amaral (2005, p. 27), these populations are described as only two distinct populations; a southern population centered in Lincoln and Dawson Counties (referred to as the "Loess Hills"), and a northern population in north central part of the state centered in Rock, Loup, Blaine, and Brown Counties and extending north into South Dakota. The five-year status review also discusses these two discrete areas but uses "Sand Hills" to describe the geographically larger ABB population in north central Nebraska (Service 2008, p. 25). The SSA Report identifies three analysis areas in Nebraska: Loess Canyons, Sand Hills, and Niobrara River (Service 2019a, pp. 22-23). The Loess Canyons

is the same as the Loess Hills population described in the earlier reports. However, the larger northern population described in those earlier reports was separated into two areas with the Niobrara River serving as the boundary between the two: "Sand Hills" analysis area (Sandhills analysis area) and "Niobrara River" analysis area. Figure 4 and 5 below depict the estimated distribution of the ABB near the Project.

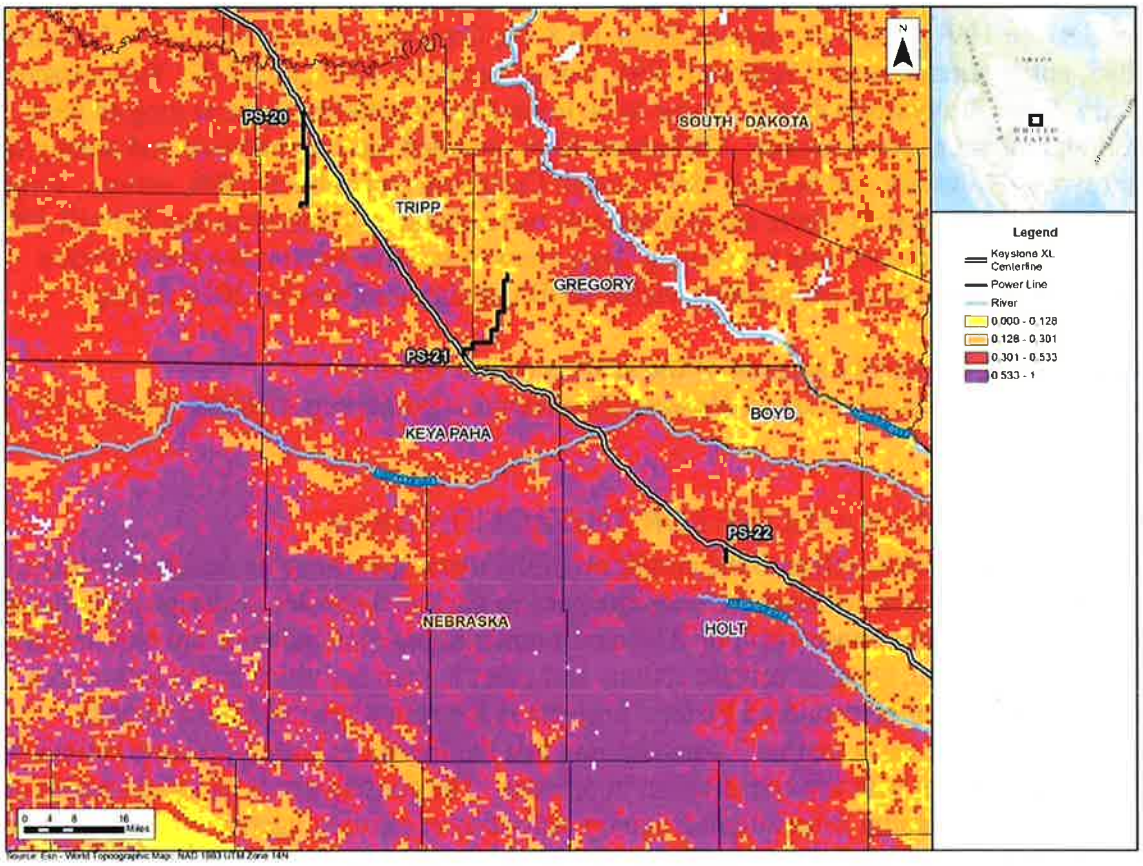

Figure 4. Predicted Distribution of American Burying Beetle near the Project, as Modeled by Leasure and Hoback (2017, entire) and presented in the BA (BLM 2019, p. 95)

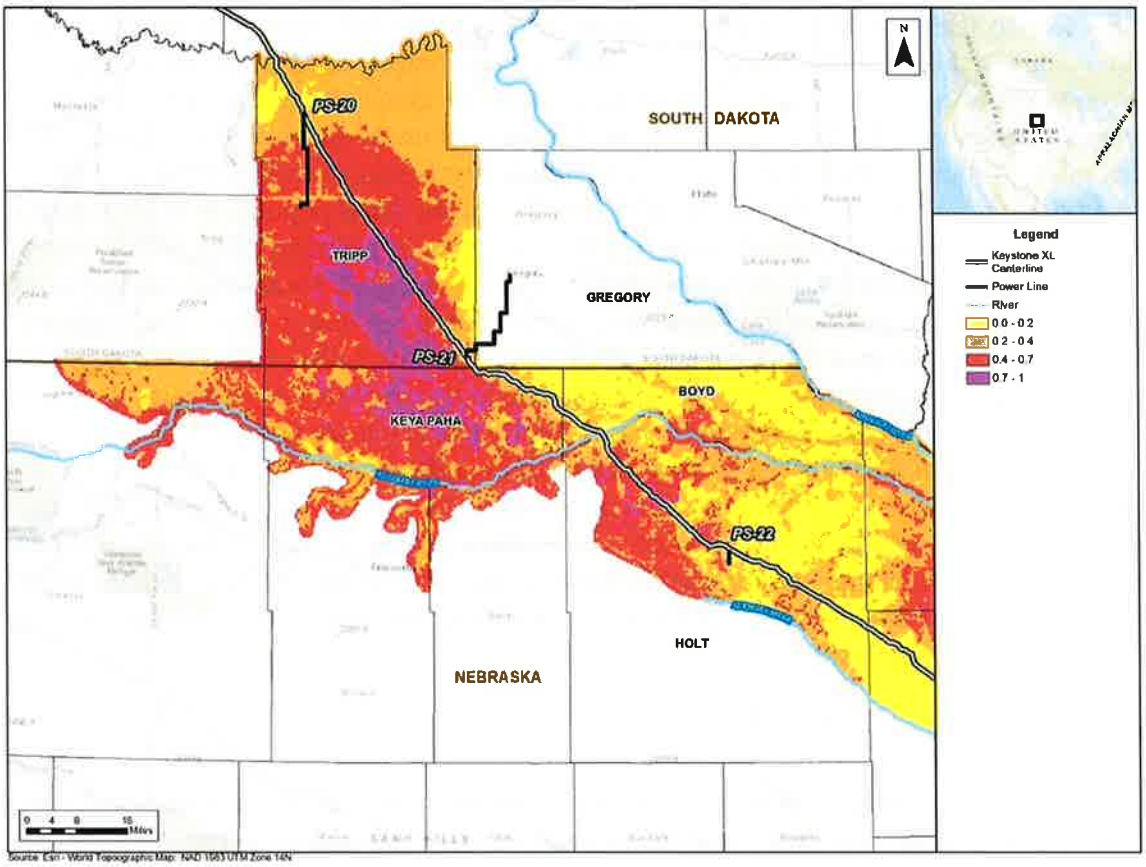

Figure 5. Predicted Distribution of American Burying Beetle near the Project, as Modeled by Jenkins et al. (2018) and Presented in the BA (BLM 2019, p. 96)

The action area for the Project falls within the Sandhills and Niobrara analysis areas described in the SSA Report (Service 2019a, entire). Approximately 8,633,685 acres of potential ABB habitat occurs in the Sandhills analysis area, including favorable, conditional, and marginal land cover types (Service 2019a, p. 63). The Sandhills analysis area has the highest ratio of positive to negative surveys of all ABB analysis areas. Future land use changes are not expected to impact relative abundance of ABBs in the Sandhills analysis area (Service 2019a, p. 119). Panella (2013, p. 2) indicates that since 2005 the trend of the ABB population in Nebraska is "fluctuating with drought." Approximately 2,961,469 acres of potential ABB habitat occurs in the Niobrara analysis area (northcentral Nebraska and southcentral South Dakota), including favorable, conditional, and marginal land cover types (Service 2019a, p. 65). The Niobrara analysis area has the highest ratio and amount of total protected lands of all ABB analysis areas (Service 2019a, p. 71) and moderate ratios of positive to negative surveys (Service 2019a, p. 121). Future land use changes may have minor local impacts but are not expected to impact relative abundance of ABBs in the Niobrara analysis area (Service 2019a, p. 121). Amaral (2005, p. 75) used survey results to estimate a population of 10,000 ABBs within 1,000 square miles of potentially suitable habitat in what is considered here as the Sandhills and Niobrara analysis areas (north central Nebraska and extending into South Dakota). Beetle populations in the Niobrara analysis area have demonstrated fluctuations, but with good recoveries over the last decade (Service 2019a, p. 120).

South Dakota

The ABB is found in South Dakota in Tripp, Todd, Bennett, and Gregory counties in South Dakota; the Project does not enter Todd or Bennett counties. Beetles have been collected in the 1990s from Todd, Tripp, and Gregory counties (Backlund and Marrone 1997, p. 55). More recent data are only available from Tripp and Gregory counties. Surveys in 2005 revealed that ABBs are concentrated in Tripp County, where the population is estimated to be approximately 1,000 individuals in an area of approximately 54,363 acres (Backlund et al. 2008, p. 14). Modeling by Jenkins et al. (2018, p. 2) suggested that the ABB is most likely to occur in relatively undisturbed sites in the loess prairie ecoregion in southern Tripp County. Jenkins et al. (2018, p. 2) surveyed for this species in 2014, 2016, and 2018 in an attempt to define the northern and western limits of its current occupied range. The results of the surveys and subsequent modeling showed that the population in South Dakota continued to occupy central and southern Tripp County. To the east of Tripp County, expanding agriculture has rendered the region less suitable for the ABB. However, in 2019, surveys were conducted unrelated to the project in southwestern Gregory County. ABBs were captured at two sites more than 2 miles from the Project, but the other six valid trap sites did not capture ABB's; the data indicate that the population density in Gregory County may be less than in Tripp County (Hoback 2019, entire). Intensive sampling in and near a portion of the action area was conducted in 2019 in Tripp County. Sampling in 2019 occurred in June (BLM, Appendix W) and August (BLM, Appendix X) and indicated that the ABB continue to occur in relatively high densities.

The best habitat for the ABBs in South Dakota is similar to that for the northern Nebraska population and consists of wet meadows in sandy soils with scattered cottonwoods trees. The

habitat quality ratings from 2013 have been re-analyzed in 2018, or, for some, 2019, to reflect current conditions. A summary of the current habitat ratings is shown on page 102 of the BA and a description of the habitat rating criteria are found on page 100 (BLM 2019). The re-analysis revealed a substantial decrease in suitable habitat in the proposed pipeline corridor in South Dakota, mostly resulting from increased development of agriculture (e.g., center-pivot corn fields). Although in 2013, 25 miles of pipeline ROW were prime habitat, only four miles of pipeline ROW remained prime habitat in 2018/2019. New agricultural developments near the ROW have reduced the habitat ratings to fair or marginal. Neither the route in South Dakota nor the rating scale has changed.

Suitability ratings of ABB habitat crossed by the Project in South Dakota are provided in Table 3.2-9 and Figure 3.2-9 on p. 100, and p. 97 of the BA, respectively (BLM 2019). The Project pipeline in South Dakota would cross approximately four miles of prime habitat, 12 miles of good habitat, 10 miles of fair habitat, and five miles of marginal habitat. Beetles are unlikely to occur in marginal and considered absent in poor habitat.

Two proposed electric power lines to pump stations in South Dakota are within range of the ABB and connect to PS-20 and PS-21. The power line to PS-20 would lie in the northwest corner of Tripp County, mostly outside of the current range of this species. While recent surveys not associated with the Project (Jenkins et al. 2018, p. 2) captured ABBs in central Tripp County south of the town of Winner, no traps were set in the northwestern part of the county. Results of only four trap sites to the north and west of Winner have been reported, none of which captured ABBs (Backlund et al. 2008, p. 12). Therefore, the power line to PS-20 is assumed to overlap the occupied range of this species only to the south of U.S. Route 18. This power line would be approximately 20.5 miles long, but only approximately 2.7 miles would lie within the range of the species, within which the approximately 16.5 acres of ROW were rated as marginal habitat (BLM 2019, Appendix W, American Burying Beetle Sampling Report June 2019).

The ROW for the power line to PS-21 would overlap approximately 56 acres of prime, 47 acres of good, 17 acres of fair, and five acres of marginal habitat (BLM 2019, pp. 100-101). No portion of the line overlaps unsuitable ("poor") habitat or extends beyond an 18.6-mile buffer around all known capture locations since 2001 (USFWS 2019a); however, the northern portion of the line, as well as the proposed rebuild of WAPA's Gregory substation, would lie outside of the likely occupied range of this species based on habitat modeling (Figure 4 and 5, above) (SDNHP 2019; Leasure and Hoback 2017, entire; Jenkins et al. 2018, entire). WAPA's substation rebuild would occur within approximately 6 acres of marginal habitat, but outside the likely occupied range of the species.

Nebraska

In Nebraska, ABB's are known to occur in Blaine, Boone, Boyd, Brown, Cherry, Custer, Dawson, Frontier, Gasper, Holt, Keya Paha, Lincoln, Loup, Rock, Thomas, Valley, and Wheeler counties, and may occur elsewhere in Nebraska (Figure 3). The Nebraska National Heritage Program database (NNHP 2019) reports documented occurrences in Boyd, Holt, and Keya Paha counties along the Project route and historic records of ABB in Antelope County, which the

Project also passes through. Most of the ABBs in Nebraska are concentrated in the Sand Hills ecoregion, which the Project avoids. The Sandhills SSA analysis area (Service 2019a, entire) is a broader species population area description and is different than the Sandhills geographic ecoregion which is associated with a specific landscape type, though they do overlap. In addition, recent sampling has failed to detect this species anywhere along the MAR or in Antelope County. Therefore, the Project overlaps the range of this species in Nebraska only within Keya Paha, Boyd, and Holt counties (Figure 4 and 5 above). Additional information on ABB sampling results conducted in 2012 and 2018, and 2019 in Nebraska can be found in the BA (BLM 2019, pp. 101-109). Recent sampling in 2018 and 2019 along the Project route did not detect ABB's in the southeastern portion of Holt County or Antelope County (BLM 2019, pp. 105-106). The ABB continues to occur at low densities along the proposed pipeline ROW in the remaining portions of Holt, Boyd, and Keya Paha Counties (BLM 2019, figure 3.2-12 and 3.2-13, pp. 107-108), with densities in Holt County remaining the highest within the ROW in Nebraska. While the Project route in these counties is within the Sandhills and Niobrara SSA analysis areas, it is outside the Sandhills ecoregion.

Suitability ratings of ABB habitat crossed by the Project in Nebraska are provided in Table 3.2-11 and Figure 3.2-9 on p. 109, and p. 97 of the BA, respectively (BLM 2019). The proposed pipeline route in Nebraska would affect about 26 miles of prime, 13 miles of good, one mile of fair, and 5 miles of marginal habitat. In total, about 46 miles of habitat occur along the proposed pipeline ROW in Nebraska. Unlike in South Dakota, expansion of intensive agriculture near the proposed pipeline has been much slower in Nebraska, because much of the land suitable for such uses had already been under intensive cultivation by 2012; therefore, habitat reevaluation was not necessary except in areas not previously rated (BLM 2019, Appendix W).

Of the necessary new electrical power lines and substation in Nebraska, only the one serving PS-22 would occur within the current occupied range of the ABB. Trapping efforts in 2012, 2018, and 2019 confirmed the presence of the ABB at the trap sites closest to PS-22. The power line that would serve PS-22 would cross approximately one mile of marginal habitat and 1.5 miles rated poor (Table 3.2-12, BLM 2019, p. 109). Although this ROW would likely be 100 feet wide legally, an existing public road and associated road ROW would lie within the power line ROW. The proposed switching station, which would be constructed, owned, and operated by the local power providers, is assumed to occupy approximately 3.5 acres, and would be situated in marginal habitat. The next closest pump station, PS-23, and its associated power line in Antelope County would be located in an area heavily developed for agriculture and outside of the occupied range of the ABB (Leasure and Hoback 2017, entire; Jenkins et al. 2018, entire).

Factors Affecting Species Environment within the Action Area

Eastern red cedar encroachment, drought, land development, light pollution, and scavengers have been identified as threats to the ABB in Nebraska (Panella 2013, p. 2). Beetles are negatively associated with, and likely decline in response to habitat loss and fragmentation and increases in row crop agriculture and cultivated croplands (Bishop et al. 2002, p. 468; Leasure and Hoback 2017, entire). Agricultural expansion in South Dakota (BLM 2019, p. 99), and previous intensive agricultural conversion and existing cultivation in Nebraska (BLM 2019, p. 105), have

resulted in losses of native prairie rangeland where ABBs occur. Most of the potential conversion of ABB habitat to cropland requires irrigation in Nebraska and South Dakota. Increased irrigation or other uses of ground water are a risk if they exceed recharge rates and lower the water table. This could reduce habitat suitability by declining aquifer levels and decreasing soil moisture near the surface (Service 2019a, p. 64). Additionally, developed and converted land leads to declines in grassland nesting birds and rodents, which probably historically provided a large portion of the carrion available to the ABB. Species in this land type (developed agriculture) are often replaced by scavenging mammals and birds that compete with burying ABBs for carrion. Fire suppression in prairie habitats in Nebraska allows the encroachment of woody plant species, particularly the eastern red cedar, which is thought to degrade habitat for burying ABBs by limiting their ability to forage for carrion (Walker and Hoback 2007, p. 297). Urban expansion remains a risk and wind energy development has increased in recent years and may become a larger risk in the future (Service 2019a, p. 64). Other potential threats listed in the SSA (Service 2019a, p. 25) include inter and intra-specific competition, loss of genetic diversity, in isolated populations, disease/pathogens, DDT, and invasive species. Climate Change is also discussed and is described in greater detail below.

Climate Change

Climate has always limited the ABB range to some degree. Populations at the northern edge of the historic range were limited by cool night time temperatures and shorter growing seasons and could potentially expand north as climates warm. However, there are no current populations near the northern edges of the historic range and habitat limitations, rather than climate may prevent existing populations from moving north (Service 2019a, p. 44). Within the Great Plains, including Nebraska and South Dakota, the number of days with the hottest temperatures and the number of nights with the warmest temperatures are projected to increase dramatically for both lower emissions and higher emissions scenario (Shafer et al., 2014, pp. 442–445). Future precipitation is much more challenging to model and therefore projections of it have more uncertainty as compared to temperature (Service 2019a, p. 39).

Climate change could affect habitat suitability and potentially reduce or expand ABB use of portions of Nebraska and South Dakota. Increasing temperatures and dryer conditions potentially associated with climate change could cause reductions in the species' reproduction and numbers. Similarly, milder winters could disrupt hibernation cycles if freezing temperatures don't occur until later in the year or if temperatures consistently reach 55°F to 60°F earlier in the year. Portions of the Sandhills and Niobrara populations are near the northern and western edge of the known ABB range and changes in temperature and moisture could affect suitable habitat in future years (Service 2019a, p. 64). Beetles in the areas may have a longer time period for potential reproduction than ABBs in the southern portion of their range. Beetles in Nebraska and South Dakota could emerge from over wintering by late May or June and be ready to reproduce at that time. From June to August, ABBs could have suitable conditions for reproduction in northern areas and that timeframe could be nearly twice as long as the southern portion of the ABB range (Service 2019a, pp. 47–48).

Climate change also has the potential to affect habitat availability through changes in land uses (Service 2019a, p. 48). The National Climate Assessment was conducted by region with Nebraska being a part of the Great Plains Region, and within that report, Shafer et al. (2014, p. 446) noted that rising temperatures in the Great Plains may increase human competition for water. Increased temperatures in the Great Plains states could lead to earlier spring snowmelt, decreased snowmelt season duration, and decreased peak snowmelt flows (Bathke et al. 2014, p. 26). Increased temperatures would also result in decreased soil moisture due to increased evapotranspiration from vegetation that breaks dormancy earlier. Drought frequency and severity would increase in Nebraska due to increased temperatures and expected seasonal variability in precipitation (Bathke et al. 2014, p. 33). Increased temperatures could increase water demands and usage for irrigation and potentially lower groundwater levels in aquifers (Service 2019a, p. 48). Also, increased temperatures and longer droughts may increase the percentage of pastures that are heavily grazed or increase the demand for hay and encourage more cuttings (Service 2019a, p. 48).

Habitat conditions, population abundance, and distribution are all likely to be affected by climate change. The Service analyzed in its recent SSA impacts of climate change to populations in the northern plains, which includes the Sandhills and the Niobrara populations in Nebraska and South Dakota (Service 2019a, entire). Under moderate emissions levels, populations in all northern plains areas should be maintained through 2099, but some reductions in abundance and distribution are possible as temperatures approach the temperature threshold levels. Under high emissions level, potential extirpation is likely for all of the northern plains areas by 2070–2099 under the high emissions level (Service 2019a, p. 162).

EFFECTS OF THE ACTION

Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 C.F.R. §402.17)

Effects of the action are a reasonable prediction of the likely response by individuals of a species to and the resulting biological effects from the environmental changes brought about by implementation of the chosen proposed action. The effects of the action to the species will occur through implementation of the Project over the period of the Project life (50 years). Effects as a result of the Project construction, operations, maintenance, and repair is likely to result in mortality or potential injury to eggs, larvae and pupae, subadults (tenerals) and adults.

Crushing and desiccation of individuals– The Project is likely to result in effects to ABBs through the loss of individuals, including eggs and larvae in brood-rearing chambers, due to mortality caused by crushing from construction equipment and vehicle traffic after exposure during excavation. Removal and physical alteration of vegetation and soil during excavation and grading would resulting in injury or mortality to ABBs. Emergency repairs and other

maintenance activities requiring ground disturbance will affect the ABB similar to construction activities.

Activities involving physically altering soils is likely to expose ABB adults, larvae, and eggs, which would result in desiccation, leading to injury or mortality. For the purposes of this analysis, it is assumed that any ABB occupying an area physically disturbed by the Project will suffer mortality via crushing from construction equipment or desiccation as a result of exposure. It is unlikely that ABB would use any temporarily disturbed areas after the initial disturbance. Therefore, ABB would not be at an elevated risk of crushing or desiccation from the repeated use of a temporarily disturbed area by construction equipment.

Vehicle use and the minor, infrequent vegetation maintenance during operation of the pipeline or power lines, without soil disturbance and excavation, is unlikely to crush or expose individuals, as these activities would occur while ABBs are buried, either during the day or during the ABB inactive season, when risk of impacts to ABBs from these activities is very low (Hoback 2016, p. 26).

Habitat disturbance/loss - Construction activities would also lead to effects on the species through effects on its habitat, namely temporary habitat loss, permanent alteration of suitable habitat to unsuitable habitat, and habitat fragmentation where the pipeline and power lines are not already co-located with other utilities. The ABB is also sensitive to soil moisture and dies when desiccated (Bedick et al. 2006, pp. 27-28). Beetles seek soils containing high moisture levels when they are inactive and soil moisture would be reduced across the ROW as the site is prepared by removing vegetation and topsoil, and grading. Equipment operations within the pipeline ROW would compact the substrate; however, as described above under conservation measures, sub-soil and soil would be de-compacted and vegetation cover would be re-established within both the temporary and permanent pipeline ROW. Native vegetation seed would generally be used, unless otherwise directed by the landowner, or as required by USACE conditions if within wetlands. As stated in the Project CMRP (BLM 2019, Appendix B), restoration and revegetation will return the disturbed areas to approximate pre-construction vegetation, use, and capability. This involves soil treatment, monitoring at least every three weeks, and repair by Keystone where unsuccessful seed germination or erosion has occurred, and topsoil replacement and contour restoration in wetlands. Wetland edges and adjacent upland areas would be stabilized by establishing permanent erosion control measures and revegetation, as applicable, during final cleanup. Breeding, feeding, and sheltering activities will be affected by any activities that occur in the active season. Prey and carrion availability are likely to be affected by the temporary and permanent loss of habitat since prey will move out of the disturbed areas and not return until those temporarily disturbed areas are restored, in approximately four years. Emergency repairs and other maintenance activities in ABB habitat would result in habitat disturbance and loss, similar to construction activities.

Construction of power lines would not permanently remove ABB habitat except where pole structures would be installed. For substations or switching stations, it is assumed that all areas within a proposed development site would no longer provide habitat for the ABB after construction begins.

Fragmentation of habitat - The majority of pipeline construction access routes will be temporary and will be restored to their previous habitat condition upon completion of construction. Meeting the success criteria for restoration may take up to four years following completion of construction activities. However, prior to the completion of this restoration, temporary access routes would result in the short-term fragmentation of ABB habitat. Emergency repairs and other maintenance activities in ABB habitat would result in habitat fragmentation, similar to construction activities. Vertebrate scavengers (i.e., American crows, skunks, raccoons) that compete for prey sources can use these temporary access routes as travel corridors into unfragmented grassland habitat (though less likely than corridors made through forested area), thus increasing competition for ABB until the disturbed areas are restored. However, once revegetated, temporary access routes will not present a permanent travel corridor for vertebrate scavengers into grassland habitats, thereby eliminating this potential form of competition.

Trees eliminated from the power line ROW might influence the quality of habitat for the ABB, however, it would not remove any suitable habitat or change current habitat ratings. Tree removal would increase habitat fragmentation and may create a corridor, thus increasing vertebrate scavenger competition as described above.

Degradation of habitat from lighting - Activities may occur in limited instances at night and will require some form of artificial lighting. The ABB, like many insects, is attracted to artificial lighting (Service 1991, p. 29). This attraction to lighted construction areas may disrupt normal ABB feeding behavior or increase the risk of predation by attracting individuals to areas unsuitable for ABB use. Beetles would be attracted to artificial lighting only during the active season of June through August (Service and NGPC 2008, entire). However, to minimize effects during the active season, most construction would take place during daylight hours and construction areas would generally not use artificial lighting. Activities that could potentially require lighting include critical pipeline tie-ins (connection of a pipeline to a facility, other pipeline systems or different sections of a pipeline), HDD crossings, and certain work required after sunset due to weather, safety, or other proposed-Project requirements. HDD crossings would require 24-hour operation until the crossing is completed. Where such activities require lighting, the lights will be down shielded. Lighting required for contractor yards and pump stations will also be down shielded, except where required for safety and security, and will utilize sodium vapor or warm, amber colored LED lighting (color temperature of 3000K or less and no greater than 70,000 lumens) to minimize effect to ABB. During Project operations, lights associated with aboveground facilities will only use on sodium vapor light or warm, amber colored LED lighting (color temperature of 3000K or less and no greater than 70,000 lumens) with downshield, as recommended by NGPC (NGPC 2019b, entire). We anticipate that these minimization measures will limit the likelihood of attracting ABB's to the active construction and operations areas, thereby reducing effects from lighting.

Temporary disruption of behavior - Increases in human activity, vehicle traffic, and noise as a result of Project activities are likely to cause ABBs to avoid areas occupied by construction personnel and equipment that may otherwise be present in suitable habitat. ABB avoidance of construction personnel and equipment is expected to be temporary.

Overwintering impacts - ABBs could be affected by the operating pipeline during the inactive season (October through early April). As previously discussed, active periods are correlated to night air temperatures. Oil transport through the pipeline releases heat that is dissipated through the soil to the ground surface. Geothermal models indicate the potential for the pipeline to warm surface areas by as much as 10°F in northern regions (South Dakota and Nebraska) (BLM 2019, Appendix E). It is unknown whether the ABB would be attracted, repelled, or neither, to soil that is artificially warmed. ABBs in Nebraska and South Dakota likely have a slowed metabolism during months where temperatures are below zero (BLM 2019, p. 116). It is unknown whether ABBs would suffer mortality from starvation if they were kept from freezing, but substantial decreases in length of time soil temperatures are below freezing would likely cause the ABBs to use too much fat energy during the winter months when they are underground. While they are underground, warming of the soil from the pipeline may also cue the ABBs to emerge prematurely (i.e., prior to late May or early June) when midnight air temperatures have not yet reached 60 °F. This may result in ABBs above ground without the ability to feed appropriately, or it may cause them to use more energy resources to rebury themselves in the soil, assuming temperatures permit such an activity. The existing literature suggests varying depths at which the ABBs overwinter (Service 2019a, p. 9), further complicating an evaluation of thermal effects. The Pipeline Temperature Effects Study conducted by Keystone in 2009 evaluated potential temperature changes at varying depths (i.e. 6, 12, 24 inches), and various distances from the pipeline (BLM 2019, Appendix E). The study predicted a reduction in the incidence of frozen soils at a depth of 12 inches and a distance of 11 feet from the pipeline centerline. The estimated total duration of unfrozen soils would likely be sufficient to affect ABBs overwintering within 11 feet from the pipeline centerline. While uncertainties were noted, temperature shifts above background levels substantial enough to influence habitat out to 11 feet from the pipeline (i.e., a 22-foot sub-corridor) were determined to make habitat unsuitable for ABB overwintering. Temperature related effects from pipeline operations to overwintering ABBs would be anticipated to occur annually once habitat restoration is complete (within four years) for the remaining duration of the Project life (46 years).

In summary, effects from the Project operations that modify soil temperature could increase overwintering mortality by (1) triggering early emergence when prey is not available and when cold temperatures could result in adult mortality; (2) causing higher metabolism for these insects resulting in starvation prior to emergence; or (3) causing mortality from the ABBs losing too much water because warmer temperatures result in greater desiccation risk to burying ABBs (Bedick et al. 2006, pp. 27-28).

Exposure to Potential Oil Spill - Under 50 C.F.R. §402.02, an effect or activity is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Under 50 C.F.R. §402.17(b), the conclusion of reasonably certain to occur must be based

on clear and substantial information. The determination of a consequence to be reasonably certain to occur must be based on solid information and should not be based on speculation or conjecture. This added term also does not mean the nature of the information must support that a consequence must be guaranteed to occur, but rather, that it must have a degree of certitude (50 C.F.R. §Part 402).

Potential oil spills could occur anywhere along the pipeline system. The timing, location, and magnitude of a potential oil spill along the pipeline is unknown, thereby increasing uncertainty of consequences to the ABB. While crude oil exposure has the potential to cause effects to individual ABBs, there is uncertainty related to the amount, location, and timing of effects to the ABB resulting from a crude oil spill from the pipeline. The uncertainty is due to the low probability of a spill and low probability of a spill coinciding with the presence of ABBs (BLM 2019, Appendix C). Despite the BA's determination that effects could be caused by oil spills, it is the Service's opinion that effects from an oil spill are not reasonably certain to occur.

If a Federal agency is involved in a response to an oil spill associated with the Project, the Federal agency may choose to initiate an emergency section 7 consultation with the Service on the Federal actions associated with the response (50 CFR 402.05). The Federal agency would submit information on the nature of the emergency action(s), the justification for the expedited consultation, and the impacts to endangered or threatened species and their habitats.

Species Response to the Proposed Action

Project effects on all life stages of individual ABBs will occur through disturbance, injury, or mortality during construction and operation. These effects can be estimated using an occurrence rate and the acres of suitable habitat affected (BLM 2019, Table 3.2-15, p. 115). The occurrence rate was estimated by BLM using the results of 2018 and 2019 surveys by Dr. Wyatt Hoback submitted to the Service in combination with a dataset from the Service showing all other ABB survey data within 1 mile of the Project. The number of ABBs affected is estimated by multiplying ABB habitat impacted (acres) by the estimated ABB density (ABBs per acre). This approach is consistent with other assumptions and abundance estimation methods in Nebraska, including the R line (Service 2019b, pp. 25-26). The estimate of individuals affected per acre is intended to be conservative, as it is based mostly on trapping results in high-quality habitats (prime and good), whereas impacts will occur across all habitat qualities. The estimate also factors in potential reproductive output, typically around 15 offspring per two adults (Service 2019a, p. 19). Using this approach, the estimated occurrence rates are 0.0899 ABBs per acre in South Dakota, 0.0046 ABBs per acre in Nebraska in Boyd County and Keya Paha County, and 0.0495 ABBs per acre in Nebraska in Holt County.

Pipeline Construction - The anticipated disturbance to the ABB habitat in South Dakota and Nebraska includes approximately 759.31 acres (314.22 in South Dakota + 445.09 in Nebraska) of temporary impacts and 485.8 acres (197.33 in South Dakota + 288.47 in Nebraska) of permanent impacts as a result of the proposed pipeline construction activities over the 50 year life of the ITP. In total (permanent and temporary) an estimated 733.56 (445.09+288.47) acres of habitat in Nebraska and 511.564 (314.223 + 197.33) acres in South Dakota (marginal, fair,

good, and prime) will be affected. In South Dakota and Nebraska, total habitat affected is 1,245.12 acres (Table 1 below in Summary of Effects). The Restoration Management Plan will ensure that the temporary impacts to habitat are restored to provide suitable habitat for the ABB and its carrion within four years post construction of the pipeline.

Based on the occurrence rates and the acres of suitable habitat that would be affected, total beetles affected by the proposed pipeline construction in Nebraska and South Dakota is estimated at 65 ABBs (see Table 1 below and BLM 2019, p. 115 for detailed calculations).

Pipeline Operations - It is not known whether the ABB considers surface soil temperature when selecting an overwintering site, although it is known that burying ABBs typically remain just below the frost line (Hoback and Conley 2014, pp. 22-24). However, assuming the ABB chooses an overwintering site without regard to soil temperature or other effects of the pipeline, approximately 83 acres of potentially suitable habitat in South Dakota, 65 acres of potentially suitable habitat in Nebraska in Boyd County and Keya Paha County, and 57 acres of potentially suitable habitat in Nebraska in Holt County would be affected during the ABB overwintering season during pipeline operation. Construction would remove suitable habitat for an estimated four years (construction followed by restoration), so approximately 46 seasons of ROW temperature increase from pipeline operation may impact overwintering ABBs. Using the same density estimates (ABBs per acre) as described above, and assuming that heat from the pipeline would affect any adult or teneral ABB that overwintered each inactive season within 11 feet of the pipeline, the total ABBs affected by heat produced from pipeline operations in Nebraska and South Dakota is estimated at 485 ABBs (see Table 1 below and BLM 2019, p. 118, for a detailed calculations).

Pipeline Repair and Maintenance - Emergency repairs and other maintenance activities are also anticipated to affect all life stages of the ABB, particularly when such activities involve excavation (BLM 2019, p.118). Emergency repairs may be completed at location and times that ABBs are active. This could lead to effects on individuals as described above for pipeline construction. Keystone estimates that less than 10 acres of suitable habitat would be affected by such activities. This is based on the following assumptions: (1) there will be 10 surveys over the 50 years to look for any locations needing maintenance, (2) history of similar pipeline operations indicates that there will be 0.05 location per mile per survey that would require some kind of maintenance, (3) each maintenance location will involve an area measuring approximately 110 feet wide by 50 feet long, totaling approximately 0.13 acre per location, and (4) all locations would occur in suitable habitat. Factoring these assumptions with the length of the proposed pipeline system within the range of the ABB leads to an estimate of somewhat less than 10 acres affected. Rounding up to 10 acres and apportioning these 10 acres across the counties according to the length of pipeline system within each county and factoring the affected area with the estimated number of individuals per acre, total beetles affected by emergency pipeline repair and maintenance in Nebraska and South Dakota combined is estimated at one ABB (see Table 1 below and BLM 2019, p. 119 for a breakdown of calculations).

Potential Oil Spill - As explained above, effects from oil spills are not reasonably certain to occur. Any injury to natural resources, including the ABB, associated with a release of oil or

hazardous substances or the response to a release of oil or hazardous substances is not exempted under this BO and therefore, an estimated number of ABBs affected by oil spills was not calculated.

Power Infrastructure Construction and Operations- New power infrastructure for three power lines, a substation rebuild, and a switching station coincide with potentially suitable ABB habitat. This power infrastructure would serve PS-20 and PS-21 in Tripp and Gregory counties, South Dakota, and PS-22 in Holt County, Nebraska. The remainder of the power infrastructure required for the Project would not overlap the current range of the species and will not affect ABBs. Construction of power infrastructure to these pump stations could affect the ABB. Power lines would not negatively affect the ABB except where pole structures would be installed. For substations or switching stations, this analysis assumes that all area within a proposed development site would no longer provide habitat for the ABB after construction begins.

Construction of the power line to PS-20 is reasonably certain to result in temporary disturbance, injury, or mortality of individual ABBs where the power line overlaps potentially suitable habitat within the range of this species. Considering that the ABB in Tripp County, South Dakota, only occurs south of U.S. Route 18, only a small portion of this 20.5-mile power line, approximately 2.7 miles, would lie within the range of this species. Within this 2.7 miles, an area of permanent disturbance covering three square feet per pole at 58 poles, a total of 0.004 acres of ABB habitat would be negatively impacted.

Construction of the 20.5-mile long power line to PS-21 is reasonably certain to result in the disturbance, injury, or mortality of individual ABBs where approximately 434 power poles are installed (approximately 0.03 acres). Additionally, rebuilding of WAPA's substation at the north end of this power line is reasonably certain to affect individuals through disturbance of six acres. While WAPA's conservation measure defined above would minimize effects from this substation rebuild, negative impacts from this activity are anticipated due to the permanent elimination of approximately six acres of marginal habitat.

Construction of the 2.5-mile long power line to PS-22 is reasonably certain to result in the disturbance, injury, or mortality of individual ABBs where approximately 54 power poles are installed (0.004 acres). Additionally, the 3.5-acre switching station is likely to affect individual ABBs, though the conservation measure of constructing this power infrastructure during the ABB's inactive period will minimize this. The permanent elimination of 3.5 acres of marginal habitat at the proposed switching station is likely to negatively impact the ABB as described for PS-21 above.

Power infrastructure activities occurring in the inactive season would impact adult and tenerals. Any power infrastructure activities required during the ABB active season would affect all life stages. In summary, power infrastructure will result in 9.54 acres of habitat disturbance in the form of permanent impacts resulting in adverse effects to one ABB (See Table 1 below and BLM 2019 Table 3.2-19, p. 121 for calculations).

Summary of Adverse Effects from All Activities

Overall, pipeline construction is estimated to affect approximately 65 ABBs, power line construction is estimated to affect approximately one ABB, heat impacts from pipeline operations are estimated to affect approximately 485 ABBs, and pipeline repairs are estimated to affect approximately one ABB. The Project is estimated to affect approximately 552 ABBs (Table 1).

Table 1- Estimated American Burying Beetle Habitat Area Affected in South Dakota (BLM 2019, p. 123-124)

State (County)	Miles of ROW	Expected Area Affected (acres)	American Burying Beetles per Acre	American Burying Beetles Affected
Effects of Construction				
Pipeline Construction				
South Dakota	31.0	511.56	0.0899	45.99
Nebraska (Boyd Co. and Keya Paha Co.)	24.4	383.02	0.0046	1.76
Nebraska (Holt Co.)	21.5	350.54	0.0495	17.35
			Subtotal	*65.10*
Power Infrastructure Construction				
South Dakota	23.2	6.04	0.0899	0.54
Nebraska (Boyd Co. and Keya Paha Co.)	0	0.00	0.0046	0.00
Nebraska (Holt Co.)	2.5	3.50	0.0495	0.17
			Subtotal	*0.71*
			Effects of Construction Subtotal	**65.81**
Effects of Operation				
Heat Effects				
South Dakota	31.0	3795.92 [a]	0.0899	341.25
Nebraska (Boyd Co. and Keya Paha Co.)	24.4	2994.60 [a]	0.0046	13.78
Nebraska (Holt Co.)	21.5	2631.66 [a]	0.0495	130.27
			Subtotal	*485.30*
Pipeline Repairs				
South Dakota	31.0	3.00 [b]	0.0899	0.27
Nebraska (Boyd Co. and Keya Paha Co.)	24.4	3.00 [b]	0.0046	0.01
Nebraska (Holt Co.)	21.5	4.00 [b]	0.0495	0.20
			Subtotal	*0.48*
			Effects of Operation Subtotal	**485.78**
			OVERALL PROJECT TOTAL	**551.59**

[a] Given that heat effects could recur in the same places every winter for the 46 years in the life of the Project that the pipeline is expected to operate in potentially suitable, recovered habitat, the number shown represents 46 times the area affected at any one time.
[b] This area is the total expected to be affected during the life of the proposed Project.

Conservation Measures and Mitigation - As described in the DESCRIPTION OF THE PROPOSED ACTION of this BO, the Project proponents (Keystone, the electrical power providers, or WAPA) have committed to several conservation measures that will minimize

impacts to the ABB. Mowing and carrion removal prior to construction will make the habitat less attractive and is likely to reduce the amount of ABBs that will be present in the area prior to construction thus minimizing potential crushing of individuals. Most of the Project activities are planned to occur during daylight hours since ABBs are nocturnal, thus reducing disturbance to ABBs during the time of day when they are active. If Project activities will be conducted at night, lighting that minimizes effects to ABBs will be used to minimize disturbance while they are active. Conservation measures related to soil improvement, erosion and sediment control, and habitat restoration will ensure that the amount of habitat disturbance is minimized. Keystone has also committed to protect 1,034 acres of occupied ABB habitat (Keystone 2019, p. 116). Management and protection on large blocks of higher quality habitat/protected lands will contribute to the resiliency of the ABB population affected by this Project.

CUMULATIVE EFFECTS

Cumulative effects "...are those effects of future state, or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation" (50 C.F.R. §401.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

The Service knows of no projects reasonably certain to occur in the action area for which the Service has the level of detail necessary to identify and analyze the amount, location and type of specific effects. Any future projects built in potential ABB habitat would need to work with the Service to comply with the ESA.

Other future non-federal activities that may occur within the action area include non-federal pipelines, power infrastructure, residential and commercial development, state and county road projects creating new disturbed land or additional lighting, conversion of forested habitat to agricultural land, and the conversion of range lands or undeveloped lands to row crop agriculture (BLM 2019, p. 122). Based on historic land use changes in ABB habitat, the conversion of lands to row crop agriculture is likely to have the largest effect on the ABB. While future projects have the potential to impact ABB habitat, the intensity of impacts and whether or not it causes effects to ABB would depend on the number and type of projects built, presence or absence of ABB at the site, geographic location, and other site and project-specific characteristics. If ABB were exposed to impacts, the resulting effects would also depend on the number and types of avoidance, minimization, and mitigation measures that would be implemented for each project.

JEOPARDY DISCUSSION AND CONCLUSION

The Service has analyzed and described the likely adverse effects to the ABB from the Project. The purpose of our analysis was to assess the effects of this Project when combined with the status of the species, the environmental baseline, and any identified cumulative effects in order to form an opinion as to whether this action would be likely to jeopardize the continuing existence of the ABB. The regulatory definition of likely to jeopardize is "...to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both

the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 C.F.R. §402.02).

Reproduction – We anticipate that habitat disturbances from Project activities during the construction, emergency repairs, and maintenance would prevent ABB reproduction in the action area. Areas with permanent impacts would not be used for ABB reproduction for the life of the Project. For areas with temporary impacts, reproduction is not likely to resume until the disturbed habitat is successfully restored in four years. When construction begins, all ABBs present would be killed and therefore removed from the reproducing population. ABBs would not colonize the area until restored habitat is suitable. Therefore, no reproduction would occur for approximately four years in each area disturbed by construction. Once habitat is restored and prey re-inhabit the area, ABBs in nearby habitat would likely recolonize and begin reproducing. As habitat generalist in terms of vegetation types, if food, moisture, and shelter are present, ABBs should recolonize disturbed areas. Areas temporarily disturbed by construction activities will be used more than one time by Keystone for various activities throughout the construction process and will not be restored until construction is complete. We do not expect ABBs to inhabit the disturbed areas during construction due to the lack of habitat and prey species. Keystone will stabilize, revegetate, and restore temporarily disturbed areas within four years after construction and monitor to ensure successful restoration. The ABB and other disturbed wildlife species, including prey species, are likely to return to the area following construction when personnel and equipment are no longer present and suitable habitat has been restored (within four years of initial disturbance). ABBs returning to the area are expected to resume reproduction within successfully restored habitat. In addition, Keystone has committed to protect and manage a large block, approximately 1,034 acres, of occupied ABB habitat in perpetuity (Keystone 2019, p. 116). This will provide reproductive habitat for the ABB population.

Numbers – We estimate that 552 ABBs (one-time take of 66 ABB from construction, annual take of less than 11 ABBs/year for 46-years of operation and maintenance) will be disturbed, injured or killed as part of the Project during the anticipated 50-year Project lifetime (Table 1, above). ABB population estimates are available for the Sandhills and Niobrara analysis areas (combined into one population estimate) in which the Project passes through. As described above, Amaral et al. (2005, p. 75) did not distinguish or split the two populations and estimated the combined population to be about 10,000 ABBs. Population estimates are not available for the individual analysis areas (Sandhills and Niobrara). The population viability analysis by Amaral et al. (2005, p. 40) concluded that ABB populations of 1,000 or more individuals are viable long-term in the absence of severe catastrophic events or reduction in carrying capacity through a reduction in carcass availability, habitat loss, or fragmentation. Amaral et al. (2005, p. 38) indicates that populations of greater than 10,000 ABB can persist even through catastrophic events. Recently, the Sandhills population was estimated to be 55,743 (NPPD 2018, p. 113). The Service used the ratio of positive to negative ABB surveys to determine ABB relative abundance in population analysis areas (Service 2019a, p. 71). The ratio of positive to negative ABB surveys in the Sandhills analysis area was defined as the highest condition category of "good," with the highest ratio of positive to negative surveys compared to other analysis areas (Service 2019a, p. 95). The Niobrara unit had the second highest proportion of positive to negative surveys (Service

2019a, p. 72). The Project will not impact the long-term persistence of the Sandhills or Niobrara ABB populations because the 552 individuals (one-time take of 66 ABB from construction, annual take of less than 11 ABBs/year for 46-years of operation and maintenance) we expect the Project to take in the form of harm within the permit area represent only a small percentage of the estimated Sandhills and Niobrara populations; this level of population loss does not represent a catastrophic event. With little to no impact on the Sandhills and Niobrara population, we do not expect there would be any effect on the rangewide population estimated by Amaral (2005, p. 37) to be approximately 50,000 individuals. In addition, Keystone has committed to protect and manage a large block, approximately 1,034 acres, of occupied ABB habitat in perpetuity (Keystone 2019, p. 116). This will contribute to the resiliency of the ABB population.

Distribution –The majority of the impacts to the beetle and its habitat will be temporary, but permanent loss of habitat will also occur. Combined, the impacts to approximately 1,265 acres (excluding habitat rated as "poor") for the entire Project represents approximately 0.011 percent of the estimated Sandhills and Niobrara occupied range (combined 11,595,154 acres of potential habitat in the Sandhills and Niobrara areas). As discussed above, the temporarily impacted habitat would not be occupied by ABBs until the habitat is successfully restored within four years after construction. Once restored habitat reaches suitability criteria, ABBs and their carrion species from nearby areas are likely to recolonize. Thus, distribution would change slightly due to this temporary disturbance until recolonization occurs; these aspects of the range would not be permanently affected. However, ABBs would not recolonize the permanently lost habitat areas. But, those acres are scattered throughout the Project area and, even in totality, represent an even smaller fraction of the occupied range of the ABB in the Sandhills and Niobrara populations. Therefore, we do not anticipate any meaningful impacts to the ABB's range wide distribution.

Jeopardy Conclusion

The definition of "likely to jeopardize" hinges on a change to the reproduction, abundance and distribution of a species such that it appreciably reduces the likelihood of both survival and recovery. Therefore, the impacts of the Proposed Action were analyzed to determine the probable effects on reproduction, abundance, and distribution of ABB in the Action Area. The described changes to the ABB's reproduction, abundance, or distribution would have a negative effect on the ABB and its habitat due to the loss of 552 ABBs (one-time take of 66 ABB from construction, annual take of less than 11 ABBs/year for 46-years of operation and maintenance) and impacts to 1,265 acres of habitat (approximately 0.011 percent of the estimated Sandhills and Niobrara occupied range). However, based on the information presented above, we do not anticipate meaningful impacts to ABB reproduction, numbers, or range wide distribution. Additionally, given the impacts on ABB reproduction, numbers, and range wide distribution, the Project will not meaningfully preclude the likelihood of species recovery. The conservation measures, including the restoration of the temporary impact acres to suitable habitat and the protection in perpetuity and long term management of a large block of occupied beetle habitat, approximately 1,034 acres, will minimize the impacts of the Project and support recovery of the ABB. Therefore, this Project is not likely to reduce appreciably the likelihood of both the survival and recovery of this listed species in the wild. It is the Service's Biological Opinion that the Project is not likely to jeopardize the continued existence of the ABB.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is defined by regulation as "an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering" (50 C.F.R. §17.3). Harass is defined by regulation as "... an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering" (50 C.F.R. §17.3). Incidental take is defined as "takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant" (50 C.F.R. §402.02). Under the terms of section 7(b)(4) and section 7(o)(2), such taking is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement (ITS).

The ITS serves to enumerate or identify the amount or extent of take "caused by" all the effects of the action and exempts the action agencies from the prohibitions against that take under section 9 of the ESA. Here, take of ABB would not occur "but for" the proposed Federal actions. Given the scope of the effects of the Federal actions, it follows that the majority of the take exempted for the Federal agencies is occurring on lands that are outside the jurisdiction of the Federal agencies, or is related to activities undertaken by the applicant not under the authority of a Federal agency, with exception of the rebuilding of the WAPA substation within ABB habitat and RUS financing of power infrastructure. Therefore, this ITS does not extend the Federal agencies' take exemption to Keystone for the take caused by the Project's actions. Instead, Keystone is developing a HCP to support its application to the Service for a section 10(a)(1)(B) incidental take permit for the ABB for their activities on non-federal lands.

For the exemption in ESA section 7(o)(2) to apply to the Federal actions considered in this BO, Federal agencies must undertake the commitments to species' conservation measures under their jurisdiction that are described in the BA and BO, particularly in: 1) the DESCRIPTION OF PROPOSED ACTION section of this BO[6], and 2) the Species Conservation Measures in the EFFECT EVALUATION section of the BA (BLM 2019, pp. 30-164). These species' conservation measure commitments are non-discretionary measures and must become binding conditions of any permit, contract, or grant issued for implementing the action. Consistent with ESA section 7(b)(4)(C)(iv), the Federal agencies have a continuing duty to regulate the action components covered by this ITS that are under its jurisdiction. The protective coverage of §7(o)(2) may lapse if the Federal agencies fails to:

[6] Some conservation measures for the ABB were updated since the submission of the BA (BLM 2019), based on review and discussion with Federal agencies. Therefore, the Service is relying on the conservation measures for the ABB in this BO rather than the ABB conservation measures in the BA.

- assume and implement the non-discretionary species' conservation measures applicable to the Federal agency; or
- require a permittee, contractor, or grantee to adhere to the non-discretionary species' conservation measures applicable to the Federal agency through enforceable terms that are added to the permit, contract, or grant document.

The Service believes all species' conservation measures necessary and appropriate to minimize take of ABB have been incorporated into the proposed action (See the DESCRIPTION OF PROPOSED ACTION section of this BO and Species Conservation Measures in the EFFECT EVALUATION section of the BA (BLM 2019, pp. 30-164)). The Service has given appropriate consideration to the beneficial actions proposed by the Federal agencies and Keystone (50 C.F.R. §402.14(g)(8)). Therefore, no terms and conditions or reasonable and prudent measures are necessary for Federal agencies for this ITS (see REASONABLE AND PRUDENT MEASURES and TERMS AND CONDITIONS sections below).

In order to monitor the impact of incidental take, the Federal agencies must report, within their jurisdiction, the progress of the action and its impact on the species to the Service as specified in this ITS.

AMOUNT OR EXTENT OF TAKE ANTICIPATED

Estimating take of insects such as the ABB is challenging because ABB numbers fluctuate substantially. The take calculation is based on the density of ABBs at the time that surveys were conducted. The Service knows of no approach that provides a better means of estimating ABB numbers and densities in the action area. The Service anticipates that the Project is reasonably certain to cause incidental take of individual ABB in the form of harm. Harm will result from death or injury of ABB from construction of the pipeline and power infrastructure, emergency repairs and maintenance of the pipeline, and pipeline operations. The methodology for calculating take is further described in the Species Response to the Proposed Action section in this BO.

Activities associated with pipeline construction are anticipated to result in an estimated one-time take of 65 ABBs. Activities associated with power infrastructure construction will account for an estimated one-time take of one ABB. Activities associated with emergency repairs and maintenance of the pipeline will account for an estimated take of one ABB. Activities associated with pipeline operations specific to heat related impacts will account for an estimated take of 485 ABBs. The combined total take of 486 ABBs from heat related impacts and pipeline emergency repairs and maintenance will occur over the 46-year life of the Project after restoration. Averaged annually, these activities would result in take of less than approximately 11 ABBs per year. No take is authorized for oil spills. In total, the Project (pipeline construction, operations, emergency repairs, and power infrastructure) is anticipated to result in incidental take of 552 ABBs in South Dakota and Nebraska over the 50-year duration of the Project.

EFFECT OF THE TAKE

In this BO, the Service determines that this level of anticipated take is not likely to result in jeopardy to the ABB.

REASONABLE AND PRUDENT MEASURES

The Service believes that all conservation measures necessary and appropriate to minimize take of ABB have been incorporated into the proposed action (See DESCRIPTION OF PROPOSED ACTION). The Service has given appropriate consideration to the beneficial actions proposed by the Federal agencies and Keystone (50 C.F.R. §402.14(g)(8)). Therefore, no RPMs are necessary for this ITS.

TERMS AND CONDITIONS

No reasonable and prudent measures to minimize the impacts of incidental take caused by the action are provided in this ITS; therefore, no terms and conditions for carrying out such measures are necessary.

MONITORING AND REPORTING REQUIREMENTS

In order to monitor the impacts of incidental take, the Federal agencies must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement (50 C.F.R. §402.14(i)(3)). This section provides the specific instructions for such monitoring and reporting (M&R). As necessary and appropriate to fulfill this responsibility to monitor and report the progress of the action and its impact on the species, the Federal agencies must require any permittee, contractor, or grantee to accomplish the monitoring and reporting requirements that apply to action components under its jurisdiction through terms that are added to the permit, contract, or grant document. Such terms must include a requirement to immediately notify the Federal Agencies and the Service if the amount or extent of incidental take specified in this ITS is exceeded during action implementation or if the action and its impact on the listed species has changed.

M&R #1. Annual Report. The Federal agencies are responsible for ensuring that the Project activities under their jurisdiction are implemented as described in the Project description. Upon initiation of activities, each Federal agency will provide the Service with an annual report that describes all activities that were covered under the biological opinion under each Federal agency's respective jurisdiction. The report will include a summary of completed construction activities and the conservation measures that were implemented for that year. Annual reporting for each agency will continue until activities under their jurisdiction have been completed

Procedures for Handling and Disposing of American Burying Beetles

If a dead or impaired ABB is found, care should be taken in its handling to preserve biological materials in the best possible state for later analysis of cause of death. In conjunction with the care of injured endangered or threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed. The dead or impaired ABB should be photographed prior to disturbing it or the site. The Service is to be notified within three (3) calendar days upon locating a dead or injured ABB. Initial notification must be made to the applicable Service

Office of Law Enforcement for Nebraska at (316) 788-4474. Then the Nebraska Ecological Services Field Office at (308) 382-6468. Notification must include the date, time, precise location of the injured animal or carcass, and any other pertinent information. Formal written notification also must be submitted within seven (7) calendar days.

All dead or moribund adults should be salvaged by placing them on cotton in a small cardboard box as soon as possible after collection. The date and location of collection should be included with the container. Specimens should then be furnished to the repository identified by the appropriate Ecological Services Field Office for deposition in their collection of invertebrates, or to another suitable site approved by the Service.

REINITIATION NOTICE

This concludes consultation on the actions outlined in the request. As provided in 50 C.F.R. §402.16:

(a) Reinitiation of consultation is required and shall be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and:

(1) If the amount or extent of taking specified in the incidental take statement is exceeded;

(2) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;

(3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion or written concurrence; or

(4) If a new species is listed or critical habitat designated that may be affected by the identified action.

(b) An agency shall not be required to reinitiate consultation after the approval of a land management plan prepared pursuant to 43 U.S.C. 1712 or 16 U.S.C. 1604 upon listing of a new species or designation of new critical habitat if the land management plan has been adopted by the agency as of the date of listing or designation, provided that any authorized actions that may affect the newly listed species or designated critical habitat will be addressed through a separate action-specific consultation. This exception to reinitiation of consultation shall not apply to those land management plans prepared pursuant to 16 U.S.C. 1604 if:

(1) Fifteen years have passed since the date the agency adopted the land management plan prepared pursuant to 16 U.S.C. 1604; and

(2) Five years have passed since the enactment of Public Law 115-141 [March 23, 2018] or the date of the listing of a species or the designation of critical habitat, whichever is later

LITERATURE CITED

Amaral M., Morgan R, Davidson C, Dikeman H, Holzer K, Byers O (eds.). 2005. American burying beetle (*Nicrophorus americanus*) population and habitat viability assessment: Final Report. IUCN/SSC Conservation Breeding Specialist Group, Apple Valley, MN. 80 pp.

Amaral M, Kozol AJ, French T. 1997. Conservation strategy and reintroduction of the endangered American burying beetle. Northeastern Naturalist 4(3):121–132.

Backlund, D.C., G.M. Marrone, C.K. Williams, and K. Tilmon. 2008. Population Estimate of the Endangered American Burying Beetle, *Nicrophorus americanus* Olivier (Coleoptera: Silphidae) in South Dakota. *The Coleopterists Bulletin* 62: 9-15.

Backlund, D.C., and G.M. Marrone. 1997. "New Records of the Endangered American Burying Beetle, *Nicrophorus americanus* Olivier, (Coleoptera: Silphidae) in South Dakota." *The Coleopterists Bulletin* 51: 53-58.

Bathke DJ, Oglesby RJ, Rowe CM, Wilhite DA. 2014. Understanding and Assessing Climate Change: Implications for Nebraska. University of Nebraska-Lincoln, Lincoln, NE.

Bedick, J.C., W.W. Hoback, and M.C. Albrecht. 2006. High Water-loss Rates and Rapid Dehydration in the Burying Beetle, *Nicrophorus marginatus. Physiological Entomology* 31: 23-29.

Bedick, JC, Ratcliffe BC, Hoback WW, Higley LG. 1999. Distribution, ecology and population dynamics of the American burying beetle *Nicrophorus americanus* Olivier (Coleoptera, Silphidae) in South-central Nebraska, USA. Journal of Insect Conservation 3(3): 171–181.

Bishop, A.A., W.W. Hoback, M. Albrecht, and K.M. Skinner. 2002. GIS Reveals Niche Partitioning by Soil Texture among Carrion Beetles. *Transactions in GIS* 6: 457-470.

Creighton JC, Schnell G. 1998. Short-term movement patterns of the endangered American burying beetle *Nicrophorus americanus*. Biological Conservation 86: 281-–287.

Creighton JC, Vaughn CC, Chapman BR. 1993. Habitat preference of the endangered American burying beetle (*Nicrophorus americanus*) in Oklahoma. The Southwestern Naturalist 38:275–277.

Hoback, W. 2019. Email Communication from Dr. Wyatt Hoback of Hoback Consulting to Valerie Haragan and Jon Schmidt of EXP Energy Services. November 22, 2019.

Hoback, W. 2016. *Effects of Compaction and Soil Moisture on American Burying Beetles*. Nebraska Department of Roads and the Federal Highway Administration. Report No. SPR-P1(15) M049.

Hoback, W., and A. Conley. 2014. Overwintering Biology and Tests of Trap and Relocate As a Conservation Measure for Burying Beetles. Nebraska Department of Transportation Research Reports. 175.

Holloway AK, Schnell GD. 1997. Relationship between numbers of the endangered American burying beetle *Nicrophorus americanus* Olivier (Coleoptera: Silphidae) and available food resources. Biological Conservation. 81:145-152.

Jenkins, T., W.W. Hoback, D. Leasure, P. Mulder, and C. Davis. 2018. Distribution of the Endangered American Burying Beetle at the Northwestern Limit of its Range. *Insect Systematics and Diversity* 2, no. 1: 1–8. doi: 10.1093/isd/ixx011

Jurzenski J. 2012. Factors affecting the distribution and survival of endangered American burying beetles, *Nicrophorus americanus* Olivier. Dissertations and Student Research in Entomology. University of Nebraska – Kearney. Kearney, NE.

Jurzenski J, Snethen DG, Brust ML, Hoback WW. 2011. New records of carrion beetles in Nebraska reveal increased presence of the American burying beetle, *Nicrophorus americanus* Olivier

(Coleoptera: Silphidae) Great Plains Research: A Journal of Natural and Social Sciences. 1188. https://digitalcommons.unl.edu/greatplainsresearch/1188

Keystone, see TransCanada Keystone Pipeline, L.P.

Kozol AJ. 1990. The natural history and reproductive strategies of the American burying beetle, *Nicrophorus americanus*. Unpublished report prepared for the U.S. Fish and Wildlife Service. 15pp.

Kozol AJ, Scott MP, Traniello, JA. 1988. The American burying beetle: studies on the natural history of an endangered species. Psyche 95: 167-176.

Leasure, D.R. and W.W. Hoback. 2017. "Distribution and Habitat of Endangered American Burying Beetle in Northern and Southern Regions." *Journal of Insect Conservation* 21:75–86. doi: 10.1007/s10841-017-9955-5.

Lomolino MV, Creighton JC. 1996. Habitat selection, breeding success and conservation of the endangered American burying beetle, *Nicrophorus americanus*. Biological Conservation 77:235–241.

Lomolino MV, Creighton JC, Schnell GD, Certain DL. 1995. Ecology and conservation of the endangered American burying beetle, *Nicrophorus americanus*. Conservation Biology 9:605–614.

Nebraska Game and Parks Commission (NGPC). 2019a. American Burying Beetle Conservation Measures Protocol: Mowing and Carrion Removal. May 31, 2019 draft.

Nebraska Game and Parks Commission (NGPC). 2019b. Email from Melissa Marinovich, Assistant Division Administrator, NGPC. October 25, 2019.

Nebraska Game and Parks Commission (NGPC). 2018. Estimated current range of American burying beetle (*Nicrophorus americanus*). Available at: http://outdoornebraska.gov/americanburyingbeetle/. Accessed December 17, 2018.

Nebraska Natural Heritage Program (NNHP). 2019. Conservation and Environmental Review Tool (CERT) Project Report and GIS files.

Nebraska Public Power District (NPPD). 2018. R-Project Final Habitat Conservation Plan. Prepared for Nebraska Public Power District, Norfolk, NE. Prepared by POWER Engineers. December 5, 2018. Available at: https://www.fws.gov/mountain-prairie/es/nebraska/library/R-Project-Final-HCP.pdf.

Panella MJ. 2013. American burying beetle *(Nicrophorus americanus)*. A species conservation assessment for the Nebraska Natural Legacy Project. Nebraska Game and Parks Commission, Wildlife Division.

Ratcliffe BC. 1996. The carrion beetles (Coleoptera: Silphidae) of Nebraska. Bulletin of the Nebraska State Museum Vol. 13. 100pp.

Shafer M, Ojima D, Antle JM, Kluck D, McPherson RA, Petersen S, Scanlon B, Sherman K. 2014. Ch. 19: Great Plains. Climate Change Impacts in the United States: The Third National Climate Assessment, Melillo JM, Richmond TC, Yohe, Eds., U.S. Global Change Research Program, pp. 441-461. doi:10.7930/J0D798BC.

South Dakota Natural Heritage Program (SDNHP). 2019. Element Occurrence GIS Shapefile. January 8, 2019.

TransCanada Keystone Pipeline, LP. 2019. Draft Habitat Conservation Plan. Submitted by EXP Energy Services, Inc., on November 25, 2019.

United States Bureau of Land Management . 2019. Amended Biological Assessment for the Keystone XL Project. November 26, 2019. Received by the Service on November 27, 2019.

United States Department of State (Department). 2018. *Draft Supplemental Environmental Impact Statement Keystone XL Mainline Alternative Route*. September 2018. Available at: https://keystonepipeline-xl.state.gov/documents/organization/286279.pdf.

United States Department of State (Department). 2014. *Final Supplemental Environmental Impact Statement for the Keystone XL Project*. January 2014. Available at: https://2012-keystonepipeline-xl.state.gov/finalseis/index.htm

United States Department of State (Department). 2012. *Final Biological Assessment for the Keystone XL Project*. Volume I. December 21, 2012. Copies available within Department (2014).

United States Fish and Wildlife Service (Service). 2019a. Species Status Assessment Report for the American Burying Beetle (*Nicrophorus americanus*). Version 1.0. February 2019. Available at: https://www.fws.gov/southwest/es/oklahoma/Documents/ABB/Listing/ABBSSA_Final_V1.0_Feb2019.pdf

United States Fish and Wildlife Service (Service). 2019b. Biological Opinion Proposed Issuance of an Incidental Take Permit for the Federally Endangered American Burying Beetle *Nicrophorus americanus*. Nebraska Public Power District R-Project Transmission Line. TAILS No. 06E00000-2019-F-0001. June 4, 2019. Accessed September 19, 2019. Retrieved from: https://www.fws.gov/nebraskaes/Library/Signed_RProject_BiologicalOpinion_06042019.pdf

United States Fish and Wildlife Service (Service) 2016. Programmatic Biological Opinion on the "Final 4(d) Rule for the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions, January 5, 2016. Available at: https://www.fws.gov/midwest/endangered/section7/batbo/16_NLEBRange_Final4d01052016.pdf.

United States Fish and Wildlife Service (Service). 2014. American Burying Beetle conservation strategy for the establishment, management, and operations of mitigation lands. Available at: https://www.fws.gov/southwest/es/oklahoma/documents/abb/surveying%20final/final%20abb%20conservation%20strategy%20and%20mitigation%20guidance%202014_05_21.pdf.

United States Fish and Wildlife Service (Service). 2013. *Biological Opinion on the Effects to Threatened and Endangered Species from the Issuance of a Presidential Permit to TransCanada Keystone XL Pipeline (Keystone) by the U.S. Department of State for the Proposed Construction, Operation, and Maintenance of the Keystone XL Pipeline and Associated Facilities at the Border and Interrelated and Interdependent Actions*. May 15, 2013. FWS-NE: 2013-164. Available at: https://2012-keystonepipeline-xl.state.gov/documents/organization/209745.pdf.

United States Fish and Wildlife Service (Service). 2008. Five-year review of the status of the American Burying Beetle. June 16, 2008. Southwest Regional Office, Albuquerque, New Mexico. Available at: https://ecos.fws.gov/docs/five_year_review/doc1968.pdf.

United States Fish and Wildlife Service (Service). 1991. American Burying Beetle (*Nicrophorus americanus*) Recovery Plan. Newton Corner, Massachusetts. 80 pp. Available at: https://ecos.fws.gov/docs/recovery_plan/910927.pdf.

United States Fish and Wildlife Service (Service). 1989. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the American Burying Beetle, Final Rule, Federal Register Vol.54 No.133, 29652-29655. Available at: https://ecos.fws.gov/docs/federal_register/fr1559.pdf.

United States Fish and Wildlife Service (Service) and Nebraska Game and Parks Commission (NGPC). 2008. Conservation Measures for the American Burying Beetle. Service, Nebraska Ecological Services Field Office. Kearney, NE. pp.7.

Walker, T. J. 1957. Ecological studies of the arthropods associated with certain decaying materials in four habitats. Ecology 38(2): 262–276.

Walker Jr. TL, Hoback WW. 2007. Effects of invasive eastern red cedar on capture rates of *Nicrophorus americanus* and other Silphidae. Environmental Entomology 36:297–307.

Willemssens, K.A. 2015. Soil preferences of Nicrophorus beetles and effects of compaction on burying behavior. University of Nebraska-Lincoln. Dissertations & Theses in Natural Resources. Paper 112. http://digitalcommons.unl.edu/natresdiss/112.

Wilson, D.S., and J. Fudge. 1984. "Burying Beetles: Intraspecific Interactions and Reproductive Success in the Field." Ecological Entomology 9: 195-203.

Appendix L – Amended Programmatic Agreement and Record of Consultation

Programmatic Agreement

Among
The U.S. Department of State,
National Park Service,
U.S. Army Corps of Engineers,
U.S. Department of Agriculture Farm Service Agency,
U.S. Department of Agriculture Natural Resources Conservation Service,
U.S. Department of Agriculture Rural Utilities Service,
U.S. Bureau of Indian Affairs,
U.S. Bureau of Land Management,
U. S. Bureau of Reclamation,
Western Area Power Administration,

Advisory Council on Historic Preservation,
Kansas State Historic Preservation Officer,
Montana Department of Environmental Quality,
Montana Department of Natural Resources and Conservation,
Montana State Historic Preservation Officer,
Nebraska State Historic Preservation Officer,
South Dakota State Historic Preservation Officer,
and
TransCanada Keystone Pipeline, LP

Regarding the Keystone XL Pipeline Project

WHEREAS, the U.S. Department of State (DOS) receives and considers applications for permits for cross-border oil pipelines pursuant to the authority delegated by the President of the United States under Executive Order (EO) 13337 (69 Federal Register 25299); and

WHEREAS, the DOS received an application for a Presidential Permit from TransCanada Keystone Pipeline, LP (Keystone) in September 2008 for the Keystone XL Pipeline Project (Keystone XL Project or the Project) which consisted of approximately 1,375 miles of new crude oil pipeline in Montana, South Dakota, Nebraska, Oklahoma, and Texas with associated effects in Kansas; and

WHEREAS, the DOS determined that issuance of a Presidential Permit for the proposed Keystone XL Project include a consultation and review process consistent with Section 106 of the National Historic Preservation Act (NHPA) (16 U.S.C. 470f, as amended) and its implementing regulations, “Protection of Historic Properties”; and

WHEREAS, the DOS developed a Programmatic Agreement (PA) in consultation with relevant state and federal agencies, Indian tribes, Keystone, and the public and executed this PA in August 2011; and

WHEREAS, the Keystone XL Project Presidential Permit application was denied in January 2012; and

WHEREAS, on May 4, 2012, Keystone submitted an application for a revised Keystone XL Pipeline Project using a route in Montana and South Dakota largely unchanged from that proposed in the 2008 Keystone application and a substantially changed route in Nebraska that sought to avoid the Sands Hills Region identified by the Nebraska Department of Environmental Quality and terminates at Steele City, Nebraska; and

WHEREAS, the Oklahoma and Texas sections of the pipeline proposed in the 2008 Keystone application are no longer part of the application received in 2012 and, therefore, the Oklahoma and Texas State Historic Preservation Offices have no further obligations under this PA; and

WHEREAS, the proposed Project undertaking consists of construction of approximately 875 miles of new crude oil pipeline in the United States, as described in section 2.1 of the Final Supplemental Environmental Impact Statement (SEIS) and Attachment H, of which approximately 209 miles (24%) were not part of the 2008 Keystone XL Presidential Permit application; and

WHEREAS, the revised Keystone XL Project Area of Potential Effects (APE) includes: (1) in Montana—a 300-foot-wide corridor, 150 feet on each side of the centerline; (2) in South Dakota—a 300-foot-wide corridor, 150 feet on each side of the centerline; (3) in Nebraska—a 300-foot-wide corridor, 150 feet on each side of the centerline in areas consistent with the route evaluated in the Final EIS for the 2008 Keystone XL application. Within those areas outside the route evaluated in the Final EIS for the 2008 Keystone XL application, the APE consists of a 500-foot-wide corridor, 250 feet on each side of the centerline. For construction or modification of electrical facilities (including distribution lines, transmission lines, and substations), a 100-foot-wide corridor centered on the Project centerline will be used. For pumping stations, including two new pump stations in Kansas on the existing Keystone Cushing Extension pipeline, and other areas that are to be disturbed by construction-related activities and ancillary facilities (including construction camps and pump stations), the APE will include all areas of disturbance and areas to be indirectly affected; and

WHEREAS, the DOS, in consultation with the Advisory Council on Historic Preservation (ACHP), has determined that the Keystone XL PA executed in August 2011 should be amended to reflect the route proposed in the new Presidential Permit application and input from subsequent consultation; and

WHEREAS, the DOS has determined that the construction of the Keystone XL Project may have an adverse effect on historic properties listed in or eligible for listing in the National Register of Historic Places (NRHP), as defined in Stipulation I.C below, and has consulted with the Montana, South Dakota, Nebraska, and Kansas State Historic Preservation Officers (SHPOs), Indian tribes who may ascribe religious and cultural significance to historic properties that may be affected by the undertaking, the ACHP, other federal agencies with actions related to this undertaking, and other consulting parties consistent with 36 C.F.R. Part 800; and

WHEREAS, consistent with 36 C.F.R. §§ 800.4(b)(2) and 800.5(a)(3), the DOS has elected to phase identification and evaluation of historic properties, and application of the criteria of adverse effect, respectively, because the undertaking and APE have changed necessitating additional efforts to identify historic properties and because access to some areas as identified in Attachment A has been restricted by property owners' refusal to grant Keystone permission to enter their private property; and

WHEREAS, consistent with 36 C.F.R. § 800.14(b), the DOS has elected to execute this PA for the Keystone XL Project because effects on historic properties cannot be fully determined prior to the issuance of a permit for the undertaking; and

WHEREAS, on February 2, 2011 the ACHP entered consultation for the Keystone XL pipeline as originally proposed finding that criteria 3 and 4 of Appendix A, Criteria for Council Involvement in Reviewing Individual Section 106 Cases, of the regulations (36 C.F.R. Part 800) implementing Section 106 of NHPA, had the potential to be met; and

WHEREAS, the United States Army Corps of Engineers (USACE) has determined that the approval for the Keystone XL Project to cross USACE-administered lands (30 U.S.C. § 185) and to place structures in, under, or over navigable waters of the United States, as defined under 33 C.F.R. Part 329, pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403), and a permit for the placement of dredge or fill material in waters of the United States as part of the Keystone XL Project in accordance with Section 404 of the Clean Water Act (334 U.S.C. § 344), are Federal actions related to the undertaking that require the USACE to comply with Section 106 of NHPA; and

WHEREAS, the U.S. Bureau of Land Management (BLM) has determined that approving the Keystone XL Project to cross Federal lands administered by the BLM would require authorization under Section 28 of the Mineral Leasing Act of 1920, 30 U.S.C. § 185, as amended; and

WHEREAS, the BLM has determined that Keystone will require access roads crossing public lands administered by the BLM in support of the Keystone XL Pipeline Project and that the access roads will require authorization under Title V of the Federal Land Policy and Management Act (FLMPA), 43 U.S.C. § 1701, as amended; and

WHEREAS, the BLM has determined that the Keystone XL Project will require electrical power from rural electrical cooperatives and that portions of the transmission lines will cross public lands administered by the BLM and that the transmission lines crossing public lands will require authorization under Title V of the FLMPA; and

WHEREAS, the BLM approvals of these Project crossings in areas under its jurisdiction is a Federal action associated with the undertaking that requires the BLM to comply with Section 106 of the NHPA and 36 C.F.R. Part 800; and

WHEREAS, the U.S. Bureau of Reclamation (USBR) manages lands and facilities that will be crossed by the Keystone XL Project and USBR approval of such crossings is a Federal action

related to the undertaking that requires the USBR to comply with Section 106 of the NHPA and 36 C.F.R. Part 800; and

WHEREAS, the Farm Service Agency (FSA), assists landowners on private lands and may have federal responsibilities and requirements on some of these lands, which are part of the Project APE, as part of its loan and conservation programs, including the Conservation Reserve Program and the Farmable Wetlands Program; and

WHEREAS, the FSA approval of the Project crossings in these areas is a Federal action associated with the undertaking that requires the FSA to comply with Section 106 of the NHPA and 36 C.F.R. Part 800; and

WHEREAS, the Rural Utilities Service (RUS) has determined that the financial assistance it may provide to rural electric cooperatives and other entities for construction or modification of electrical facilities (including distribution lines, transmission lines, and substations) to power some Keystone XL Project pump stations or to ensure transmission system reliability, under the U.S. Department of Agriculture (USDA) Rural Development Utilities Programs, are Federal actions related to the undertaking that require the RUS to comply with Section 106 of NHPA and 36 C.F.R. Part 800; and

WHEREAS, the Bureau of Indian Affairs (BIA) has responsibility for approving any right-of-ways crossing Indian Trust lands, such as those being considered as part of the route for a 230-kilovolt (kV) transmission line in south-central South Dakota associated with the Keystone project and described in Appendix J to the SEIS, and this is a Federal action related to the undertaking that requires the BIA to comply with Section 106 of the NHPA and 36 C.F.R. Part 800; and

WHEREAS, the Western Area Power Administration (Western) has determined that the modification and construction of substations and transmission lines that Western will own and that will provide power to the Keystone XL Pipeline Project, will require review under Section 106 of NHPA and 36 C.F.R. Part 800; and

WHEREAS, the Natural Resources Conservation Service (NRCS) has conservation easement interests in the states through which the Keystone XL pipeline will traverse; and

WHEREAS, the NRCS has determined that approving the Keystone XL Pipeline to cross an NRCS easement constitutes a federal action associated with the undertaking that requires NRCS to comply with Section 106 of the NHPA and 36 C.F.R. Part 800; and

WHEREAS, the proposed revised Keystone XL Project pipeline alignment crosses five National Historic Trails (the Lewis and Clark, Oregon, California, Mormon Pioneer, and Pony Express National Historic Trails), all of which were designated by the U.S. Congress and have as their purpose “the identification and protection of the historic route and its historic remnants and artifacts for public use and enjoyment” (National Trails System Act, P.L. 90-543, as amended); and

WHEREAS, the National Park Service (NPS) administers National Historic Trails and is a signatory to this PA due to the potential for adverse effects to five National Historic Trails including the Lewis and Clark National Historic Trail; and

WHEREAS, the USACE, BLM, RUS, BIA, NRCS, NPS, Western, USBR, and FSA have designated the DOS as the lead Federal agency for purposes of Section 106 of the NHPA consistent with 36 C.F.R. § 800.2(a)(2); and

WHEREAS, the DOS will incorporate this PA into its decisional process on any Presidential Permit that it may issue for the Keystone XL Project and will include in any permit it issues on the Keystone XL Project a condition that Keystone will abide by its commitments in this PA; and

WHEREAS, the USACE, BLM, RUS, BIA, NRCS, NPS, Western, USBR, and FSA will each incorporate this PA into its decisional process on any authorization, approval, permit, or assistance it may issue for the Keystone XL Project, and will include in any authorization, approval, permit, or assistance it issues on the Keystone XL Project, a condition that Keystone will abide by its commitments in this PA; and

WHEREAS, cultural resource identification, evaluation, and effect assessment efforts, including those needed to address the changes in the APE, are summarized in Section 3.11 of the SEIS and Attachment G of this PA; and

WHEREAS, additional efforts to identify, evaluate and assess effects to historic properties for the Project will take place after the execution of this PA because access to some areas has been restricted, as summarized in Attachment A, and all areas of construction have yet to be determined; and

WHEREAS, for the purposes of this PA, “Indian tribes and Nations” shall have the same definition as “Indian tribes” which appears in Section 301(4) of the NHPA; and

WHEREAS, the DOS invited the 84 Indian tribes listed in Appendix B to participate in consultation; and

WHEREAS, the DOS provided Indian tribes the opportunity to provide information about historic properties of concern to Indian tribes and conduct Traditional Cultural Property (TCP) studies within the proposed Project APE, as summarized in Attachment I; and

WHEREAS, the DOS invited Indian tribes that participated in consultation in 2011 and 2013 to sign as Concurring Parties to this PA, consistent with 36 C.F.R. §§ 800.2(c)(2) and 800.6(c)(3); and

WHEREAS, other federal agencies that develop actions related to this undertaking subsequent to the execution of this PA may comply with Section 106 by following the requirements set forth in Stipulation XIV of this PA; and

WHEREAS, the Montana Department of Natural Resources and Conservation has participated in consultation and was invited by the DOS consistent with 36 C.F.R. § 800.6(c)(2) to sign the PA in 2011 and amendments to the PA in 2013 as an invited signatory; and

WHEREAS, the Montana Department of Environmental Quality has participated in consultation and was invited by the DOS consistent with 36 C.F.R. § 800.6(c)(2) to sign the PA in 2011 and amendments to the PA in 2013 as an invited signatory; and

WHEREAS, Keystone, which would construct the Keystone XL Project pipeline if approved, has participated in consultation, and was invited by the DOS consistent with 36 C.F.R. §§ 800.2(c)(4) and 800.6(c)(2) to sign the PA in 2011 and amendments to the PA in 2013 as an invited signatory; and

WHEREAS, the DOS has provided the public with information about the undertaking and its effects on historic properties and sought public comment and input consistent with 36 C.F.R. §§ 800.2(d) from April 2009 through Federal Register notices, direct mailings, extensive scoping and comment meetings, and inviting comments from the public by phone, mail, fax, and email during public comment periods on the Keystone XL Pipeline Presidential Permit applications; and

NOW, THEREFORE, the DOS, USACE, BLM, RUS, BIA, FSA, NRCS, Western, USBR, NPS, ACHP, and the Montana, South Dakota, Nebraska, and Kansas SHPOs agree that the following stipulations will be implemented in order to take into account the effect of the undertaking on historic properties and to ensure actions consistent with Section 106 of the NHPA.

STIPULATIONS

The DOS, BLM, RUS, BIA, FSA, NRCS, Western, USACE, USBR, and NPS as appropriate, will ensure that the following stipulations are carried out.

I. STANDARDS AND DEFINITIONS

A. Identification and evaluation studies and treatment measures required under the terms of this PA will be carried out by or under the direct on-site supervision of a professional who meets, at a minimum, the *Secretary of the Interior's Historic Preservation Professional Qualification Standards* (48 FR 44716, September 29, 1983). These qualification standards do not apply to individuals recognized by consulting Indian tribes to have expertise in identification, evaluation, assessment of effect, and treatment of effects to historic properties of religious and cultural significance to Indian tribes.

B. In developing scopes of work for identification and evaluation studies, and treatment measures required under the terms of this PA, Keystone and RUS borrowers, and other contractors working with Federal agencies, will take into account the following regulations and guidelines:

1. The ACHP's guidance on conducting archaeology under Section 106 (2007);
2. The ACHP's *Policy Statement Regarding the Treatment of Burial Sites, Human Remains and Funerary Objects* (February 23, 2007);
3. Applicable SHPO and Tribal Historic Preservation Office guidance;
4. The Secretary of the Interior's *Standards and Guidelines for Archaeology and Historic Preservation* (48 FR 44716-42, September 29, 1983);
5. The "*Treatment of Archaeological Properties*" (ACHP 1983);
6. The *Guidelines for Reporting on Cultural Resources Investigations for Pipeline Projects*" (Federal Energy Regulatory Commission, Office of Energy Projects, December 2002);
7. Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403);
8. Section 404 of the Clean Water Act (334 U.S.C. § 344);
9. BLM 8110 Manual: Identifying and Evaluating Cultural Resources;
10. Montana/Dakotas Cultural Resources Handbook 8110-1: Guidelines for Identifying Cultural Resources;
11. The National Trails System Act (P.L. 90-543, as amended);
12. Section 28 of the Mineral Leasing Act of 1920 (30 USC 185);
13. Title V of the Federal Land Policy and Management Act of 1976 (43 USC 1701); and
14. *National Register Bulletin 38, Guidelines for Evaluating and Documenting Traditional Cultural Properties* (NPS 1990; Revised 1992: 1998)

C. Definitions

Coordination Plan: A plan that, pursuant to Stipulations V.B and V.D, describes the coordination of construction with identification and evaluation of cultural resources, treatment of adverse effects, and protection of unanticipated discoveries.

Concurring Parties: An invited consulting party to this PA that agrees with the content of the PA. Consistent with 36 C.F.R. § 800.6(c)(3), the refusal of a Concurring Party to sign the PA does not invalidate this PA. Concurring Parities may not terminate the PA.

Construction Spread: A construction unit or segment of a pipeline alignment or corridor to be determined by Keystone prior to construction.

Consulting Indian Tribes: Indian tribes that have consultative roles in the Section 106 process consistent with 36 C.F.R. § 800.2(c).

Consulting Parties: Parties that have consultative roles in the Section 106 process consistent with 36 C.F.R. § 800.2(c).

Data Recovery: The recovery of archaeological information from a historic property subject to an adverse effect.

Determination of Effect: A determination made by a Federal agency in regards to a Project's effect upon a historic property consistent with 36 C.F.R. Part 800.

Determination of Eligibility: A determination made by a Federal agency, in coordination with the SHPO and/or designated representatives of consulting Indian tribes, as appropriate, respecting a cultural resource's eligibility for inclusion in the NRHP and more fully described in 36 C.F.R. Part 60 and 36 C.F.R. § 800.16(l)(2).

Effect: An alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the NRHP (see 36 C.F.R. § 800.16(i)).

Environmental Impact Statement: An analysis of a major Federal action's environmental impacts conducted consistent with NEPA.

Historic Property: Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (see 36 C.F.R. § 800.16(l)(1)).

Invited Signatory: The DOS has invited Keystone, the Montana Department of Natural Resources and Conservation, and the Montana Department of Environmental Quality to sign this PA consistent with 36 C.F.R. § 800.6(c)(2). The refusal of any invited signatory to sign the PA does not invalidate the PA. An invited signatory, listed above, that has signed the PA, may terminate the PA consistent with 36 C.F.R. § 800.6(c)(8).

Historic Trail and Archaeological Monitoring Plan: A plan that, pursuant to Stipulation V.E and Attachment F, identifies appropriate areas for monitoring construction by professionals under the supervision of individuals who meet the professional qualifications in Stipulation I. The plan's principal goal is to reduce the potential for impacts to unidentified historic properties.

Signatory: The signatories are: the DOS, BLM, USBR, USACE, NPS, Western, RUS, NRCS, FSA, BIA, ACHP, and the SHPOs of Kansas, Montana, South Dakota, and Nebraska. Only signatories and the invited signatories, as defined, may terminate the PA consistent with 36 C.F.R. § 800.6(c)(8).

Tribal Monitoring Plan: A plan that, pursuant to Stipulation V.E and Attachment E, identifies appropriate areas for monitoring construction by tribal members appointed by their respective Indian tribes. These tribal members shall meet the qualifications as noted in Stipulation V.E.3. The plan's principal goal is to reduce the potential for impacts to previously unidentified historic properties that may also be properties of religious and cultural significance to Indian tribes that meet the National Register criteria (see 36 C.F.R. § 800.16(1)(a)).

Treatment Plan: A plan developed in consultation with the parties to this PA that identifies the minimization and mitigation measures for historic properties located within the APE that will be adversely affected by the Project.

II. CONFIDENTIALITY

The DOS, BLM, NRCS, BIA, FSA, RUS, Western, USBR, NPS, USACE, and Keystone will safeguard information about historic properties of religious and cultural significance to Indian tribes, including location information, or information provided by Indian tribes to assist in the identification of such properties, consistent with Section 304 of NHPA, 16 U.S.C. § 470w3, and all other applicable laws.

III. THE RESPONSIBILITIES OF FEDERAL AGENCIES WITH LAND MANAGEMENT AND OTHER PERMITTING AUTHORITIES

A. The USACE will ensure, for that part of the APE under its jurisdiction, that it has met its compliance obligations pursuant to Section 10 and Section 404 permitting authority.

B. The BLM will comply with Section 106 and its implementing regulations (36 C.F.R. Part 800) for the issuance of permits for those actions under its jurisdiction.

C. The USBR will review and comment on the evaluation and treatment of any historic properties managed by the USBR.

D. Attachment H includes maps that illustrate the Project areas that cross lands managed by the BLM and the USBR.

E. Consultation for this Project between Indian tribes and Federal land management and permitting agencies will be coordinated through the DOS.

IV. KEYSTONE XL PROJECT—CONSTRUCTION OR MODIFICATION OF ELECTRICAL DISTRIBUTION/TRANSMISSION FACILITIES

A. Prior to granting approval of financial assistance to construct or modify electrical facilities by rural electric cooperatives or other entities, the RUS will complete the requirements of 36 C.F.R. §§ 800.3 through 800.7 and notify the DOS of the outcome.

B. In implementing Stipulation IV.A, the RUS may authorize a borrower to initiate Section 106 consultation in accordance with 36 C.F.R. § 800.2(c) (4). The RUS issued a blanket delegation for its borrowers to initiate Section 106 consultation in July 2009 and reissued the blanket delegation with some revision in August 2012. As the RUS recognized in those memos, the RUS may not delegate its responsibility to conduct government-to-government consultation with Indian tribes to a borrower, unless the RUS and that Indian tribe agree, in writing, to conduct consultation in that manner.

C. Prior to construction of the 230-kV transmission line that Western will own, Western will complete the requirements of 36 C.F.R. §§ 800.3 through 800.7. In implementing

Stipulation IV.C., Western will serve as a signatory under the PA. Western shall coordinate implementation of Stipulation IV.C with the DOS.

D. The RUS will ensure that the terms of Stipulations VI.B and VI.C are incorporated into construction contracts to ensure that its borrowers and construction contractors meet their responsibility for notification of any unanticipated discoveries. When RUS-funded projects occur on BLM land, the RUS will coordinate with the BLM to ensure compliance with Stipulations VI.B and VI.C of this PA.

E. Prior to granting approval or financial assistance for construction or modification of electrical distribution/transmission facilities that are necessary components of the pipeline project and therefore considered within the Project APE, any Federal agency that is incorporated into this PA pursuant to Stipulation XIV will complete the requirements of 36 C.F.R. §§ 800.3 through 800.7 for those facilities under its jurisdiction and notify the DOS of the outcome if not already carried out elsewhere in this PA.

F. The DOS retains responsibility for completing the requirements of 36 C.F.R. §§ 800.3 through 800.7 for those electrical distribution/transmission facilities that are necessary components of the Project if they are not under the jurisdiction of any Federal agency and not referenced in Stipulation IV, A through E above.

V. KEYSTONE XL PROJECT – PIPELINE CONSTRUCTION

A. The DOS has provided SHPOs, designated representatives of consulting Indian tribes, and other consulting parties with an opportunity to provide their views on the identification and evaluation of historic properties, consistent with 36 C.F.R. § 800.16(l)(1), including historic properties of religious and cultural significance to Indian tribes, and the treatment of affected historic properties, in connection with the construction of the Keystone XL Project. It will continue to provide all consulting parties with an opportunity to provide their views on the identification and evaluation of historic properties, assessment of effects, and treatment of adverse effects after approval of amendments to this PA.

B. Identification and Evaluation of Historic Properties

1. In consultation with the SHPOs, designated representatives of consulting Indian tribes, and other consulting parties, the DOS will make a reasonable and good faith effort to complete the identification and evaluation of historic properties within the APE for each construction spread, including in areas yet to be surveyed outlined in Attachment A, prior to the initiation of construction of that spread, consistent with 36 C.F.R. §§ 800.4(a), (b), and (c). On Federal lands, the scope of the identification effort will be determined by the DOS in consultation with the appropriate Federal land managing agency, applicable SHPOs, designated representatives of consulting Indian tribes, and other consulting parties.

2. The DOS will make a reasonable and good faith effort to complete the identification and evaluation of historic properties, as appropriate, consistent with 36 C.F.R. §§ 800.4(a), (b), and (c), before Keystone initiates construction activities (including vegetative clearing to comply with the Migratory Bird Treaty Act, if clearing is undertaken).

    a. In the identification and evaluation of historic properties to which Indian tribes may attach religious and cultural significance, the DOS will take into consideration information submitted by Indian tribes to the DOS prior to construction through consultations and through the protocols for TCP studies, post-review discovery, and the Tribal Monitoring Plan, as set forth in this PA.
    b. In the event identification of historic properties cannot be completed for any Construction Spreads prior to construction, Keystone will develop and submit a Coordination Plan to the DOS for review and approval pursuant to Stipulation V.D. The Coordination Plan must describe the measures Keystone will use to implement and complete the identification and evaluation of cultural resources and appropriate consultation before any historic properties are adversely affected by vegetation clearing and construction activities related to that spread.

C. Treatment of Historic Properties

1. Whenever feasible, avoidance of adverse effects to historic properties will be the preferred treatment. In consultation with the DOS, ACHP, SHPOs, designated representatives of consulting Indian tribes, and other consulting parties, Keystone may elect to consider and implement avoidance measures prior to completing the evaluation of historic properties.

    Avoidance measures may include:
    a. Avoidance through pipeline or access road route variation or Project feature relocation;
    b. Avoidance through abandonment;
    c. Avoidance through bore or horizontal directional drill;
    d. Avoidance by narrowing the construction corridor ("neck down"); or
    e. Avoidance through the use of existing roadways as Project access roads to the extent practicable.

2. When historic properties are identified in the APE pursuant to Stipulation V.B, the DOS will apply criteria of adverse effect consistent with 36 C.F.R. § 800.5(a) in consultation with the ACHP, SHPO, designated representatives of consulting Indian tribes, and other consulting parties. If the DOS finds that historic properties might be adversely affected by actions covered under this PA and within the APE, the DOS will consult with the ACHP, SHPOs, designated representatives of consulting Indian tribes, and other consulting parties to determine prudent and feasible ways to avoid adverse effects.

a. Once the DOS approves avoidance measures, Keystone will implement those measures.

3. If the DOS determines that the adverse effect cannot be avoided, the DOS will consult with the ACHP, SHPOs, designated representatives of consulting Indian tribes, and other consulting parties to determine those measures to be implemented by Keystone to minimize and mitigate adverse effects on affected historic properties identified in the APE.

4. If, after consultation, the DOS determines that the adverse effect cannot be avoided, Keystone will draft a comprehensive Treatment Plan for each adversely affected historic property. The Treatment Plan will describe the measures identified by the DOS under Stipulation V.C.3 to minimize and mitigate the adverse effect of pipeline construction activities on historic properties, the manner in which these measures will be carried out, and a schedule for their implementation.

   a. When mitigation consists of or includes Data Recovery, the Treatment Plan also will identify the specific research questions to be addressed by Data Recovery with an explanation of their relevance, the archaeological methods to be used, and provisions for public interpretation and education, subject to Stipulation II restrictions, if any. Management summaries of all archaeological investigations must be submitted to the DOS, relevant Federal agencies, and the SHPO for review and approval prior to the commencement of construction activities and construction may be authorized on the basis of information contained in those summaries. Designated representatives of consulting Indian tribes will be notified for their information and awareness and may provide any relevant information to DOS and SHPO within nine (9) calendar days to inform their review of the summaries. Final reports must be submitted to the DOS and the SHPO for review within six months of the completion of the fieldwork.

   b. A Treatment Plan may also include mitigation for adverse effects to historic districts, buildings and structures, and to TCPs and other properties of religious and cultural significance to Indian tribes. This mitigation may include the recordation of historic properties according to Historic American Building Survey/Historic American Engineering Record Standards and Guidelines for Architectural and Engineering Documentation. Other types of mitigation for adverse effects to historic districts, buildings, and structures, and to TCPs and other properties of religious and cultural significance to Indian tribes may also be described in the Treatment Plan. The mitigation proposed for an adverse effect to a historic district, building, and/or structure, and to TCPs and other properties of religious and cultural significance to Indian tribes will be commensurate with the level of significance and extent of adverse effect and will be determined in a manner consistent with Stipulation V.C.4.c.

   c. Keystone will submit the draft Treatment Plan to the DOS, BLM (if applicable), ACHP, designated representatives of consulting Indian tribes, the SHPO of the

applicable state, Montana Department of Environmental Quality (if applicable), Montana Department of Natural Resources and Conservation (if applicable), and other applicable consulting parties for a forty-five (45) calendar day review. Keystone will address timely comments and recommendations submitted by SHPOs, designated representatives of consulting Indian tribes, and other consulting parties in preparation of the Final Treatment Plan.

d. When it has addressed all of the timely comments and recommendations, Keystone will submit the Final Treatment Plan to the DOS for review and approval. Keystone will also submit the Final Treatment Plan to the BLM for review and approval when involving lands subject to Stipulation III.C. The DOS and BLM will issue their final decision on the Treatment Plan within thirty (30) calendar days. Once the Final Treatment Plan is approved by the DOS (and the BLM if involving BLM-managed lands), copies of the Treatment Plan will be distributed to all SHPOs, designated representatives of consulting Indian tribes, and other consulting parties.

5. Keystone will make a reasonable and good faith effort to complete implementation of the Final Treatment Plan approved by the DOS prior to beginning construction of any spread for which the Treatment Plan is required. If it is not possible to meet this schedule, Keystone will develop a Coordination Plan in accordance with Stipulation V.D that establishes how appropriate treatment will be determined and implemented during construction of the respective spread.

D. Coordination of Construction and Historic Preservation Activities

1. The DOS will make a reasonable and good faith effort to complete the identification and evaluation of historic properties and potential historic properties, and the mitigation of adverse effects to them in accordance with Stipulations V.B and V.C prior to the initiation of vegetative clearing if vegetative clearing and construction on the Keystone XL spreads, including the Montana, South Dakota, and Nebraska spreads, is to be undertaken.

2. If these DOS activities cannot be completed prior to the start of vegetative clearing and construction of these spreads, Keystone will develop and provide to the DOS a detailed plan describing how the requirements of Stipulations V.B and V.C—identification, evaluation and treatment of historic properties—will be completed in coordination with vegetative clearing and construction activities in such a way that historic properties will not be adversely affected prior to the implementation of any mitigation measures.

a. A Coordination Plan will be prepared for each state and will include those measures developed by Keystone pursuant to Stipulations V.B and V.C to complete the identification and evaluation of historic properties, and, as appropriate, mitigation of adverse effects to them during and coordinated with vegetation clearing and construction activities. In addition, the Coordination Plan

will include a schedule for all proposed activities and recommended measures for the protection of unanticipated discoveries in accordance with Attachment C, as appropriate.

b. Keystone will submit the draft Coordination Plan for each state for such spreads, including the Kansas, Montana, South Dakota, and Nebraska spreads, to the DOS, BLM (as applicable), ACHP, SHPOs (as applicable), designated representatives of consulting Indian tribes, and consulting parties for forty-five (45) calendar day review. Keystone shall address timely comments and recommendations submitted by the applicable SHPO, designated representatives of consulting Indian tribes, and other consulting parties in preparation of the Final Coordination Plan for each state. When it has addressed all of the comments and recommendations, Keystone will submit the Final Coordination Plan for each state to the DOS for review. The DOS shall issue its final decision on the Coordination Plan for each state within thirty (30) calendar days. Following approval by the DOS, the Final Coordination Plan for each state will be distributed to all of the SHPOs, designated representatives of consulting Indian tribes, and other consulting parties.

3. Keystone will complete implementation of the Final Coordination Plan approved by the DOS during construction of the Kansas, Montana, South Dakota, and Nebraska spreads.

E. Historic Trail and Archaeological Monitoring Plan ("HTAM Plan") and Tribal Monitoring Plan

1. In consultation with the SHPOs and designated representatives of consulting Indian tribes, Keystone will monitor construction in selected areas of the APE of each spread as a supplement to identification efforts. Any historic properties identified by Keystone during monitoring will be treated in accordance with Stipulation VI.A and C.

a. The HTAM Plan outlines areas that have been previously identified by the DOS during identification and evaluation efforts that warrant monitoring during soil disturbing activities for potential effects to historic properties.

b. The Tribal Monitoring Plan outlines areas that have been previously identified by Indian tribes, either through the preparation of Traditional Cultural Property reports or through consultation, that warrant monitoring during clearing and trenching for potential effects to previously unidentified historic properties that may include properties of religious and cultural significance to an Indian tribe and that meet the National Register criteria (See 36 C.F.R. § 800.16(l)(1)).

2. Historic Trail monitoring will be performed by a professional who either meets the qualification standards for archaeology established in Stipulation I.A or is under the on-site supervision of such a professional.

3. At the discretion of the DOS, tribal monitors may substitute other types of experience with construction monitoring and/or traditional cultural knowledge for the degrees required by the Professional Qualification Standards. DOS may also consider other accommodations regarding education and experience where allowed by the Standards and implementing guidance.

4. In consultation with the DOS, Keystone will consider information provided by Indian tribes in a timely manner when completing the identification of historic properties before construction begins as set forth in Stipulation V.B and in the HTAM Plan and Tribal Monitoring Plan provided for under Stipulation V.E. Keystone will ensure that tribal monitors have reasonable access to Project construction sites and activities. In those areas previously identified by Indian tribes as needing monitoring, the Tribal Monitoring Plan stipulates that at least one monitor will be used per Construction Spread depending upon the extent and location of construction activities, as well as the relative historic importance of each Spread to each Indian tribe.

5. Keystone has submitted a plan for historic trail and archaeological monitoring and tribal monitoring for each spread to the DOS, BLM, ACHP, SHPO, designated representatives of consulting Indian tribes, and Consulting Parties for review and comment prior to the signing of this PA. The Tribal Monitoring Plan and HTAM Plan are attached to this PA in Attachments E and F.

6. Keystone will implement the HTAM Plan and Tribal Monitoring Plan for each spread that has been approved by the DOS.

F. Construction

1. Lead Environmental Inspector (EI): Prior to initiating vegetative clearing or construction, Keystone will employ the Lead EI whose responsibilities will include ensuring compliance with the terms of this PA. In meeting this responsibility, the Lead EI will rely on the technical expertise of on-site professionals who meet the standards established in Stipulation I.A and tribal monitors with experience outlined in Stipulation V.E.3.

   a. The Lead EI will monitor construction activities on-site and prepare a daily log, reporting to Keystone and designated representatives of consulting Indian tribes on activities performed to implement the terms of this PA, as appropriate. Keystone will make the daily log available to the DOS and SHPOs, and other consulting parties upon request.

   b. Keystone will ensure through the construction contract that the Lead EI will possess the authority to stop construction in the event of an inadvertent discovery in accordance with Stipulation VI.A and Attachment C.

2. Training: Keystone will ensure that, if the Lead EI does not meet the professional qualification standards established in Stipulation I.A, the Lead EI will receive appropriate training in historic preservation from a professional who meets the standards established in Stipulation I.A in order to perform the requirements of this PA. Keystone also will provide an appropriate level of training in historic preservation conducted by a professional who meets the standards established in Stipulation I.A to all construction personnel (including new, added, replaced workers) so that PA requirements are understood and unanticipated discoveries quickly identified. Keystone will conduct this training prior to initiating vegetative clearing or construction activities on a spread. Keystone also will conduct periodic refresher training during construction of the spread.

3. Construction Contract: Keystone will incorporate the terms of Stipulation VI.A and Attachment C into construction contracts to ensure that its Lead EI and construction contractors meet their responsibility for notification of the unanticipated discoveries.

F. Scheduling

The DOS may authorize the start of vegetative clearing and construction for an individual spread when the plans prepared in accordance with Stipulations V.D and V.E as appropriate for that spread, have been submitted by Keystone and approved by the DOS in accordance with the terms of this PA.

VI. UNANTICIPATED DISCOVERIES OR ADVERSE EFFECTS DURING CONSTRUCTION OF THE KEYSTONE XL PROJECT

A. Pipeline Construction

1. "Applicable Federal agency" is the Federal agency with jurisdiction for the land on which construction is occurring or, in the absence of such an agency, the DOS, as appropriate.

2. If previously unidentified historic properties are discovered by monitors or construction personnel unexpectedly or unanticipated adverse effects on previously identified historic properties occur as pipeline construction activities are carried out within the one-hundred-and-ten (110) foot-wide construction corridor or other ancillary facilities and access roads within the APE, the construction contractor will immediately halt all construction activity within a one-hundred-and-fifty (150) foot radius of the discovery or adversely affected historic property, notify the Lead EI of the discovery and implement interim measures to protect the discovery from looting and vandalism. Within forty-eight (48) hours of receipt of this notification of the discovery, the Lead EI shall:

   a. Inspect the work site to determine the extent of the discovery or adverse effect and ensure that construction activities have halted;
   b. Clearly mark the area of the discovery or adverse effect;

c. Implement additional measures other than those mentioned above, as appropriate, to protect the discovery or adversely affected historic property from looting and vandalism; and
d. Notify the applicable Federal agency, SHPOs, designated representatives of consulting Indian tribes, and other consulting parties of the discovery or adverse effect.

3. In the case of an unanticipated discovery, the applicable Federal agency will notify all consulting parties that it will be receiving comments concerning the unanticipated discovery and provide contact information. The applicable Federal agency will have seven (7) calendar days following notification provided in accordance with Stipulation VI.A.2 to determine the National Register eligibility of the discovery after considering the timely filed views of the SHPOs, designated representatives of consulting Indian tribes, other consulting parties, and Keystone. The applicable Federal agency may assume the newly discovered property to be eligible for the National Register for the purposes of Section 106 consistent with 36 C.F.R. § 800.13(c).

4. For discovered properties determined eligible or assumed to be eligible pursuant to Stipulation VI.A.3, the applicable Federal agency will notify the ACHP, SHPOs, designated representatives of consulting Indian tribes, and other consulting parties of those actions that it proposes to resolve adverse effects which may include a Treatment Plan as outlined in Stipulation V.C.

   a. SHPOs, designated representatives of consulting Indian tribes, and other consulting parties will have ninety-six (96) hours to provide their views on the proposed actions.
   b. The applicable Federal agency will ensure that the timely filed recommendations of SHPOs, designated representatives of consulting Indian tribes, and other consulting parties are taken into account prior to granting approval of the measures that Keystone will implement to resolve adverse effects.
   c. Keystone will carry out the approved measures prior to resuming construction activities in the location of the discovery.

5. In the case of unanticipated adverse effects to a previously identified historic property, the applicable Federal agency will notify the ACHP, SHPOs, designated representatives of consulting Indian tribes, and other consulting parties of those actions that it proposes to resolve adverse effects which may include a Treatment Plan as outlined in Stipulation V.C.

   a. SHPOs, designated representatives of consulting Indian tribes, and other consulting parties will have forty-eight (48) hours to provide their views on the proposed actions.
   b. The applicable Federal agency will ensure that the timely filed recommendations of SHPOs, designated representatives of consulting Indian tribes, and other

consulting parties are taken into account prior to granting approval of the measures that Keystone will implement to mitigate adverse effects.

c. Keystone will carry out the approved measures prior to resuming construction activities in the location of the affected property.

6. Dispute Resolution: The applicable Federal agency will seek and take into account the recommendations of the ACHP in resolving any disagreements that may arise regarding resolution of adverse effects that relate to the implementation of Stipulation VI.A. The applicable Federal agency will use the contact information provided in Attachment D to notify the ACHP. Within seven (7) calendar days of receipt of such a written request, the ACHP will provide the applicable Federal agency recommendations on resolving the dispute. The applicable Federal agency will take into account any timely filed recommendations provided by the ACHP in making a final decision about how to proceed.

B. Construction or Modification of Electrical Facilities

1. If previously unidentified historic properties are discovered unexpectedly during construction or modification of transmission facilities funded by the RUS, the RUS borrower's construction contractor will immediately halt all construction activity within a one-hundred-and-fifty (150) foot radius of the discovery, notify the RUS borrower of the discovery and implement interim measures to protect the discovery from looting and vandalism. Within forty-eight (48) hours of receipt of this notification of the discovery, the RUS borrower shall:

   a. Notify the RUS Contact (and BLM Contact if discovery occurs on BLM land);
   b. Inspect the work site to determine the extent of the discovery and ensure that construction activities have halted;
   c. Clearly mark the area of the discovery; and
   d. Implement additional measures, as appropriate, to protect the discovery from looting and vandalism.

2. Upon receipt of such notification the RUS and, if applicable, BLM will coordinate the notification of SHPOs, designated representatives of consulting Indian tribes, and other consulting parties and notify the SHPOs, designated representatives of consulting Indian tribes, and other consulting parties of the discovery.

3. The RUS and, if applicable, BLM will have seven (7) calendar days following notification provided in accordance with Stipulation VI.B.1 to determine the National Register eligibility of the discovery in consultation with the SHPOs, designated representatives of consulting Indian tribes, other consulting parties, and the borrower. The RUS and, if applicable, BLM may assume the newly discovered property to be eligible for the National Register for the purposes of Section 106 pursuant to 36 C.F.R. § 800.13(c).

4. For properties determined eligible, or treated as such, pursuant to Stipulation VI.B.3, the RUS, in coordination with the BLM (if applicable), will notify the SHPOs, designated representatives of consulting Indian tribes, and other consulting parties of those actions that it proposes to resolve adverse effects. SHPOs, designated representatives of consulting Indian tribes, and other consulting parties will provide their views on the proposed actions within ninety-six (96) hours. The RUS will ensure that the timely filed recommendations of the SHPOs, designated representatives of consulting Indian tribes, and other consulting parties are taken into account prior to granting approval of those actions that the borrower will implement to resolve adverse effects. Once RUS approval has been granted, its borrower will carry out the approved measures prior to resuming construction activities in the location of the discovery.

5. Dispute Resolution: The RUS and, if applicable, BLM will seek and take into account the recommendations of the ACHP in resolving any disagreements that may arise regarding the resolution of adverse effects that relate to the implementation of Stipulation VI.B. The applicable Federal agency will use the contact information provided in Attachment D in order to notify the ACHP. Within seven (7) calendar days of receipt of such a written request, the ACHP will provide the RUS and, if applicable, BLM with its recommendations for resolving the dispute. The RUS and, if applicable, BLM will take into account any recommendations provided by the ACHP in making a final decision about how to proceed.

6. Reporting: No later than six (6) months following the resumption of construction within the location of the discovery, the RUS will submit a final report to the SHPOs, designated representatives of consulting Indian tribes, and other consulting parties describing implementation of the actions taken in accordance with Stipulation VI.B and, as appropriate, the analysis and interpretation of recovered information.

C. Unanticipated Discovery of Human Burials and Remains, and Funerary Objects

1. When Native American human remains or funerary objects or objects of cultural patrimony are unexpectedly discovered during construction of the Keystone XL Project on Federal or tribal lands within the APE, Keystone or an RUS borrower, as appropriate, will notify immediately the Federal agency responsible for compliance with the Native American Graves Protection and Repatriation Act, 25 U.S.C. 3001 et. seq., and its implementing regulations, 43 C.F.R. Part 10.

2. Non-Native American human burials and remains, and funerary objects discovered on Federal lands within the APE will be treated by the Federal agency having jurisdiction of the remains in accordance with applicable Federal law, taking into account the ACHP's *Policy Statement on the Treatment of Burial Sites, Human Remains and Funerary Objects* (February 23, 2007).

3. The DOS, Western, and RUS will treat human burials and remains discovered on non-Federal land consistent with the provisions of Attachment C and any applicable

federal, state, and local burial laws. In those instances where the USACE has jurisdiction under Section 10 or 404 permitting authority for non-Federal lands in the APE, the applicable Federal agencies will ensure that Keystone complies with the provisions of Attachment C acting in the place of the DOS. In determining appropriate actions to be carried out, the DOS, RUS, and/or other Federal agencies will be guided by the ACHP's *Policy Statement on the Treatment of Burial Sites, Human Remains and Funerary Objects* (February 23, 2007).

VII. CURATION

A. Federal agencies will curate any artifacts, materials or records resulting from archaeological identification and mitigation conducted on Federal lands under their jurisdiction in accordance with 36 C.F.R. Part 79, "*Curation of Federally-Owned and Administered Archaeological Collections*." Federal agencies with jurisdiction over the Federal lands will consult with Indian tribes consistent with 36 C.F.R. 79.

B. Keystone and RUS borrowers will return all artifacts recovered from private lands to the respective landowner after analysis is complete, unless applicable state law requires otherwise. Keystone and RUS borrowers will encourage and assist landowners in donating any returned artifacts to a local curation facility identified by the respective SHPO. Keystone shall pay all required curation fees associated with the donation of artifacts to the local curation facility.

C. On Federally controlled or owned properties, Federal agencies will determine the disposition of human burials, human remains and funerary objects in accordance with applicable Federal law.

VIII. REPORTING

A. Within three (3) months of completion of pipeline construction of a spread, Keystone will submit a comprehensive draft report to the DOS describing the results and findings of the implementation of the actions and plans specified in Stipulations V.C through G, VI.A, including Attachment C.

B. Keystone will submit a draft comprehensive report for each spread to the ACHP, SHPOs, designated representatives of consulting Indian tribes, and other consulting parties of the respective states in which the spread is located, for forty-five (45) day review and comment. Keystone shall address timely comments and recommendations submitted by ACHP, SHPOs, designated representatives of consulting Indian tribes, and other consulting parties in preparation of the Final Comprehensive Report for that spread. Keystone will submit the final report to the DOS for review and approval. The final comprehensive report will be provided by the DOS to the ACHP, SHPOs, designated representatives of consulting Indian tribes, and other consulting parties once approved.

IX. MONITORING IMPLEMENTATION OF THE PA

Each quarter following the execution of this PA until it expires or is terminated, the DOS with the assistance of the USACE, BLM, RUS, FSA, NRCS, BIA, and USBR as necessary will provide the ACHP, SHPOs, designated representatives of consulting Indian tribes, and other consulting parties to this PA a progress report summarizing the work carried out pursuant to its terms. Such report will include any scheduling changes proposed, any problems encountered, and any disputes and objections received in the efforts to carry out the terms of this PA. The DOS will maintain and update a list of the current contact for the ACHP, SHPOs, designated representatives of consulting Indian tribes, and other consulting parties and will be distributed in each quarterly report.

X. DISPUTE RESOLUTION

A. "Appropriate Federal agency" refers to the DOS, BLM, RUS, USBR, and USACE, or other Federal land managing and/or permitting agency as applicable.

B. Should any signatory, invited signatory, or concurring party to this PA object at any time to any actions proposed or the manner in which the terms of this PA are implemented, the appropriate Federal agency will consult with such party to resolve the objection. If the appropriate Federal agency determines that such objection cannot be resolved, the appropriate Federal agency will:

   1. Forward all documentation relevant to the dispute, including the applicable Federal agency's proposed resolution, to the ACHP. The ACHP will provide the appropriate Federal agency with its advice on the resolution of the objection within thirty (30) calendar days of receiving adequate documentation. Prior to reaching a final decision on the dispute, the appropriate Federal agency will prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP, signatories, invited signatories, and concurring parties, and provide them with a copy of this written response. The appropriate Federal agency will then proceed according to its final decision.

   2. If the ACHP does not provide its advice regarding the dispute within the thirty (30) calendar day time period, the applicable Federal agency may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, the appropriate Federal agency will prepare a written response that takes into account any timely comments regarding the dispute from the signatories, invited signatories, and concurring parties to the PA, and provide them and the ACHP with a copy of such written response.

C. The Federal agencies are responsible for carrying out all other actions subject to the terms of this PA that are not the subject of the dispute.

D. The process of dispute resolution outlined in Stipulation X does not pertain to disputes that arise from unanticipated discoveries covered in Stipulation VI.

XI. DURATION

This PA will be null and void if all of its stipulations have not been carried out within seven (7) years from the date of its execution. At such time, and prior to work continuing on the Keystone XL Project, the DOS will either: (a) execute a Memorandum of Agreement (MOA) or PA consistent with 36 C.F.R. §§ 800.6 or 800.14(b), respectively; or (b) request, take into account, and respond to the comments of the ACHP consistent with 36 C.F.R. § 800.7. Prior to such time, the DOS may consult with the other signatories and invited signatories to reconsider the terms of the PA and amend it in accordance with Stipulation XII. The DOS will notify the signatories, invited signatories, and concurring parties as to the course of action they will pursue.

XII. AMENDMENT

Any signatory or invited signatory to this PA may propose in writing that it be amended. The signatories and invited signatories will consult in an effort to reach agreement on an amendment. Any amendment will be effective on the date it is signed by all of the signatories and invited signatories and filed with the ACHP.

XIII. TERMINATION

A. If any signatory or invited signatory to this PA determines that its terms will not or cannot be carried out, that party will immediately consult with the other signatories and invited signatories to attempt to develop an amendment per Stipulation XII. If within thirty (30) calendar days an amendment cannot be reached, any signatory or invited signatory may terminate the PA upon written notification to the other signatories and invited signatories.

B. Termination by an individual SHPO shall only terminate the application of this PA within the jurisdiction of the SHPO.

   1. Once the PA is terminated for an individual state, and prior to work continuing on the undertaking in that state, DOS must either (a) execute a PA pursuant to 36 CFR § 800.6 or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR § 800.7. DOS shall notify the signatories as to the course of action it will pursue.

C. If the PA is terminated in its entirety, and prior to work continuing on the undertaking, the DOS shall request, take into account, and respond to the comments of the ACHP consistent with 36 C.F.R. § 800.7(a). Following consultation with the ACHP, the DOS will notify the signatories, invited signatories and concurring parties as to the course of action it will pursue.

XIV. COORDINATION WITH OTHER FEDERAL REVIEWS

In the event that Keystone or a Federal agency applies for additional Federal funding or approvals for the Keystone XL Project and the undertaking remains unchanged, such funding or approving agency may comply with Section 106 by agreeing in writing to the terms of this PA and notifying and consulting with the applicable SHPOs, designated representatives of consulting Indian tribes, and the ACHP. Any necessary modifications will be considered in accordance with Stipulation XII.

XV. SCOPE OF THE PA

This PA is limited in scope to actions that will facilitate the construction of the Keystone XL Project and related facilities, and is entered into solely for that purpose.

EXECUTION of this PA by the DOS, ACHP, BLM, RUS, Western, USACE, USBR, NPS, NRCS, FSA, BIA, the Montana SHPO, South Dakota SHPO, Nebraska SHPO, and Kansas SHPO and implementation of its terms evidence that the DOS, Western, BLM, RUS, NRCS, FSA, BIA, USACE, USBR, and NPS have taken into account the effects of the Keystone XL Project on historic properties and afforded the ACHP an opportunity to comment.

Deborah Klepp / PN for December 23, 2013

Deborah Klepp **Date**
Director
Office of Environmental Quality and Transboundary Issues
Bureau of Oceans and International Environmental and Scientific Affairs
United States Department of State

Corm Cam s ell
Acting Regional Director, Intermountain Region
National Park Service

434 0/3
Date

18 DEC 2013

Joel R. Cross
Colonel, Corps of Engineers
District Commander

Date

12/17/2013

Date

Bennet Horter
Federal Preservation Officer
United States Department of Agriculture Farm Service Agency

Salvador Salinas 12-17-13

Salvador Salinas **Date**
State Conservationist
United States Department of Agriculture Natural Resources Conservation Services

Mark S. Plank 12/17/13

Mark S. Plank **Date**
Director, Engineering and Environmental Staff
United States Department of Agricultural Rural Utilities Service

12-18-13

Weldon Loudermilk
Great Plains Regional Director
United States Bureau of Indian Affairs

Date

Diane M Friez

12/18/2013

Diane Friez
District Manager, Eastern Montana/Dakotas District
Bureau of Land Management

Date

DECEMBER 18, 2013

Michael J. Ryan
Regional Director, Great Plains Region
Bureau of Reclamation

Date

Robert J. Harris 12/19/13

Robert Harris **Date**
Regional Manager, Upper Great Plains Region
Western Area Power Administration (WESTERN)

John M. Fowler

12/19/13

John M. Fowler
Executive Director
Advisory Council on Historic Preservation

Date

Patrick Zelmer DSHPO for 12-17-13

Jennie Chinn
State Historic Preservation Officer
Kansas

Date

12·19·13

Tracy Stone-Manning
Director
Montana Department of Environmental Quality
(Invited Signatory)

Date

12-19-13

John Tubbs
Director
Montana Department of Natural Resources and Conservation
(Invited Signatory)

Date

Mark Baumler

12/18/2013

Mark Baumler
State Historic Preservation Officer
Montana

Date

Michael J. Smith
State Historic Preservation Officer
Nebraska

Dec. 18, 2013
Date

17 Dec 13

Jay D. Vogt
State Historic Preservation Officer
South Dakota

Date

Dec 18/13

Corey Goulet
Vice President
TransCanada Pipelines Limited
(Invited Signatory)

Date

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ATTACHMENT A

The following table summarizes the proposed Project areas for which Keystone has yet to conduct identification and evaluation studies as of the finalization of the PA. The majority of these proposed Project areas have been denied access versus new areas that have yet to surveyed.

Areas Not Surveyed Along the Proposed Project APE		
State	**Project Area Type**	**Cultural Survey Remaining (acres)**
Montana	ROW	0.00
Montana	Pump Stations	0.00
Montana	Ancillary facilities	0.00
Montana	Access Roads	0.00
South Dakota	ROW	23.70
South Dakota	Pump Stations	0.00
South Dakota	Ancillary facilities	0.00
South Dakota	Access Roads	0.00
Nebraska	ROW	937.65
Nebraska	Pump Stations	43.45[1]
Nebraska	Ancillary facilities	N/A[2]
Nebraska	Access Roads	33.05[3]
Total		**1037.85**[1, 2, 3]

[1] Pump stations in Nebraska have been surveyed for multiple locations.
[2] Additional ancillary facilities may be needed, however, are not known at this time.
[3] Additional access roads may be needed, however, are not known at this time.

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ATTACHMENT B

1. Absentee-Shawnee Tribe of Indians of Oklahoma
2. Alabama-Coushatta Tribes of Texas
3. Alabama-Quassarte Tribal Town, Oklahoma
4. Apache Tribe of Oklahoma
5. Arapahoe Tribe of the Wind River Reservation, Wyoming (aka Northern Arapaho Tribe)
6. Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation, Montana (aka Fort Peck Tribes)
7. Blackfeet Tribe of the Blackfeet Indian Reservation of Montana
8. Cherokee Nation, Oklahoma
9. Cheyenne and Arapaho Tribes, Oklahoma
10. Cheyenne River Sioux Tribe of the Cheyenne River Reservation, South Dakota
11. Chickasaw Nation, Oklahoma
12. Chippewa-Cree Indians of the Rocky Boy's Reservation, Montana
13. Choctaw Nation of Oklahoma
14. Comanche Nation, Oklahoma
15. Confederated Salish & Kootenai Tribes of the Flathead Indian Nation, Montana
16. Confederated Tribes of the Goshute Reservation, Nevada and Utah
17. Crow Creek Sioux Tribe of the Crow Creek Reservation, South Dakota
18. Crow Tribe of Montana
19. Delaware Tribe of Indians, Oklahoma
20. Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada
21. Eastern Band of Cherokee Indians of North Carolina
22. Eastern Shawnee Tribe of Oklahoma
23. Ely Shoshone Tribe of Nevada
24. Flandreau Santee Sioux Tribe of South Dakota
25. Forest County Potawatomi Community, Wisconsin
26. Fort Belknap Indian Community of the Fort Belknap Reservation of Montana (aka Gros Ventre and Assiniboine Tribe of Ft. Belknap)
27. Hannahville Indian Community, Michigan
28. Ho-Chunk Nation of Wisconsin
29. Iowa Tribe of Kansas and Nebraska
30. Iowa Tribe of Oklahoma
31. Jena Band of Choctaw Indians, Louisiana
32. Kaw Nation, Oklahoma
33. Kialegee Tribal Town, Oklahoma
34. Kickapoo Traditional Tribe of Texas
35. Kickapoo Tribe of Indians of the Kickapoo Reservation in Kansas
36. Kiowa Indian Tribe of Oklahoma
37. Lower Brule Sioux Tribe of the Lower Brule Reservation, South Dakota
38. Lower Sioux Indian Community in the State of Minnesota
39. Match-e-be-nash-she-wish Band of Pottawatomi Indians of Michigan (aka Gun Lake Potawatomi)

40. Mille Lacs Band of Minnesota Chippewa Tribes, Minnesota
41. Modoc Tribe of Oklahoma
42. Nez Perce Tribe, Idaho
43. Northern Cheyenne Tribe of the Northern Cheyenne Indian Reservation, Montana
44. Nottawaseppi Huron Band of the Potawatomi, Michigan (aka Huron Potawatomi Nation)
45. Oglala Sioux Tribe of the Pine Ridge Reservation, South Dakota
46. Omaha Tribe of Nebraska
47. Osage Nation, Oklahoma
48. Otoe-Missouria Tribe of Indians, Oklahoma
49. Pawnee Nation of Oklahoma
50. Poarch Band of Creek Indians of Alabama
51. Pokagon Band of Potawatomi Indians, Michigan and Indiana
52. Ponca Tribe of Indians of Oklahoma
53. Ponca Tribe of Nebraska
54. Prairie Band of Potawatomi Nation, Kansas
55. Prairie Island Indian Community in the State of Minnesota
56. Red Lake Band of Chippewa Indians, Minnesota
57. Rosebud Sioux Tribe of the Rosebud Indian Reservation, South Dakota
58. Sac & Fox Nation of Missouri in Kansas and Nebraska
59. Sac & Fox Nation, Oklahoma
60. Sac & Fox Tribe of the Mississippi in Iowa
61. Santee Sioux Nation, Nebraska
62. Seneca-Cayuga Tribe of Oklahoma
63. Shakopee Mdewakanton Sioux Community of Minnesota
64. Shoshone-Bannock Tribes of the Fort Hall Reservation of Idaho
65. Shoshone Tribe of the Wind River Reservation, Wyoming (aka Eastern Shoshone Tribe)
66. Sisseton-Wahpeton Oyate of the Lake Traverse Reservation, South Dakota
67. Skull Valley Band of Goshute Indians of Utah
68. Southern Ute Indian Tribe of the Southern Ute Reservation, Colorado
69. Spirit Lake Tribe, North Dakota
70. Standing Rock Sioux Tribe of North & South Dakota
71. Stockbridge Munsee Community, Wisconsin
72. Thlopthlocco Tribal Town, Oklahoma
73. Three Affiliated Tribes of the Fort Berthold Reservation, North Dakota
74. Tonkawa Tribe of Indians of Oklahoma
75. Turtle Mountain Band of Chippewa Indians of North Dakota
76. United Keetoowah Band of Cherokee Indians in Oklahoma
77. Upper Sioux Community, Minnesota
78. Ute Indian Tribe of the Uintah & Ouray Reservation, Utah (aka Ute Indian Tribe, also Northern Ute Tribe)
79. Ute Mountain Tribe of the Ute Mountain Reservation, Colorado, New Mexico and Utah
80. White Earth Band of Minnesota Chippewa Tribes, Minnesota
81. Wichita and Affiliated Tribes (Wichita, Keechi, Waco & Tawakonie), Oklahoma
82. Winnebago Tribe of Nebraska
83. Yankton Sioux Tribe of South Dakota
84. Ysleta Del Sur Pueblo of Texas

ATTACHMENT C

Plans for the Unanticipated Discovery of Cultural Resources

If previously unidentified cultural resources are discovered by monitors or construction personnel unexpectedly, Keystone will follow the procedures described in the state-specific plans included in this attachment for (1) Montana, (2) South Dakota, (3) Nebraska, (4) North Dakota, and (5) Kansas. If the following plans conflict in any way with Keystone's obligations under the Programmatic Agreement and Tribal Monitoring Plan, Keystone will follow the procedures described in the Programmatic Agreement and Tribal Monitoring Plan.

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UNANTICIPATED DISCOVERIES PLAN

I. Unanticipated Discoveries Plan for the Keystone XL project corridor (Project) in Montana

If previously unidentified historic properties are discovered by monitors or construction personnel unexpectedly or unanticipated adverse effects on previously identified historic properties occur as pipeline construction activities are carried out within the one-hundred-and-ten (110) foot-wide construction corridor or other ancillary facilities and access roads within the APE, the construction contractor will immediately halt all construction activity within a one-hundred-and-fifty (150) foot radius of the discovery or adversely affected historic property, notify the Lead EI of the discovery and implement interim measures to protect the discovery from looting and vandalism.

Within forty-eight (48) hours of receipt of this notification of the discovery, the Lead EI shall:

a. Inspect the work site to determine the extent of the discovery or adverse effect and ensure that construction activities have halted;
b. Clearly mark the area of the discovery or adverse effect;
c. Implement additional measures other than those mentioned above, as appropriate, to protect the discovery or adversely affected historic property from looting and vandalism; and
d. Notify the DOS, SHPO, MDEQ, designated representatives of consulting Indian tribes, and other consulting parties of the discovery or adverse effect.

In the case of an unanticipated discovery, DOS will notify all consulting parties that it will be receiving comments concerning the unanticipated discovery and provide contact information. The DOS will have seven (7) calendar days following notification provided in accordance with Stipulation VI.A.2 to determine the National Register eligibility of the discovery after considering the timely filed views of the SHPO, MDEQ, designated representatives of consulting Indian tribes, other consulting parties, and Keystone. The applicable Federal agency may assume the newly discovered property to be eligible for the National Register for the purposes of Section 106 consistent with 36 C.F.R. § 800.13(c).

For discovered properties determined eligible or assumed to be eligible pursuant to Stipulation VI.A.3, the applicable Federal agency will notify the ACHP, SHPO, MDEQ, designated representatives of consulting Indian tribes, and other consulting parties of those actions that it proposes to resolve adverse effects which may include a Treatment Plan as outlined in Stipulation V.C.

a. SHPO, MDEQ, designated representatives of consulting Indian tribes, and other consulting parties will have ninety-six (96) hours to provide their views on the proposed actions.
b. DOS will ensure that the timely filed recommendations of SHPO, MDEQ, designated representatives of consulting Indian tribes, and other consulting parties are taken into account prior to granting approval of the measures that Keystone will implement to resolve adverse effects.

c. Keystone will carry out the approved measures prior to resuming construction activities in the location of the discovery.

In the case of unanticipated adverse effects to a previously identified historic property, the applicable Federal agency will notify the ACHP, SHPO, MDEQ, designated representatives of consulting Indian tribes, and other consulting parties of those actions that it proposes to resolve adverse effects which may include a Treatment Plan as outlined in Stipulation V.C.

a. SHPO, MDEQ, designated representatives of consulting Indian tribes, and other consulting parties will have forty-eight (48) hours to provide their views on the proposed actions.
b. DOS will ensure that the timely filed recommendations of SHPO, MDEQ, designated representatives of consulting Indian tribes, and other consulting parties are taken into account prior to granting approval of the measures that Keystone will implement to mitigate adverse effects.
c. Keystone will carry out the approved measures prior to resuming construction activities in the location of the affected property.

Dispute Resolution: DOS will seek and take into account the recommendations of the ACHP in resolving any disagreements that may arise regarding resolution of adverse effects that relate to the implementation of Stipulation VI. DOS will use the contact information provided in Attachment C or D to notify the ACHP. Within seven (7) calendar days of receipt of such a written request, the ACHP will provide DOS recommendations on resolving the dispute. DOS will take into account any timely filed recommendations provided by the ACHP in making a final decision about how to proceed.

II. Accidental Discovery of Human Remains on state or private lands

All human burials and funerary objects in the state of Montana are protected pursuant to the Human Skeletal Remains and Burial Site Protection Act (Montana Code Ann. §22-3-801 through §22-3-811).

In the event that human remains or burials are encountered during additional archaeological investigations or construction activities, Keystone or its designated representative shall immediately cease work within 150 foot radius from the point of discovery and implement measures to protect the discovery from looting and vandalism. No digging, collecting or moving human remains or other items shall occur after the initial discovery. Protection measures will include the following.

a) Flag the buffer zone around the find spot.
b) Keep workers, press, and curiosity seekers, away from the find spot.
c) Tarp the find spot.
d) Prohibit photography of the find unless requested by an agency official.
e) Have an individual stay at the location to prevent further disturbance until a law enforcement officer arrives.

Keystone will immediately notify local law enforcement, DOS, SHPO, and MDEQ within forty-eight (48) hours of the discovery. DOS shall notify the SHPO, MDEQ, Indian tribes, and other consulting parties within forty-eight (48) hours of the discovery. If local law enforcement determines that the remains are not associated with a crime, DOS shall determine if it is prudent and feasible to avoid disturbing the remains. If DOS in consultation with the Keystone determines that disturbance cannot be avoided, the DOS shall consult with the SHPO, MDEQ, Indian tribes, and other consulting parties to determine acceptable procedures for the removal, treatment and disposition of the burial or remains. The DOS shall ensure that Keystone implements the plan for removal, treatment and disposition of the burial or remains as authorized by the SHPO. The DOS shall notify Keystone that they may resume construction activities in the area of the discovery upon completion of the plan authorize as by the SHPO.

Contact Information:

Stan Wilmoth
State Archaeologist
State Historic Preservation Office
P.O. Box 201203
Helena, MT 59620
406-444-7719
swilmoth@mt.gov

James Strait, RPA
Montana DEQ/EMB/MFSA
1520 East 6th Avenue
P.O. Box 200901
Helena, MT 59620
Office: 406-444-6765
Cell: 406-696-1267
jstrait@mt.gov

Craig Jones
Montana DEQ/EMB/MFSA
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Helena, MT 59620
406-444-0514
crajones@mt.gov

III. Unanticipated Discovery of Human Burials, Remains, and Funerary Objects on Federal Lands

For the accidental discovery of human burials, remains, and funerary objects on Federal lands please reference Stipulation VI.(C) of the PA.

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UNANTICIPATED DISCOVERIES PLAN

I. Unanticipated Discoveries Plan for the Keystone XL project corridor (Project) in South Dakota

1. In the event that previously unidentified archaeological resources are discovered during ground disturbing activities within the project area (area of potential effect), Project shall halt immediately all construction work within 100 feet (30.5 m) of the discovery and in the surrounding area where further subsurface remains can reasonably be expected to occur. The area of the discovery will be clearly marked by means of flagging or fencing.

2. The construction contractor will notify a designated representative of Project of the discovery. Following notification of the discovery, the designated representative of Project will immediately inspect the work site and determine the extent of the affected archaeological resource as defined by the State Historic Preservation Office (SHPO) or by the SHPO in consultation with the archaeologist retained by Project.

3. Within 14 calendar days of the original notification of discovery, the archaeologist retained by Project, in consultation with the SHPO, will determine the National Register eligibility of the resource. The SHPO or Project may extend this 14-day calendar period one time by an additional 7 calendar days, with Project providing written notice to the SHPO prior to the expiration date of the said 14-day calendar period.

4. If the resource is determined eligible for the National Register, Project shall submit to the SHPO and the Department of State (DOS) a plan for its avoidance, protection, recovery of information, or destruction without data recovery. Said plan will be submitted to the SHPO and the DOS within 14 calendar days of a determination of eligibility, and shall be approved by the SHPO and the DOS prior to implementation.

5. Work in the affected area may resume per SHPO authorization pending either:
    i. development and implementation of an appropriate data recovery plan or other recommended mitigation procedures, or
    ii. determination that the located remains are not eligible for inclusion on the National Register.

6. Any disputes concerning the evaluation or treatment of previously unidentified resources will be resolved through consultation among the SHPO, a designated representative of Project, and the archaeologist retained by Project.

II. Accidental Discovery of Human Remains on state or private lands

All human burials and funerary objects in the state of South Dakota are protected pursuant to South Dakota Codified Law Chapter 34-27-25, 34-27-28, 34-27-31.

In the event that human remains or burials are encountered during additional archaeological investigations or construction activities, Project or its designated representative shall immediately cease work within 150 foot radius from the point of discovery and implement measures to protect the discovery from looting and vandalism. No digging, collecting or moving human remains or other items shall occur after the initial discovery. Protection measures will include the following.

a) Flag the buffer zone around the find spot.
b) Keep workers, press, and curiosity seekers, away from the find spot.
c) Tarp the find spot.
d) Prohibit photography of the find unless requested by an agency official.
e) Have an individual stay at the location to prevent further disturbance until a law enforcement officer arrives.

Project will immediately notify local law enforcement, the DOS, and the South Dakota State Archaeologist (State Archaeologist) within forty-eight (48) hours of the discovery. The DOS shall notify the SHPO, Indian tribes and other consulting parties within forty-eight (48) hours of the discovery. If local law enforcement determines that the remains are not associated with a crime, the DOS shall determine if it is prudent and feasible to avoid disturbing the remains. If the DOS in consultation with the Project determines that disturbance cannot be avoided, the DOS shall consult with the State Archaeologist, SHPO, Indian tribes and other consulting parties to determine acceptable procedures for the removal, treatment and disposition of the burial or remains. The DOS shall ensure that the Project implements the plan for removal, treatment and disposition of the burial or remains as authorized by the State Archaeologist. The DOS shall notify the Project that they may resume construction activities in the area of the discovery upon completion of the plan authorize as by the State Archaeologist.

Contact Information:

James K. Haug, State Archaeologist
South Dakota State Historical Society
Archaeological Research Center
PO Box 1257
Rapid City, SD 57709
(605) 394-1936

Katie Lamie, Repository Manager
South Dakota State Historical Society
Archaeological Research Center
PO Box 1257
Rapid City, SD 57709
(605) 394-1936

Paige Olson, Review and Compliance Coordinator
South Dakota State Historical Society
State Historic Preservation Office
900 Governors Drive
Pierre, SD 57501
(605) 773-3458

Amy Rubingh, Review and Compliance Archaeologist
South Dakota State Historical Society
State Historic Preservation Office
900 Governors Drive
Pierre, SD 57501
(605) 773-3458

III. Unanticipated Discovery of Human Burials, Remains, and Funerary Objects on Federal Lands

For the accidental discovery of human burials, remains, and funerary objects on Federal lands please reference Stipulation VI.(C) of the PA.

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UNANTICIPATED DISCOVERIES PLAN

I. Unanticipated Discoveries Plan for the Keystone XL project corridor (Project) in Nebraska

1. In the event that previously unidentified archaeological resources are discovered during ground disturbing activities within the project area (area of potential effect), Project shall halt immediately all construction work within 100 feet (30.5 m) of the discovery and in the surrounding area where further subsurface remains can reasonably be expected to occur. The area of the discovery will be clearly marked by means of flagging or fencing.

2. The construction contractor will notify a designated representative of Project of the discovery. Following notification of the discovery, the designated representative of Project will immediately inspect the work site and determine the extent of the affected archaeological resource as defined by the State Historic Preservation Office (SHPO) or by the SHPO in consultation with the archaeologist retained by Project.

3. Within 14 calendar days of the original notification of discovery, the archaeologist retained by Project, in consultation with the SHPO, will determine the National Register eligibility of the resource. The SHPO or Project may extend this 14-day calendar period one time by an additional 7 calendar days, with Project providing written notice to the SHPO prior to the expiration date of the said 14-day calendar period.

4. If the resource is determined eligible for the National Register, Project shall submit to the SHPO and the Department of State (DOS) a plan for its avoidance, protection, recovery of information, or destruction without data recovery. Said plan will be submitted to the SHPO and the DOS within 14 calendar days of a determination of eligibility, and shall be approved by the SHPO and the DOS prior to implementation.

5. Work in the affected area may resume per SHPO authorization pending either:
    i. development and implementation of an appropriate data recovery plan or other recommended mitigation procedures, or
    ii. determination that the located remains are not eligible for inclusion on the National Register.

6. Any disputes concerning the evaluation or treatment of previously unidentified resources will be resolved through consultation among the SHPO, a designated representative of Project, and the archaeologist retained by Project.

II. Accidental Discovery of Human Remains

All human burials in the state of Nebraska are protected by law. In the event that human remains or burials are encountered during additional archaeological investigations or construction

activities, Project or its designated representative shall immediately cease work within 100 feet (30.5 m) of the discovery, cover the burial with impermeable plastic sheeting, and mark it with lathing stakes or fencing. Project will immediately notify both the SHPO, and in accordance with Nebraska Rev. Stat. §12- 1201 through §12-1212 (unmarked Human Burial Law), the local county coroner. If human skeletal remains appear to be from an unregistered grave, the coroner shall notify the SHPO within 24 hours. If the human remains are determined to be Native American, they will be handled in accordance with the Native American Graves Protection and Repatriation Act (NAGPRA). Work in the affected area may resume per SHPO authorization.

SHPO Contact Information:
L. Robert Puschendorf (Deputy SHPO)
State Historic Preservation Office
Nebraska State Historical Society
P.O. Box 82554
Lincoln, Nebraska 68501
Tele: 402-471-4787
Fax: 402-471-3316

UNANTICIPATED DISCOVERIES PLAN

I. Unanticipated Discoveries Plan for the Keystone XL project corridor (the Project) in North Dakota

1. In the event that previously unidentified archaeological resources are discovered during ground disturbing activities within the project area (area of potential effect), the Project shall halt immediately all construction work within 100 feet (30.5 m) of the discovery and in the surrounding area where further subsurface remains can reasonably be expected to occur. The area of the discovery will be clearly marked by means of flagging or fencing.

2. The construction contractor will notify a designated representative of the Project of the discovery. Following notification of the discovery, the designated representative of the Project will immediately inspect the work site and determine the extent of the affected archaeological resource as defined by the State Historic Preservation Office (SHPO) or by the SHPO in consultation with the Project archaeologist.

3. Within 14 calendar days of the original notification of discovery, the Project archaeologist, in consultation with the SHPO, will evaluate the National Register eligibility of the resource. The SHPO or the Project may extend this 14-day calendar period one time by an additional 7 calendar days, with the Project providing written notice to the SHPO prior to the expiration date of the said 14-day calendar period.

4. If the resource is determined eligible for the National Register, the Project shall submit to the SHPO and the Department of State (DOS) a plan for its avoidance, protection, recovery of information, or destruction without data recovery. Said plan will be submitted to the SHPO and the DOS within 14 calendar days of a determination of eligibility, and shall be approved by the SHPO and the DOS prior to implementation.

5. Work in the affected area may resume per SHPO authorization pending either:
    i. development and implementation of an appropriate data recovery plan or other recommended mitigation procedures, or
    ii. determination that the located remains are not eligible for inclusion on the National Register.

6. Any disputes concerning the evaluation or treatment of previously unidentified resources will be resolved through consultation among the SHPO, a designated representative of Project, and the Project archaeologist.

II. Accidental Discovery of Human Remains

All human burials in the state of North Dakota are protected by law. In the event that human remains or burials are encountered during additional archaeological investigations or construction activities, the Project or its designated representative shall immediately cease work within 100 feet (30.5 m) of the discovery, cover the burial with impermeable plastic sheeting, and mark it with lathing stakes or fencing. The Project will immediately notify local law enforcement and the State Historical Society of North Dakota (Protection of human burial sites, human remains, and burial goods; North Dakota Century Code 23-06-27). Work in the affected area may resume per SHPO authorization.

SHPO Contact Information:
Fern Swenson (Deputy SHPO)
State Historical Society of North Dakota
612 East Boulevard Avenue
Bismarck, North Dakota 58505
Phone: 701.328.2666
Fax: 701.328.3710

UNANTICIPATED DISCOVERIES PLAN

I. Unanticipated Discoveries Plan for the Keystone XL project corridor ("Project") in Kansas

1. In the event that previously unidentified archaeological resources are discovered during ground disturbing activities within the project area (area of potential effect), Project shall halt immediately all construction work within 100 feet (30.5 m) of the discovery and in the surrounding area where further subsurface remains can reasonably be expected to occur. The area of the discovery will be clearly marked by means of flagging or fencing.

2. The construction contractor will notify a designated representative of Project of the discovery. Following notification of the discovery, the designated representative of Project will immediately inspect the work site and determine the extent of the affected archaeological resource as defined by the State Historic Preservation Office (SHPO) or by the SHPO in consultation with the archaeologist retained by Project.

3. Within 14 calendar days of the original notification of discovery, the archaeologist retained by Project, in consultation with the SHPO, will determine the National Register eligibility of the resource. The SHPO or Project may extend this 14-day calendar period one time by an additional 7 calendar days, with Project providing written notice to the SHPO prior to the expiration date of the said 14-day calendar period.

4. If the resource is determined eligible for the National Register, Project shall submit to the SHPO and the Department of State (DOS) a plan for its avoidance, protection, recovery of information, or destruction without data recovery. Said plan will be submitted to the SHPO and the DOS within 14 calendar days of a determination of eligibility, and shall be approved by the SHPO and the DOS prior to implementation.

5. Work in the affected area may resume per SHPO authorization pending either:
   i. development and implementation of an appropriate data recovery plan or other recommended mitigation procedures, or
   ii. determination that the located remains are not eligible for inclusion on the National Register.

6. Any disputes concerning the evaluation or treatment of previously unidentified resources will be resolved through consultation among the SHPO, a designated representative of Project, and the archaeologist retained by Project.

II. Accidental Discovery of Human Remains

All human burials in the state of Kansas are protected by law. In the event that human remains or burials are encountered during additional archaeological investigations or construction activities, Project or its designated representative shall immediately cease work within 100 feet of the discovery, cover the burial with impermeable plastic sheeting, and mark it with lathing stakes or fencing. Project will immediately notify both the SHPO, and in accordance with Kansas Code §75-2741, et seq. (unmarked Human Burial Law), local law enforcement. If human skeletal remains appear to be from an unregistered grave, the coroner shall notify the SHPO within 24 hours. If the human remains are determined to be Native American, they will be handled in accordance with NAGPRA. Work in the affected area may resume per SHPO authorization.

SHPO Contact Information:
Jennie Chinn
State Historic Preservation Officer
Kansas State Historical Society
6425 SW Sixth Avenue
Topeka, Kansas 66615-1099
Ph. 785-272-8681 Ext. 205
Fax 785-272-8682
Email jchinn@kshs.org

DOS Contact Information:
U.S. Department of State
OES/ENV
NEPA Coordinator and International Affairs Officer
Tele: 202-647-4284
Fax: 202-647-1052
Cell: 240-723-3157
orlandoea2@state.gov

ATTACHMENT D

A. CONTACTS AT FEDERAL AND STATE AGENCIES

Department of State

Jack Jackson, Jr.
Senior Advisor and Liaison for
Native American Affairs
2201 C Street NW, Suite 3880
Washington, D.C. 20520
202-647-8309
JacksonJ3@state.gov

Travis Grout
Project Manager
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GroutTA@state.gov

Advisory Council on Historic Preservation

Reid Nelson
Director of the Office of Federal Agency Programs
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John Eddins
Program Analyst

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U.S. Bureau of Land Management

Diane Friez
District Manager, Eastern Montana/Dakotas Office
Department of the Interior
Bureau of Land Management
111 Garryowen Road
Miles City, MT 59301
406-233-2892

National Park Service

Dan Wiley
Chief of Resources Stewardship, Lewis and Clark Historic Trail
601 Riverfront Drive
Omaha, NE 68102
402-661-1830
Dan_Wiley@nps.gov

U.S. Army Corps of Engineers

Cathy Juhas
Project Manager Billings Regulatory Office
2602 1st Avenue N.
Suite 309
PO BOX 2256

Billings, MT 59103
406-657-5910
Fax 406-657-5911

U.S. Department of Agriculture Rural Utilities Service

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Deirdre Remley
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Washington, DC 20250
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U.S. Department of Agriculture Natural Resources Conservation Service

Andrée DuVarney
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P.O. Box 2890, Room 6158-S
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Sarah Bridges
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U.S. Department of Agriculture Farm Services Agency

Bennett Horter
Federal Preservation Officer
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U.S. Bureau of Indian Affairs

Dr. Carson Murdy
Regional Archaeologist
Bureau of Indian Affairs, Great Plains Region
115 4th Ave. SE, Suite 400
Aberdeen, SD 57401
605-226-7656
carson.murdy@bia.gov

Western Area Power Administration
Rod O'Sullivan
Environmental Protection Specialist
Upper Great Plains Region
P.O. Box 35800
Billings, MT 59107
406-247-7260

U.S. Bureau of Reclamation
Brad Coutant
Regional Archaeologist
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Kansas State Historical Society
Jennie Chinn
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jchinn@kshs.org

Tim Weston
Kansas State Archaeologist
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tweston@kshs.org

Nebraska State Historical Society
Terry L. Steinacher
State Archaeologist
P.O. Box 82554
Lincoln, Nebraska 68501-2554
308-665-2918
fax 308-665-2917

L. Robert Puschendorf
Deputy State Historic Preservation Officer
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Fax 402-471-3100
bob.puschendorf@nebraska.gov

South Dakota State Historic Preservation Office
Jay D. Vogt
State Historic Preservation Officer
900 Governors Drive
Pierre, South Dakota 57501-2217
605-773-3458

Jim Haug
State Archaeologist
PO Box 1257
Rapid City, SD 57709-1257
605-394-1936

Paige Olson
Review and Compliance Coordinator
900 Governors Drive
Pierre, SD 57501
(605) 773-6004

Montana Historical Society
Stan Wilmoth, Ph.D.
Deputy State Historic Preservation Officer and State Archaeologist
P.O. Box 201202
Helena, MT 59620-1202
(406) 444-7719
swilmoth@mt.gov

Montana Department of Environmental Quality
James Strait
Environmental Science Specialist
1520 E. Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901
406-444-6765

Montana Department of Natural Resources and Conservation
Patrick Rennie
Trust Lands Archaeologist
1625 11th Avenue
Helena, MT 59620
406-444-2882
prennie@mt.gov

B. CONSULTING TRIBES' POINTS OF CONTACT

The following list of tribes will be used during implementation of the Programmatic Agreement for the Keystone XL Pipeline Project.

1. Absentee-Shawnee Tribe of Indians of Oklahoma

Mr. George Blanchard
Governor
2025 South Gordon Cooper Drive
Shawnee, OK 74801

Ms. Stacy Hessler
Tribal Historic Preservation Officer
2025 South Gordon Cooper Drive
Shawnee, OK 74801

2. Alabama-Coushatta Tribes of Texas

Mr. Bryant Celestine
Tribal Historic Preservation Officer
571 State Park Road 56
Livingston, TX 77351
936-563-1181
Celestine.Bryant@actribe.org

Mr. Oscola Clayton Sylestine
Principal Chief
571 State Park Road 56
Livingston, TX 77351

3. Apache Tribe of Oklahoma

Mr. Donnie Donald Cabaniss, Jr.
Chairman
P.O. Box 1330
Anadarko, OK 73005
405-247-9493 ext. 121

4. Arapahoe Tribe of the Wind River Reservation, Wyoming (aka Northern Arapaho Tribe)

Ms. Darlene Conrad
Tribal Historic Preservation Officer
P.O. Box 1182
Fort Washakie, WY 82514
307-856-1628

Mr. Darrell O'Neal, Sr.
Chairman
P.O. Box 396
Fort Washakie, WY 82514

5. Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation, Montana (aka Fort Peck Tribes)

Mr. Darrell "Curley" Youpee
Tribal Historic Preservation Officer

Mr. Floyd Azure
Chairman

P.O. Box 1027
Poplar, MT 59255
406-768-2382 or 406-768-3152
Email on file

P.O. Box 1027
Poplar, MT 59255

Ms. Deb Madison
Water Quality Certification
P.O. Box 1027
Poplar, MT 59255

6. Blackfeet Tribe of the Blackfeet Indian Reservation of Montana

John Murray
Tribal Historic Preservation Officer
P.O. Box 850
Browning, MT 59417
406-338-7522
john.murray@blackfeetplanning.org

Ed Juneau
Deputy Tribal Historic Preservation Officer
P.O. Box 79
Browning, MT 59417
406-338-7521
depthpo@gmail.com

Mr. Willie A. Sharp, Jr.
Chairman
1 Agency Square
Browning, MT 59417
406-338-7521

Mr. Darnell Rides at the Door
Cultural Committee Member
1 Agency Square
Browning, MT 59417
406-338-7521

Mr. Scotty Osborne
Tribal Historic Preservation Officer
1212 Fox Street
Bozeman, MT 59715

7. Cherokee Nation, Oklahoma

Mr. Bill John Baker
Principal Chief
P.O. Box 948
Tahlequah, OK 74465
918-453-5618
Gina-BlackFox@cherokee.org (assistant)

Dr. Richard Allen
Tribal Historic Preservation Officer
P.O. Box 948
Tahlequah, OK 74465

8. Cheyenne and Arapaho Tribes, Oklahoma

Mr. Dale Hamilton
Arapaho Director, Culture and Heritage Program
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ATTACHMENT E

Tribal Monitoring Plan

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KEYSTONE XL PIPELINE PROJECT
TRIBAL MONITORING PLAN
U.S. DEPARTMENT OF STATE

Table of Contents

1.0 BACKGROUND 2
2.0 SUMMARY 2
3.0 OBJECTIVE 3
4.0 PROCESSES 3
5.0 ENVIRONMENTAL INSPECTOR 3
6.0 TRIBAL MONITORS 4
7.0 QUALIFICATIONS OF TRIBAL MONITORS 5
8.0 TRAINING 5
9.0 AREAS TO BE MONITORED 5
APPENDIX A 6

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KEYSTONE XL PIPELINE PROJECT
TRIBAL MONITORING PLAN

1.0 BACKGROUND

TransCanada Keystone Pipeline, LP (Keystone) has applied for a Presidential Permit for the Keystone XL Pipeline Project (Keystone XL Project or the Project). Consistent with Section 106 of the National Historic Preservation Act (NHPA), the Department of State (DOS) has determined that an amended Programmatic Agreement (PA) is necessary for the Project. Keystone is committed to working with the DOS and the consulting Indian tribes to assist with the implementation of the PA, which includes identifying and minimizing project impacts on previously unidentified historic properties. For the purposes of this plan, the term "historic property" is defined as

> Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (see 36 C.F.R. § 800.16(l)(1))

The DOS will make a reasonable and good faith effort to complete the identification and evaluation of historic properties, as appropriate, in the Project's area of potential impact consistent with 36 C.F.R. § 800.4(a), (b), and (c), before Keystone initiates construction activities.

The effort to identify and evaluate historic properties for the Keystone XL Pipeline Project has been aided by the completion of Traditional Cultural Property (TCP) reports by several Indian tribes. All consulting Indian tribes for this Project were afforded opportunities to prepare these studies so that the DOS could take into account the potential for the Project to affect historic properties of concern to Indian tribes. The DOS distributed emails, mailed letters, conducted teleconferences, and also participated in face-to-face tribal consultation in group and individual settings to obtain information concerning historic properties that were of concern to Indian tribes. These efforts are summarized and documented in both the Final Supplemental Environmental Impact Statement (SEIS) as well as in Attachment G of the PA.

Arising from these efforts, the DOS has required, through Stipulation V.E. of the PA, that Keystone provide Indian tribes the opportunity to participate as tribal monitors during construction to further reduce the potential for Project effects to previously unidentified historic properties. This Tribal Monitoring Plan provides procedures for the hiring, training, and supervising of Tribal monitors and other relevant topics..

2.0 SUMMARY

Tribal monitors will be hired by Keystone to monitor specific areas during the grading and trenching activities related to Project construction. These areas have cultural significance and have been identified as a result of Cultural Resource Surveys and Inventories, TCP Studies conducted for the Project, and the Section 106 Consultation process. The areas where tribal monitoring will occur are identified in Appendix A to this Plan. Tribal monitors will have reasonable and unimpeded access to all areas subject to monitoring throughout the grading and trenching phases of construction.

The tribal monitors are required to have adequate safety training to work on the right-of-way and must follow protocols developed by Keystone while in the field. For the Keystone XL Pipeline Project, the tribal monitors shall be selected by the individual Indian tribes and recognized as having experience in the identification of historic properties. Construction activities affecting land used historically by one or several Indian tribes should be monitored by representatives of those Indian tribes claiming historical use of that land. Their role will be to alert the Lead Environmental Inspector (Lead EI) of any previously unidentified historic properties uncovered during construction activities.

There will be clear lines of communication between the tribal monitors and Lead EI. Tribal monitors will be required to keep detailed records of their activities through daily logs and weekly activity reports that describes the area and activities monitored during the week, describes any issues or concerns encountered, and describes how the issue/concerns was resolved. The report will be submitted to Keystone's Lead EI and to DOS on a weekly basis.

3.0 OBJECTIVE

The objective of the Keystone tribal monitoring program is to minimize the potential for adverse effects from the Project activities on previously unidentified historic properties, as appropriate, consistent with PA Stipulations V and VI as well as applicable Unanticipated Discovery Plans (Attachment C). This Plan provides guidelines to assist with the decision making processes and effective communication when contracting with tribal monitors.

4.0 PROCESSES

The DOS, in consultation with the Indian tribes, has identified specific areas requiring monitoring, listed in Appendix A to this Plan.

5.0 ENVIRONMENTAL INSPECTOR

Keystone has established clear lines of communication and reporting within the Project team and the environmental compliance organization. Ensuring compliance with the conditions of the PA is the responsibility of all members at all levels of the Project organization.

To facilitate Project compliance and monitoring, construction and environmental oversight at the spread level will be provided by the Project's Lead Environmental Inspector (EI). The tribal monitor(s) on each Project spread will report to the Lead EI during the Project. The Lead EI on the Project will coordinate the tribal monitoring program and will implement the activities below:

- Verify compliance with the requirements of the PA, including the Coordination Plan, Historic Trails and Archaeological Monitoring Plan, plans for the unanticipated discovery of cultural resources and human remains or burials (Attachment C), and any Treatment Plans;
- Stop construction activities that are not in compliance with this plan or the PA; and
- Keep records and a daily log of compliance and activities performed pursuant to the PA.

Keystone will ensure that, if the Lead EI does not meet the professional qualification standards established in the PA, the Lead EI will receive appropriate training in historic preservation from a professional who meets the standards established in the PA so that the PA requirements are understood

and unanticipated discoveries are quickly identified. Keystone, for the same reason, will provide an appropriate level of training in historic preservation conducted by a professional who meets the standards established in the PA to all construction personnel. Keystone will conduct this training prior to initiating vegetative clearing or construction activities on a spread, and conduct periodic refresher training, as deemed necessary, during construction of the spread.

6.0 TRIBAL MONITORS

Tribal monitors will work collaboratively with Keystone's Environmental Inspection Team, in an advisory role, to assist the Project compliance with the PA, the Coordination Plan, this Monitoring Plan, plans for the unanticipated discovery of cultural resources and human remains or burials, and any Treatment Plans that are intended to resolve possible adverse effects to know cultural resources sites and to protect historic properties that may be discovered during construction. Keystone will be responsible for administering the tribal monitoring program through a tribal liaison, Lead EI, and the Keystone Project Team.

Position Description:

- During grading and trenching in the areas included in the tribal monitoring program, the tribal monitor will assist with the identification of previously unidentified historic properties that hold significance to the Tribe. Subject to the other provisions of this part, at least one monitor will be used per Construction Spread depending upon the extent and location of construction activities, as well as the relative historic importance of each Spread to each Indian tribe.
- Tribal monitors will report and communicate directly with the Lead EI assigned to each work area and may not direct construction personnel or equipment.
- It is the responsibility of the tribal monitor to actively observe and report any artifact or human remains found either on the surface or subsurface within the Project boundaries to the Lead EI, as required by the PA and any applicable Unanticipated Discovery Plan. If previously unidentified historic properties are discovered by monitors, the construction contractor will immediately halt construction in its immediate vicinity as required in Section VI of the PA. The Lead EI will notify the Project cultural resources specialist/archaeologist of the discovery. The cultural resources specialist/archaeologist will evaluate whether the find constitutes a potential historic property in accordance with the applicable State Historic Preservation Officer (SHPO) guidelines for the location and National Park Service (NPS) National Register Bulletins. The cultural resources specialist/archaeologist will evaluate whether the construction team is required to implement the process for unanticipated discoveries laid out in Section VI of the PA. The Lead EI will provide information on the discovery to all consulting parties within forty-eight (48) hours.
- The tribal monitor is required to adhere to the PA and this tribal monitoring plan. The tribal monitor will report to the Lead EI if a previously unidentified historic property is discovered. The Lead EI will review the PA and this Plan with the tribal monitor so that the roles and responsibilities of the monitor and the Lead EI are clearly understood. The monitor may request a copy of this Plan and the PA for reference.
- Monitors are responsible for reporting daily and weekly activities that identify the areas and activities monitored during the week, describe any issues or concerns, and describe how the issue or concern was resolved. Reports should contain a description of the construction methods used, the types of cultural resources identified (if any) during monitoring, evaluation and interpretation

of any cultural resources, and curation arrangements for any recovered items. Reports must be submitted in writing to the Lead EI and to DOS on a weekly basis. Keystone will summarize the results of the monitoring into reports that will be provided to the consulting parties on a weekly basis.

- Monitors are part of the construction team and as such, are required to participate in the safety and environmental training on site as well as in tailgate meetings. They must abide by all safety rules and wear personal protective equipment at all times while on site.
- At the start of each work day, tribal monitors must meet with the Lead EI at the applicable spread office at the prescribed time in order to receive daily safety and information briefings. No monitor will be allowed on a construction spread without receiving that day's safety and informational briefing. Keystone will take reasonable efforts to ensure that tardy tribal monitors or monitors moving between Construction Spreads will receive supplemental daily safety and informational briefings to ensure compliance with the PA and this tribal monitoring plan.
- The Lead EI will seek the advice and input of tribal monitors, if available, when unanticipated discoveries are encountered and will consider their input when implementing the terms of the PA.
- If potential historic properties are encountered, the Lead EI will notify and seek advice from the Project cultural resource specialist/archaeologist as soon as practicable. The Project cultural resource specialist/archaeologist shall meet the *Secretary of Interior Professional Qualification Standards* and will act as a liaison between the tribal monitor, Lead EI, Tribal Historic Preservation Officers (THPOs), and other signatories and consulting parties, if determined necessary.

7.0 QUALIFICATIONS OF TRIBAL MONITORS

Credentials and qualifications of the tribal monitors shall be within the purview of the individual Indian tribes and will be reviewed and approved by the DOS. Only DOS approved tribal employees and/or tribal members may perform the work. The individuals selected will be officially recognized by the appropriate Indian tribe as having the capabilities to perform the duties as described above. Keystone will work with the Indian tribes to articulate the responsibilities of the monitors and deploy them to optimize their role in reducing the potential for Project effects to historic properties. A tribe may contract out monitoring work to other tribes who have qualified staff, provided that the tribe officially delegates such authority in writing. Additional alternate monitors may be permitted if either of a tribe's monitors are unable to continue their participation in the Project.

8.0 TRAINING

All monitors will be required to satisfactorily complete a one-day comprehensive training focused on the activities on the pipeline right-of-way. Monitors must also attend pre-construction training as coordinated by the prime contractor, including environmental and safety trainings provided to all on-site personnel. Keystone will make reasonable efforts to ensure that these trainings are accessible to tribal monitors and alternates.

9.0 AREAS TO BE MONITORED

To facilitate construction, the overall pipeline route is divided into smaller sections, or spreads, of varying lengths. Construction, environmental, and tribal monitoring oversight at the spread level is provided by a team assigned to each spread. Tribal monitoring will be conducted in areas identified by TCP Inventories and Studies and/or areas identified by Indian tribes during the Section 106 process as listed in Appendix A to this Plan. In those areas previously identified by Indian tribes as needing monitoring, at least one monitor will be used per spread depending upon the nature and locations of construction activities, as well as the relative historic importance of each spread to each tribe. In some instances, it may be necessary for an Indian tribe to designate more than one monitor and alternate to provide monitoring for all areas of concern for the Indian tribe.

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APPENDIX A

Areas for Tribal Monitoring were determined through the reviews of submitted TCP Reports and additional consultation with the Indian tribes. These maps have been developed based upon meetings with the consulting parties and individual tribes, and the review of the submitted TCP studies.

Confidential – Not United States Government classified.

This information is not included in the Final Supplemental EIS.

ATTACHMENT F

Historic Trail and Archaeological Monitoring Plan

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KEYSTONE XL PIPELINE PROJECT
HISTORIC TRAIL AND ARCHAEOLOGICAL MONITORING PLAN
U. S. DEPARTMENT OF STATE

Table of Contents

1.0 BACKGROUND……. 2
2.0 SUMMARY……. 2
3.0 OBJECTIVE ……..……. 3
4.0 PROCESSES……..…….. 3
5.0 CULTURAL RESOURCE MONITORS……...……...……. 3
6.0 QUALIFICATIONS OF CULTURAL RESOURCE MONITORS……..…… 4
7.0 TRAINING…….. 4
8.0 AREAS TO BE MONITORED……. 5
9.0 COMMUNICATIONS ……... 8
10.0 REPORTING…….. 8

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KEYSTONE XL PIPELINE PROJECT
HISTORIC TRAIL AND ARCHAEOLOGICAL MONITORING PLAN

1.0 BACKGROUND

TransCanada Keystone Pipeline, LP (Keystone) has applied for a Presidential Permit for the Keystone XL Pipeline Project (Keystone XL Project or the Project). The Department of State (DOS) has determined that a Programmatic Agreement (PA) is necessary for the Project because the effects on potential historic properties cannot be fully assessed for all properties prior to the issuance of the Presidential Permit (if issued). For the purposes of this plan, the term "historic property" is defined as

> Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (see 36 C.F.R. § 800.16(l)(a)).

Consistent with the PA and its associated coordination and treatment plans, Keystone will have completed the cultural resources surveys so that appropriate avoidance, minimization, and treatment measures are implemented and completed prior to construction. Under Stipulation V of the PA, DOS prepared this Historic Trail and Archaeological Monitoring Plan (Monitoring Plan or Plan) to address cultural resources monitoring during the construction of the Keystone XL Project.

Keystone is committed to working with DOS, the consulting parties, the National Park Service (NPS) and other federal agencies further reducing the potential for impacts on historic trails and other historic properties including roads, ruts, archaeological sites, structures, buildings, natural landmarks, and the general cultural landscape. This Historic Trail and Archaeological Monitoring Plan is in addition to a Tribal Monitoring Plan. Both plans are required under Stipulation V of the PA and are appended to the Keystone XL Pipeline Project PA as separate documents. The Tribal Monitoring Plan is not a substitute for this Plan. All consulting parties and agencies have had opportunities to review and comment on these plans.

2.0 SUMMARY

Keystone will hire archaeologists to monitor specific areas during ground disturbing activities related to Project construction. The locations requiring monitoring have been identified through past cultural resources surveys and inventories, surveys performed for this Project, and the Section 106 consultation process. A list of the areas identified by the NPS and SHPOs is included in Table 8-1 in this plan. Keystone will continue to coordinate with DOS during the Section 106 consultation process and will adhere to this Monitoring Plan should any other areas require cultural resources monitoring.

Monitors are required to meet the qualifications identified in Section 7 of this document, must have adequate training to work on the right-of-way, and must follow strict communication protocols while in the field.

The monitors will focus on the identification of previously unidentified historic properties (historic or precontact) during construction. These monitors will be positioned at specified locations during Project construction to monitor grading and/or trenching activities. The monitor will also provide assistance with the identification of materials related to the historic trails including roads, ruts, archaeological sites, structures, buildings, natural landmarks, and the general cultural landscape.

3.0 OBJECTIVE

The objective of the historic trail and archaeological monitoring program is to minimize the potential for adverse effects to previously identified and unidentified historic properties from the Project activities and to assist with the implementation of the Unanticipated Discovery Plans in the PA. This Plan identifies the locations where monitoring is required, stipulates the required qualifications for cultural resource monitors, and outlines a communication plan for the monitors in the event that previously unidentified historic properties are encountered in the course of construction.

4.0 PROCESSES

The locations requiring construction monitoring for this Project have been determined by the DOS in consultation with the NPS, SHPOs, Indian tribes, and other federal agencies and is be based upon the survey work completed for the Project. Keystone will implement the monitoring work to assist the DOS in meeting its responsibilities consistent with the National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act (NHPA). Keystone will continue to consult with the DOS and will implement this Plan at additional locations if the DOS determines that construction monitoring is required at those locations.

5.0 CULTURAL RESOURCE MONITORS

Cultural resource monitors will work collaboratively with Keystone's Environmental Inspection Team in an advisory role to assist the Project in achieving compliance with the PA, including the Coordination Plan, this Monitoring Plan, the Tribal Monitoring Plan, Unanticipated Discovery Plans, and any Treatment Plans to protect known historic properties (as defined by the SHPO in each state) that are eligible, or potentially eligible, for listing in the National Register of Historic Places as well as historic properties that may be discovered during construction.

Position Description:

- During grading and trenching activities in areas identified in Table 8-1, the historic trail and archaeological monitors will provide assistance with the identification of historic properties that have not been previously identified.

- Monitors should review the mitigation plan and verify through field examination that areas requiring a reduction in active right-of-way space (necking down) or avoidance fencing are properly staged before construction work occurs.
- Monitors will report and communicate directly with the Lead Environmental Inspector (Lead EI) assigned to each work area and may not direct construction personnel or equipment.
- It is the responsibility of the monitor to actively observe and report, as required by the PA and any applicable Unanticipated Discovery Plan, any potential historic property not previously identified through surveys or human remains found either on the surface or subsurface within the Project boundaries.
- Monitors are required to adhere to the PA and report to Keystone's Lead EI if a potential historic property is discovered that has not already been identified and deemed not eligible. Keystone will conduct the appropriate reporting to federal and state regulatory agencies as outlined in the PA communication protocol.
- Monitors are responsible for reporting daily and weekly activities in a manner that describes the areas and activities monitored during the week, any issues or concerns that were encountered, and how the issues or concerns (if any) were resolved. The reports should be submitted in writing to the Lead EI. Monitors are part of the construction team and, as such, are required to participate in safety and environmental training on site, as well as in tailgate meetings. They must abide by all safety rules and wear the required protective equipment at all times while on site.
- Construction will occur Monday through Saturday and may, under certain circumstances, also occur on Sunday. Monitors are expected to be available during all work hours.
- At the start of each work day, monitors must report to the Lead EI at the applicable spread office at the prescribed time in order to receive daily safety and information briefings. A monitor may not work on a given day if he or she fails to attend this briefing, unless Keystone, at its discretion, provides a supplemental briefing.
- Lead EIs will seek the advice and input of monitors, if available, when unanticipated discoveries are encountered, and will consider their input when implementing the terms of the PA and the Unanticipated Discovery Plan.
- If a potential historic property is encountered, the monitors will notify the Lead EI immediately.
- Monitors shall meet the professional standards outlined in Section 6.0 of this Plan.

6.0 QUALIFICATIONS OF CULTURAL RESOURCE MONITORS

Historic trail and archaeological monitoring shall be carried out by or under the direct on-site supervision of a professional archaeologist who meets, at a minimum, the Secretary of the Interior's Historic Preservation Professional Qualification Standards (48 FR 44716, September 29, 1983). All monitors should have demonstrated experience in monitoring construction activities and be knowledgeable of changes in soil color and deposition that may be associated with cultural materials.

7.0 TRAINING

All monitors will be required to satisfactorily complete a one-day comprehensive training focused on the activities on the pipeline right-of-way. Completion of this program is compulsory. It is required that the monitors also attend the multi-day environmental/safety trainings provided to all on-site personnel.

All monitors will be required to attend the pre-construction training as coordinated by the prime contractor prior to any monitoring activity. The training program consists of two phases: environmental training and safety training. These training programs are conducted by the Keystone prime contractor's environmental and safety professionals and will commence in the morning of the first day of monitoring for each spread.

8.0 AREAS TO BE MONITORED

The locations requiring construction monitoring has been determined by the DOS in consultation with the NPS, SHPOs, and other consulting parties. These areas are outlined in Table 8-1 in this document. Keystone will implement this Monitoring Plan to assist the DOS in meeting its responsibilities under NEPA and Section 106 of the NHPA. Keystone will continue to consult with DOS and will implement this Plan at additional locations, should it be determined that construction monitoring is required.

8.1 Cultural Resources Monitoring – State-by-State

Table 8-1 indicates specific areas near previously identified historic properties (and potential historic properties) that DOS recommends for archaeological monitoring. If the specific area is avoided prior to construction, then no monitoring of that area is required. Additional potential historic properties may be identified as the Section 106 Process continues. Monitoring is recommended in the following circumstances:

- Where construction activities will not directly impact a known site, but occur immediately adjacent to one or more sites;
- To ensure site avoidance; and
- To ensure that site boundaries have been correctly defined.

The monitoring areas in Montana, South Dakota and Nebraska have been defined by multiple surveys carried out for the centerline, access roads, and ancillary facilities. Monitoring in all of these instances has been proposed by the applicant and agreed to by DOS.

Sites of cultural or religious significance to Indian tribes identified in the context of consultations with tribes or Traditional Cultural Properties surveys conducted by tribes are not listed below due to confidentiality concerns. See the Tribal Monitoring Plan (Attachment E), the Summary of Identification and Evaluation Efforts (Attachment G), and the Programmatic Agreement for more information.

Table 8-1 Cultural Resources to be Monitored

Montana*

Site Number	Site Type	Recommended Activities
24MC0628	Historic farmstead	Artifact movement, fencing, monitoring
24PE0723	Historic ranch complex	Fence and Monitor
24PH1805	Previously recorded historic farmstead	Fence and Monitor
24PH4267	Historic farmstead	Fence and Monitor
24VL1936	Precontact stone feature	Avoidance/Fence and Monitor

*This information will be further defined with input from the MT SHPO, BLM and MDEQ.

South Dakota

The proposed route avoids all previously identified historic properties (and potential historic properties). Additional potential historic properties may be identified as the Section 106 Process continues. This information will be further defined with input from the South Dakota SHPO.

Nebraska

The proposed route avoids all previously identified historic properties (and potential historic properties). Additional potential historic properties may be identified as the Section 106 Process continues. This information will be further defined with input from the Nebraska SHPO.

9.0 COMMUNICATIONS

Keystone has established clear lines of communication and reporting within the Project team and the environmental compliance organization. To facilitate construction compliance and monitoring, the overall pipeline route is divided into smaller sections, or spreads, of varying lengths. Construction and environmental oversight at the spread level is provided by a team assigned to each spread. Cultural resource monitors will be required to report to the Lead EI responsible for the spread within which the work is taking place. The Lead EI will coordinate the construction monitoring program.

Keystone will be responsible for administering the Monitoring Plan and will retain cultural resource monitors that meet the Professional Qualifications noted in Section 7 of the PA.

Historic trail and archaeological monitors will work together with Lead EIs to assist in reducing effects to previously identified and unidentified historic properties and perform monitoring activities in areas targeted prior to construction. If a historic trail that is also a potential historic property is discovered, the parties will follow the terms of the communications protocol established in this document, the PA, and all local, state and federal laws governing the protection and discovery of archaeological and cultural resources. Historic trail and archaeological monitors will communicate with the Lead EI assigned to each work area and will not direct construction personnel or equipment. The authority to stop work will rest the Lead EI and Keystone construction and Project management team.

At the start of each work day, historic trail and archaeological monitors will report to the Lead EI they are assigned to at the prescribed time in order to receive daily safety and information briefings. Failure to arrive at the designated briefing time will preclude the monitor's ability to participate on that day unless Keystone, at its discretion, is able to provide a supplemental briefing. Lead EIs will seek the advice of historic trail and archaeological monitors, if available, when unanticipated discoveries are encountered, and will consider their input. If any issues develop, monitors will communicate with the assigned Lead EI.

10.0 REPORTING

Monitors will be required to complete written daily reports and weekly activity reports that describe the areas monitored and will provide the reports to the Lead EI. The reports will describe methods used, the findings during monitoring, evaluation of the cultural material recovered, any additional interpretation of the material recovered, and curation arrangements. Those reports will be compiled and given to the Lead EI. Copies of the monitor's reports will be forwarded to DOS, the applicable SHPOs, and NPS for areas where monitoring is occurring at locations identified in Table 8-1.

ATTACHMENT G

Summary of Identification and Evaluation Efforts and Effect Assessment for Historic Properties within the Project APE (As Found in the Final Supplemental Environmental Impact Statement)

Overview

This attachment summarizes the cultural resource identification and evaluation efforts conducted to date for the Keystone XL Project. This preface is followed by state-by-state summaries of identification and evaluation activities as well as the proposed Project effects assessment for resources within each state. Due to the large amount of site data, site-by-site findings can be reviewed in the Final Supplemental EIS in Sections 3.11 and 4.11.

Since 2008, DOS has consulted with affected Indian tribes, SHPOs, federal agencies, and local governments regarding the proposed Project as required by Section 106 of the National Historic Preservation Act. As part of this consultation effort, DOS has conducted formal government-to-government consultations with 84 Indian tribes, in addition to inviting all interested Indian tribes to prepare traditional cultural property (TCP) studies. Eight Indian tribes have completed or are in the process of completing TCP reports for the proposed Project.

As part of the Final EIS route evaluation process, a Programmatic Agreement (PA) was developed, finalized, and signed over a 2-year period between 2009 and 2011. Signatory parties to this agreement included the Department, U.S. Bureau of Land Management (BLM), U.S. Army Corps of Engineers (USACE), U.S. Bureau of Reclamation (USBR), National Park Service (NPS), Western Area Power Administration (Western), U.S. Department of Agriculture Rural Utilities Service (RUS), U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), USDA Farm Service Agency (FSA), U.S. Bureau of Indian Affairs (BIA), and the State Historic Preservation Officer's (SHPO) of Montana, South Dakota, Nebraska, Kansas, Oklahoma, and Texas. Invited signatories included the Montana Department of Natural Resources and Conservation, Montana Department of Environmental Quality, and Keystone. Indian tribes that signed the PA included the Alabama-Coushatta Tribes of Texas; Arapahoe Tribe of the Wind River Reservation, Wyoming; Blackfeet Tribe of the Blackfeet Indian Reservation of Montana; Fort Belknap Indian Community of the Fort Belknap Reservation of Montana; Iowa Tribe of Kansas and Nebraska; Miami Tribe of Oklahoma; and Pawnee Nation of Oklahoma. These parties assisted in the development of a PA that allows for the continued identification and evaluation of cultural resources, if the proposed Project is permitted. The PA outlines the appropriate consultation and notification procedures to be followed prior to and during construction. The PA also ensures that cultural resource surveys are conducted within the entire proposed Project area prior to construction.

The proposed Project route was selected to avoid disturbing historic properties (i.e. resources that are eligible for, or listed in the National Register of Historic Places) to the maximum extent possible. Adverse effects to historic properties from construction at some proposed Project locations may occur due to the lack of feasible routing alternatives or alternative construction methods. Treatment measures for these direct or indirect impacts shall be implemented on an individual site basis as noted in the PA. In addition, unidentified archaeological sites or historic properties may be adversely affected as a result of proposed Project-related activities. If

unanticipated cultural materials or human remains are encountered during construction, Keystone will follow the procedures outlined in the Unanticipated Discovery Plans that have been developed for all five states in coordination with their SHPO's. Tribal and Archaeological Monitoring Plans have also been developed and will be implemented to further reduce the potential for adverse effects to cultural resources. Treatment Plans will be developed for those historic properties that cannot be avoided by construction activities.

Montana

Cultural resource surveys and inventories have been conducted in Montana. This work is discussed in the main Class III Cultural Resources Survey conducted for the state and in 16 subsequent addendum reports submitted to the Montana SHPO. For those resources situated in the APE, Keystone is attempting to identify feasible alternative reroutes around the resources or identifying alternative construction methods to avoid or minimize effects. Several stone circle sites may be adversely affected by the proposed Project, however, Project planning is ongoing and these sites may be avoided by Project modifications. If these sites are adversely affected, Keystone will follow the protocols of this PA and prepare a Treatment Plan for each site that is adversely affected. Due to the proximity of the proposed Project to other identified sites, archaeological or tribal monitoring may also be used to ensure adequate measures are undertaken to avoid or minimize Project effects to historic properties.

As of October 2013, the entire APE for the proposed Project has been surveyed.

South Dakota

Cultural resource surveys and inventories have been conducted in South Dakota. This work is discussed in the main Level III Cultural Resources Survey conducted for the state and in ten subsequent addendum reports submitted to the South Dakota SHPO. For those resources situated in the APE, Keystone is attempting to identify feasible alternative reroutes around the resources or identifying alternative construction methods to avoid or minimize effects. If these sites are adversely affected, Keystone will follow the protocols of this PA and prepare a Treatment Plan for each site that is adversely affected. Due to the proximity of the proposed Project to other identified sites, archaeological or tribal monitoring may also be used to ensure adequate measures are undertaken to avoid or minimize Project effects to historic properties.

As of October 2013, approximately 24 acres of the proposed Project corridor remain unsurveyed for the proposed Project. Additional cultural resources surveys within the proposed Project corridor are ongoing. The cultural resources surveys for proposed Project corridor will be documented in future reports. Upon receipt, DOS will review these reports consistent with 36 CFR Part 800 and the PA.

Nebraska

Cultural resource pedestrian surveys and inventories have been conducted in Nebraska. This work is discussed in the main Phase I Cultural Resources Survey conducted for the state and in 13 subsequent addendum reports submitted to the Nebraska SHPO. For those resources situated in the APE, Keystone is attempting to identify feasible alternative reroutes around the resources or identifying alternative construction methods to avoid or minimize effects. If these sites are

adversely affected, Keystone will follow the protocols of this PA and prepare a Treatment Plan for each site that is adversely affected. Due to the proximity of the proposed Project to other identified sites, archaeological or tribal monitoring may also be used to ensure adequate measures are undertaken to avoid or minimize Project effects to historic properties.

As of October 2013, approximately 938 acres of the proposed Project corridor, 33 acres of access roads (for known roads), 44 acres of pump stations, and an undetermined acreage of other ancillary facilities remain unsurveyed for the proposed Project. Additional cultural resources surveys within the proposed Project corridor are ongoing. The cultural resource surveys for the proposed Project corridor, access roads, pump stations, and ancillary facilities will be documented in future reports. Upon receipt, DOS will review these reports consistent with 36 CFR Part 800 and the PA.

North Dakota

Cultural resource surveys and inventories have been conducted in North Dakota. This work is discussed in the main Class III Cultural Resources Survey conducted for the state submitted to the North Dakota SHPO. No historic properties are situated in the Project APE for North Dakota.

No additional cultural resources survey work is currently planned in North Dakota.

Kansas

Cultural resource surveys and inventories have been conducted in Kansas. This work is discussed in the main Phase II Cultural Resources Survey conducted for the state and in one subsequent addendum report submitted to the Kansas SHPO. No historic properties are situated in the Project APE for Kansas.

No additional cultural resources survey work is currently planned in Kansas.

Tribal Consultation

In an attempt to identify properties of religious and cultural significance, including TCPs, the DOS conducted an extensive tribal consultation effort.

Consistent with 36 CFR Part 800, DOS has engaged Indian tribes in government-to-government consultation. The list of Indian tribes that were notified for this proposed Project was derived from lists maintained by DOS, NPS, BLM, USACE, SHPOs, state tribal liaisons, THPOs, BIA, and recommendations from other Indian tribes. In compliance with 36 CFR 800.2 and confidentiality requirements, DOS provided consulting Indian tribes the opportunity to review findings or determinations that were derived from historic properties reports prepared for portions of the proposed Project's APE. During the Final EIS tribal consultation process, the Department engaged 95 Indian tribes and tribal groups. Following these invitations, 45 Indian tribes notified the Department that they would like to become consulting parties. Additionally, two Indian tribes were undecided as to whether they would become consulting parties, but nevertheless participated in calls and meetings. Twenty-one Indian tribes notified the Department that they did not wish to consult on the proposed Project and had no objection to the proposed Project, but would like to be notified should human remains be found. Twenty-seven Indian tribes did not respond to requests for consultation.

As part of the Final EIS consultation process, the Department conducted a broad range of tribal consultations, ranging from group meetings involving many Indian tribes and discussion topics to individual discussions on specific topics via letter, phone, or email. The Department conducted considerable discussion with the Indian tribes and THPOs on cultural resources within the framework of the Final EIS. Consultations included discussions of cultural resources, in general, cultural resources surveys, TCPs and TCP surveys, effects to cultural resources, and mitigation. The Department has conducted its government-to-government consultation as an open forum to listen to tribal views on the proposed Project and its potential impacts on the environment, cultural resources, and the tribes themselves. During the consultation process, Indian tribes were provided with funding to pay for the cost of travel and attendance at consultations. Additionally, tribes were provided proposed Project cultural resources survey reports and opportunities to conduct TCP surveys funded by Keystone. The Department concluded a PA consistent with Section 106 of the NHPA on August 12, 2011.

When the Final EIS route was revised to the proposed Project route, the Department engaged Indian tribes that had previously expressed an interest in the states/areas crossed by the proposed Project route or whose interests have not been expressed. As a result, 80 Indian tribes initially were invited to consult regarding the proposed Project by letters dated September 21, 2012. Follow-up phone calls and emails were sent to these Indian tribes to determine their interest in consulting on the proposed Project. Three government-to-government consultation meetings were held in October 2012 to ensure that the Indian tribes were fully aware of their role in the consultation process and to ensure that their issues of concern were understood in the consultation process. Meetings were held in Billings, Montana; Pierre, South Dakota; and Lincoln, Nebraska.

As part of the Draft Supplemental EIS public comment process, four additional Indian tribes have contacted the Department for inclusion in the government-to-government consultation process, which ensued. Therefore, the Department has invited a total of 84 Indian tribes to consult regarding the proposed Project. A government-to-government consultation meeting was held in Rapid City, South Dakota, on May 16, 2013 to provide an update to the Indian tribes concerning the Draft Supplemental EIS and the proposed Project, status of the Section 106 consistent process, discussion on amending the PA, and the opportunity for additional TCP surveys within the reroute areas. Additionally, a government-to-government consultation conference call was held on July 31, 2013 to discuss amending the PA. Individual tribal discussions on specific topics via meetings, letter, phone, and email have continued. Indian tribes continue to be provided with funding by Keystone for costs related to travel and attendance at consultations, proposed Project cultural resources survey reports, and opportunities to conduct additional TCP surveys within the reroute areas. The Department would continue government-to-government consultations to build on previous work, as appropriate, to ensure that tribal issues of concern are addressed in the consultation process and to amend and incorporate modifications to the PA in consultation with the Indian tribes to conclude the Section 106 consistent process for the proposed Project. Indian tribes that DOS contacted are listed in Table 1.

TABLE 1
Indian Tribes Consulted under Section 106 for the Proposed Project

	Interested/Consulting Party	Indian Tribe
1	Undecided	Absentee-Shawnee Tribe of Indians of Oklahoma
2	Undecided	Alabama-Coushatta Tribes of Texas

TABLE 1
Indian Tribes Consulted under Section 106 for the Proposed Project

	Interested/Consulting Party	Indian Tribe
3	Not Consulting	Alabama-Quassarte Tribal Town, Oklahoma
4	Undecided	Apache Tribe of Oklahoma
5	Consulting	Arapahoe Tribe of the Wind River Reservation, Wyoming (aka Northern Arapaho Tribe)
6	Consulting	Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation, Montana (aka Fort Peck Tribes)
7	Consulting	Blackfeet Tribe of the Blackfeet Indian Reservation of Montana
8	Undecided	Cherokee Nation, Oklahoma
9	Undecided	Cheyenne and Arapaho Tribes, Oklahoma
10	Consulting	Cheyenne River Sioux Tribe of the Cheyenne River Reservation, South Dakota
11	Not Consulting	Chickasaw Nation, Oklahoma
12	Consulting	Chippewa Cree Indians of the Rocky Boy's Reservation, Montana
13	Not Consulting	Choctaw Nation of Oklahoma
14	Not Consulting	Comanche Nation, Oklahoma
15	Not Consulting	Confederated Salish & Kootenai Tribes of the Flathead Indian Nation, Montana
16	Consulting	Confederated Tribes of the Goshute Reservation, Nevada and Utah
17	Consulting	Crow Creek Sioux Tribe of the Crow Creek Reservation, South Dakota
18	Consulting	Crow Tribe of Montana
19	Undecided	Delaware Tribe of Indians, Oklahoma
20	Consulting	Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada
21	Undecided	Eastern Band of Cherokee Indians of North Carolina
22	Not Consulting	Eastern Shawnee Tribe of Oklahoma
23	Consulting	Ely Shoshone Tribe of Nevada
24	Not Consulting	Flandreau Santee Sioux Tribe of South Dakota
25	Undecided	Forest County Potawatomi Community, Wisconsin
26	Undecided	Fort Belknap Indian Community of the Fort Belknap Reservation of Montana (aka Gros Ventre and Assiniboine Tribe of Ft. Belknap)
27	Undecided	Hannahville Indian Community, Michigan
28	Consulting	Ho-Chunk Nation of Wisconsin
29	Not Consulting	Iowa Tribe of Kansas and Nebraska
30	Not Consulting	Iowa Tribe of Oklahoma
31	Not Consulting	Jena Band of Choctaw Indians, Louisiana
32	Consulting	Kaw Nation, Oklahoma
33	Undecided	Kialegee Tribal Town, Oklahoma
34	Undecided	Kickapoo Traditional Tribe of Texas
35	Undecided	Kickapoo Tribe of Indians of the Kickapoo Reservation in Kansas
36	Consulting	Kiowa Indian Tribe of Oklahoma

TABLE 1
Indian Tribes Consulted under Section 106 for the Proposed Project

	Interested/Consulting Party	Indian Tribe
37	Consulting	Lower Brule Sioux Tribe of the Lower Brule Reservation, South Dakota
38	Undecided	Lower Sioux Indian Community in the State of Minnesota
39	Undecided	Match-e-be-nash-she-wish Band of Pottawatomi Indians of Michigan (aka Gun Lake Potawatomi)
40	Not Consulting	Mille Lacs Band of Minnesota Chippewa Tribes, Minnesota
41	Undecided	Modoc Tribe of Oklahoma
42	Consulting	Nez Perce Tribe, Idaho
43	Consulting	Northern Cheyenne Tribe of the Northern Cheyenne Indian Reservation, Montana
44	Undecided	Nottawaseppi Huron Band of the Potawatomi, Michigan (aka Huron Potawatomi Nation)
45	Consulting	Oglala Sioux Tribe of the Pine Ridge Reservation, South Dakota
46	Consulting	Omaha Tribe of Nebraska
47	Consulting	Osage Nation, Oklahoma
48	Undecided	Otoe-Missouria Tribe of Indians, Oklahoma
49	Consulting	Pawnee Nation of Oklahoma
50	Consulting	Poarch Band of Creek Indians of Alabama
51	Consulting	Pokagon Band of Potawatomi Indians, Michigan and Indiana
52	Undecided	Ponca Tribe of Indians of Oklahoma
53	Consulting	Ponca Tribe of Nebraska
54	Undecided	Prairie Band of Potawatomi Nation, Kansas
55	Not Consulting	Prairie Island Indian Community in the State of Minnesota
56	Consulting	Red Lake Band of Chippewa Indians, Minnesota
57	Consulting	Rosebud Sioux Tribe of the Rosebud Indian Reservation, South Dakota
58	Undecided	Sac & Fox Nation of Missouri in Kansas and Nebraska
59	Undecided	Sac & Fox Nation, Oklahoma
60	Consulting	Sac & Fox Tribe of the Mississippi in Iowa
61	Consulting	Santee Sioux Nation, Nebraska
62	Not Consulting	Seneca-Cayuga Tribe of Oklahoma
63	Undecided	Shakopee Mdewakanton Sioux Community of Minnesota
64	Undecided	Shoshone Tribe of the Wind River Reservation, Wyoming (aka Eastern Shoshone Tribe)
65	Consulting	Shoshone-Bannock Tribes of the Fort Hall Reservation of Idaho
66	Consulting	Sisseton-Wahpeton Oyate of the Lake Traverse Reservation, South Dakota
67	Consulting	Skull Valley Band of Goshute Indians of Utah
68	Consulting	Southern Ute Indian Tribe of the Southern Ute Reservation, Colorado
69	Undecided	Spirit Lake Tribe, North Dakota

TABLE 1
Indian Tribes Consulted under Section 106 for the Proposed Project

	Interested/Consulting Party	Indian Tribe
70	Consulting	Standing Rock Sioux Tribe of North & South Dakota
71	Not Consulting	Stockbridge Munsee Community, Wisconsin
72	Undecided	Thlopthlocco Tribal Town, Oklahoma
73	Undecided	Three Affiliated Tribes of the Fort Berthold Reservation, North Dakota
74	Consulting	Tonkawa Tribe of Indians of Oklahoma
75	Undecided	Turtle Mountain Band of Chippewa Indians of North Dakota
76	Not Consulting	United Keetoowah Band of Cherokee Indians in Oklahoma
77	Undecided	Upper Sioux Community, Minnesota
78	Undecided	Ute Indian Tribe of the Uintah & Ouray Reservation, Utah (aka Ute Indian Tribe, also Northern Ute Tribe)
79	Undecided	Ute Mountain Tribe of the Ute Mountain Reservation, Colorado, New Mexico and Utah
80	Not Consulting	White Earth Band of Minnesota Chippewa Tribes, Minnesota
81	Undecided	Wichita and Affiliated Tribes (Wichita, Keechi, Waco & Tawakonie), Oklahoma
82	Not Consulting	Winnebago Tribe of Nebraska
83	Consulting	Yankton Sioux Tribe of South Dakota
84	Consulting	Ysleta Del Sur Pueblo of Texas

To facilitate consulting party participation in Section 106 consultation, DOS has conducted government-to-government and agency consultation meetings along the proposed Project route. Meetings were held in Rapid City, South Dakota (May and July 2009) in Pierre, South Dakota (February 2010), in Billings, Montana (October 2009 and June 2010), and near Malta, Montana (October 2009). Gulf Coast Segment meetings were held in Oklahoma City, Oklahoma (May and July 2009), in Dallas, Texas (November 2009) and in Tulsa, Oklahoma (June 2010). Transcripts for all of the meetings held to date have been prepared and distributed to the consulting parties. DOS also held a Section 106 consultation meeting in Washington, D.C. in December 2010. A list of consultation meetings is included in Table 2.

The following are general issues and concerns commonly expressed by the tribes through letters, emails, phone calls, and at consultation meetings to date that have informed the Final Supplemental EIS' analysis:

- The Department's tribal consultation process and plan;
- Previous and future TCP studies;
- Previous and future cultural resources surveys;
- Tribal role in identification and evaluation of cultural resources;
- Status of the PA and how it may or may not be amended;

- Non-cultural resources impacts of the proposed Project (e.g., potential releases, environmental impacts such as surface and groundwater and natural resources, tribal socioeconomics, environmental justice);
- Impacts to the environment and Indian tribes in Canada; and
- Economic opportunities for tribal members during construction of the proposed Project.

The Department has gathered these issues and concerns and has evaluated opportunities to address them as part of the tribal consultation and cultural resources processes.

TABLE 2
List of DOS Group Consultation Meetings and Webinars with Indian Tribes

Date	Place	Indian Tribes Present	Agencies Represented[a,b]
May 12, 2009	Rapid City, SD	Ponca Tribe of NE, Standing Rock Sioux, Cheyenne River Sioux, Rosebud Sioux, Santee Sioux, Sisseton Wahpeton Oyate, Oglala Sioux, Iowa Tribe of KS and NE	BIA, BLM, NPS, USACE, SD SHPO, DOS
May 14, 2009	Oklahoma City, OK	Osage Nation, Kickapoo, Cheyenne-Arapaho, Pawnee Nation of Oklahoma, Kickapoo Tribe in Kansas, Caddo Nation, Delaware Nation, Muscogee Nation, Absentee-Shawnee	USACE, OK SHPO, DOS
July 14, 2009	Rapid City, SD	Fort Peck, Lower Sioux, Ponca Tribe, Northern Cheyenne, Rosebud Sioux, Cheyenne River Sioux, Three Affiliated Tribes, Mille Lacs Band of Ojibwe, Kickapoo Tribe in Kansas	USACE, Western, MT DEQ, BLM, DOS
July 28, 2009	Oklahoma City, OK	Pawnee Nation of Oklahoma, Iowa Tribe of KS and NE, Alabama Coushatta Tribe, Muscogee Nation, Osage Nation, Kaw Nation, Choctaw Nation, Delaware Nation, Kickapoo Tribe KS, Absentee Shawnee Tribe	USACE, NPS, OK SHPO, DOS
October 7, 2009	Webinar	Cheyenne River Sioux Tribe, Osage Nation of Oklahoma, Pawnee Nation of Oklahoma, Rosebud Sioux Tribe, Sisseton-Wahpeton Oyate Sioux, Turtle Mountain Band of Chippewa	Reclamation, BLM, MT DEQ, USACE, Texas Historical Commission
October 20-21, 2009	Billings, MT	Blackfeet Nation, Chippewa-Cree, Spirit Lake, Lower Sioux Indian Community, Yankton Sioux, Cheyenne River Sioux, Rosebud Sioux, Standing Rock Sioux, Turtle Mountain Band of Chippewa, Mille Lacs Band of Ojibwe, Osage Nation, Fort Belknap, Northern Cheyenne	BLM, USACE, BIA, Western, DOS, Montana SHPO, MT DEQ
October 22, 2009	Malta, MT (vicinity)	Chippewa-Cree, Blackfeet	MT DEQ, DOS
November 12-13, 2009	Dallas, TX	Kaw Nation, Choctaw, Pawnee Nation, Kialegee Tribal Town, Muscogee (Creek) Nation, Osage nation, Alabama-Coushatta Tribe, Absentee Shawnee Tribe, Lower Sioux	USACE, NPS, DOS
February 25, 2010	Pierre, SD	Lower Brule Tribe	Western, BEPC
June 22-23, 2010	Billings, MT	Chippewa-Cree, Blackfoot Tribe, Standing Rock Sioux, Turtle Mountain, Northern Arapaho, Ft. Peck Tribes, Mille Lacs, Ponca Tribe, Yankton Sioux	BLM, USACE, BEPC, DOS

TABLE 2
List of DOS Group Consultation Meetings and Webinars with Indian Tribes

Date	Place	Indian Tribes Present	Agencies Represented[a,b]
June 23, 24, 2010	Tulsa, OK	Pawnee Nation, Alabama Coushatta Tribe, Choctaw, Kaw Nation, Muscogee Nation, Osage, Sac and Fox Nation	USACE, DOS
June 23, 2010	Tulsa, OK	Pawnee Nation	DOS
December 7, 2010	Washington, D.C.	Alabama Coushatta, Blackfeet, Chippewa Cree, Choctaw, Fort Peck Tribe, Iowa Nation, Kilagee (Creek) Nation, Northern Arapaho, Osage, Pawnee Nation, Sac and Fox Nation, Yankton Sioux	ACHP, BIA, USACE, Western, EPA, USDA FSA, BLM, MTDEQ, DOS, CEQ
December 8, 2010	Washington, DC	Pawnee Nation	USACE, Nebraska SHPO, DOS
March 30, 2011	Rapid City, SD	Cheyenne River	South Dakota SHPO, DOS
October 22, 2012	Billings, MT	Blackfeet, Chippewa-Cree, Crow Tribe, Northern Cheyenne, Yankton Sioux	DOS
October 24, 2012	Pierre, SD	Cheyenne River, Crow Creek, Standing Rock, Yankton	DOS
October 26, 2012	Lincoln, NE	Fort Peck, Kaw Nation, Pawnee Nation, Ponca (Nebraska)	DOS
May 16, 2013	Rapid City, SD	Chippewa-Cree, Fort Peck, Mille Lacs, Northern Arapaho, Northern Cheyenne, Oglala, Omaha, Pokagon, Ponca (Nebraska), Red Lake, Yankton	BIA, BLM, DOS, NRCS, South Dakota SHPO, USACE
July 31, 2013	Conference Call	Chippewa-Cree, Choctaw, Goshute, Oglala, Nez Perce, Pawnee, Shoshone-Bannock, Standing Rock, Yankton	ACHP, BLM, DOS, MT DEQ, NRCS, RUS, USACE, Western

[a] Representatives from TransCanada have attended several of the tribal consultation meetings at the request of tribes. Meetings attended by TransCanada include May 14, 2009, October 20-21, 2009, November 12-13, 2009, June 22-25, 2010, September 9, 2010, December 7, 2010, and December 8, 2010.

[b] Project specialists from Cardno-ENTRIX or Environmental Resources Management attended all tribal consultation meetings.

The Indian tribes listed in Table 3 have expressed an interest in conducting TCP studies within the proposed Project APE. When scopes of work (SOW) has been submitted, DOS reviewed and approved the SOWs and draft reports provided by the Indian tribes. Eight Indian tribes withdrew offers to complete the TCP studies. Seven of the eight remaining studies have subsequently been completed and finalized. DOS continues to consult with the Indian tribes in regards to recommendations made in these reports concerning the eligibility of a historic property and/or proposed Project effects. DOS will make determinations of eligibility and proposed Project effect and attempt to resolve any adverse effects to historic properties.

TABLE 3
List of Indian Tribes that Expressed an Interest in Conducting Traditional Cultural Property Studies

Tribe	Date of Contact	Date SOW Received	Date of Response	Date TCP Received	Date TCP Accepted

TABLE 3
List of Indian Tribes that Expressed an Interest in Conducting Traditional Cultural Property Studies

Tribe	Date of Contact	Date SOW Received	Date of Response	Date TCP Received	Date TCP Accepted
Arapahoe Tribe of the Wind River Reservation, Wyoming	10/26/2009	1/8/2010	1/20/2010	10/10/2010	12/01/2010
Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation, Montana	8/10/2009	11/20/2009	11/30/2009	Chose Not to Participate	N/A
Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation, Montana	9/10/2013	Chose Not to Participate	N/A	N/A	N/A
Blackfeet Tribe of the Blackfeet Indian Reservation of Montana	8/18/2009	8/24/2009	9/14/2009	12/15/2009	1/25/2010
Cheyenne and Arapaho Tribes, Oklahoma	8/14/2009	8/24/2009	9/14/2009	1/01/2010	4/16/2010
Chippewa-Cree Indians of the Rocky Boy's Reservation, Montana	8/1/2013	08/10/2013	08/14/2013	Chose Not to Participate	N/A
Fort Belknap Indian Community of the Fort Belknap Reservation of Montana	8/1/2013	Chose Not to Participate	N/A	N/A	N/A
Lower Sioux Indian Community in the State of Minnesota	8/4/2009	8/11/2009	9/14/2009	Chose Not to Participate	N/A
Ponca Tribe of Nebraska	4/16/2013	Chose Not to Participate	N/A	N/A	N/A
Pawnee Nation of Oklahoma	9/11/2009	9/1/2009	9/14/2009	4/12/2010	5/25/2010
Pawnee Nation of Oklahoma	8/15/2013	Chose Not to Participate	N/A	N/A	N/A
Rosebud Sioux Tribe of the Rosebud Indian Reservation, South Dakota	11/12/2009	11/20/2009	11/30/2009	Chose Not to Participate	N/A
Santee Sioux Nation, Nebraska	4/16/2013	Pending	Pending	Pending	Pending
Spirit Lake Tribe, North Dakota	8/11/2009	8/11/2009	9/14/2009	10/01/2010	3/17/2010
Turtle Mountain Band of Chippewa Indians of North Dakota	8/11/2009	9/22/2009	9/24/2009	6/2010	8/30/2010
Yankton Sioux Tribe of South Dakota	8/13/2009	1/13/2010	1/20/2010	3/17/2011	4/18/2011

Federal and State Agency Consultation

Consistent with NEPA and Section 106, DOS has consulted with federal agencies whose participation in the proposed Project was considered an undertaking. These agencies include

BLM, the Bureau of Reclamation (Reclamation), Western, RUS, NRCS, FSA, BIA, and USACE.[1] The ACHP has also formally entered into consultation with DOS. DOS has also consulted with the NPS due to agency interest in the proposed Project. In coordination with DOS, each of these agencies is reviewing the cultural resource findings as appropriate given their Section 106 responsibilities.

DOS is also consulting with state agencies, including the SHPOs in the states crossed by the proposed Project corridor as well as the Montana DNRC and the Montana DEQ, who is the lead for the Montana Environmental Policy Act (MEPA). Consultation has occurred with these groups in person as well as by email, and teleconference. Several agencies have attended the agency and tribal Section 106 consultation meetings as listed in Table 2.

[1] In addition to the tribal consultation process conducted by the Department, other federal agencies with individual permitting and authorization responsibilities would be conducting separate government-to-government tribal consultation efforts. For instance, prior to any work taking place on USACE lands, the notification and consultation procedures spelled out in the Missouri River PA would be followed.

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ATTACHMENT H

Project Maps

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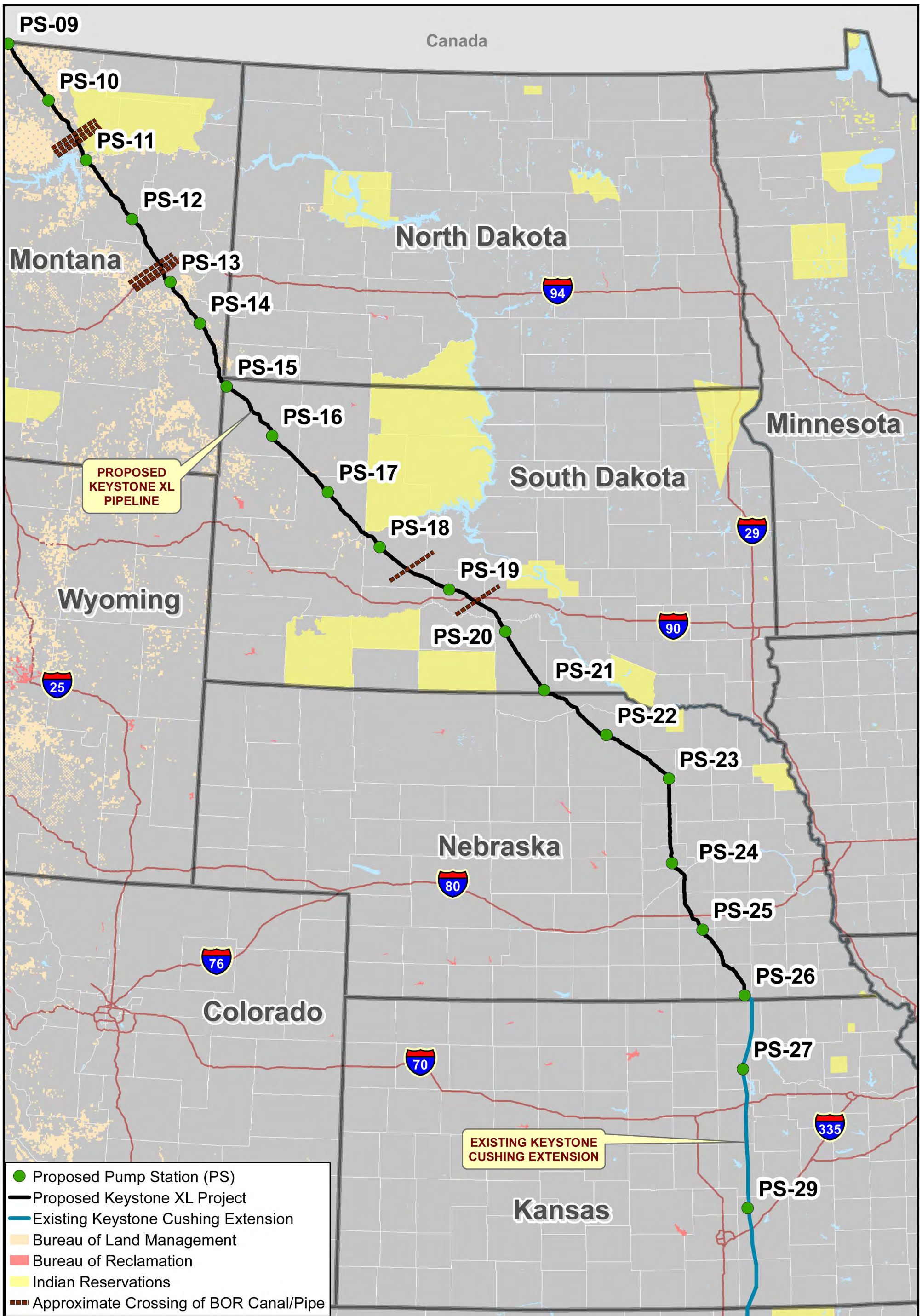

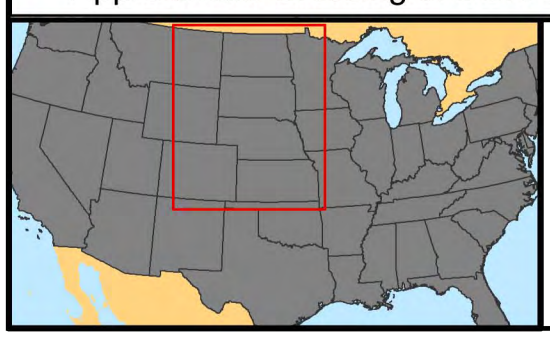

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PROPOSED
KEYSTONE XL PROJECT

Figure 1

Project Overview

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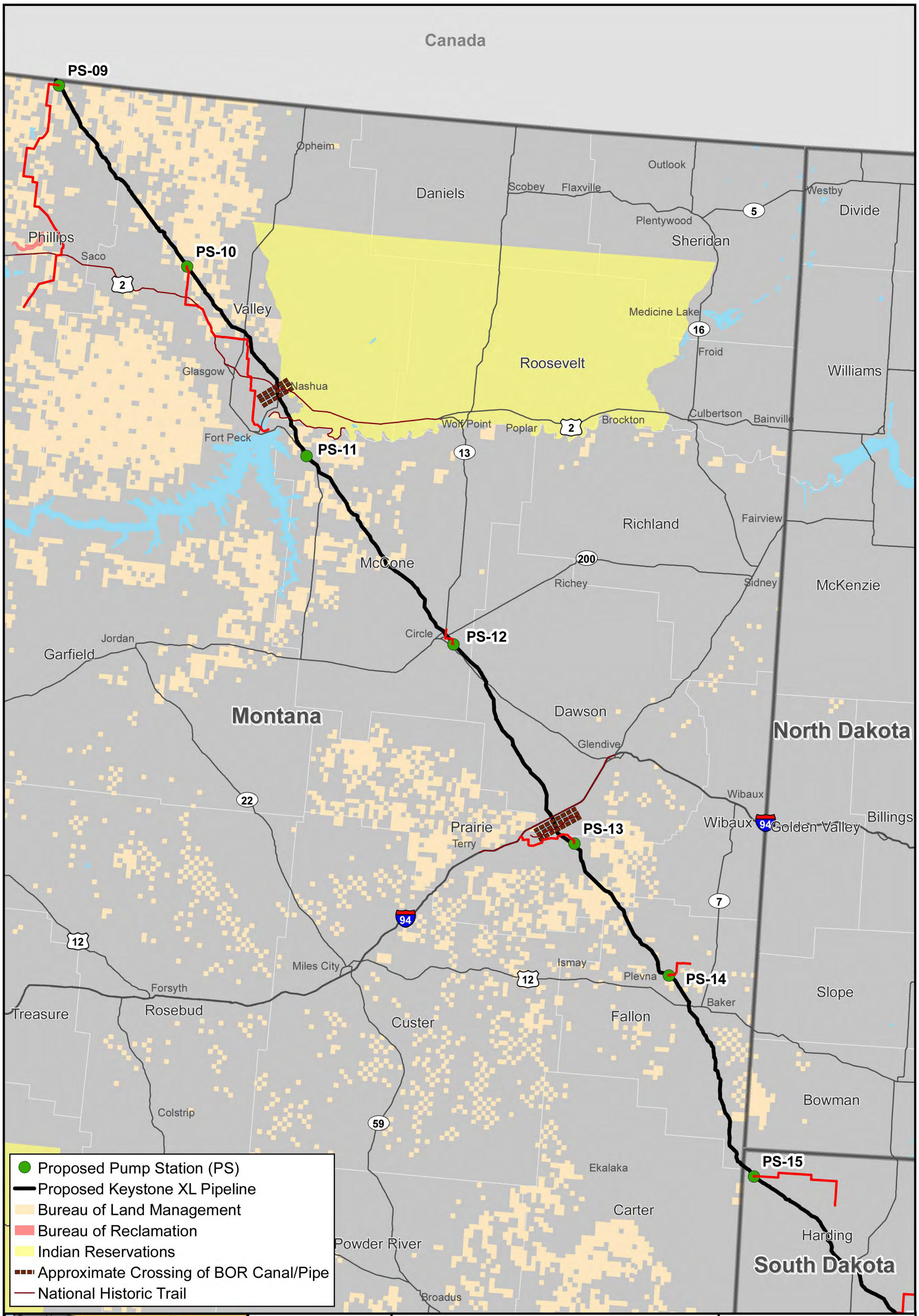

PROPOSED KEYSTONE XL PROJECT

Figure 2

Project Overview (Montana)

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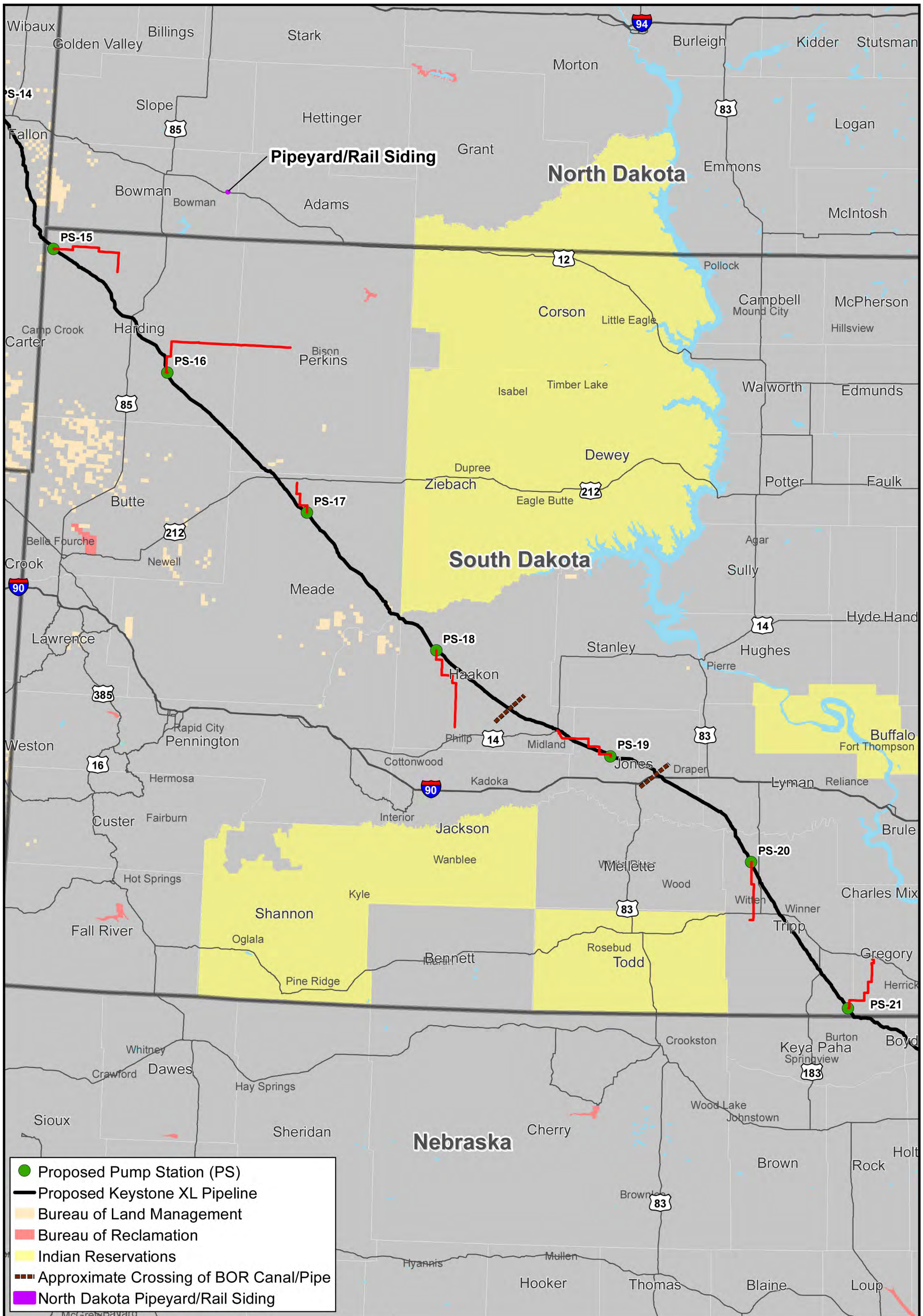

PROPOSED KEYSTONE XL PROJECT

Figure 3

Project Overview (North Dakota & South Dakota)

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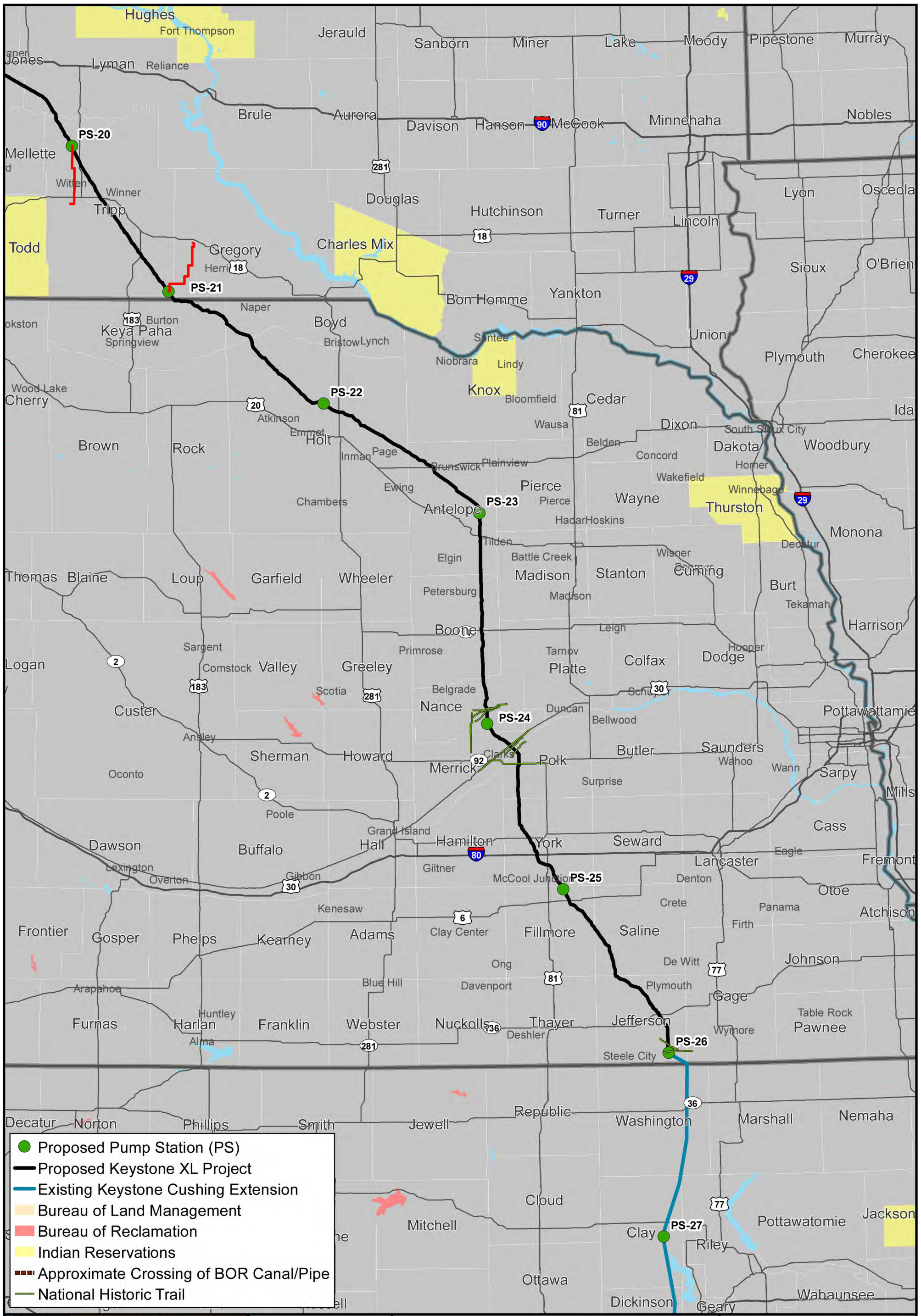

PROPOSED KEYSTONE XL PROJECT

Figure 4

Project Overview (Nebraska)

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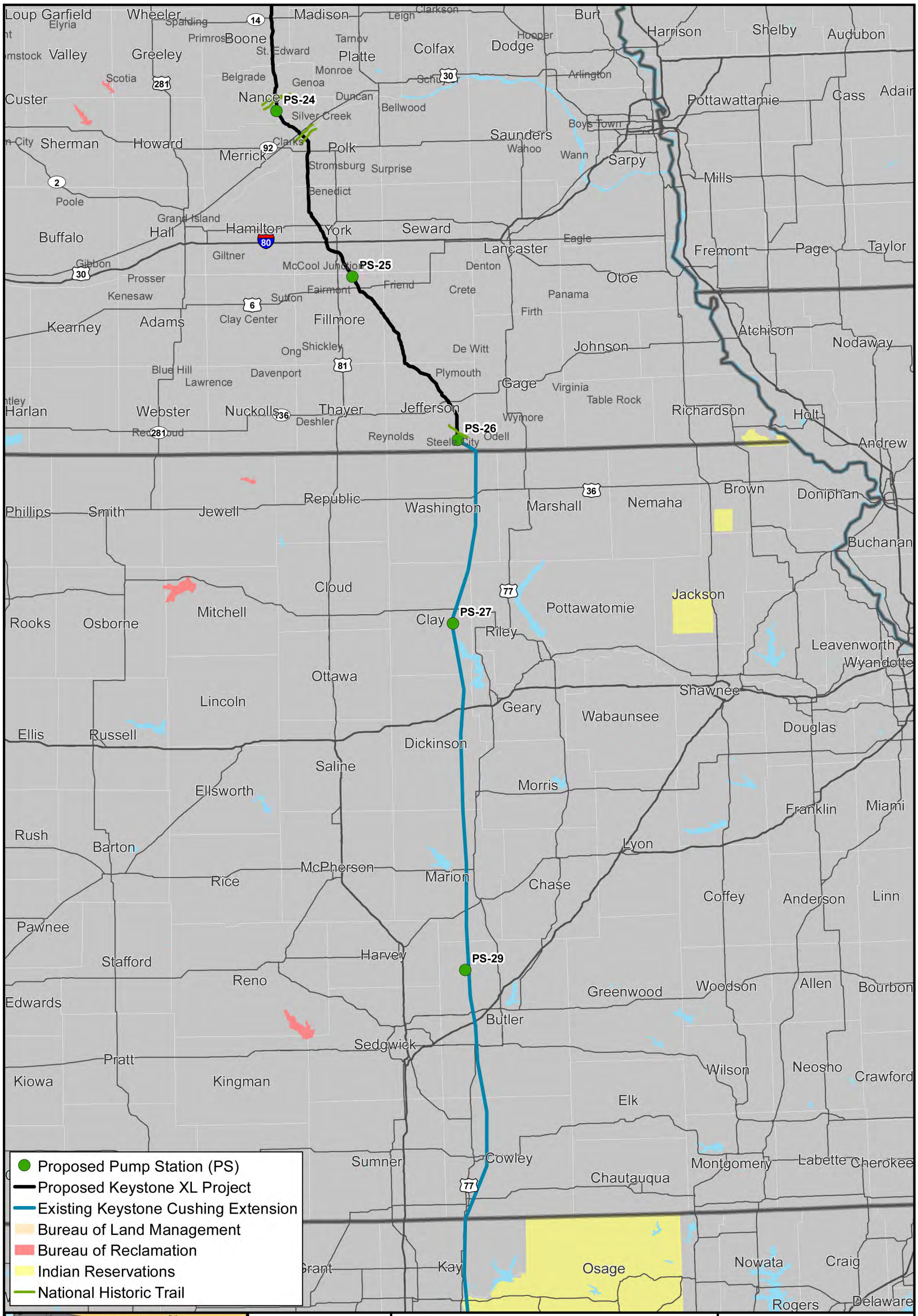

PROPOSED KEYSTONE XL PROJECT

Figure 5

Project Overview (Kansas)

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ATTACHMENT I

Summary of Government-to-Government Consultation with Indian Tribes Since September 2012

Starting on September 21, 2012, the Department of State (DOS) notified the 84 Indian tribes listed in Appendix B of its intent to amend the Keystone XL Programmatic Agreement (PA) to reflect changes to the proposed Keystone XL Project's route in Keystone's 2012 Presidential permit application. The DOS had previously consulted with these Indian tribes while preparing the Final Environmental Impact Statement (Final EIS) for the Keystone XL pipeline route as described in Keystones 2008 Presidential permit application. The DOS consulted with 67 Indian tribes, listed in Attachment D, on a government-to-government basis and regularly informed all 67 Indian tribes of the progress on amending the PA. All Indian tribes that participated in consultation were invited in 2013 to sign as Concurring Parties to the Programmatic Agreement, consistent with 36 C.F.R. §§ 800.2(c)(2) and 800.6(c)(3). [Number TBD] Indian tribes informed the DOS that they would like to sign as Concurring Parties.

Of the 67 Indian tribes with which the DOS consulted, the DOS met with 17 Indian tribes, listed below, to discuss the proposed Project and its potential impacts on the environment, cultural resources, and other resources of concern to the consulting Indian tribes. The DOS gave Indian tribes the opportunity to review the proposed Project cultural resources survey reports. On several occasions, the DOS conveyed an invitation to Indian tribes to conduct applicant-funded Traditional Cultural Property (TCP) studies within the proposed Project area of potential effects (APE). All Indian tribes that expressed an interest and provided the necessary documentation were afforded an opportunity to conduct TCP studies within the proposed Project APE. Attachment G lists Indian tribes that submitted scopes of work to conduct TCP studies. The DOS also invited Indian tribes to help develop and participate in the Tribal Monitoring Plan (Attachment E).

In addition to communication by phone, email, and letter, Principal Deputy Assistant Secretary Judith Garber and other DOS officials travelled to areas near the proposed Project route to hold four face-to-face consultations, to which all Indian tribes were invited and whose participation was funded by the applicant. Indian tribes that participated in these meetings and a follow-up teleconference are listed below.

1. **Billings, Montana – October 22, 2012**
   Attended by 5 Indian tribes: Blackfeet Tribe (3 representatives), Chippewa Cree Tribe (4 representatives), Crow Tribe (1 representative), Northern Cheyenne Tribe (1 representative), and Yankton Sioux Tribe (3 representatives).

2. **Pierre, South Dakota – October 24, 2012**
   Attended by 4 Indian tribes: Cheyenne River Sioux Tribe (2 representatives), Crow Creek Sioux Tribe (2 representatives), Standing Rock Sioux Tribe (1 representative), and Yankton Sioux Tribe (2 representatives).

3. **Lincoln, Nebraska – October 26, 2012**

Attended by 4 Indian tribes: Assiniboine and Sioux Tribes (2 representatives), Kaw Nation (1 representative), Pawnee Nation (4 representatives), and Ponca Tribe of Nebraska (3 representatives).

4. **Rapid City, South Dakota – May 16, 2013**
   Representatives of 10 Indian tribes (Northern Arapaho Tribe, Assiniboine and Sioux Tribes, Oglala Sioux Tribe, Yankton Sioux Tribe, Mille Lacs Band of Minnesota Chippewa Tribes, Northern Cheyenne Tribe, Omaha Tribe, Pokagon Band of Potawatomi Indians, Ponca Tribe of Nebraska, and Red Lake Band of Chippewa Indians) were seated for the consultation with Department of State representatives. The meeting could not proceed due to a demonstration.

5. **Teleconference – July 31, 2013**
   Representatives of 9 Indian tribes identified themselves in this call: Chippewa Cree Tribe, Choctaw Nation, Confederated Goshute Tribe, Nez Perce Tribe, Oglala Sioux Tribe, Pawnee Nation of Oklahoma, Shoshone-Bannock Tribes, Standing Rock Sioux Tribe, and Yankton Sioux Tribe.

APPENDIX E

Amended Programmatic Agreement and Record of Consultation

E2 Record of Consultation

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Record of Consultation: Indian Tribes and Nations

Indian Tribe or Nation	State	Letters	Telephone	Emails	Faxes	Meetings
Absentee-Shawnee Tribe of Indians of Oklahoma	OK	1/30/09; 3/30/09; 4/1/09; 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/18/09, 6/22/11; 10/9/12; 10/16/12	5/4/09; 5/11/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 8/21/09; 8/24/09; 9/1/09; 9/10/09; 9/14/09; 9/30/09; 10/7/09; 10/9/09; 10/12/09; 10/13/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		5/14/09; 7/28/09; 11/12/09
Alabama-Coushatta Tribes of Texas	TX	1/30/09; 2/20/09; 3/30/09; 4/22/09; 5/4/09; 6/3/09; 6/18/09; 7/9/09; 7/13/09; 9/8/09; 9/10/09; 9/14/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 3/23/10; 4/5/10; 6/9/10; 6/14/10; 7/20/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 4/18/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/9/13; 12/24/13	3/18/09; 7/1/09; 1/12/10; 5/4/10; 7/19/10; 11/19/10; 4/13/11; 5/4/11; 6/23/11 (2); 6/24/11; 6/27/11; 10/9/12; 10/16/12; 10/19/12	4/7/09; 5/4/09; 5/7/09; 6/25/09; 6/29/09; 7/1/09; 7/6/09;7/10/09; 7/13/09; 8/4/09; 8/13/09 (2); 8/24/09 (2); 9/1/09; 9/10/09; 9/15/09; 9/30/09; 10/5/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/10/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 1/15/10; 1/22/10; 2/19/10; 1/26/10; 2/23/10; 3/16/10; 3/22/10; 3/31/10; 5/4/10; 5/6/10; 5/15/10; 5/28/10; 6/2/10; 6/4/10; 6/21/10; 6/22/10; 6/23/10; 6/29/10; 7/6/10; 7/12/10; 7/16/10; 7/19/10; 7/20/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/9/10; 11/11/10; 11/19/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/11/11; 2/22/11;3/18/11; 3/29/11; 4/18/11; 4/26/11; 4/28/11; 4/28/11; 5/4/11; 6/2/11; 6/6/11; 6/8/11; 6/21/11; 6/20/11; 6/24/11 (3); 6/30/11 (3); 7/1/11; 7/8/11; 7/12/11; 7/20/11; 7/22/11; 7/26/11 (4); 10/10/12; 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13	7/10/09	7/28/09; 11/12/09; 7/24/10; 7/25/10; 12/7/10
Alabama-Quassarte Tribal Town, Oklahoma	OK	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/9/12	03/19/09			
Apache Tribe of Oklahoma	AZ	1/30/09; 3/30/09; 4/1/09; ; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/18/09; 10/9/12; 10/16/12			
Arapahoe Tribe of the Wind River Reservation, Wyoming (aka Northern Arapaho Tribe)	WY	1/30/09; 3/30/09; 4/1/09; 11/17/09; 11/18/09; 11/30/09; 12/24/09; 12/31/09; 1/10/10; 1/20/10 1/27/10; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/18/09; 10/7/09; 10/13/09; 10/14/09; 10/19/09; 11/10/09; 12/1/09; ; 12/15/09; 12/17/09; 3/15/10; 3/22/10; 6/10/10; 11/22/10; 10/9/12; 10/16/12	11/7/09; 11/25/09; 11/30/09; 12/1/09; 12/11/09; 12/15/09; 12/21/09; 12/22/09; 12/31/09; 1/19/10; 1/20/10; 1/21/10; 1/22/10; 1/26/10; 1/27/10; 2/2/10; 2/5/10; 2/8/10; 3/12/10; 3/18/10; 3/31/10; 5/5/10; 5/6/10; 6/2/10; 6/4/10; 6/15/10; 6/16/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 9/3/10; 10/1/10 ; 10/15/10; 10/21/10; 10/22/10; 11/2/10; 11/3/10; 11/11/10; 11/15/10; 11/24/10; 12/2/10; 12/7/10; 12/8/10; 12/14/10; 12/20/10; 12/22/10; 12/29/10; 1/12/11; 1/27/11; 1/28/11; 2/11/11; 2/16/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 4/20/11; 4/26/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 8/1/11; 8/3/11 (2); 10/17/12 (2); 10/18/12; 10/20/12; 10/22/12; 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 5/13/13; 5/14/13; 5/21/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13	12/1/09	7/22/10; 7/23/10; 12/7/10; 5/16/13
Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation, Montana (aka Fort Peck Tribes)	MT	1/30/09; 3/30/09; 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 11/30/09; 12/24/09; 12/31/09; 7/23/10; 11/24/10; 12/9/10; 3/8/11; 5/3/11; 5/4/11; 6/28/11; 9/21/12 (3); 10/11/12 (3); 3/20/13 (3); 5/1/13 (3); 6/14/13 (3); 7/17/13 (3); 12/24/13	3/19/09; 5/7/09; 10/13/09 (2); 10/26/09; 11/3/09; 11/4/09; 11/18/09 (2); 6/9/10; 11/15/10; 11/18/10; 3/8/11; 7/13/11 (2); 7/14/11; 10/9/12 (2); 10/16/12 (2); 1/17/13; 3/29/13; 8/12/13; 11/27/13	3/20/09 (2); 4/22/09; 5/4/09; 6/18/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09 (2); 8/10/09; 8/11/09; 8/12/09; 8/13/09 (2); 9/10/09; 9/28/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09 (2); 11/11/09; 11/17/09; 11/20/09 (4); 12/31/09; 2/2/10; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10 (2); 7/16/10 (4); 7/23/10 (2); 8/10/10; 10/15/10 (2); 10/21/10; 11/3/10; 11/11/10; 11/24/10 (2); 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 4/25/11 (3); 5/3/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/13/11 (3); 7/20/11; 7/22/11; 10/16/12; 11/2/12; 11/8/12; 3/4/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 5/8/13 (3); 6/14/13; 7/11/13; 7/16/13; 7/31/13; 11/27/13; 12/23/13		7/14/09; 7/22/10; 7/23/10; 12/7/10; 10/26/12; 05/16/13

Record of Consultation: Indian Tribes and Nations

Indian Tribe or Nation	State	Letters	Telephone	Emails	Faxes	Meetings
Blackfeet Tribe of the Blackfeet Indian Reservation of Montana	MT	1/30/09; 2/18/09; 3/12/09; 3/30/09; 4/1/09; 4/15/09; 4/22/09; 5/13/09; 6/3/09; 6/18/09; 7/13/09; 8/24/09; 9/8/09; 9/10/09; 9/14/09; 9/28/09; 11/17/09; 11/18/09; 12/15/09; 12/24/09; 12/31/09; 1/25/10; 7/23/10; 11/24/10; 12/9/10; 3/8/11; 4/26/11; 5/3/11; 5/4/11; 6/28/11; 10/17/11; 9/21/12 (3); 10/11/12 (3); 3/20/13 (3); 5/1/13 (3); 6/14/13 (3); 7/17/13 (3); 12/24/13	8/18/09; 8/21/09; 0/8/09; 10/13/09; 10/21/09; 11/10/09; 11/11/09; 11/13/09; 6/10/10; 7/13/10; 10/17/10; 11/17/10; 5/17/11; 6/7/11; 11/1/11; 10/9/12; 10/10/12; 10/16/12	2/23/09 (2); 4/22/09; 5/4/09; 6/18/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09 (2); 8/13/09; 8/21/09 (2); 8/24/09 (3); 8/25/09; 8/27/09; 8/31/09 (2); 9/3/09; 9/8/09; 9/9/09 (2); 9/10/09 (2); 9/15/09; 9/28/09; 9/30/09 (2); 10/7/09; 10/9/09; 10/12/09; 10/13/09; 10/14/09 (4); 10/19/09; 10/21/09; 10/26/09; 11/2/09 11/3/09; 11/7/09; 11/9/09; 11/11/09; 11/12/09; 11/17/09; 11/20/09; 12/11/09 12/15/09; 12/16/09 (2); 12/17/09; 12/29/09; 12/31/09; 1/4/10; 1/6/10; 1/19/10; 1/25/10; 2/4/10; 3/10/10; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/11/10; 6/16/10; 6/18/10; 6/21/10 (2); 6/22/10; 6/23/10; 7/6/10; 7/12/10 (2); 7/16/10 (4); 7/23/10; 8/10/10; 10/15/10 (2); 10/21/10; 11/3/10; 11/11/10; 11/15/10; 11/24/10 (2); 11/28/10; 12/2/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/11/11; 2/22/11; 3/18/11; 3/29/11 (2); 4/18/11; 4/25/11 (2); 4/26/11 (2); 5/3/11; 6/2/11 (2); 6/3/11 (3); 6/7/11; 6/17/11; 6/19/11; 6/20/11; 6/22/11 (4); 6/27/11; 6/29/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 8/1/11; 8/5/11; 10/17/11; 10/18/11 (2); 10/25/11; 10/27/11 (2); 10/31/11 (4); 11/1/11; 10/9/12; 10/16/12 (3); 11/2/12; 11/8/12; 3/4/13; 4/3/13; 4/4/13 (2); 4/9/13 (2); 4/17/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		10/20/09; 10/22/09; 7/22/10; 7/23/10; 12/7/10; 10/22/12
Cherokee Nation, Oklahoma	OK	1/30/09; 3/30/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/18/09; 10/9/12; 10/16/12	5/4/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 10/9/12 (2); 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		
Cheyenne and Arapaho Tribes, Oklahoma	OK	1/30/09; 3/30/09; 4/1/09; 4/22/09; 5/7/09; 5/22/09 ; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 3/16/10; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/18/09; 11/9/09; 11/13/09; 1/14/10; 5/4/10; 10/9/12; 10/16/12	5/4/09; 5/7/09; 5/22/09; 6/25/09; 6/29/09; 6/30/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 8/14/09 (3); 9/1/09; 9/10/09; 9/15/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/12/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 1/14/10; 1/30/10; 2/26/10; 3/1/10; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/19/10; 7/20/10; 7/23/10; 8/10/10; 8/11/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/11/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11 (3); 7/22/11		5/14/09
Cheyenne River Sioux Tribe of the Cheyenne River Reservation, South Dakota	SD	1/30/09; 3/30/09; 4/1/09; ; 4/22/09; 6/3/09; 6/18/09; 7/13/09; 7/21/09; 9/8/09; 9/10/09; 9/14/20009; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 4/14/11; 4/18/11; 6/22/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/18/09; 10/13/09; 4/25/11; 4/29/11; 10/9/12; 10/16/12	5/4/09; 5/1/09; 5/26/09; 6/15/09; 6/22/09; 6/25/09; 6/29/09; 7/1/09; 7/6/09; 7/9/09; 7/13/09; 8/4/09; 8/13/09; 8/27/09; 8/28/09; 9/1/09; 9/2/09; 9/10/09; 9/14/09; 9/30/09; 10/7/09; 10/9/09; 10/13/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/19/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/11/11; 4/14/11; 4/15/1 (2); 4/18/11 (2); 4/19/11; 4/25/11 (3); 4/26/11 (2); 4/27/11; 6/6/11; 6/21/11; 6/22/11 (2); 6/30/11 (3); 7/22/11; 7/27/11; 10/16/12 (2); 10/17/12 (2); 10/23/12; 11/2/12; 11/8/12; 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/17/13; 7/31/13; 12/23/13		5/12/09; 7/14/09; 10/20/09; 10/24/12
Chickasaw Nation, Oklahoma	OK	1/26/10; 1/30/09; 3/30/09; 4/1/09; 1/26/10; 9/21/12; 10/11/12; 10/31/12	3/18/09; 3/20/09; 4/1/09; 10/9/12; 10/16/12	1/20/10; 1/26/10		

Record of Consultation: Indian Tribes and Nations

Indian Tribe or Nation	State	Letters	Telephone	Emails	Faxes	Meetings
Chippewa-Cree Indians of the Rocky Boy's Reservation, Montana	MT	1/30/09; 3/30/09; 4/1/09 ; 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 1/27/10; 7/23/10; 11/24/10; 12/9/10; 3/8/11; 5/3/11; 5/4/11; 5/16/11; 6/28/11; 10/17/11; 9/21/12 (2); 10/11/12 (2); 3/20/13 (2); 5/1/13 (2); 6/14/13 (2); 7/16/13 (2); 7/17/13 (2); 12/24/13	3/19/09; 10/21/09; 10/26/09; 1/27/10; 6/8/10; 6/18/10; 7/19/10; 11/20/10; 11/22/10; 12/3/10 (2); 6/3/11; 6/23/11; 6/24/11; 6/27/11; 10/9/12; 10/16/12; 2/12/13; 3/14/13; 4/23/13; 8/1/13	5/4/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09 (2); 8/13/09; 9/10/09; 9/28/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 10/26/09; 11/3/09; 11/11/09; 11/17/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/8/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10 (2); 7/16/10 (4); 7/23/10 (2); 8/10/10; 10/15/10 (2); 10/21/10; 11/3/10; 11/11/10; 11/24/10 (2); 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 5/3/11; 5/16/11; 5/20/11 (2); 5/23/11; 6/2/11 (5); 6/3/11; 6/17/11; 6/20/11 (3); 6/23/11 (2); 6/24/11 (2); 6/27/11; 6/28/11 (2); 6/29/11; 7/1/11; 7/8/11 (3); 7/11/11; 7/12/11; 7/20/11; 7/22/11; 8/5/11; 8/11/11 (2); 10/17/11; 10/18/11; 10/27/11; 10/31/11 (4); 11/1/11; 12/11/11; 12/12/11 (2); 10/16/12; 10/19/12; 10/20/12 (2); 11/2/12; 11/8/12 (3); 12/5/12; 12/19/12; 3/4/13; 3/14/13 (2); 4/3/13; 4/4/13; 4/9/13 (2); 4/23/13; 5/7/13 (2); 5/13/13 (3); 5/14/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 8/9/13; 8/10/13 (3); 8/14/13 (4); 12/23/13; 1/10/14		10/20/09; 10/22/09; 7/22/10; 7/23/10; 12/7/10; 10/22/12; 07/31/13
Choctaw Nation of Oklahoma	OK	1/30/09; 3/30/09; 4/1/09; 4/10/09; 4/20/09; 4/22/09; 4/24/09; 5/13/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/9/09; 9/10/09; 9/17/09; 9/28/09; 11/17/09; 11/18/09; 12/2/09; 12/24/09; 12/31/09 ; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/18/09; 4/14/09; 5/22/09; 9/10/09; 9/15/09; 10/20/10; 10/23/10; 7/25/11; 10/10/12; 10/16/12	5/4/09; 6/25/09; 6/29/09 (2); 7/1/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/14/09; 9/30/09; 10/7/09; 10/9/09 (3); 10/19/09;11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/30/10; 3/31/10; 4/5/10; 5/7/10 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/7/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 10/27/10; 11/3/10; 11/9/10; 11/11/10; 11/24/10; 12/3/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 7/25/11 (5); 10/10/12; 10/14/12; 10/17/12 (2); 10/18/12 (2); 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/24/13; 7/30/13; 7/31/13		11/12/09; 7/24/10; 7/25/10; 12/7/10; 7/31/13
Comanche Nation, Oklahoma	OK	1/30/09; 9/21/12; 10/11/12	3/18/09; 10/10/12	3/19/09		
Confederated Salish & Kootenai Tribes of the Flathead Indian Nation, Montana	MT	1/30/09; 3/30/09; 4/1/09; 5/3/11; 9/21/12 (2); 10/11/12 (2)	3/19/09; 10/10/12 (3); 10/16/12 (2); 10/17/12	10/17/12		
Confederated Tribes of the Goshute Reservation, Nevada and Utah	UT	5/9/2013; 6/14/13; 7/17/13; 12/24/13		4/22/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/25/13; 7/30/13 (2); 7/31/13; 8/27/13; 12/23/13		
Crow Creek Sioux Tribe of the Crow Creek Reservation, South Dakota	SD	1/30/09; 2/19/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/23/09; 6/24/11; 10/10/12; 10/16/12	10/17/12 (2); 11/2/12; 11/8/12; 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		10/24/12
Crow Tribe of Montana	MT	1/30/09; 2/18/09; 3/30/09; 4/1/09; 4/7/09; 4/22/09; 5/4/09; 5/5/09; 5/13/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 7/23/10; 11/24/10; 12/9/10; 5/3/11; 6/28/11; 9/21/12 (4); 10/11/12 (4); 3/20/13 (4); 5/1/13 (4); 6/14/13 (4); 7/17/13 (4); 12/24/13	3/18/09; 3/19/09; 3/26/09; 3/29/09; 10/13/09; 10/26/09 (2); 3/8/10; 3/10/10; 3/26/10; 6/24/11; 10/10/12; 10/16/12; 10/17/12	4/22/09; 5/4/09; 6/18/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09 (2); 8/13/09; 9/10/09; 9/14/09; 9/28/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/11/09; 11/17/09; 11/20/09; 12/31/09; 3/29/10; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10 (2); 7/16/10 (4); 7/23/10 (2); 8/10/10; 10/15/10 (2); 10/21/10; 11/3/10; 11/11/10; 11/24/10 (2); 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 10/16/12; 10/19/12; 11/2/12; 11/8/12; 3/4/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/10/13 (2); 7/11/13; 7/16/13; 7/31/13; 12/23/13		10/22/12

Record of Consultation: Indian Tribes and Nations

Indian Tribe or Nation	State	Letters	Telephone	Emails	Faxes	Meetings
Delaware Tribe of Indians, Oklahoma	OK	1/30/09; 3/30/09; 4/1/09; 4/7/09; 4/17/09 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/18/09; 10/10/12; 10/16/12	5/4/09; 4/29/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 10/19/20; 10/20/12; 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13		5/14/09; 7/28/09
Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada	NV	5/9/2013; 6/14/13; 7/17/13; 12/24/13		4/22/2013		
Eastern Band of Cherokee Indians of North Carolina	NC	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 10/10/12; 10/16/12	12/23/13		
Eastern Shawnee Tribe of Oklahoma	OK	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12	3/18/09; 10/10/12; 10/16/12			
Ely Shoshone Tribe of Nevada	NV	5/9/2013; 6/14/13; 7/17/13; 12/24/13		4/22/2013		
Flandreau Santee Sioux Tribe of South Dakota	SD	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 8/14/13	3/23/09; 10/10/12; 10/16/12			
Forest County Potawatomi Community, Wisconsin	WI	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12; 10/30/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 10/10/12; 10/17/12	10/19/12; 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13		
Fort Belknap Indian Community of the Fort Belknap Reservation of Montana (aka Gros Ventre and Assiniboine Tribe of Ft. Belknap)	MT	1/30/09; 2/18/09; 3/30/09; 4/1/09; 4/14/09; 4/22/09; 5/13/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 7/23/10; 11/24/10; 12/9/10; 3/8/11; 5/3/11; 6/28/11; 9/21/12 (4); 10/11/12 (4); 3/20/13 (4); 5/1/13 (4); 6/14/13 (4); 7/17/13 (4); 12/24/13	3/19/09; 10/13/09; 10/16/09; 10/22/09 (2) 10/26/09; 6/28/11; 10/10/12 (2); 10/17/12 (2)	3/20/09; 4/22/09; 5/4/09; 6/18/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09 (2); 8/13/09; 9/10/09; 9/28/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/11/09; 11/17/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10 (2); 7/16/10 (4); 7/23/10 (2); 8/10/10; ; 10/15/10 (4); 10/21/10; 11/3/10; 11/11/10; 11/24/10 (2); 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 5/3/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 10/16/12; 11/2/12; 11/8/12; 3/4/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13		10/20/09
Hannahville Indian Community, Michigan	MI	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 10/17/12			
Ho-Chunk Nation of Wisconsin	WI	1/30/09; 3/30/09; 4/1/09; 4/8/09 5/10/09 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 7/18/11	5/4/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 1/2/10; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/18/11 (6); 7/22/11; 9/26/12; 9/28/12 (2); 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		

Record of Consultation: Indian Tribes and Nations

Indian Tribe or Nation	State	Letters	Telephone	Emails	Faxes	Meetings
Iowa Tribe of Kansas and Nebraska	KS; NE	1/30/09; 3/30/09; 4/1/09 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 11/25/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/20/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 9/25/12; 10/11/12; 9/12/13	3/19/09; 5/5/09	5/4/09; 5/5/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/10/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09;11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/20/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 9/25/12		5/12/09; 7/28/09; 7/24/10; 7/25/10; 12/7/10
Iowa Tribe of Oklahoma	OK	1/30/09; 3/30/09; 4/1/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12	3/24/09	5/4/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 9/27/12		
Jena Band of Choctaw Indians, Louisiana	LA	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12	3/19/09; 10/10/12; 10/17/12	1/7/2013		
Kaw Nation, Oklahoma	OK	1/30/09; 3/30/09; 4/1/09 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/20/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 6/9/10; 10/16/12; 3/29/13; 7/25/13	5/4/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 7/27/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09 (2); 9/30/09; 10/7/09; 10/9/09; 10/19/09; 10/21/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/18/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/20/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 4/22/11; 5/16/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11 (5); 7/22/11; 10/17/12; 11/2/12; 11/8/12; 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/25/13; 7/31/13; 12/23/13		7/28/09; 11/12/09; 10/26/12
Kialegee Tribal Town, Oklahoma	OK	1/30/09; 3/30/09; 4/1/09; 4/6/09; 4/22/09; 6/3/09; 6/18/09; 7/13/09; 8/10/09 9/8/09; 9/10/09; 9/24/09; 9/28/09; 11/17/09; 11/18/09; 11/25/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 11/10/09; 1/14/10; 3/16/10; 11/12/10; 10/16/12	5/4/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 7/15/09 (2); 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/24/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 10/21/09; 11/3/09; 11/4/09; 11/10/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 1/14/10; 2/8/10; 3/12/10; 3/16/10; 3/31/10; 4/9/10; 4/20/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/9/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13	8/10/09; 11/3/10; 11/12/10	12/7/10
Kickapoo Traditional Tribe of Texas	TX	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 10/16/12; 10/17/12			

Record of Consultation: Indian Tribes and Nations

Indian Tribe or Nation	State	Letters	Telephone	Emails	Faxes	Meetings
Kickapoo Tribe of Indians of the Kickapoo Reservation in Kansas	KS	1/30/09; 3/30/09; 4/1/09 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/18/09; 8/4/09; 8/6/09; 8/11/09; 9/10/09; 6/24/11; 7/6/11; 10/16/12	5/4/09; 5/7/09; 5/12/09; 6/25/09; 6/29/09; 7/1/09; 7/6/09; 7/13/09; 7/23/09; 8/4/09; 8/6/10; 8/10/10; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/24/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		5/14/09; 7/14/09; 7/28/09
Kiowa Indian Tribe of Oklahoma	OK	1/30/09; 3/30/09; 4/1/09; 4/24/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 6/24/11; 10/16/12; 10/17/12; 11/21/12	3/25/09; 5/4/09; 5/8/09; 6/19/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		
Lower Brule Sioux Tribe of the Lower Brule Reservation, South Dakota	SD	1/30/09; 2/9/09; 3/30/09; 4/1/09; 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 7/29/10; 6/14/10; 7/23/10; 7/29/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	7/10/09; 8/11/09; 10/14/09; 12/9/09; 2/2/10; 2/9/10; 3/4/10; 6/10/10; 10/10/12; 10/17/12; 10/18/12	2/6/09; 5/4/09; 6/25/09; 6/29/09; 7/1/09; 7/9/09; 7/13/09; 8/4/09; 8/13/09; 8/28/09 (2); 9/1/09; 9/10/09; 9/11/09; 9/30/09; 10/5/09; 10/7/09; 10/9/09; 10/19/09; 11/2/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/9/09; 12/31/09; 2/2/10; 2/9/10; 3/1/10; 3/17/10; 3/31/10; 4/5/10; 4/19/10; 4/20/10; 4/30/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 7/28/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 10/18/12 (2); 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13		2/27/10
Lower Sioux Indian Community in the State of Minnesota	MN	1/30/09; 3/30/09; 4/1/09; 4/22/09; 6/3/09; 6/18/09; 7/13/09; 8/11/09 9/8/09; 9/10/09; 9/14/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	8/21/09; 11/9/09; 1/22/10; 2/26/10; 10/12/12; 10/17/12	4/23/09; 5/4/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/10/09; 8/11/09; 8/13/09; 8/17/09; 8/21/09; 9/1/09; 9/10/09; 9/15/09; 9/29/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 10/29/09; 11/2/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		7/14/09; 10/20/09
Match-e-be-nash-she-wish Band of Pottawatomi Indians of Michigan (aka Gun Lake Potawatomi)	MI	1/30/09; 3/6/09; 4/1/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 10/12/12; 10/17/12			

Record of Consultation: Indian Tribes and Nations

Indian Tribe or Nation	State	Letters	Telephone	Emails	Faxes	Meetings
Mille Lacs Band of Minnesota Chippewa Tribes, Minnesota	MN	1/30/09; 3/30/09; 4/1/09; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 9/27/12; 10/11/12; 10/16/12; 11/5/12; 6/25/13	3/19/09; 10/12/12; 10/16/12; 10/17/12	5/4/09; 6/22/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 7/14/09; 7/27/09; 7/30/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/13/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 5/21/10; 6/14/10; 6/2/10; 6/4/10; 6/18/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/20/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 10/25/10; 10/26/10; 11/3/10; 11/10/10; ; 11/11/10; 11/12/10; 11/24/10; 11/30/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 4/1/13; 4/18/13; 5/7/13		7/14/09; 10/20/09; 7/22/10; 7/23/10; 5/16/13
Modoc Tribe of Oklahoma	OK	1/30/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 10/12/12; 10/17/12			
Nez Perce Tribe, Idaho	ID	2/19/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/3/13; 7/17/13; 12/24/13	10/12/12; 10/17/12	4/22/13; 5/8/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		7/31/2013
Northern Cheyenne Tribe of the Northern Cheyenne Indian Reservation, Montana	MT	1/30/09; 2/18/09; 3/30/09; 4/1/09; 4/8/09; 4/9/09; 4/22/09; 5/13/09 (2); 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 7/23/10; 11/24/10; 12/9/10; 6/28/11; 9/21/12 (2); 10/11/12 (2); 3/20/13 (2); 5/1/13 (2); 6/14/13 (2); 7/17/13 (2); 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 7/13/09; 10/13/09; 10/19/09; 10/22/09 (2); 11/16/09; 9/20/11; 10/10/12 (2); 10/17/12 (2); 5/29/13	4/14/09; 4/15/09; 5/4/09; 6/18/09; 6/29/09; 7/1/09; 7/6/09; 7/7/09; 7/13/09; 8/4/09 (2); 8/13/09; 8/25/09; 9/10/09; 9/14/09; 9/28/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/11/09; 11/17/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10 (2); 7/16/10 (4); 7/23/10 (2); 8/10/10; 10/15/10 (2); 10/21/10; 11/3/10; 11/11/10; 11/24/10 (2); 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 8/5/11; 9/7/11 (2); 10/16/12; 11/2/12; 11/8/12; 3/4/13; 4/3/2013; 4/9/13; 4/23/13; 5/1/2013; 5/7/13; 5/29/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		7/14/09; 10/20/09; 10/22/12; 05/16/13
Nottawaseppi Huron Band of the Potawatomi, Michigan (aka Huron Potawatomi Nation)	MI	1/30/09; 3/30/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 10/10/12; 10/17/12	3/23/09; 12/23/13		
Oglala Sioux Tribe of the Pine Ridge Reservation, South Dakota	SD	1/30/09; 2/19/09; 3/30/09; 4/1/09 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 7/30/12; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/16/13; 7/17/13; 7/30/13; 12/24/13	3/23/09; 10/10/12; 10/16/12; 10/23/12; 11/5/12; 11/6/12; 4/2/13; 4/10/13	5/4/09; 5/7/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/2/09; 11/3/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11(2); 7/22/11; 7/25/11; 7/30/12; 10/23/12 (3); 3/4/13; 3/22/13; 4/3/13; 4/8/13; 4/9/13; 4/10/13 (3); 4/12/13; 4/22/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 8/13/13; 12/23/13		5/12/09; 5/16/13; 7/31/13
Omaha Tribe of Nebraska	NE	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 9/12/13; 12/24/13	3/19/09; 10/10/12; 10/17/12; 10/22/12	10/22/12; 3/4/13; 3/22/13; 4/1/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13		5/16/2013

Record of Consultation: Indian Tribes and Nations

Indian Tribe or Nation	State	Letters	Telephone	Emails	Faxes	Meetings
Osage Nation, Oklahoma	OK	1/30/09; 3/30/09; 4/1/09 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/17/13; 12/24/13	3/18/09; 3/24/09; 4/13/09; 11/10/09; 7/12/11; 10/10/12; 10/17/12	5/4/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/7/09; 8/13/09; 9/1/09; 9/4/09; 9/10/09; 9/30/09; 10/5/09; 10/7/09; 10/9/09; 10/13/09; 10/14/09; 10/19/09; 10/26/09; 10/27/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/8/10; 6/15/10; 6/16/10; 6/18/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/8/10; 11/11/10; 11/12/10; 11/15/10; 11/24/10; 11/29/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/12/11 (2); 7/20/11; 7/22/11; 3/4/13; 3/22/13; 4/1/13; 4/2/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		5/14/09; 7/28/09; 10/20/09; 11/12/09; 7/24/10; 7/25/10;
Otoe-Missouria Tribe of Indians, Oklahoma	OK	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 10/10/12; 10/17/12	12/23/13		
Pawnee Nation of Oklahoma	OK	1/30/09; 3/30/09; 4/1/09; 4/6/09; 4/7/09; 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/11/09; 9/14/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 4/30/10; 5/25/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 9/21/10; 9/24/10; 10/20/10; 10/28/10; 11/15/10; 11/24/10; 12/9/10; 1/26/11; 3/4/11; 3/29/11(2); 4/29/11 (2); 6/30/11; 7/8/11; 9/21/12; 10/8/12; 10/11/12; 3/20/13; 4/19/13; 5/1/13; 6/14/13; 7/17/13; 8/8/13; 9/12/13; 12/24/13	3/19/09; 12/8/09; 2/9/10; 4/30/10; 5/3/10; 5/4/10; 5/5/10; 8/11/10; 9/8/10; 9/21/10; 11/22/10; 11/30/10; 12/1/10; 7/14/11; 7/29/11; 7/27/11; 5/25/12; 10/10/12; 11/20/12; 1/29/13; 3/15/13; 3/29/13; 5/13/13	4/7/09; 5/4/09; 5/6/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 8/17/09; 9/1/09; 9/4/09; 9/9/09 (2); 9/10/09; 9/15/09; 9/30/09; 10/7/09; 10/9/09; 10/12/09; 10/19/09; 10/20/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/8/09; 12/31/09; 2/10/10; 3/31/10; 4/29/10; 4/30/10; 5/3/10; 5/6/10; 5/24/10; 6/2/10; 6/4/10; 6/9/10; 6/16/10; 6/18/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/8/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/9/10; 11/11/10; 11/12/10; 11/13/10; 11/19/10; 11/22/10; 11/24/10; 11/29/10; 12/1/10; 12/3/10; 12/7/10; 12/8/10; 12/14/10; 12/16/10; 1/12/11; 1/26/11; 1/27/11; 1/28/11; 2/11/11; 2/22/11; 3/3/11; 3/4/11; 3/5/11; 3/9/11; 3/10/11; 3/18/11; 3/29/11; 4/18/11; 4/19/11 (2); 4/29/11; 6/21/11 (2); 6/22/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/14/11; 7/15/11 (2); 7/19/11 (2); 7/20/11; 7/22/11; 7/28/11; 8/2/11 (10); 5/25/12; 9/17/12; 9/18/12; 9/25/12; 9/28/12; 10/9/12 (2); 10/12/12; 10/17/12; 11/2/12; 11/8/12; 3/4/13; 3/22/13; 4/1/13; 4/2/13; 4/3/13 (2); 4/4/13; 4/5/13; 4/8/13; 4/9/13; 4/16/13; 4/17/13 (2); 4/18/13; 4/19/13; 4/22/13; 4/23/13 (2); 4/25/13; 5/1/13; 5/6/13; 5/7/13 (2); 5/9/13; 5/10/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 8/6/13; 12/23/13		5/14/09; 7/28/09; 11/12/09; 7/24/10; 7/25/10; 9/9/10; 12/7/10; 12/8/10; 10/26/12; 5/16/13; 7/31/13
Poarch Band of Creek Indians of Alabama	AL	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 10/10/12; 10/17/12	10/14/12; 10/19/12; 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 6/21/13; 7/1/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		
Pokagon Band of Potawatomi Indians, Michigan and Indiana	MI	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 10/10/12; 10/11/12	4/1/13; 4/3/13; 4/9/13; 4/23/13; 5/1/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13; 1/13/14 (3)		5/16/2013
Ponca Tribe of Indians of Oklahoma	OK	1/30/09; 3/30/09; 4/1/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 10/10/12; 10/17/12	5/4/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/3/10; 6/4/10; 6/18/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13	08/03/09	

Record of Consultation: Indian Tribes and Nations

Indian Tribe or Nation	State	Letters	Telephone	Emails	Faxes	Meetings
Ponca Tribe of Nebraska	NE	1/30/09; 3/30/09; 4/1/09; 4/8/09; 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/16/13; 7/17/13; 9/12/13; 12/24/13	3/18/09; 10/10/12; 10/17/12; 11/5/12; 11/16/12	4/29/09; 5/4/09;6/25/09; 6/29/09; 7/1/09; 7/6/09; 7/7/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/12/09 (2); 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 10/14/13; 10/15/12 (2); 11/2/12; 11/5/12 (2); 11/8/12; 11/16/13; 12/19/13; 1/30/13; 3/4/13; 3/22/13 (2); 4/3/13; 4/9/13; 4/11/13; 4/16/13; 4/23/13; 5/7/13; 5/20/13; 5/21/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		5/12/09; 7/14/09; 7/22/10; 7/23/10; 10/26/12; 5/16/13
Prairie Band of Potawatomi Nation, Kansas	KS	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12; 10/19/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/18/09; 10/10/12; 10/17/12	10/10/12; 10/17/12 (2); 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13; 12/23/13		
Prairie Island Indian Community in the State of Minnesota	MN	1/30/09; 3/30/09; 9/21/12; 10/11/12; 10/15/12	3/19/09; 10/10/12	3/19/09; 10/14/12; 10/15/12		
Red Lake Band of Chippewa Indians, Minnesota	MN	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 10/10/12; 10/17/12	10/14/12; 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		5/16/2013
Rosebud Sioux Tribe of the Rosebud Indian Reservation, South Dakota	SD	1/30/09; 2/19/09; 3/30/09; 4/1/09; 4/9/09; 4/22/09; 5/5/09; 5/8/09; 5/22/09; 6/3/09; 6/18/09; 7/13/09; 7/21/09 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 11/30/09; 12/24/09; 12/31/09; 1/6/10; 2/11/10; 4/5/10; 6/9/10; 6/14/10; 6/20/10; 7/23/10; 8/13/10; 10/6/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 9/12/13; 10/1/13; 12/24/13	3/23/09; 10/12/12; 10/17/12; 9/5/13; 9/20/13	5/4/09; 5/6/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/13/09; 10/19/09; 10/21/09; 10/22/09; 10/23/09; 10/26/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 11/30/09; 12/9/09; 12/31/09; 1/6/10; 2/11/10; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 10/15/12; 10/18/12 (2); 2/25/13; 2/27/13; 3/4/13; 3/5/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13; 1/9/14		5/12/09; 7/14/09; 10/20/09
Sac & Fox Nation of Missouri in Kansas and Nebraska	OK	1/30/09; 3/30/09 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 1/21/10; 11/5/10; 11/19/1;0 11/26/10; 12/3/10; 10/10/12; 10/17/12	5/4/09; 4/30/09; 5/1/09; 5/15/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/3/10; 6/4/10; 6/17/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/14/10; 11/22/10; 11/24/10; 12/1/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11		7/24/10; 7/25/10; 12/7/10
Sac & Fox Nation, Oklahoma	KS	1/30/09; 3/30/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 10/11/12			
Sac & Fox Tribe of the Mississippi in Iowa	MS	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 10/16/12			

Record of Consultation: Indian Tribes and Nations

Indian Tribe or Nation	State	Letters	Telephone	Emails	Faxes	Meetings
Santee Sioux Nation, Nebraska	NE	1/30/09; 3/30/09; 4/1/09 4/22/09; 5/8/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 9/12/13; 12/24/13	3/23/09; 10/16/12; 10/17/12	5/4/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		5/12/09
Seneca-Cayuga Tribe of Oklahoma	OK	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12	3/19/09; 10/16/12			
Shakopee Mdewakanton Sioux Community of Minnesota	MN	1/30/09; 3/30/09; 4/1/09; 4/7/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/23/09; 10/17/12	3/24/09; 12/23/13		
Shoshone Tribe of the Wind River Reservation, Wyoming (aka Eastern Shoshone Tribe)	WY	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	10/9/12; 10/17/12			
Shoshone-Bannock Tribes of the Fort Hall Reservation of Idaho	ID	2/19/09; 3/30/09; 4/1/09 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 5/9/13 (2); 6/14/13; 7/17/13; 12/24/13	3/23/09; 10/9/12; 10/17/12; 8/28/13	5/4/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 5/3/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13 (2); 12/23/13		7/31/13
Sisseton-Wahpeton Oyate of the Lake Traverse Reservation, South Dakota	SD	1/30/09; 3/30/09; 4/1/09 4/22/09; 5/8/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	10/13/09; 12/3/09; 4/9/10; 6/10/10; 10/9/12; 10/17/12	3/17/09; 5/4/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09 (2); 10/9/09; 10/19/09 (2); 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09 (2); 12/3/09; 12/31/09; 3/31/10; 4/9/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 3/4/13; 3/22/13; 4/3/13; 4/9/13 (3); 4/23/13; 5/7/13 (2); 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		5/12/09
Skull Valley Band of Goshute Indians of Utah	UT	5/9/2013; 6/14/13; 7/17/13; 12/24/13		4/22/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		
Southern Ute Indian Tribe of the Southern Ute Reservation, Colorado	UT	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/18/09; 10/9/12; 10/17/12 (2); 10/21/12	10/10/12; 12/23/13		

Record of Consultation: Indian Tribes and Nations

Indian Tribe or Nation	State	Letters	Telephone	Emails	Faxes	Meetings
Spirit Lake Tribe, North Dakota	ND	1/30/09; 2/19/09; 3/30/09; 4/1/09; 4/22/09; 6/3/09; 6/18/09; 7/13/09; 8/11/09; 9/8/09; 9/10/09; 9/14/09; 9/28/09 10/1/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 2/11/10; 2/25/10; 3/17/10; 4/5/10; 5/4/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 5/4/10; 10/16/12; 10/17/12; 11/5/12; 11/6/12; 3/26/13	5/4/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 8/24/09; 9/1/09; 9/10/09; 9/15/09 (2); 9/30/09; 10/7/09; 10/9/09; 10/13/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 2/11/10; 3/17/10; 3/31/10; 5/4/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/11/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/5/11 (2); 7/8/11; 7/20/11; 7/22/11; 7/25/13; 7/31/13; 12/23/13		10/20/09
Standing Rock Sioux Tribe of North & South Dakota	ND	1/30/09; 2/19/09; 3/30/09; 4/1/09; 4/9/09 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 8/8/13; 12/24/13	10/10/12; 10/17/12; 4/3/13	5/4/09; 5/6/09; 5/11/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09 (2); 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/14/10; 6/15/10; 6/17/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 11/2/12; 11/8/12; 3/4/13; 3/12/13 (2); 3/13/13; 3/14/13; 3/22/13; 3/29/13; 4/3/13; 4/9/13; 4/22/13; 4/23/13; 5/1/13; 5/7/13; 5/9/13 (2); 6/14/13; 7/5/13; 7/11/13 (2); 7/16/13; 7/29/13; 7/30/13; 7/31/13; 8/6/13; 12/23/13		5/12/09; 10/20/09; 7/22/10; 7/23/10; 10/24/12; 7/31/13
Stockbridge Munsee Community, Wisconsin	WI	1/30/09; 3/30/09; 9/21/12; 10/10/12; 10/11/12	3/19/09		3/20/09	
Thlopthlocco Tribal Town, Oklahoma	OK	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12	10/10/12; 10/17/12			
Three Affiliated Tribes of the Fort Berthold Reservation, North Dakota	ND	1/30/09; 3/30/09; 4/1/09 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 10/10/12; 10/17/12	5/4/09; 4/29/09; 5/22/09; 6/25/09; 6/29/09; 6/30/09; 7/1/09; 7/6/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09 (2); 10/9/09 (2); 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		7/14/09
Tonkawa Tribe of Indians of Oklahoma	OK	1/30/09; 3/30/09; 4/1/09; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 9/27/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 10/10/12; 10/17/12	4/3/09; 5/4/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 9/27/12; 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		

Record of Consultation: Indian Tribes and Nations

Indian Tribe or Nation	State	Letters	Telephone	Emails	Faxes	Meetings
Turtle Mountain Band of Chippewa Indians of North Dakota	ND	1/30/09; 2/19/09; 3/30/09; 4/1/09 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/24/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 2/11/10; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 3/8/11; 3/29/11; 5/3/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 10/13/09; 12/9/09; 12/17/09; 12/18/09; 6/10/10; 10/9/12; 10/17/12	5/4/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/24/09 (2); 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/15/09; 11/17/09; 11/18/09; 11/20/09; 12/15/09; 12/18/09; 12/31/09; 2/11/10; 3/17/10; 3/18/10; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/16/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/11/11; 2/12/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 5/3/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 7/20/11 (9)	10/14/09	10/20/09
United Keetoowah Band of Cherokee Indians in Oklahoma	OK	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12	3/19/09; 10/9/12; 10/17/12	10/17/12		
Upper Sioux Community, Minnesota	MN	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	10/9/12; 10/17/12			
Ute Indian Tribe of the Uintah & Ouray Reservation, Utah (aka Ute Indian Tribe, also Northern Ute Tribe)	UT	1/30/09; 3/30/09; 4/1/09 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/18/09; 10/9/12; 10/17/12	5/4/09; 4/29/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/8/09; 12/31/09 ; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 12/23/13		
Ute Mountain Tribe of the Ute Mountain Reservation, Colorado, New Mexico and Utah	CO	1/30/09; 3/30/09; 4/1/09; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 10/9/12; 10/17/12	12/23/13		
White Earth Band of Minnesota Chippewa Tribes, Minnesota	MN	1/30/09; 3/30/09; 4/1/09; 7/24/09; 9/21/12; 10/11/12	3/19/09; 10/9/12; 10/17/12	10/18/12 (2)		
Wichita and Affiliated Tribes (Wichita, Keechi, Waco & Tawakonie), Oklahoma	OK	1/30/09; 3/30/09; 4/1/09; 7/24/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/11/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 6/22/11; 10/9/12	5/4/09; 4/29/09; 5/20/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 10/9/12; 10/18/12; 3/4/13; 3/22/13; 4/3/13; 4/9/13; 4/23/13; 5/7/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 12/23/13		
Winnebago Tribe of Nebraska	NE	1/30/09; 3/30/09; 4/1/09 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 11/17/09; 11/18/09; 12/24/09; 12/31/09; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10; 11/24/10; 12/9/10; 1/16/11; 3/29/11; 6/30/11; 7/8/11; 9/21/12; 10/3/12; 10/11/12	3/19/09; 6/22/11 (3); 10/9/12; 10/17/12	5/4/09; 5/5/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/4/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/18/09; 11/20/09; 12/31/09; 3/31/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 10/16/12		

Record of Consultation: Indian Tribes and Nations

Indian Tribe or Nation	State	Letters	Telephone	Emails	Faxes	Meetings
Yankton Sioux Tribe of South Dakota	SD	1/30/09; 2/19/09; 3/30/09; 4/1/09 4/22/09; 6/3/09; 6/18/09; 7/13/09; 9/8/09; 9/10/09; 9/28/09; 10/19/09; 10/29/10; 11/10/09; 11/17/09; 11/18/09; 11/30/09; 12/16/10; 12/24/09; 12/31/09; 1/6/10; 1/15/10; 1/20/10; 2/22/10; 2/26/10; 4/5/10; 6/9/10; 6/14/10; 7/23/10; 8/13/10 ; 11/24/10; 12/9/10; 1/26/11; 3/29/11; 4/18/11; 6/30/11; 7/8/11; 1/30/12; 9/21/12; 10/11/12; 11/6/12; 3/20/13; 4/8/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	9/30/09; 10/13/09; 10/16/09; 12/15/09; 4/21/10; 11/12/10; 7/11/11; 7/14/11; 10/10/12; 10/12/12; 10/13/12; 10/15/12; 10/16/12; 11/5/12; 11/16/12; 12/10/12; 12/19/12; 2/12/13	3/17/09; 5/4/09; 5/5/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 7/14/09; 8/4/09; 8/13/09 (2); 8/25/09 (3); 8/26/09; 9/1/09 (2); 9/10/09; 9/14/09; 9/29/09; 9/30/09; 10/7/09; 10/9/09; 10/13/09; 10/14/09 (2); 10/16/09 (2); 10/19/09; 11/3/09; 11/4/09; 11/7/09; 11/11/09; 11/12/09; 11/17/09; 11/18/09; 11/20/09 (2); 12/3/09; 12/15/09; 12/16/09 (2); 12/17/09; 12/22/09; 12/23/09; 12/24/09; 12/29/09; 12/31/09; 1/7/10; 1/13/10; 1/21/10; 1/26/10; 2/3/10; 2/12/10; 2/17/10; 2/24/10; 2/25/10; 2/28/10; 3/2/10; 3/31/10; 4/21/10; 5/6/10; 6/2/10; 6/3/10; 6/4/10; 6/7/10; 6/8/10; 6/11/10; 6/18/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/24/10; 11/30/10; 12/1/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/26/11 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11(2); 5/11/11; 6/21/11; 6/30/11 (3); 7/1/11; 7/6/11; 7/8/11; 7/20/11; 7/22/11; 9/26/12; 9/28/12 (2); 10/12/12 (3); 10/15/12; 10/17/12 (2); 10/22/12 (3); 11/2/12; 11/6/12; 11/7/12; 11/8/12 (3); 11/14/12; 11/15/12; 11/16/12; 12/10/12; 12/19/12; 2/12/13; 2/21/13; 3/4/13; 3/22/13 (2); 4/3/13; 4/4/13; 4/9/13 (2); 4/12/13; 4/22/13; 4/23/13; 5/7/13; 5/9/13; 6/14/13; 7/11/13; 7/16/13; 7/31/13; 10/23/13; 12/23/13		10/20/09; 12/7/10; 10/22/12; 10/24/12; 5/16/13; 7/31/13
Ysleta Del Sur Pueblo of Texas	TX	1/30/09; 3/30/09; 4/1/09; 4/22/09; 6/3/09; 6/18/09; 7/13/09; 7/30/09; 9/21/12; 10/11/12; 10/15/12; 3/20/13; 5/1/13; 6/14/13; 7/17/13; 12/24/13	3/19/09; 10/9/12; 10/16/12	12/23/13	7/31/09	

Record of Consultation: Government Agencies

Agency	Letters	Telephone	Emails	Faxes	Meetings
ACHP	2/19/09; 3/30/09; 6/3/09; 6/18/09; 7/13/09; 9/30/09; 11/2/09; 12/24/09; 12/31/09; 4/2/10; 6/14/10; 7/23/10; 8/12/10; 11/24/10; 12/9/10; 1/14/11; 1/16/11; 2/4/11; 6/30/11; 7/8/11; 12/19/13	7/24/09; 9/11/09; 11/19/09; 11/23/09; 1/15/10; 2/22/10; 4/8/10; 6/6/11; 7/30/10; 2/16/11; 3/4/11; 5/19/11; 7/8/11; 8/1/11; 5/14/13; 7/24/13; 7/31/13; 8/20/13; 10/25/13	7/22/09; 8/17/09; 8/18/09; 9/1/09; 9/2/09; 9/10/09; 9/11/09; 9/14/09; 9/17/10; 9/30/09; 10/7/09; 10/9/09; 10/15/09; 10/19/09; 11/3/09; 11/4/09; 1/7/10; 1/8/10; 2/18/10; 2/19/10; 3/9/10; 3/31/10; 4/7/10; 4/19/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 10/22/10; 11/3/10; 11/11/10; 11/15/10; 11/24/10; 12/7/10; 12/8/10; 12/13/10; 1/12/11; 1/14/11; 1/19/11; 1/21/11; 1/24/11; 1/27/11; 1/28/11; 1/30/11; 2/17/11; 2/22/11; 2/28/11; 3/3/11; 3/18/11; 3/29/11; 4/18/11 (3); 4/26/11; 6/3/11 (2); 6/16/11; 6/21/11(2); 6/22/11 (3); 6/27/11 (2); 6/28/11 (2); 6/30/11(3); 7/1/11; 7/5/11 (2); 7/8/11 (8); 7/20/11; 7/22/11; 8/1/11 (7); 8/3/11 (3); 10/15/12 (2); 10/17/12; 11/30/12; 1/16/13; 4/1/13; 4/3/13; 4/4/13 (3); 4/9/13; 4/10/13; 4/23/13; 5/1/13; 5/9/13 (3); 5/13/13; 5/14/13; 5/15/13; 5/23/13; 7/23/13; 7/24/13; 8/5/13; 8/13/13 (4); 8/14/13; 8/15/13; 8/16/13; 8/19/13; 8/20/13; 8/21/13; 8/28/13; 9/3/13; 9/5/13 (2); 9/6/13 (3); 9/11/13; 9/18/13 (4); 9/19/13 (4); 9/25/13 (3); 9/26/13 (2); 9/27/13 (4); 10/18/13; 10/22/13; 10/23/13; 10/24/13; 10/30/13; 11/6/13; 11/8/13; 11/25/13 (2); 11/27/13 (2); 12/2/13; 12/6/13; 12/10/13; 12/11/13 (2); 12/12/13 (2); 12/13/13; 12/16/13		8/18/09; 4/8/10; 8/17/10; 10/26/10; 12/7/10; 4/23/13; 9/23/13
BIA	2/19/09; 3/30/09; 5/12/09; 6/3/09; 6/18/09; 6/25/09; 7/13/09; 9/30/09; 11/2/09; 12/24/09; 12/31/09; 4/2/10; 6/14/10; 7/23/10; 8/12/10; 11/24/10; 12/9/10; 1/18/11; 6/30/11; 7/8/11	6/23/10 ; 5/14/13; 7/24/13	5/5/09; 5/6/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/15/09; 10/19/09; 11/3/09; 11/4/09; 3/31/10; 4/19/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/9/10; 12/14/10; 1/4/11; 1/12/11; 1/14/11; 1/18/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11(3); 7/1/11; 7/8/11; 7/15/11; 7/19/11 (2); 7/20/11 (3); 7/22/11; 4/1/13; 4/9/13; 4/23/13; 5/9/13 (2); 5/14/13; 7/23/13; 7/24/13; 8/13/13; 8/16/13; 8/19/13; 8/21/13; 8/28/13; 9/11/13; 12/2/13; 12/12/13; 12/16/13		5/12/09; 10/20/09; 10/21/09; 6/22/10; 6/23/10; 12/7/10; 5/16/13
BLM	2/19/09; 3/30/09; 6/3/09; 6/14/09; 6/18/09; 6/25/09; 7/13/09; 9/30/09; 11/2/09; 12/9/09; 12/24/09; 12/31/09; 4/2/10; 6/14/10; 7/16/10; 7/19/10; 7/23/10; 8/6/10; 8/9/10; 8/12/10; 11/24/10; 11/29/10; 12/7/10; 12/9/10; 12/15/10; 2/17/11; 2/24/11; 5/3/11; 6/13/11; 6/30/11; 7/8/11	4/13/09; 4/14/09; 4/26/09; 6/14/09; 6/25/09; 6/27/09; 8/14/09; 10/21/09; 10/23/09; 10/26/09; 11/18/09; 11/23/09; 12/10/09; 6/7/10; 6/25/10; 7/19/10; 12/2/10; 12/3/10; 4/19/11; 6/6/11; 7/13/11; 7/14/11; 7/28/11; 5/14/13; 7/24/13; 7/31/13; 8/20/13	1/30/09; 2/3/09; 2/17/099/09; 2/20/09; 4/13/09; 4/22/09; 5/1/09; 5/5/09; 6/2/09; 6/13/09; 6/25/09; 6/29/09; 6/30/09; 7/1/09; 7/7/09; 7/13/09; 8/10/09; 8/12/09; 8/13/09; 8/20/09; 9/1/09; 9/10/09; 9/14/09; 9/21/09; 9/23/09; 9/30/09; 10/2/09; 10/5/09; 10/6/09; 10/7/09; 10/8/09; 10/9/09; 10/19/09; 10/22/09; 10/26/09; 11/3/09; 11/4/09; 11/9/09; 11/11/09; 12/2/09; 12/3/09; 12/28/09; 1/19/10; 2/9/10; 3/9/10; 3/31/10; 4/1/10; 4/3/10; 4/19/10; 4/26/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 6/24/10; 7/6/10; 7/12/10; 7/16/10; 7/18/10; 7/20/10; 7/23/10; 8/3/10; 8/4/10; 8/9/10; 8/10/10; 10/15/10; 10/21/10; 11/3/10; 11/11/10; 11/24/10; 12/8/10; 12/14/10; 1/12/11; 1/14/11; 1/27/11; 1/28/11; 2/16/11; 2/22/11; 3/18/11; 3/29/11; 4/4/11; 4/15/11; 4/18/11(2); 4/21/11 (3); 4/26/11; 5/31/11; 6/13/11 (5); 6/17/11; 6/21/11; 6/28/11; 6/29/11; 6/30/11(3); 7/1/11; 7/8/11; 7/12/11(6); 7/14/11; 7/20/11(2); 7/22/11; 4/1/13; 4/9/13; 4/23/13; 5/7/13; 5/9/13 (2); 5/14/13; 7/23/13; 7/24/13; 8/13/13; 8/16/13; 8/19/13; 8/21/13; 8/28/13 (2); 9/11/13; 12/2/13; 12/12/13 (3); 12/16/13	10/15/09; 10/16/09	5/12/09; 8/25/09; 9/14/09; 10/7/09; 10/20/09; 10/21/09; 10/27/09; 6/22/10; 6/23/10; 12/7/10; 5/16/13
BOR	9/30/09 ; 11/2/09; 12/17/09; 12/24/09; 12/31/09; 1/14/10; 1/19/10; 4/2/10; 6/14/10; 7/23/10; 8/12/10; 11/24/10; 12/9/10; 12/15/10; 1/16/11; 6/30/11; 7/8/11	10/23/09; 10/26/09; 1/6/11; 6/22/11; 7/19/11; 11/4/13	9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 10/27/09; 10/30/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 12/17/09; 1/14/10; 1/19/10; 1/20/10; 3/31/10; 4/19/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 11/3/10; 11/11/10; 11/24/10; 12/7/10; 12/8/10; 12/14/10; 12/15/10; 1/12/11; 1/27/11; 1/28/11; 7/11/11; 4/1/13; 4/9/13; 4/23/13; 5/9/13; 5/14/13; 7/23/13; 7/24/13; 8/13/13; 8/16/13; 8/19/13; 8/21/13; 8/28/13; 9/11/13; 12/2/13; 12/9/13; 12/12/13; 12/16/13		10/7/09; 10/27/09

Record of Consultation: Government Agencies

Agency	Letters	Telephone	Emails	Faxes	Meetings
MDEQ	2/19/09; 3/18/09; 3/30/09; 4/6/09; 6/3/09; 6/18/09; 6/25/09; 7/13/09; 9/30/09; 11/2/09; 12/24/09; 12/31/09; 3/30/10; 4/2/10; 6/14/10; 7/23/10; 8/12/10; 9/2/10; 9/3/10; 10/14/10; 11/24/10; 12/7/10; 12/9/10; 2/17/11; 3/7/11; 5/3/11; 6/30/11; 7/8/11	4/13/09; 4/14/09; 12/3/10; 6/6/11; 7/8/11; 7/29/11; 5/14/13; 7/24/13; 7/31/13; 8/20/13	1/30/09; 2/4/09; 4/14/09; 5/4/09; 6/10/09; 6/25/09; 6/29/09; 7/1/09; 7/2/09; 7/13/09; 8/13/09; 8/21/09; 9/1/09; 9/10/09;9/29/09; 10/2/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/9/09; 11/11/09; 11/17/09; 12/7/09; 1/14/10; 1/19/10; 1/20/10; 3/9/10; 3/11/10; 3/12/10; 3/23/10; 3/26/10; 3/31/10; 4/14/10; 4/19/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/9/10; 7/12/10; 7/16/10; 7/19/10; 7/23/10; 7/26/10; 8/9/10; 8/10/10; 9/3/10; 9/30/10; 10/15/10; 10/21/10; 11/3/10; 11/8/10; 12/3/10; 12/7/10; 12/8/10; 12/14/10; 1/3/11; 1/12/11; 1/27/11; 1/28/11; 2/16/11; 2/22/11; 3/7/11; 3/18/11; 3/29/11; 4/4/11(2); 4/18/11; 4/28/11; 5/12/11 (2); 5/26/11; 5/31/11; 6/16/11; 6/21/11; 6/30/11(3); 7/1/11; 7/8/11; 7/14/11(2); 7/18/11(2); 7/20/11; 7/21/11; 7/22/11; 7/25/11(4); 4/9/13; 4/23/13; 7/23/13; 7/24/13; 8/13/13; 8/16/13; 8/19/13; 8/21/13; 8/28/13; 9/11/13; 12/2/13; 12/12/13 (4); 12/13/13; 12/16/13 (2)		4/22/09; 5/12/09; 10/7/09; 10/13/09; 10/20/09; 10/21/09; 10/22/09; 6/22/10; 6/23/10; 7/28/10; 12/7/10
MDNRC	6/3/09; 6/12/09; 6/18/09; 7/1209; 9/30/09; 11/2/09; 12/24/09; 12/31/09; 4/2/10; 6/14/10; 7/16/10; 7/23/10; 8/12/10; 11/24/10; 12/9/10; 1/16/11; 6/30/11; 7/8/11	4/14/09; 3/26/10	4/14/09; 4/23/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 7/20/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/5/09; 10/7/09; 10/9/09; 10/12/09; 10/13/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 3/31/10; 4/19/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 6/24/10; 7/6/10; 7/7/10; 7/8/10; 7/12/10; 7/16/10; 7/23/10; 7/27/10; 8/10/10; 10/15/10; 10/21/10; 11/3/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11(3); 7/1/11; 7/8/11; 7/20/11(4); 7/22/11; 4/9/13; 4/23/13; 7/23/13; 7/24/13; 8/13/13; 8/16/13; 8/19/13; 8/21/13; 8/28/13; 9/11/13; 12/2/13; 12/12/13 (3); 12/16/13; 12/18/13 (2)		4/22/09; 10/22/09; 7/28/10
NPS	2/19/09; 3/23/09; 3/30/09; 6/3/09; 6/18/09; 6/25/09; 7/13/09; 7/22/09; 8/26/09; 9/30/09; 11/2/09; 11/2309; 12/24/09; 12/31/09; 4/2/10; 6/14/10; 7/23/10; 8/6/10; 8/12/10; 9/17/10; 11/24/10; 12/9/10; 1/14/11; 2/14/11; 6/30/11; 7/8/11	4/22/09; 5/5/09; 8/12/09; 8/21/09; 9/25/09; 9/30/09; 10/8/09; 10/26/09; 3/25/10; 7/21/10; 7/1/11	5/1/09; 5/6/09; 5/8/09; 6/25/09; 6/29/09; 6/30/09; 7/1/09; 7/6/09; 7/13/09; 7/21/09; 7/22/09; 7/24/09; 8/13/09; 8/26/09; 9/1/09; 9/10/09; 9/30/09; 10/2/09; 10/7/09; 10/9/09; 10/19/09; 10/26/09; 11/3/09; 11/4/09; 11/5/09; 11/9/09; 11/11/09; 11/17/09; 1/29/10; 3/31/10; 4/19/10; 5/6/10; 6/2/10; 6/3/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/18/10; 7/21/10; 7/23/10; 8/10/10; 9/14/10; 9/16/10; 10/12/10; 10/15/10; 10/21/10; 11/3/10; 11/5/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/14/11; 1/27/11; 1/28/11; 2/14/11; 2/15/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 4/20/11; 5/4/11; 5/19/11 (2); 6/21/11; 6/28/11; 6/29/11 (2); 6/30/11(4); 7/1/11(2); 7/8/11; 7/20/11(6); 7/22/11; 8/2/11(2); 8/3/11; 4/1/13; 4/9/13; 4/23/13; 5/9/13 (2); 5/14/13 (2); 7/23/13; 7/24/13; 8/13/13; 8/16/13; 8/19/13; 8/21/13; 8/28/13; 9/11/13; 11/8/13; 12/2/13; 12/12/13; 12/16/13		5/12/09; 7/28/09; 10/8/09; 11/12/09; 11/13/09
RUS	2/19/09; 3/30/09; 6/3/09; 6/18/09; 7/13/09; 9/30/09; 11/2/09; 12/24/09; 12/31/09; 1/25/10; 4/2/10; 6/14/10; 7/23/10; 7/30/10; 8/12/10; 11/24/10; 12/9/10; 1/16/11; 4/19/11; 6/20/11; 6/30/11; 7/12/11; 7/8/11	6/29/09; 7/29/09; 10/27/09; 11/6/09; 12/4/09; 6/8/10; 6/14/10; 6/22/10; 3/8/11; 4/18/11; 5/14/13; 7/24/13; 7/31/13; 8/20/13; 12/16/13	6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 10/27/09; 11/2/09; 11/3/09; 11/4/09; 11/11/09; 11/16/09; 11/17/09; 11/20/09; 12/3/09; 1/22/10; 1/23/10; 1/25/10; 3/31/10; 4/19/10; 4/28/10; 5/6/10; 5/27/10; 5/28/10; 6/2/10; 6/4/10; 6/8/10; 6/11/10; 6/14/10; 6/15/10; 6/21/10; 6/23/10; 7/6/10; 7/9/10; 7/12/10; 7/16/10; 7/23/10; 7/29/10; 8/2/10; 8/10/10; 10/15/10; 10/21/10; 11/3/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 4/19/11; 6/20/11 (2); 6/21/11(2); 6/30/11(3); 7/1/11; 7/8/11; 7/12/11; 7/20/11; 7/22/11; 7/26/11(3); 7/27/11; 4/1/13; 4/9/13; 4/23/13; 5/9/13 (2); 5/14/13; 7/23/13; 7/24/13; 8/13/13; 8/16/13; 8/19/13; 8/21/13; 8/28/13; 9/11/13; 12/2/13; 12/12/13 (2); 12/13/13 (2); 12/16/13 (2); 12/17/13		
SHPO_KS	2/2/09; 2/10/09; 3/30/09; 4/13/09; 6/3/09; 6/18/09; 7/13/09; 7/22/09; 7/30/09; 9/18/09; 9/30/09; 10/28/09; 11/2/09; 11/3/09; 11/6/09; 11/16/09; 12/24/09; 12/31/09; 1/12/10; 4/2/10; 6/14/10; 7/16/10; 7/23/10; 7/26/10; 8/12/10; 11/24/10; 12/9/10; 12/10/10; 12/21/10; 6/4/11; 6/30/11; 7/8/11; 7/11/11; 8/16/12; 8/22/12; 3/14/13	7/31/09; 5/12/11; 4/4/13	2/11/09; 3/27/09; 3/30/09; 4/16/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 7/31/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/6/09; 11/10/09; 11/11/09; 11/17/09; 1/12/10; 1/13/10; 3/31/10; 4/19/10; 4/23/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/2/10; 8/10/10; 10/15/10; 10/21/10; 11/3/10; 12/3/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 5/11/11; 5/12/11; 5/13/11 (5); 5/31/11 (3); 6/3/11 (2); 6/17/11 (3); 6/21/11; 6/28/11 (2); 6/30/11(3); 7/1/11; 7/8/11(2); 7/20/11; 7/22/11; 4/9/13; 4/23/13; 7/23/13; 7/24/13; 8/13/13; 8/16/13; 8/19/13; 8/21/13; 8/28/13; 9/11/13; 12/2/13; 12/3/13; 12/12/13; 12/16/13	10/26/09	

Record of Consultation: Government Agencies

Agency	Letters	Telephone	Emails	Faxes	Meetings
SHPO_MT	2/2/09; 2/20/09; 3/30/09; 4/17/09; 4/22/09; 6/3/09; 6/12/09; 6/18/09; 6/22/09; 7/2/09; 7/8/09; 7/13/09; 7/17/09; 9/30/09; 11/2/09; 11/13/09; 12/14/09; 12/24/09; 12/31/09; 1/11/10; 4/2/10; 6/14/10; 7/16/10 (2); 7/23/10; 7/28/10; 8/5/10; 8/6/10; 8/12/10; 11/24/10; 11/29/10; 12/7/10; 12/9/10; 12/16/10; 1/14/11; 2/17/11; 2/28/11; 5/3/11; 6/2/11; 6/30/11; 7/8/11(2); 7/28/11; 11/18/11; 7/2/12; 7/11/12; 7/2/12; 7/11/12; 4/26/13; 6/3/13; 8/27/13	4/1/09; 4/14/09; 10/14/09; 10/20/09; 1/14/10 6/6/11; 7/2/10; 7/28/10; 8/26/10; 7/7/11; 7/28/11; ; 5/14/13; 8/20/13	2/6/09; 6/12/09; 6/25/09; 6/29/09; 7/1/09; 7/6/09; 7/7/09; 7/13/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/2/09; 10/5/09; 10/7/09; 10/9/09; 10/12/09; 10/19/09; 10/20/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 11/24/09; 1/7/10; 1/11/10; 1/13/10; 1/14/10; 1/15/10; 1/19/10; 2/4/10; 3/31/10; 4/19/10; 5/6/10; 5/14/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 6/24/10; 7/1/10; 7/6/10; 7/7/10; 7/12/10; 7/16/10; 7/23/10; 7/27/10; 7/28/10; 8/2/10; 8/9/10; 8/10/10; 8/19/10; 8/26/10; 10/15/10; 10/21/10; 10/28/10; 11/3/10; 11/11/10; 12/7/10; 12/8/10; 12/10/10; 12/14/10; 12/29/10; 1/4/11; 1/5/11; 1/12/11; 1/27/11; 1/28/11; 2/16/11; 2/17/11; 2/22/11; 3/18/11; 3/29/11; 4/4/11(2); 4/18/11; 5/26/11; 5/31/11; 6/2/11; 6/3/11 (3); 6/16/11; 6/17/11; 6/21/11(2); 6/28/11; 6/29/11; 6/30/11(3); 7/1/11(2); 7/6/11; 7/7/11; 7/8/11; 7/20/11; 7/22/11; 7/29/11; 4/9/13; 4/23/13; 5/9/13; 5/10/13; 7/23/13; 7/24/13; 8/13/13; 8/16/13; 8/19/13; 8/21/13; 8/28/13 (2); 9/11/13; 12/2/13; 12/12/13; 12/16/13	8/3/09	4/22/09; 10/20/09; 10/21/09
SHPO_ND		8/16/2013	8/16/13 (2); 12/13/13		
SHPO_NE	5/27/08; 2/2/09; 2/20/09; 3/17/09; 3/30/09; 4/17/09; 6/3/09; 6/12/09; 6/18/09; 6/22/09; 7/2/09; 7/13/09; 9/30/09; 10/30/09; 11/2/09; 11/3/09; 11/16/09; 12/24/09; 12/31/09; 4/2/10; 6/14/10; 7/16/10; 7/23/10; 8/12/10; 9/20/10; 9/30/10; 11/5/10; 11/24/10; 12/9/10; 3/2/11; 3/4/11; 3/18/11; 3/29/11; 4/7/11; 4/14/11; 4/29/11; 5/4/11; 5/10/11; 5/25/11; 6/4/11; 6/15/11; 6/24/11; 6/30/11; 7/8/11; 7/25/11; 8/9/11; 12/23/11; 1/26/12; 6/28/12; 7/19/12 (2); 4/26/13; 5/7/13; 6/11/13 (2); 6/24/13; 9/12/13	3/23/09; 4/1/09; 4/14/09; 9/28/10; 10/4/10; 11/11/10; 11/15/10; 11/16/10; 3/18/11; 4/15/11; 6/3/11; 7/15/11; 8/1/11; 5/14/13; 8/20/13; 12/12/13	6/12/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 3/31/10; 4/19/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 9/20/10; 9/29/10; 10/14/10; 10/15/10; 10/21/10; 11/3/10; 11/5/10; 11/16/10; 11/19/10; 11/29/10; 12/1/10; 12/2/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/26/11; 1/27/11; 1/28/11; 2/22/11; 3/3/11; 3/18/11; 3/29/11; 4/18/11(2); 4/29/11; 5/4/11; 5/31/11 (3); 6/2/11 (3); 6/3/11 (6); 6/6/11 (3), 6/9/11; 6/10/11 (2), 6/15/11; 6/21/11; 6/28/11; 6/29/11 (2); 6/30/11(3); 7/1/11; 7/5/11 (2); 7/8/11; 7/15/11 (4); 7/20/11; 7/22/11;7/25/11(5); 8/2/11; 8/3/11(2); 7/19/12; 3/5/13; 4/9/13; 4/23/13; 7/23/13; 7/24/13; 8/13/13; 8/16/13; 8/19/13; 8/20/13; 8/21/13; 8/28/13; 9/5/13; 9/6/13; 9/11/13; 12/2/13; 12/5/13; 12/6/13; 12/12/13 (4); 12/16/13	8/3/09	4/21/09
SHPO_SD	2/2/09; 2/9/09; 2/20/09; 3/30/09; 4/17/09; 4/23/09; 6/3/09; 6/12/09; 6/18/09; 6/22/09; 7/1/09; 7/2/09; 7/13/09; 7/22/09; 8/13/09; 9/30/09; 11/2/09; 11/3/09; 11/24/09; 12/24/09; 12/31/09; 1/14/10; 3/1/10 (2); 4/2/10; 6/14/10; 7/16/10; 7/23/10; 8/4/10; 8/5/10; 8/9/10; 8/12/10; 10/21/10 (3); 10/26/10; 11/24/10; 12/2/10; 12/9/10; 12/14/10; 1/4/11; 1/10/11; 1/27/11 (3); 2/4/11; 2/16/11; 2/17/11; 2/22/11; 2/24/11; 2/25/11 (2); 3/1/11 (2); 3/21/11; 4/18/11; 6/4/11; 6/30/11; 7/8/11(2); 8/18/11; 10/18/11 (2); 7/2/12; 7/12/12; 4/26/13; 5/9/13; 6/11/13 (2); 7/9/13; 7/10/13	4/1/09; 9/29/09; 10/30/09; 1/6/10; 2/17/11; 4/18/11; 6/2/11; 7/1/11; 7/14/11; 4/3/13; 12/12/13	4/1/09; 4/15/09; 4/27/09; 5/4/09; 6/12/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/5/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 10/30/09; 11/2/09; 11/3/09; 11/4/09; 11/5/09; 11/11/09; 11/17/09; 12/29/09; 1/5/10; 1/6/10; 1/11/10; 1/12/10; 1/14/10; 3/31/10; 4/19/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 6/29/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 11/3/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/16/11; 2/22/11; 2/23/11; 2/25/11; 2/28/11; 3/1/11; 3/18/11; 3/23/11; 3/25/11; 3/29/11; 4/4/8/11; 4/14/11; 4/15/11; 4/18/11 (4); 4/19/11 (3); 4/20/11; 4/26/11; 6/1/11; 6/2/11; 6/3/11 (2); 6/7/11 (2); 6/8/11; 6/13/11; 6/14/11; 6/15/11; 6/21/11; 6/29/11 (2); 6/30/11(3); 7/1/11(2); 7/6/11; 7/8/11(2); 7/15/11; 7/20/11(2); 7/22/11; 4/9/13; 4/23/13; 5/9/13; 7/23/13; 7/24/13; 8/13/13; 8/16/13; 8/19/13; 8/21/13; 8/28/13; 9/11/13; 11/1/13 (3); 12/2/13; 12/10/13; 12/12/13 (2); 12/16/13 (2); 12/17/13		4/23/09; 5/16/13

Record of Consultation: Government Agencies

Agency	Letters	Telephone	Emails	Faxes	Meetings
USACE	2/19/09; 3/30/09; 6/3/09; 6/12/09; 6/18/09; 6/25/09; 7/13/09; 8/20/09; 9/30/09; 10/13/09; 10/19/09; 11/2/09; 11/25/09; 12/24/09; 12/31/09; 4/2/10; 6/14/10; 7/23/10; 8/12/10; 11/24/10; 12/9/10; 1/16/11; 6/30/11; 7/8/11	5/7/09; 10/9/09; 7/8/11; 9/28/12; 5/14/13; 7/24/13; 7/31/13; 8/20/13	3/4/09; 4/14/09; 4/15/09; 4/27/09; 5/6/09; 5/11/09; 6/10/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 7/21/09; 8/13/09; 8/20/09; 9/1/09; 9/10/09; 9/30/09; 10/1/09; 10/5/09; 10/7/09; 10/8/09; 10/9/09; 10/13/09; 10/19/09; 10/21/09; 11/2/09; 11/3/09; 11/4/09; 11/10/09; 11/11/09; 11/17/09; 11/23/09; 2/23/10; 3/31/10; 4/19/10; 4/30/10; 5/6/10; 5/7/10; 6/2/10; 6/3/10; 6/4/10; 6/7/10; 6/17/10; 6/18/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 9/15/10; 9/21/10; 9/22/10; 10/4/10; 10/5/10; 10/15/10; 10/16/10; 10/21/10; 10/22/10; 10/26/10; 11/3/10; 11/12/10; 11/22/10; 11/29/10; 12/7/10; 12/8/10; 12/14/10; 1/3/11; 1/12/11; 1/14/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11(3); 7/1/11(3); 7/5/11; 7/8/11 (5); 7/20/11(2); 7/22/11; 8/1/11; 8/2/11(2); 9/28/12 (2); 4/1/13; 4/3/13; 4/9/13; 4/23/13; 5/9/13 (2); 5/14/13; 7/23/13; 7/24/13; 7/31/13; 8/13/13; 8/16/13; 8/19/13; 8/21/13; 8/28/13; 9/11/13; 12/2/13 (2); 12/10/13; 12/12/13; 12/13/13; 12/16/13		4/22/09; 5/12/09; 5/14/09; 7/28/09; 10/20/09; 10/21/09; 11/12/09; 11/13/09; 6/22/10; 6/23/10; 7/22/10; 7/23/10; 12/7/10; 12/8/10; 5/16/13
USDA FSA	2/19/09; 3/30/09; 6/3/09; 6/18/09; 7/13/09; 7/20/09; 9/30/09; 11/2/09; 12/24/09; 12/31/09; 4/2/10; 6/14/10; 7/23/10; 8/12/10; 11/24/10; 12/9/10; 1/16/11; 6/30/11; 7/8/11	5/14/13; 7/24/13; 8/20/13	6/22/09; 6/25/09; 6/29/09; 7/1/09; 7/13/09; 7/20/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 3/31/10; 4/19/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 11/3/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 7/20/11; 7/21/11(2); 4/1/13; 4/9/13; 4/23/13; 5/9/13; 5/14/13; 7/23/13; 7/24/13; 8/13/13; 8/16/13; 8/19/13; 8/21/13; 8/28/13; 9/11/13; 12/2/13; 12/12/13; 12/16/13		12/7/10
USDA NRCS	2/19/09; 3/30/09; 5/29/09; 6/3/09; 6/18/09; 7/13/09; 9/30/09; 11/2/09; 12/24/09; 12/31/09; 4/2/10; 6/14/10; 7/23/10; 8/12/10; 11/24/10; 12/9/10; 1/16/11; 6/30/11; 7/8/11	3/26/10; 5/14/13; 7/24/13; 7/31/13; 8/20/13	6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 3/26/10; 3/31/10; 4/19/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 8/11/10;; 8/12/10; 10/15/10; 10/21/10; 11/3/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11(3); 7/1/11; 7/8/11; 7/20/11(2); 7/22/11; 7/28/11; 7/29/11; 8/3/11(3); 4/1/13; 4/8/13 (2); 4/9/13; 4/23/13; 5/9/13; 5/10/13 (2); 5/14/13; 7/23/13; 7/24/13; 8/13/13; 8/16/13; 8/19/13; 8/21/13; 8/28/13; 9/11/13; 12/2/13; 12/12/13; 12/16/13		5/16/13
USFWS	2/19/09; 3/30/09; 6/3/09; 6/18/09; 7/13/09; 9/30/09; 11/2/09; 12/24/09; 12/31/09; 4/2/10; 6/14/10; 7/23/10; 8/12/10; 11/24/10; 12/9/10; 1/16/11; 6/30/11; 7/8/11		6/25/09; 6/29/09; 7/1/09; 7/13/09; 8/13/09; 9/1/09; 9/10/09; 9/30/09; 10/7/09; 10/9/09; 10/19/09; 11/3/09; 11/4/09; 11/11/09; 11/17/09; 3/31/10; 4/19/10; 5/6/10; 6/2/10; /4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 10/15/10; 10/21/10; 11/3/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11(3); 7/1/11; 7/8/11; 7/20/11; 7/22/11		
Western	4/14/09; 6/3/09; 6/18/09; 7/13/09; 9/30/09; 11/2/09; 12/24/09; 12/31/09; 1/26/10; 4/2/10; 6/14/10; 7/23/10; 8/12/10; 11/24/10; 12/9/10; 1/16/11; 6/30/11; 7/8/11	9/15/09; 2/8/10; 2/17/10; 2/19/10; 3/26/10; 8/16/10; 9/13/10; 9/23/10; 10/15/10; 10/19/10; 10/20/10; 11/15/10; 11/30/10; 7/31/13	9/14/09; 9/16/09; 9/17/09; 9/18/09; 1/25/10; 1/26/10; 1/28/10; 1/29/10; 2/1/10; 2/8/10; 2/17/10; 2/18/10; 3/1/10; 3/8/10; 3/18/10; 3/31/10; 4/19/10; 5/6/10; 6/2/10; 6/4/10; 6/21/10; 6/23/10; 7/6/10; 7/12/10; 7/16/10; 7/23/10; 8/10/10; 9/7/10; 9/13/10; 10/15/10; 10/18/10; 10/21/10; 10/25/10; 11/3/10; 11/5/10; 11/16/10; 12/7/10; 12/8/10; 12/14/10; 1/12/11; 1/27/11; 1/28/11; 2/22/11; 3/18/11; 3/29/11; 4/18/11; 6/21/11; 6/30/11(3); 7/1/11; 7/8/11; 7/20/11; 7/22/11; 4/1/13; 4/9/13; 4/23/13; 5/9/13; 5/14/13; 7/23/13; 7/24/13; 8/13/13; 8/16/13; 8/19/13; 8/21/13; 8/28/13; 9/11/13; 12/2/13; 12/5/13; 12/12/13; 12/16/13		10/20/09; 10/21/09; 2/24/10

Notes:

ACHP = Advisory Council on Historic Preservation
BIA = Bureau of Indian Affairs
BLM = Bureau of Land Management
BOR = U.S. Bureau of Reclamation
MDEQ = Montana Department of Environmental Quality
MDNRC = Montana Department of Natural Resources and Conservation
NPS = U.S. Department of the Interior, National Park Service
RUS = Rural Utilities Service
SHPO_KS = State Historic Preservation Office, Kansas
SHPO_MT = State Historic Preservation Office, Montana
SHPO_NE = State Historic Preservation Office, Nebraska
SHPO_SD = State Historic Preservation Office, South Dakota
USACE = U.S. Army Corps of Engineers
USDA FSA = U.S. Department of Agriculture, Farm Service Agency
USDA NRCS = U.S. Department of Agriculture, Natural Resources Conservation Service
USFWS = U.S. Fish and Wildlife Service

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Appendix M – Unanticipated Contamination Discovery Plan

TransCanada Keystone Pipeline, L.P.
Keystone XL Pipeline

Unanticipated Contamination Discovery Plan

Project Number:

TAL-00050388-60

Submitted By:

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KXL1399-EXP-RE-PLN-0004

Rev	Date (yyyy-mm-dd)	Issue	Prepared by	Checked by	Approved by	Project Manager	Client
1	2018-09-13	IFU	JA	JAS	JAS	RG	TCPL
2	2019-07-29	IFU	JA	RF	JAS	RG	TCPL
3	2019-09-13	IFU	RB	LH	JAS	SS	TCPL
4	2020-01-14	IFU	LH	AP	JAS	SS	TCPL

Unanticipated Contamination Discovery Plan (Soils) Modification Tracker			
Previously Submitted Version: Rev 3A			
Current Version: Rev 4			
Count	**Section No.**	**Previously Submitted Version Original Text**	**Modified/Updated Text**
1	1.0 Introduction	This Unanticipated Contamination Discovery Plan (Plan) is intended to provide guidance to ensure worker and public safety as well as prevent the spread of contamination in the event that waste and/or contaminated soils (as defined in applicable federal, state, and local regulations and guidelines see Appendix A) are encountered during construction of the Project.	This Unanticipated Contamination Discovery Plan (Plan) is intended to provide guidance to ensure worker and public safety as well as prevent the spread of contamination in the event that substances that could potentially be considered waste and/or contaminated soils, as defined in applicable federal, state, and local regulations and guidelines (see Appendix A), are encountered during construction of the Project
2	1.2 Objectives	Non-hazardous wastes encountered during construction would be addressed using the procedures found in the Waste Management Plan that each contractor is required to prepare	If potentially hazardous materials are encountered during construction, the actions contained in this Plan provide measures that the Project entity and its contractors would undertake.
3	1.2.1 Project Responsibilities	Notifying the appropriate agencies/authorities	Notifying the appropriate agencies/authorities, to the extent required by law
4	1.2.1 Project Responsibilities	Engaging specialized waste contractor(s) to characterize discovered wastes and to implement subsequent response actions as negotiated with the landowner and the lead State Agency) and/or the U.S. Environmental Protection Agency (EPA).	If necessary, characterizing discovered substances and implementing subsequent response actions as negotiated with the lead State Agency and/or the U.S. Environmental Protection Agency (EPA).
5	1.2.2 Contractor Responsibilities	The Contractor shall be responsible for implementation of the initial response procedures contained in Section 2.1 of this Plan, including securing the site and ceasing construction activities at the location where hazardous waste was found.	The Contractor shall be responsible for implementation of the initial response procedures contained in Section 2.1 of this Plan, including securing the site and ceasing construction activities at the location where the potentially hazardous substance was found.
6	2.0 Discovery	Identifying and recognizing existing hazardous materials or contaminants is the first step to initiate the proper response action.	Identifying and recognizing existing, potentially hazardous materials or contaminants is the first step to initiate the proper response action.

Unanticipated Contamination Discovery Plan (Soils) Modification Tracker			
Previously Submitted Version: Rev 3A			
Current Version: Rev 4			
Count	**Section No.**	**Previously Submitted Version Original Text**	**Modified/Updated Text**
7	2.0 Discovery	Stained or discolored earth, as contrasted to adjoining soil	Stained or discolored earth, as contrasted to adjoining soil within the same soil horizon
8	2.1 Initial Response Procedures	Notify the Project entity's Lead Environmental Inspector and Resident Construction Supervisor	Notify the Project entity's On-Site Safety Supervisor, Lead Environmental Inspector, and Resident Construction Supervisor
9	2.1 Initial Response Procedures	Await further instructions from Keystone	Await further instructions from Keystone, which will come after the On-Site Safety Supervisor, Lead Environmental Inspector, and Resident Construction Supervisor consult with Keystone and its legal team.
10	2.2.1 State Agency Notifications	Table of State Contacts	Table modified to only show State Departments of Env Quality of Natural Resources
11	2.2.3 Assessment	Keystone would engage a specialized waste consultant to identify and characterize the contamination through sampling and analytical testing.	Keystone may undertake procedures to identify and characterize the contamination through sampling and analytical testing.
12	2.2.3 Assessment	A waste consultant may also be employed to develop special construction specifications to complete portions of the Project within or around contaminated areas.	Special construction specifications may be developed to complete portions of the Project within or around contaminated areas.

Unanticipated Contamination Discovery Plan (Soils) Modification Tracker			
Previously Submitted Version: Rev 3A			
Current Version: Rev 4			
Count	**Section No.**	**Previously Submitted Version Original Text**	**Modified/Updated Text**
13	2.2.4 Mitigation Measures	The final disposition of contaminated soils and/or water (groundwater, surface water) would be determined through discussions with the jurisdictional agencies and affected landowners. Depending on the extent and characteristics of contamination identified, Keystone would first seek a realignment to avoid encountering further contamination. If such a move is infeasible, plans would be developed with the landowner and applicable state agency for excavation or reducing the contamination and disposing of contaminated material at an approved waste disposal site depending on waste characterization, e.g. hazardous vs non-hazardous.	The final disposition of potentially contaminated soils would be determined by Keystone and its legal team.
14	3.1 Keystone Responsibilities	The level of associated documentation from initial discovery through final resolution would depend on the extent of discovered contamination, the potential toxicity of contaminants, and degree of further disturbance of the contaminated site by construction activities	The level of associated documentation from initial discovery through final resolution would depend on the extent of discovered potential contamination, the potential toxicity of contaminants, and degree of further disturbance of the discovery site by construction activities
15	3.1 Keystone Responsibilities	Keystone would document steps involved from initial discovery through final disposition, and written approval by agencies and record the following information when unanticipated contamination is discovered:	Keystone would document steps involved from initial discovery through final disposition, and written approval by agencies and record the following information when unanticipated contamination is discovered:
16	Appendix A - State Contaminated Soil Regulation Definitions	1.2. Montana Department of Environmental Quality Technical Guidance Documents for Spills/Unanticipated Contamination Discovery	Section Deleted
17	Appendix A - State Contaminated Soil Regulation Definitions	2.1 Nebraska Administrative Code - Definitions	Section Deleted

Unanticipated Contamination Discovery Plan (Soils) Modification Tracker			
Previously Submitted Version: Rev 3A			
Current Version: Rev 4			
Count	**Section No.**	**Previously Submitted Version Original Text**	**Modified/Updated Text**
18	Appendix A - State Contaminated Soil Regulation Definitions	3.1 North Dakota Administrative Code Definitions	Section Deleted

Legal Notification

This report was prepared by EXP Energy Services Inc. for Keystone XL Pipeline.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. EXP Energy Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Acronyms and Abbreviations

BLM	Bureau of Land Management
Contractor	Construction Contractor
EPA	United States Environmental Protection Agency
HAZWOPER	Hazardous Waste Operations and Emergency Response
KXL	Keystone XL Pipeline
OSHA	Occupational Safety and Health Administration
Plan	Unanticipated Contamination Discovery Plan
PPE	Personal protective equipment
Project	Keystone XL Pipeline
RCRA	Resource Conservation and Recovery Act

Table of Contents

Legal Notification i

Acronyms and Abbreviations ii

Table of Contents iii

1.0 Introduction 1

1.1 Purpose and Scope 1

1.2 Objectives 1

1.2.1. Project Responsibilities 1

1.2.2. Contractor Responsibilities 1

1.3 Scope 1

2.0 DISCOVERY 2

2.1 Initial Response Procedures 2

2.2 Site Characterization and Hazard Assessment 2

2.2.1. State Agency Notifications 2

2.2.2. Federal Agency Notifications 4

2.2.3. Hazard Assessment 4

2.2.4. Mitigation Measures 5

3.0 RECORDKEEPING 5

3.1 Keystone Responsibilities 5

3.2 Contractor Responsibilities 6

Appendix

Appendix A - State Contaminated Soil Regulation Definitions 7

1.0 INTRODUCTION

This *Unanticipated Contamination Discovery Plan* (Plan) is intended to provide guidance to ensure worker and public safety as well as prevent the spread of contamination in the event that substances that could potentially be considered waste and/or contaminated soils, as defined in applicable federal, state, and local regulations and guidelines (see Appendix A), are encountered during construction of the Project. Whereas preconstruction planning has avoided known hazardous and non-hazardous material sites, undocumented sources of contamination could be encountered during construction.

1.1 Purpose and Scope

1.2 Objectives

The objective of this Plan is to prescribe measures for safely addressing unanticipated, potentially hazardous wastes found during construction of the Project. If potentially hazardous materials are encountered during construction, the actions contained in this Plan provide measures that the Project entity and its contractors would undertake.

1.2.1. Project Responsibilities

Keystone would be responsible for identifying known documented hazardous waste and/or contaminated sites ahead of construction and taking appropriate action to avoid these sites or mitigate them. In the event of an unanticipated discovery, Keystone would be responsible for:

- Notifying the appropriate agencies/authorities, to the extent required by law;
- Providing guidance to the Construction Contractor (Contractor); and,
- If necessary, characterizing discovered substances and implementing subsequent response actions as negotiated with the lead State Agency and/or the U.S. Environmental Protection Agency (EPA).

1.2.2. Contractor Responsibilities

The Contractor shall be responsible for implementation of the initial response procedures contained in Section 2.1 of this Plan, including securing the site and ceasing construction activities at the location where the potentially hazardous substance was found.

1.3 Scope

This Plan shall be effective during all construction phases of the Project and at all Project construction locations.

2.0 DISCOVERY

Identifying and recognizing existing, potentially hazardous materials or contaminants is the first step to initiate the proper response action. During excavation, indicators of possible impacted soils that the Contractor will be expected to look for include, but are not limited to:

- Rusted barrels and containers;
- Stained or discolored earth, as contrasted to adjoining soil within the same soil horizon;
- Fill material containing debris unearthed during trenching or grading;
- Household trash covered by earth or other material that appears to be interspersed with industrial debris;
- Gasoline smells or other hydrocarbon odors that emanate when the earth is disturbed;
- Oily residue intermixed with earth;
- Sheen on groundwater;
- Hydrocarbon sheen on surface water; and/or
- Cinders, ash and other combustion products.

Structures such as abandoned oil and gas lines, asbestos pipe, old transformers, and underground storage tanks also require special handling if identified during excavation.

2.1 Initial Response Procedures

Immediately following discovery of potentially hazardous waste or contaminants, the Contractor would:

- Cease work in the vicinity of suspected contamination;
- Cordon off or otherwise restrict access to the suspected area to protect workers and the public;
- Notify the Project entity's On-Site Safety Supervisor, Lead Environmental Inspector, and Resident Construction Supervisor; and,
- Await further instructions from Keystone, which will come after the On-Site Safety Supervisor, Lead Environmental Inspector, and Resident Construction Supervisor consult with Keystone and its legal team.

2.2 Site Characterization and Hazard Assessment

Keystone would undertake the following procedures used to determine the extent, nature, and disposition of suspected contamination encountered by construction. These actions would be undertaken by a trained Occupational Safety and Health Administration (OSHA) and Hazardous Waste Operations and Emergency Response (HAZWOPER) technicians that implement specialized personal protective equipment (PPE), sampling, and decontamination protocols approved by Keystone.

The actions following discovery and site security would include:

- Identifying the extent of unanticipated site contamination, as required;
- Determining the worker safety and public exposure concerns;
- Documenting the work from discovery through to final disposition of the materials found; and,
- Consulting with Keystone and its legal team on the appropriate next steps after the discovery.

2.2.1. State Agency Notifications

All agency notifications, to the extent required, would be made by Keystone. Phone numbers for the appropriate State offices are shown below.

Agency	Telephone Number	Fax Number	Home Page Website	Online Spill Report Form
Montana				
Montana Department of Environmental Quality	(406) 444-2544	(406) 444-4386	https://deq.mt.gov/	http://deq.mt.gov/DEQAdmin/ENF/spill
South Dakota				
South Dakota Department of Environment & Natural Resources	605-773-3296 and 605-773-3231 (after hours)	N/A	http://denr.sd.gov/des/gw/Spills/Spills.aspx https://denr.sd.gov/des/gw/tanks/SuspectedRelease.aspx	https://denr.sd.gov/des/gw/Spills/Spills.aspx https://dps.sd.gov/contact/online-form/emergency-management?agency=11
Nebraska				
Nebraska Department of Environmental Quality	402-471-2186 or 877-253-2603	N/A	http://www.deq.state.ne.us/	http://deq.ne.gov/NDEQProg.nsf/OnWeb/Complaint
Kansas				
Kansas Department of Health and Environment Spill Response Program	(785) 291-3333 24/7 Spills Hotline (785) 368-7301	(785) 559-4261	http://www.kdheks.gov/spill/	kdhe.SpillHotline@ks.gov http://www.kdheks.gov/spill/kansas_spill_release_reporting_numbers.html http://www.kdheks.gov/spill/download/KS_Spill_Reporting.pdf
Oklahoma				
Oklahoma Department of Environmental Quality	(405)-702-0100 DEQ Hotline 1-800-522-0206	405-702-1001	http://www.deq.state.ok.us/	N/A
Texas				
Texas Spill-Reporting Hotline (State)	1-800-832-8224	N/A	https://www.tceq.texas.gov/response/spills	N/A
Railroad Commission of Texas	1-844-773-0305 or (512) 463-6788	N/A	http://www.rrc.state.tx.us/	N/A

2.2.1.1 State Lands

If potential contamination is found on state lands, the appropriate state land agency would be notified, if necessary.

Land Agency	Telephone Number	Fax Number
Montana Department of Natural Resources and Conservation	(406) 444-2074	(406) 444-2684
South Dakota Department of Environment & Natural Resources	605-773-3296 and 605-773-3231 (after hours)	(605) 773.6035
South Dakota Department of Transportation	(605) 773-3046	(605) 773-3921
Nebraska Department of Natural Resources	(402) 471-2363	(402) 471-2900
Note: Pump stations in Kansas, Oklahoma, and Texas would not cross state lands.		

2.2.2. Federal Agency Notifications

All federal agency notifications, to the extent necessary, would be made by Keystone. Phone numbers for the EPA and Bureau of Land Management (BLM) offices are shown in the following tables.

U.S. Environmental Protection Agency – Region 8 and 6

EPA Region 8	Phone	Fax	Online Spill Report Form Webpage
National Response Center	(800) 424-8802	N/A	http://www.nrc.uscg.mil/report.html
EPA Region 8 (CO, MT, ND, SD, UT, and WY)	Emergency Response (800) 424-8802 Main Number 303-312-6312 (800) 227-8917 (toll free Region 8 states only: CO, MT, ND, SD, UT, WY)	303-312-7910	https://www.epa.gov/aboutepa/forms/contact-epas-region-8-office
EPA Region 6	**Phone**	**Fax**	**Online Spill Report Form Webpage**
EPA Region 6 (OK, TX, NM, LA, AR)	Emergency Response (800) 887-6063 Main Number 1-800-887-6063	N/A	N/A
EPA Region 7	**Phone**	**Fax**	**Online Spill Report Form Webpage**
Region 7 (NE, IA, KS, and MO)	(913) 281-0991 Region 7 24/7 Emergency Spill Response Line (913) 551-7003 or 800-223-0425	N/A	https://www.epa.gov/ks/forms/contact-us-about-epa-kansas

Bureau of Land Management

BLM Land Manager	Phone	Fax
Montana Dakotas State Office	(406) 896-5000	(406) 896-5298
North Central Montana District Office	(406) 538-1900	(406) 538-1904
Glasgow, Montana Field Office	(406) 228-3750	(406) 228-3751

2.2.3. Hazard Assessment

Keystone may undertake procedures to identify and characterize the contamination through sampling and analytical testing. The objectives of the investigation could include:

- Devising a plan for additional site-specific investigations as necessary;

- Determining the characteristics of the soil, groundwater, and vapor (e.g., groundwater recovery rates; vertical and horizontal extent of contamination; chemicals of concern; etc.);
- Determining the handling and/or disposal requirements for any contaminated media unearthed as part of the construction process or if the site should be avoided with a reroute;
- Recommending a preventive action plan to ensure the problem is not aggravated and to minimize liability; and,
- Determining the requirements necessary for the construction contractor to resume work in the area.

Special construction specifications may be developed to complete portions of the Project within or around contaminated areas. The data obtained from the investigation could also enable the development of special site closure specifications related to groundwater treatment or filtration systems; ventilation systems; ongoing site monitoring; contaminated material disposal or reuse options; and permitting.

2.2.4. Mitigation Measures

The final disposition of potentially contaminated soils would be determined by Keystone and its legal team.

3.0 RECORDKEEPING

Documentation of the unanticipated potential contamination discovery would start with the details associated with initial discovery and end with the final disposition of the discovered substances.

3.1 Keystone Responsibilities

The level of associated documentation from initial discovery through final resolution would depend on the extent of discovered potential contamination, the potential toxicity of contaminants, and degree of further disturbance of the discovery site by construction activities.

Keystone would document steps involved from initial discovery through final disposition. If agency notification is determined to be necessary, documentation would also include the written approval by agencies and the following information:

- Detailed description of initial discovery, e.g. time and place of discovery;
- Initial response actions taken to secure the site from further disturbance or human exposure;
- Establishment of site security (from Contractor);
- The description of discovered substances (visual and odors);
- The extent of disturbance of the site by construction;
- Sampling performed and analytical testing results;
- Agency notifications made in response to the discovery;
- Actions taken to secure contamination in place or at the treatment, storage, or disposal facility.
- Waste management consultant engagement;
- Site investigation, assessment, report and/or removal of contaminated materials in the construction area by the waste management contractor (e.g., burial or exhumation and offsite disposal);
- Sampling, chain of custody, and laboratory results;

- Secure copies of any transport manifests and delivery receipts;
- Site closure plans, verification, and concurrence (by regulatory agencies); and,
- Agreed-upon activities to resume Project construction or to avoid the site.

3.2 Contractor Responsibilities

The Contractor would cooperate with Keystone by providing all pertinent and detailed information regarding the initial discovery, site security measures, and recommendations for avoidance, including workspace requirements to avoid the unanticipated contamination discovery.

If directed by Keystone, the Contractor may be required to develop a Decontamination Plan that includes guidance on the procedures for decontaminating materials and equipment that directly come in contact with the contaminated materials.

Appendix A - State Contaminated Soil Regulation Definitions

1. Montana Contaminated Soil Regulation Definitions

1.1. Montana Code Annotated - Definitions

Title 75. Environmental Protection, Chapter 10. Waste and Litter Control, Part 4. Hazardous Waste Management

75-10-602. Definitions. As used in this part, the following definitions apply:

(2) (a) "Contaminant" includes but is not limited to any element, substance, compound, or mixture, including disease-causing agents, that after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction), or physical deformations in the organisms or their offspring.

(b) The term does not include petroleum (including crude oil or any fraction of crude oil that is not specifically listed or designated as a hazardous substance as provided in subsection (4)(a)) or natural gas, liquefied natural gas, synthetic gas of pipeline quality, or mixtures of natural gas and synthetic gas.

(3) "Department" means the department of environmental quality provided for in **2-15-3501**.

(4) (a) "Hazardous substance" means:

(i) any substance designated pursuant to section 311(b)(2)(A) of the federal Water Pollution Control Act;

(ii) any element, compound, mixture, solution, or substance designated a hazardous substance by regulations promulgated by the administrator of the federal environmental protection agency pursuant to section 102 of CERCLA;

(iii) any hazardous waste having the characteristics identified under or listed pursuant to section 3001 of the federal Solid Waste Disposal Act (but not including any waste the regulation of which under the Solid Waste Disposal Act has been suspended by act of congress);

(iv) any toxic pollutant listed under section 307(a) of the Federal Water Pollution Control Act;

(v) any hazardous air pollutant listed under section 112 of the federal Clean Air Act; and

(vi) any imminently hazardous chemical substance or mixture with respect to which the administrator of the environmental protection agency has taken action pursuant to section 7 of the federal Toxic Substances Control Act.

(b) The term does not include petroleum (including crude oil or any fraction of crude oil that is not specifically listed or designated as a hazardous substance as provided in subsection (4)(a)) or natural gas, natural gas liquids, liquefied natural gas, synthetic gas usable for fuel, or mixtures of natural gas and synthetic gas.

(5) "Hazardous waste" means a solid waste or combination of solid wastes that because of its quantity, concentration, or physical, chemical, or infectious characteristics may:

(a) cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; or

(b) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of or otherwise managed.

(6) "President" means the president of the United States.

(7) "Release" means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment but excludes:

(a) any release that results in exposure to persons solely within a workplace, with respect to a claim that persons may assert against their employer;

(b) emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel, or pipeline pumping station engine;

(c) (i) the release of source, byproduct, or special nuclear material from a nuclear incident, as those terms are defined in the federal Atomic Energy Act of 1954, if the release is subject to requirements with respect to financial protection established by the nuclear regulatory commission under section 170 of that act; or

(ii) for the purposes of section 104 of CERCLA or any other response action, any release of source byproduct or special nuclear material from any processing site designated under section 102(a)(1) or 302(a) of the federal Uranium Mill Tailings Radiation Control Act of 1978;

2. Nebraska Contaminated Soil Regulation Definitions

2.1. Nebraska Department of Environmental Quality Technical Guidance Documents for Spills/Unanticipated Contamination Discovery

Nebraska's Voluntary Cleanup Program (VCP)
Refer to the Nebraska Voluntary Cleanup Program guidance document for additional information on contaminated site clean-up. Available online at: http://deq.ne.gov/Publica.nsf/pages/05-162/#Sec

Investigation-Derived Waste (IDW) and Remediation Waste Considerations
IDW is a subset of remediation wastes. IDW is waste that is generated in the process of investigating or examining a known or potentially contaminated site. It includes solid and hazardous waste, media (including groundwater, surface water, soils, and sediments) and all debris that contains listed hazardous wastes or exhibits a characteristic of a hazardous waste. It also includes media and debris that is not hazardous but is contaminated with hazardous constituents. Not all IDW is hazardous waste. Refer to the following guidance document: *Investigation Derived Waste & Remediation Waste Considerations* for contaminated site cleanup information. Available online at: http://deq.ne.gov/NDEQProg.nsf/PubsForm.xsp?databaseName=CN=DEQSER6/O=NDEQ!!publica.nsf&documentId=FDB8419E3FC0757586256FC10065D5B0&action=editDocument

Management of Petroleum-Contaminated Material
For petroleum contaminated site cleanup refer to the following guidance document: *Petrol Contaminated Management* available online at:

http://deq.ne.gov/NDEQProg.nsf/xsp/.ibmmodres/domino/OpenAttachment/CN=DEQSER6/O=NDEQ!!publica.nsf/5CA123574A01B50286256FE700692137/Attach/06-205%20Petrol%20Contaminated%20Management.pdf

3. South Dakota Contaminated Soil and Hazardous Waste Definitions and Regulations

3.1. South Dakota Administrative Code - Definitions

Article 74:28
Hazardous Waste Chapter 74:28:22
Identification and Listing

74:28:22:01. Identification and listing of hazardous wastes. Solid wastes which are subject to regulation as hazardous wastes are those identified and listed in 40 C.F.R. §§ 261.1 to 261.1089, inclusive, except 40 C.F.R. § 261.4(b)(16) and (17); §§ 261.140 to 261.151, inclusive, and Appendices I, VII, VIII, and IX (July 1, 2016).

Article 74:32
Chapter 74:32:01
74:32:01:01. Definitions.
(11) "Risk assessment," a scientific evaluation of the properties of petroleum products and the conditions of environmental and human exposure to petroleum products in order to ascertain the likelihood of adverse effects to the environment and exposed humans and the nature of such effects;

Article 74:56
Chapter 74:56:05

74:56:05:04 Contaminant of potential concern (COPC): material detected at a hazardous waste site which has the potential to adversely affect receptors due to its concentration, distribution, and/or mode of toxicity. Alternatively, referred to as chemical of potential concern.

74:56:05:20. Unrecoverable petroleum-contaminated soils. If visibly contaminated soils or contaminated soils that exceed the guidelines established in §§ 74:56:05:06 to 74:56:05:14, inclusive, are unrecoverable and left in place under buildings, roads, or structures or are in contact with such features as sewer lines, utility lines, and water supply lines, the responsible person must establish a monitoring program consistent with this chapter. If the department determines that contaminated soils left in place are a potential threat to human health and the environment, the responsible person must take measures to protect public health and the environment. Such measures may include in situ remediation, ventilation, removal, or other applicable technologies as they become available. The department may allow soils contaminated above site-specific standards to be left in place if physical constraints, other than those listed in this section, do not allow for complete removal. Contaminated soils left in place may be remediated with department approval in accordance with §§ 74:56:05:06 to 74:56:05:14, inclusive.

Chapter 34A-11
Hazardous Waste Management

34A-11-2 Definitions

(3) "Disposal," the discharge, deposit, injection, dumping, spilling, leaking, or placing of any hazardous waste into or on any land, air, or water so that such hazardous waste or any constituent thereof may enter the environment, or be emitted into air, or discharged into any waters, including groundwaters;

(4) "Hazardous waste," a solid waste and combination of solid wastes, as defined in subdivision 34A-6-1.3(17), which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed but does not include radioactive materials regulated pursuant to chapter 34-21;

(5) "Hazardous waste management," the systematic control of the collection, source separation, storage, transportation, processing, treatment, recovery, and disposal of hazardous waste;

4. Kansas Contaminated Soil and Hazardous Waste Definitions and Regulations

K. A. R. 28-48. – SPILL REPORTING 28-48-1.

Definitions. The following words and phrases when used in these regulations have the meanings respectively ascribed to them in this section.

(a) ‘‘Owner’’ means individual, partnership, firm, trust, company, association, corporation, institution, political subdivision or agency which is financially responsible for the material or facility.

(b) ‘‘Person responsible’’ means person or organization which has been placed in control of the material or facility by the owner.

(c) ‘‘Waters of the state’’ means all streams and springs, and all bodies of surface or groundwater, whether natural or artificial, within the boundaries of the State. (Authorized by and implementing K.S.A. 1984 Supp. 65-171d; effective May 1, 1986.)

28-48-2. Action required. All sewage, substances, materials, or wastes, as set forth in 65-171d, regardless of phase or physical state, which are, or threaten to contaminate or alter any of the properties of the waters of the state or pollute the soil in a detrimental, harmful, or injurious manner or create a nuisance, shall be reported in the following manner: (a) The owner or person responsible for the discharge or escape of materials detrimental to the quality of waters of the state or pollution of the soil under conditions other than provided by a valid permit issued by the secretary of health and environment, shall report the discharge or escape to the Kansas department of health and environment. (b) Emergency or accidental discharge of materials which are detrimental to the quality of waters of the state or tend to cause pollution of the soil shall be immediately reported to the Kansas department of health and environment by the owner, owner’s representatives, or person responsible. In the event the pollution causing material is in transit or in storage within the state, the owner, carrier, or person responsible for storage shall be responsible for immediate notification to the Kansas department of health and environment that the pollutant will gain admittance to the waters of the state or the soil. (Authorized by and implementing K.S.A. 1984 Supp. 65-171d; effective May 1, 1986.)

5. Oklahoma Hazardous Waste Regulations

5.1. Oklahoma Code Annotated - Definitions

Oklahoma regulations concerning hazardous waste are found at Title 252, Department of Environmental Quality, Chapter 205 Hazardous Waste Management and can be viewed at: http://www.deq.state.ok.us/rules/205.pdf

These regulations incorporate the federal regulations for identification of hazardous waste found at 40 CFR 261.150.

5.2. Oklahoma Code Annotated - Reporting

Oklahoma regulations concerning hazardous waste are found at Title 252, Department of Environmental Quality, Chapter 205 Hazardous Waste Management. Reporting requirements are found in Oklahoma Administrative Code (OAC) 252:205-13-1. Notification to the Oklahoma Department of Environmental Quality can be made through their hotline at 1-800-522-0286.

6. Texas Hazardous Waste Regulations

6.1. Texas Administrative Code - Definitions

Hazardous waste is defined as any solid waste listed as hazardous or possesses one or more hazardous characteristics as defined in federal waste regulations. Federal regulations defining hazardous waste are located at 40 CFR 261.3 and can be viewed at:
https://www.ecfr.gov/cgi-bin/text-idx?SID=d77a3de13bd4c2b84810ca9141f44284&mc=true&node=se40.28.261_13&rgn=div8

This definition is codified in Texas Administrative Code Title 30 Part 1 Chapter 33 Subchapter A (30 TAC 30:335.1) as follows and can be viewed at:
http://texreg.sos.state.tx.us/public/readtac$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=335

> (69) Hazardous industrial waste--Any industrial solid waste or combination of industrial solid wastes identified or listed as a hazardous waste by the administrator of the United States Environmental Protection Agency in accordance with the Resource Conservation and Recovery Act of 1976, §3001 (42 United States Code, §6921). The administrator has identified the characteristics of hazardous wastes and listed certain wastes as hazardous in 40 Code of Federal Regulations Part 261. The executive director will maintain in the offices of the commission a current list of hazardous wastes, a current set of characteristics of hazardous waste, and applicable appendices, as promulgated by the administrator.
>
> (70) Hazardous secondary material--A secondary material (e.g., spent material, by-product, or sludge) that, when discarded, would be identified as "Hazardous waste" as defined in this section.
>
> (71) Hazardous secondary material generator--Any person whose act or process produces hazardous secondary materials at the generating facility. For purposes of this paragraph, "generating facility" means all contiguous property owned, leased, or otherwise controlled by the hazardous secondary material generator. For the purposes of 40 Code of Federal Regulations §261.4(a)(23), a facility that collects hazardous secondary materials from other persons is not the hazardous secondary material generator.
>
> (72) Hazardous substance--Any substance designated as a hazardous substance under 40 Code of Federal Regulations Part 302.
>
> (73) Hazardous waste--Any solid waste identified or listed as a hazardous waste by the administrator of the United States Environmental Protection Agency in accordance with the federal Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, 42 United States Code, §§6901 et seq.

6.2. Texas Administrative Code - Reporting

Texas reporting requirements are identified in the following chapters of the Texas Administrative Code:

- Subchapter D of Chapter 334 in Title 30 Underground and Aboveground Storage Tanks
- Chapter 350 in Title 30 Texas Risk Reduction Program
- Chapter 327 in Title 30 Spill Prevention and Control

Appendix N – Summary of Wetland Condition Assessment

Table N-1. Summary of Wetland Condition Assessment of Select Wetlands along the Keystone XL Pipeline

Feature ID	State	County	Approx. Milepost	Wetland on CL	Delineation Date (Year)	Wetland Classification	Feature in similar condition to when delineated?
W106VA002	MT	Valley	25.32	YES	2010	PSS	YES
W304VA001	MT	Valley	25.44	YES	2012	PEM	YES
W105MC001	MT	McCone	137.81	YES	2010	PEM	YES
W105MC003	MT	McCone	139.53	YES	2010	PEM	YES
W105MC002	MT	McCone	139.99	YES	2010	PEM	YES
W901DA001	MT	Dawson	168.38	YES	2013	PEM	YES
W106PR001	MT	Prairie	216.55	YES	2010	PEM	YES
W121FA004	MT	Fallon	229.03	NO	2009	PEM	YES
W276FA001	MT	Fallon	253.54	YES	2011	PEM	YES
W8AFA004	MT	Fallon	261.14	YES	2008	PEM	YES
W106FA002	MT	Fallon	261.78	YES	2010	PEM	YES
W901FA001	MT	Fallon	275.14	NO	2013	PEM	YES
W8AFA001	MT	Fallon	279.07	YES	2008	PEM	YES
W109HA001	SD	Harding	289.04	YES	2010	PEM	NO*
W302HA001	SD	Harding	296.14	YES	2012	PEM	YES
WWTRVHA001	SD	Harding	298.9	YES	2013	PEM	YES
WWTRVHA003	SD	Harding	300.41	YES	2013	PEM	YES
W500HA002	SD	Harding	316.32	NO	2010	PEM	YES
W302HA002	SD	Harding	332.49	YES	2012	PEM	YES
WWTRVHA011A	SD	Harding	351.78	YES	2013	PEM	YES
W567ME003	SD	Meade	399.96	NO	2011	PEM	YES
W567ME004	SD	Meade	400.28	NO	2011	PEM	YES
W8AHK002	SD	Haakon	485.59	YES	2008	PEM	YES
W308JO001	SD	Jones	497.5	YES	2012	PEM	YES
W308JO002	SD	Jones	507.64	YES	2012	PEM	YES
W104TR009	SD	Tripp	565.03	YES	2009	PEM	YES
W311KP001	NE	Keya Paha	604.24	YES	2012	PEM	YES
W302HT001	NE	Holt	649.98	YES	2012	PEM	YES
W302HT003	NE	Holt	650.43	NO	2012	PEM	YES
W306HT005	NE	Holt	659.18	YES	2012	PEM	YES
W306HT003	NE	Holt	679.92	YES	2012	PFO	YES
W306AT001	NE	Antelope	683.85	YES	2012	PEM	YES

*Note that the inaccurately mapped portion of wetland W109HA001 is outside the Project's disturbance footprint.