

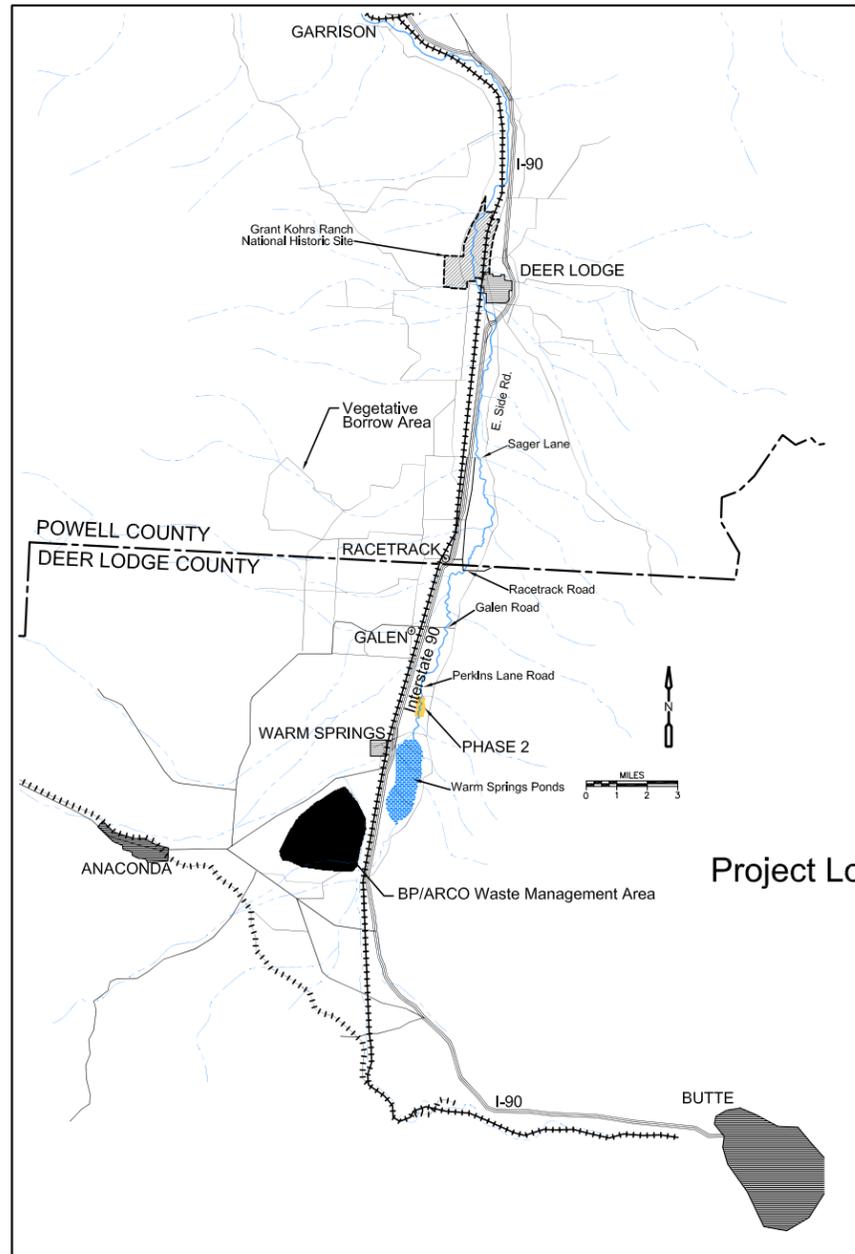
Clark Fork River

Reach A Phase 2 Remedial Action Project

Miltown Reservoir/Clark Fork River NPL Site

Deer Lodge County, Montana

MARCH 2015



Prepared for:



The Montana Department of Environmental Quality
Mine Waste Cleanup Bureau

The Montana Department of Justice
Natural Resource Damage Program



Prepared by:



CDM Smith, Inc. - Helena, Montana
Geum Environmental Consulting, Inc. - Hamilton, Montana

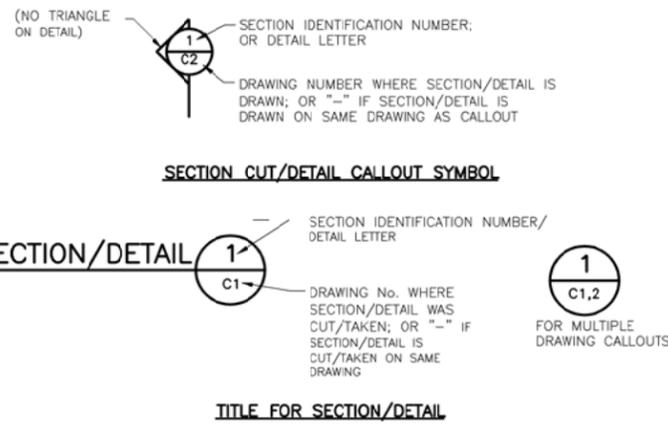
SHEET INDEX:

G1	COVER GENERAL LEGEND AND NOTES
C1	GENERAL SITE PLAN
C2-C3	WORK THIS CONTRACT
C4-C5	EXISTING CONDITIONS AND TEST PIT LOCATIONS
C6-C7	DEWATERING PLAN
C8-C9	EXCAVATION PLAN
C10-C11	NON-IMPACTED MATERIAL EXCAVATION AREAS
C12-C13	SUBGRADE PLAN
C14-C15	FINAL GRADING PLAN
C16-C17	VEGETATIVE BACKFILL DEPTHS, MICROTOPOGRAPHY, WOOD AND BRUSH PLACEMENT
C18-C19	STREAMBANK TREATMENT PLAN
C20	CHANNEL A AND OXBOW RECONSTRUCTION PLAN
C21	CHANNEL A DIVERSION PLAN AND CONSTRUCTION SEQUENCE
C22	CHANNEL B RECONSTRUCTION PLAN
C23	PERKINS LANE BRIDGE AREA FLOODPLAIN PLAN
C24	BECK BORROW AREA DEVELOPMENT AND RECLAMATION PLAN
C25	LOGAN BORROW AREA DEVELOPMENT AND RECLAMATION PLAN
C26	LAMPERT BORROW AREA DEVELOPMENT PLAN
C27	LAMPERT BORROW AREA RECLAMATION PLAN
C28	ALLUVIUM BORROW AREA EXCAVATION PLAN
C29	ALLUVIUM BORROW AREA RECLAMATION PLAN
C30	TRANSPORTATION PLAN
C31-C32	TRAFFIC CONTROL PLAN
C33-C34	HAUL ROAD DEVELOPMENT PLAN
C35-C36	HAUL ROAD RECLAMATION PLAN
C37	WASTE MANAGEMENT AREA PLAN
XS1-XS2	FLOODPLAIN CROSS SECTIONS
XS3	CHANNEL A AND OXBOW RECONSTRUCTION PROFILES
XS4	CHANNEL A RECONSTRUCTION CROSS SECTIONS
XS5	OXBOW RECONSTRUCTION CROSS SECTIONS
D1	HAUL ROAD DETAILS
D2	STREAMBANK TREATMENT DETAILS
D3	STREAMBANK TREATMENT, BANK TOE AND TRIBUTARY CHANNEL DETAILS
D4	TYPICAL DOUBLE VEGETATED SOIL LIFT BANK TREATMENT CONSTRUCTION SEQUENCE
D5	BIFURCATION AND GAP STREAMBANK TREATMENT DETAILS
D6	CHANNEL A RECONSTRUCTION AND STREAMBANK TRANSITION DETAILS
D7	HARDENED SECONDARY CHANNEL CROSSING AND WATER GAP DETAILS
D8	FARM FENCE DETAILS
D9	WILDLIFE FENCING DETAILS
D10	MICROTOPOGRAPHY AND WOOD AND BRUSH PLACEMENT DETAILS
D11	EROSION CONTROL DETAILS
D12-D13	DEWATERING PLAN DETAILS

LEGEND

	PHASE 1 REMOVAL BOUNDARY		BUILDING OR STRUCTURE FOOTPRINT
	PHASE 2 REMOVAL BOUNDARY		SHRUBBERY OR TREE
	DISTURBANCE BOUNDARY		FLOODPLAIN ALLUVIUM
	PROPERTY BOUNDARY		POINT BAR ALLUVIUM
	EXISTING ROAD		EXISTING GROUND
	PROPOSED PRIMARY HAUL ROADS		VEGETATIVE BACKFILL
	PROPOSED SECONDARY HAUL ROADS		SURVEY CONTROL POINT
	FIBER OPTIC LINE		ELEVATION OF BASE OF EXCAVATION (FT)
	TELEPHONE LINE		DEPTH OF EXCAVATION (IN)
	BURIED ELECTRIC LINE		ARSENIC CONCENTRATION GREATER THAN 620 PPM
	OVERHEAD ELECTRIC LINE		MONITORING WELL
	EXISTING FENCE		PROPOSED SUMP
	PROPOSED 8FT WILDLIFE FENCE		PROPOSED SEDIMENT POND
	FARM FENCE		GENERAL FILL BACKFILL AREAS
	WATER GAP		CHANNEL MIGRATION ZONE (CMZ)
	CULVERT		WETLANDS
	EXISTING INDEX CONTOUR LINE AND ELEVATION DESIGNATION		TEST PIT LOCATIONS
	EXISTING INTERMEDIATE CONTOUR LINE		TEST PIT IN TARGET RANGE
	PROPOSED INDEX CONTOUR LINE AND ELEVATION DESIGNATION		TEST PIT FINER THAN TARGET RANGE
	PROPOSED INTERMEDIATE CONTOUR LINE		TEST PIT COARSER THAN TARGET RANGE
	PROPOSED DEWATERING TRENCH		RED AREAS INDICATE NON-IMPACTED MATERIAL DEEPER THAN 1 FOOT TO BE EXCAVATED AND REPLACED IN EXCAVATED FLOODPLAIN AT LOCATIONS INDICATED BY ENGINEER.
	PROPOSED DISCHARGE PIPE		OLIVE AREAS TO BE EXCAVATED FROM 0 TO 1 FOOT
	EXISTING CONTOUR MAJOR, 5 FT INTERVAL		TYPE A MATERIAL
	EXISTING CONTOUR MINOR, 1 FT INTERVAL		NORMAL DENSITY WOODY DEBRIS WITH MICROTOPOGRAPHY
	SUBGRADE INDEX CONTOUR, 1FT INTERVAL		HIGH DENSITY WOODY DEBRIS WITH MICROTOPOGRAPHY
	SUBGRADE INTERMEDIATE CONTOUR, 0.5 FT INTERVAL		MICROTOPOGRAPHY
	FINAL GRADE INDEX CONTOUR, 1FT INTERVAL		
	FINAL GRADE INTERMEDIATE CONTOUR, 0.5 FT INTERVAL		
	EXCAVATION SURFACE MAJOR, 1 FT INTERVAL		
	EXCAVATION SURFACE MINOR, 0.5 FT INTERVAL		
	GAP TREATMENT		
	BRUSH TRENCH (BT)		
	WILLOW CUTTINGS BEHIND BANKS (WCBB)		
	DOUBLE VEGETATED SOIL LIFT (DVSL)		
	NO TREATMENT AREA (NT)		
	PRESERVE VEGETATION (PV)		
	POINT BAR REGRADING AREA (PB)		
	LATERAL BARS (LB)		
	NO VEGETATIVE BACKFILL		
	6 INCHES OF VEGETATIVE BACKFILL		
	12 INCHES OF VEGETATIVE BACKFILL		
	18 INCHES OF VEGETATIVE BACKFILL		

SECTION AND DETAIL DESIGNATION



SYMBOLS AND ABBREVIATIONS

#	NUMBER
&	AND
@	AT
%	PERCENT
Δ	DEFLECTION ANGLE IN DEGREES
>	GREATER THAN
<	LESS THAN
*	ARSENIC GREATER THAN 620 PPM
'	INTERNATIONAL FOOT
"	U.S. INCHES
▼	WATER SURFACE MARKER
AR	ATLANTIC RICHFIELD COMPANY
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
BNSF	BURLINGTON NORTHERN SANTA FE
BT	BRUSH TRENCH
CF	CUBIC FEET
CFR	CLARK FORK RIVER
CHK'D	CHECKED
CMP	CORRUGATED METAL PIPE
CMPA	CORRUGATED METAL PIPE ARCH
CY	CUBIC YARDS
DEQ	MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIA	DIAMETER
DWG	DRAWINGS
DRWN	DRAWN
DVSL	DOUBLE VEGETATED SOILS LIFT
E	EAST
E	BURIED ELECTRICAL LINE
EG	EXISTING GRADE
EPA	U.S. ENVIRONMENTAL PROTECTION AGENCY
FG	FINAL GRADE
FO	FIBER OPTIC
FT	U.S. FOOT
G	GAS LINE
GA	GAGE
GAL	U.S. GALLON
H	HORIZONTAL
HOR	HORIZONTAL
I-90	INTERSTATE 90
IN	U.S. INCHES
MAX	MAXIMUM
MIN	MINIMUM
MIN	MINUTE
LB	LATERAL BAR
LF	LINEAR FEET
LLC	LIMITED LIABILITY COMPANY
MDEQ	MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
MI	U.S. MILE
MISC	MISCELLANEOUS
MUTCD	MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
N	NORTH
NO	NUMBER
NT	NO TREATMENT
NTS	NOT TO SCALE
OC	ON CENTER
PB	POINT BAR
PH	TELEPHONE LINE
PP	OVERHEAD ELECTRIC
PPM	PARTS PER MILLION
PV	PRESERVE VEGETATION
QTY	QUANTITY
RD	ROAD
REV	REVISION
RR	RAILROAD
ROW	RIGHT OF WAY
SF	SQUARE FEET
S	SOUTH
STA	STATION
STD	STANDARD
SY	SQUARE YARDS
TYP	TYPICAL
UE	UNDERGROUND ELECTRIC
UP	UTILITY POLE
UG	UNDERGROUND
USGS	UNITED STATES GEOLOGICAL SURVEY
V	VERTICAL
VER	VERTICAL
W	WEST
XS	CROSS SECTION

MAPPING SOURCES:

SURVEY CONTROL: DAN BROWN AND ASSOCIATES, BUTTE, MT
 MAPPING BY FUGRO EARTH DATA AND DJA, AUGUST 2011 LIDAR DATA.

SURVEY CONTROL POINTS

NO./NAME	NORTH	EAST	ELEVATION (Z)	TYPE
SEWER LAGOON	722134.474	1137872.808	4818.926	RR SPIKE
CP1	726136.1	1139399	4785.458	IPS 1/2 REBAR
CP2	727737.8	1140245	4774.314	IPS 1/2 REBAR
CP3	730370.4	1140652	4770.977	IPS 1/2 REBAR
CP4	731375	1141031	4760.338	IPS 1/2 REBAR
CP5	731307.8	1142949	4767.86	IPS 1/2 REBAR
CP6	729178.9	1143506	4803.163	IPS 1/2 REBAR
CP7	727759.7	1143198	4798.588	IPS 1/2 REBAR
CP8	725955.3	1142492	4808.012	IPS 1/2 REBAR

HORIZONTAL SURVEY CONTROL IS STATE PLANE COORDINATES NAD83 CONVERTED TO INTERNATIONAL FEET. VERTICAL CONTROL IS NAVD88 IN US SURVEY FEET.

EXISTING CONDITIONS GENERAL NOTES:

- CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF CURRENT CONDITIONS AND LOCATIONS OF ALL THE EXISTING ITEMS WITHIN OR ADJACENT TO THE WORK, OR THAT MAY BE DISTURBED BY THE WORK.
- THE LOCATIONS OF ALL SUBSURFACE CONDITIONS ARE BASED ON THE BEST AVAILABLE INFORMATION AS OF INVESTIGATION COMPLETED IN 2009.
- CONTRACTOR SHALL VERIFY LOCATIONS OF ALL EXISTING SURFACE FEATURES, AND OTHER EXISTING ITEMS.
- CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL SURFACE AND SUBSURFACE UTILITIES. UTILITY LOCATIONS SHOWN ON DRAWING ARE APPROXIMATE AND FOR INFORMATIONAL PURPOSE ONLY.
- CONTRACTOR SHALL PROTECT AND REPAIR AT CONTRACTOR'S EXPENSE ANY DAMAGE TO UTILITIES CAUSED BY CONTRACTOR.
- DRAWINGS PLOTTED IN COLOR FOR REALIZATION OF ALL DESIGNED FEATURES.

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DESIGNED BY: KM
 DRAWN BY: KM
 SHEET CHK'D BY: TJ
 CROSS CHK'D BY: WHB
 APPROVED BY: WHB
 DATE: MARCH 2015

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 50 West 14th Street Suite 200
 Helena, Montana
 Tel: (406) 441-1400
 consulting • engineering • construction • operations

DEPARTMENT OF ENVIRONMENTAL QUALITY
 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

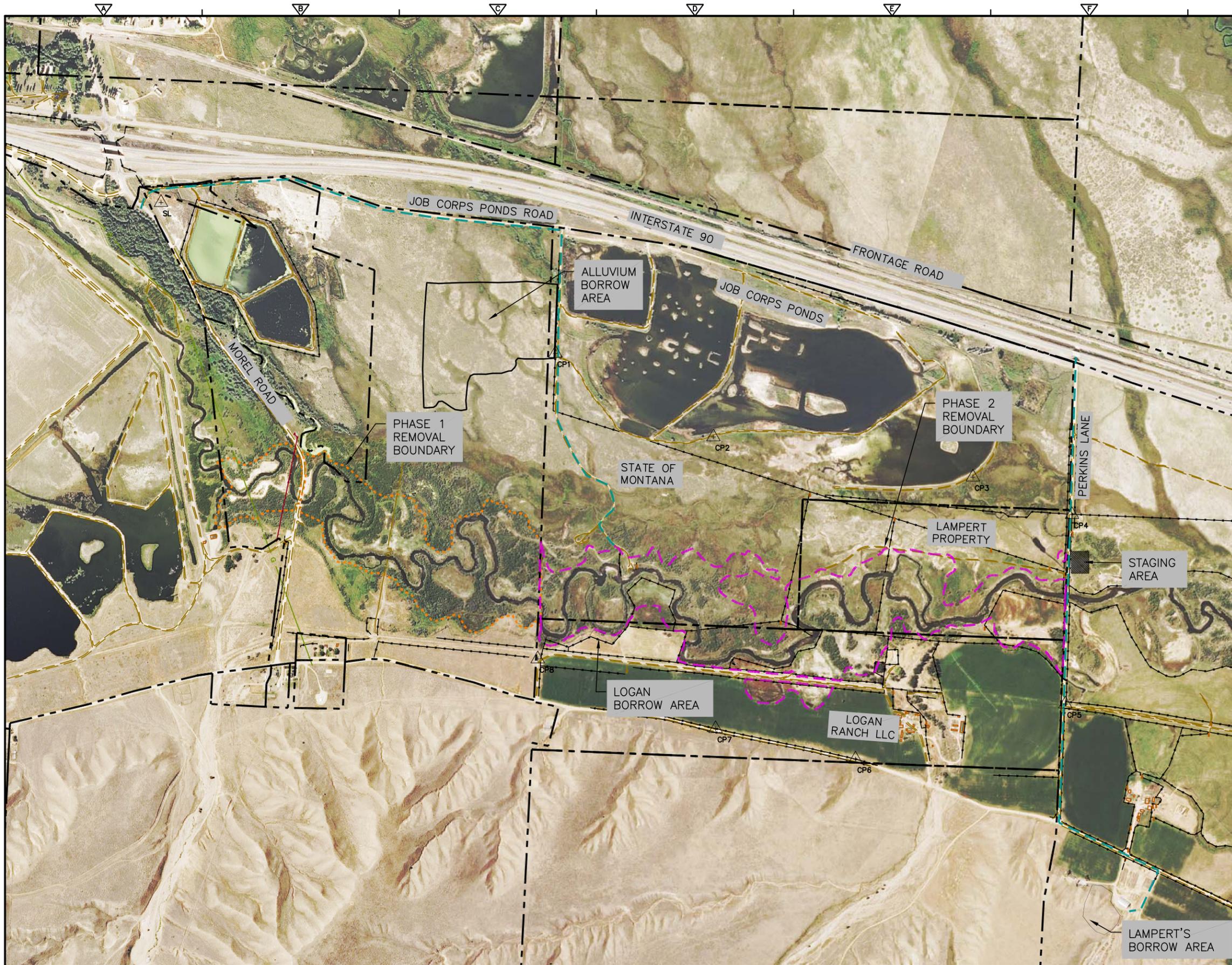
GENERAL LEGEND AND NOTES

PROJECT NO. 103068
 FILE NAME: GSTPL001.DWG

SHEET NO.
G1

REV. NO.	DATE	DRWN	CHKD	REMARKS

K:\CFR - PHASE 2\dwg rev dec2013\CTPL-C1 General Site Plan.dwg SAVED:3/5/15 PRINTED:3/5/15 BY: MAINZHAUSENK







LEGEND

- PHASE 1 REMOVAL BOUNDARY
- PHASE 2 REMOVAL BOUNDARY
- - - - - PROPERTY BOUNDARY
- ACCESS AND OFFSITE HAUL ROADS

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: _____ KM
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 SHEET CHK'D BY: _____ TJ
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 APPROVED BY: _____ WHB
 DATE: _____ MARCH 2015

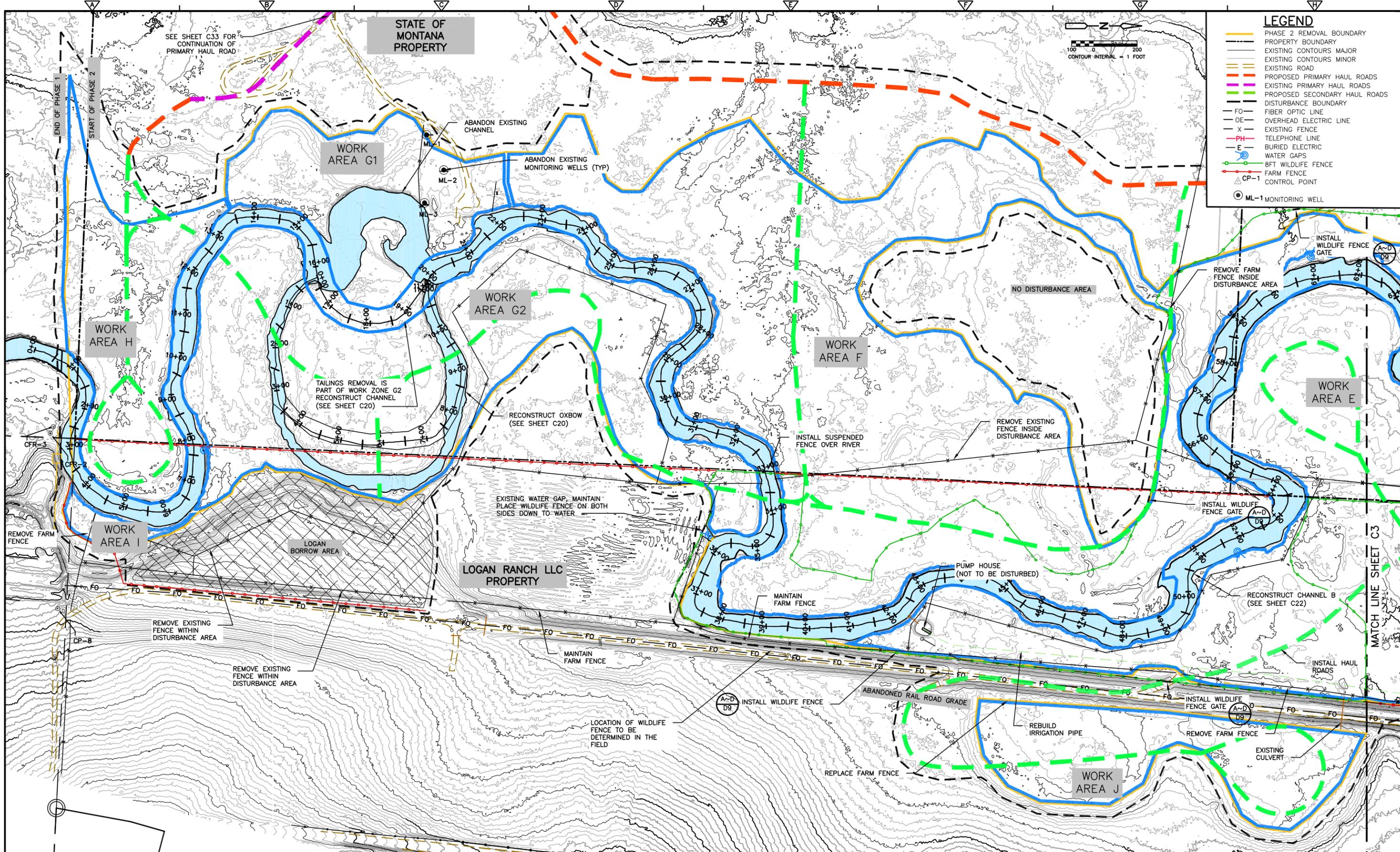
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DEPARTMENT OF ENVIRONMENTAL QUALITY
 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

GENERAL SITE PLAN

PROJECT NO. 103068
 FILE NAME: CTPL-C1.DWG
 SHEET NO.
C1

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LEGEND	
	PHASE 2 REMOVAL BOUNDARY
	PROPERTY BOUNDARY
	EXISTING CONTOURS MAJOR
	EXISTING CONTOURS MINOR
	EXISTING ROAD
	PROPOSED PRIMARY HAUL ROADS
	EXISTING PRIMARY HAUL ROADS
	PROPOSED SECONDARY HAUL ROADS
	DISTURBANCE BOUNDARY
	FIBER OPTIC LINE
	OVERHEAD ELECTRIC LINE
	EXISTING FENCE
	TELEPHONE LINE
	BURIED ELECTRIC
	WATER GAPS
	8FT WILDLIFE FENCE
	FARM FENCE
	CONTROL POINT
	MONITORING WELL

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: _____ KM
 DRAWN BY: _____ KM
 SHEET CHK'D BY: _____ TJ
 CROSS CHK'D BY: _____ WHB
 APPROVED BY: _____ WHB
 DATE: _____ MARCH 2015

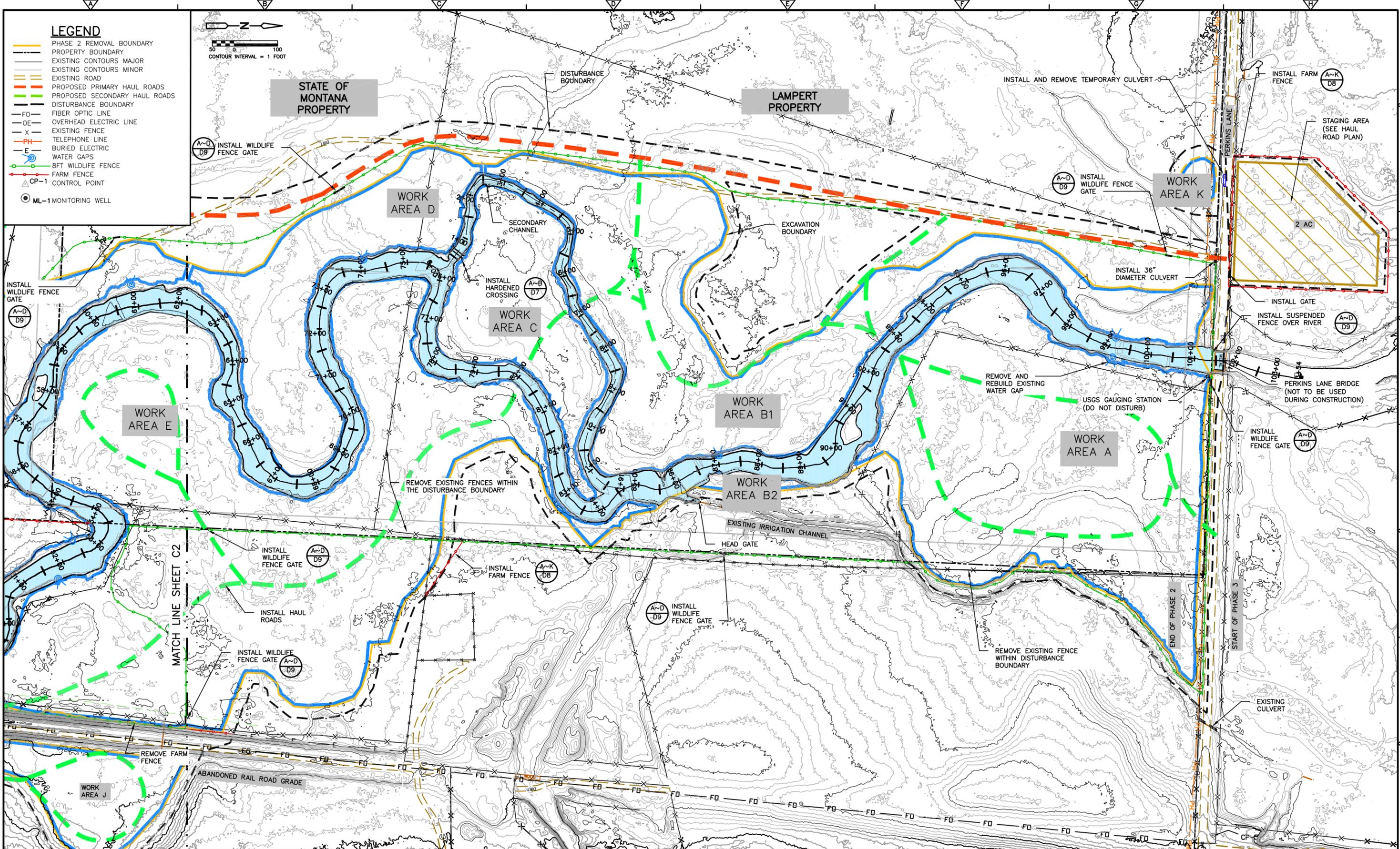
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 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

WORK THIS CONTRACT

PROJECT NO.	103068
FILE NAME:	CSTPL-C2
SHEET NO.	C2

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LEGEND

- PHASE 2 REMOVAL BOUNDARY
- PROPERTY BOUNDARY
- EXISTING CONTOURS MAJOR
- EXISTING CONTOURS MINOR
- EXISTING ROAD
- PROPOSED PRIMARY HAUL ROADS
- PROPOSED SECONDARY HAUL ROADS
- DISTURBANCE BOUNDARY
- FO FIBER OPTIC LINE
- OE OVERHEAD ELECTRIC LINE
- X EXISTING FENCE
- PH TELEPHONE LINE
- E BURIED ELECTRIC
- WATER GAPS
- 8FT WILDLIFE FENCE
- FARM FENCE
- CP-1 CONTROL POINT
- ML-1 MONITORING WELL



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: KM
 DRAWN BY: KM
 SHEET CHK'D BY: TJ
 CROSS CHK'D BY: WHB
 APPROVED BY: WHB
 DATE: MARCH 2015

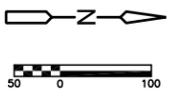
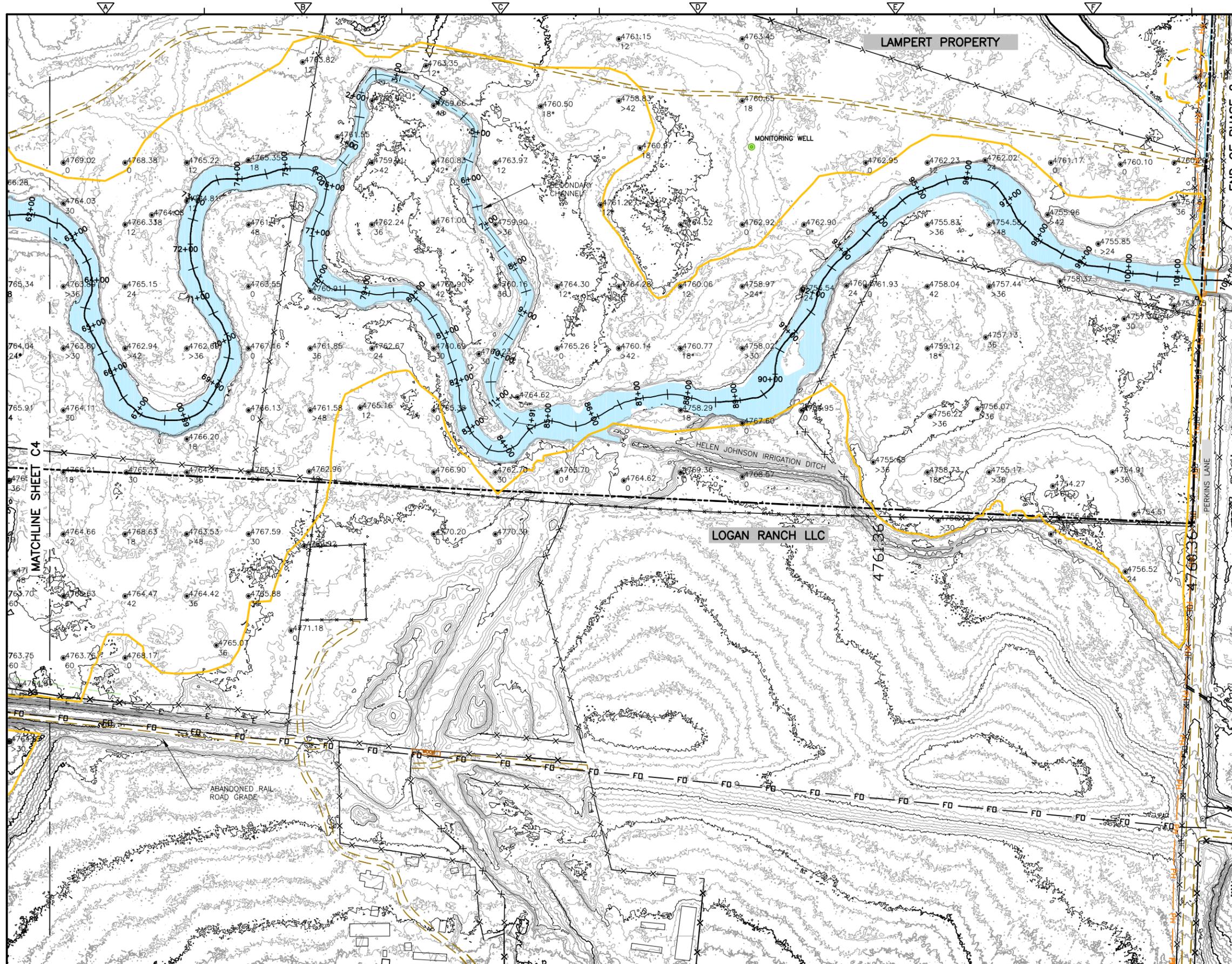
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DEPARTMENT OF ENVIRONMENTAL QUALITY
 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

WORK THIS CONTRACT
 C3

PROJECT NO.	103068
FILE NAME:	CSPL-C3
SHEET NO.	C3

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NOTES
 1. TEST PIT RESULTS AND LOCATIONS PROVIDED BY TETRA TECH, INC. (2009)
 2. * INDICATES ARSENIC CONCENTRATIONS GREATER THAN 620 PPM.

- LEGEND**
- PHASE 2 REMOVAL BOUNDARY
 - - - PROPERTY BOUNDARY
 - E - ELECTRIC LINE
 - FO - FIBER OPTIC LINE
 - OE - OVERHEAD ELECTRIC LINE
 - PH - TELEPHONE LINE
 - - - UNDERGROUND IRRIGATION LINE
 - X - EXISTING FENCE
 - 4756.3 ELEVATION OF BASE OF EXCAVATION
 - 12 DEPTH TO BASE OF TAILINGS (INCHES)
 - == EXISTING ROAD
 - EXISTING CONTOUR MAJOR, 5 FT INTERVAL
 - EXISTING CONTOUR MINOR, 1 FT INTERVAL

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: **KM**
 DRAWN BY: **KM**
 SHEET CHK'D BY: **TJ**
 CROSS CHK'D BY: **WHB**
 APPROVED BY: **WHB**
 DATE: **MARCH 2015**

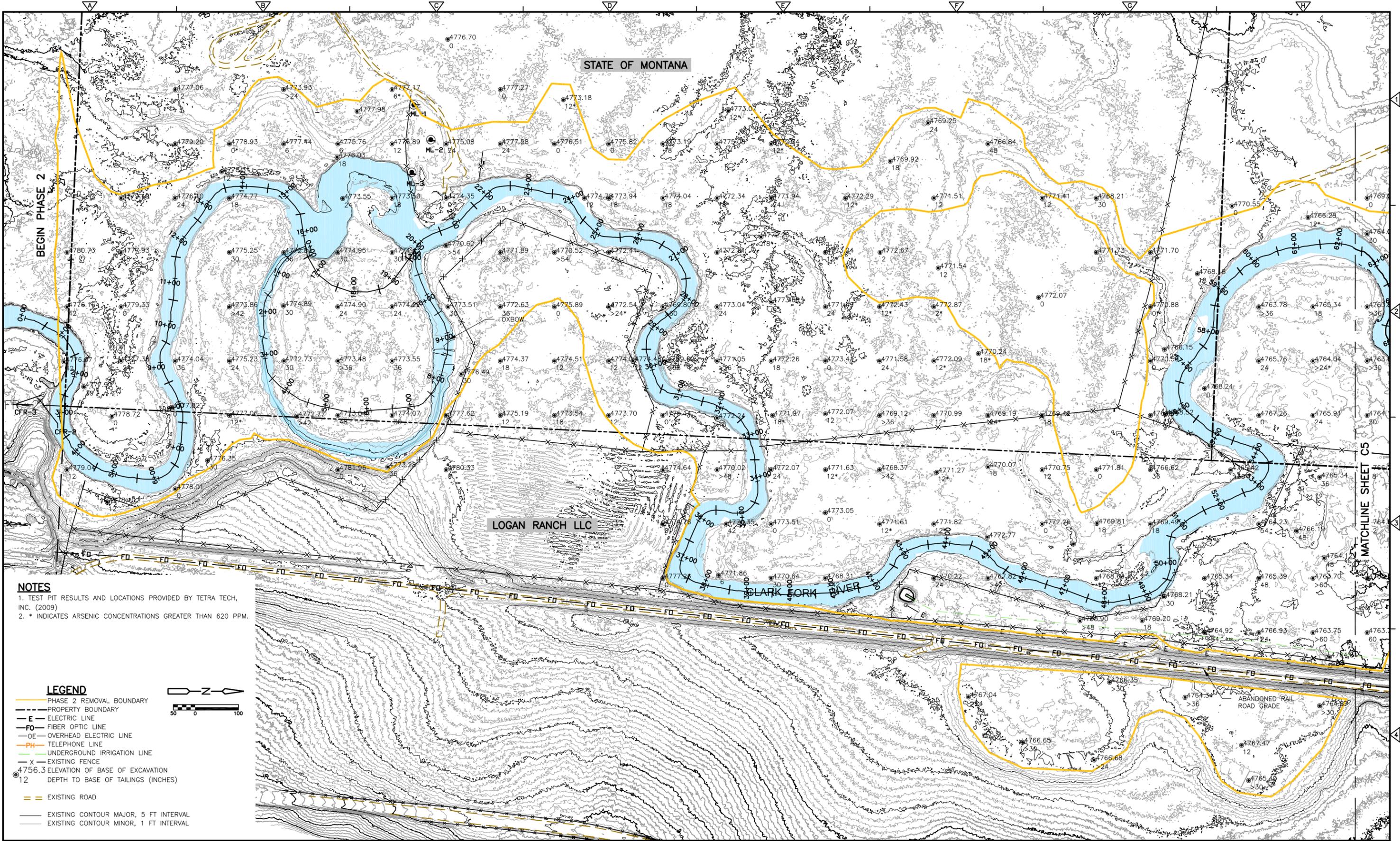
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DEPARTMENT OF ENVIRONMENTAL QUALITY
CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

EXISTING CONDITIONS AND TEST PIT LOCATIONS

PROJECT NO.	103068
FILE NAME:	CS\PL-C5
SHEET NO.	C5

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NOTES
 1. TEST PIT RESULTS AND LOCATIONS PROVIDED BY TETRA TECH, INC. (2009)
 2. * INDICATES ARSENIC CONCENTRATIONS GREATER THAN 620 PPM.

LEGEND

- PHASE 2 REMOVAL BOUNDARY
- - - PROPERTY BOUNDARY
- E- ELECTRIC LINE
- FO- FIBER OPTIC LINE
- OE- OVERHEAD ELECTRIC LINE
- PH- TELEPHONE LINE
- UG- UNDERGROUND IRRIGATION LINE
- X- EXISTING FENCE
- 4756.3 ELEVATION OF BASE OF EXCAVATION
- 12 DEPTH TO BASE OF TAILINGS (INCHES)
- == EXISTING ROAD
- EXISTING CONTOUR MAJOR, 5 FT INTERVAL
- EXISTING CONTOUR MINOR, 1 FT INTERVAL

Scale: 0 50 100 feet

REV. NO.	DATE	DRWN	CHKD	REMARKS

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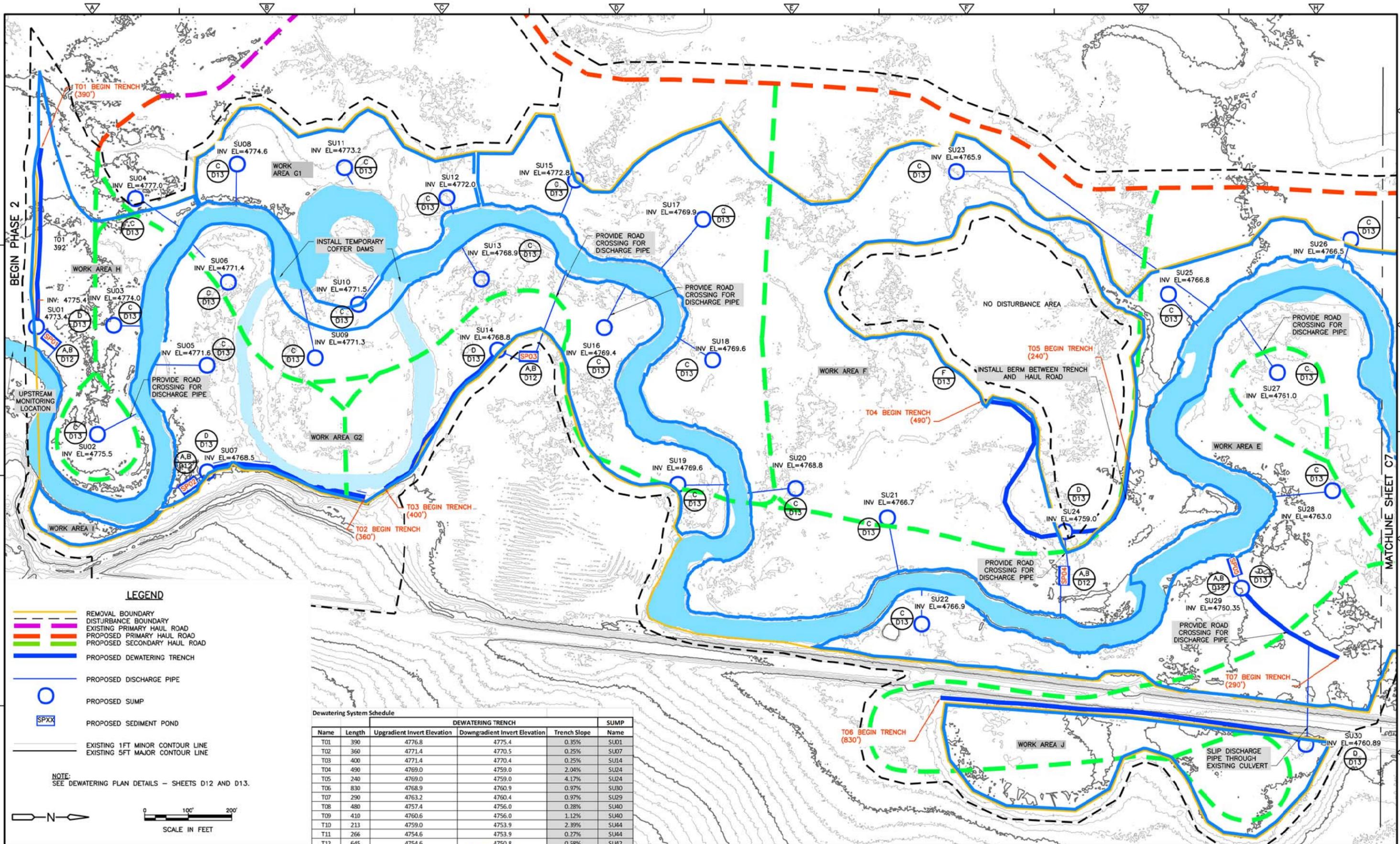
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DEPARTMENT OF ENVIRONMENTAL QUALITY
 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

EXISTING CONDITIONS AND TEST PIT LOCATIONS

PROJECT NO. 103068
 FILE NAME: CSTPL-C4
 SHEET NO. C4

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LEGEND

- REMOVAL BOUNDARY
- DISTURBANCE BOUNDARY
- EXISTING PRIMARY HAUL ROAD
- PROPOSED PRIMARY HAUL ROAD
- PROPOSED SECONDARY HAUL ROAD
- PROPOSED DEWATERING TRENCH
- PROPOSED DISCHARGE PIPE
- PROPOSED SUMP
- SPXX PROPOSED SEDIMENT POND
- EXISTING 1FT MINOR CONTOUR LINE
- EXISTING 5FT MAJOR CONTOUR LINE

NOTE:
SEE DEWATERING PLAN DETAILS - SHEETS D12 AND D13.



Dewatering System Schedule				
Name	Length	DEWATERING TRENCH		SUMP
		Upgradient Invert Elevation	Downgradient Invert Elevation	
T01	390	4775.4	4775.4	0.35% SU01
T02	360	4771.4	4770.5	0.25% SU07
T03	400	4771.4	4770.4	0.25% SU14
T04	490	4769.0	4759.0	2.04% SU24
T05	240	4769.0	4759.0	4.17% SU24
T06	830	4768.9	4760.9	0.97% SU30
T07	290	4763.2	4760.4	0.97% SU29
T08	480	4757.4	4756.0	0.28% SU40
T09	410	4760.6	4756.0	1.12% SU40
T10	213	4759.0	4753.9	2.39% SU44
T11	266	4754.6	4753.9	0.27% SU44
T12	645	4754.6	4750.8	0.58% SU42

DESIGNED BY: MJP
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 CROSS CHK'D BY: WHB
 APPROVED BY: WHB
 DATE: MARCH 2015



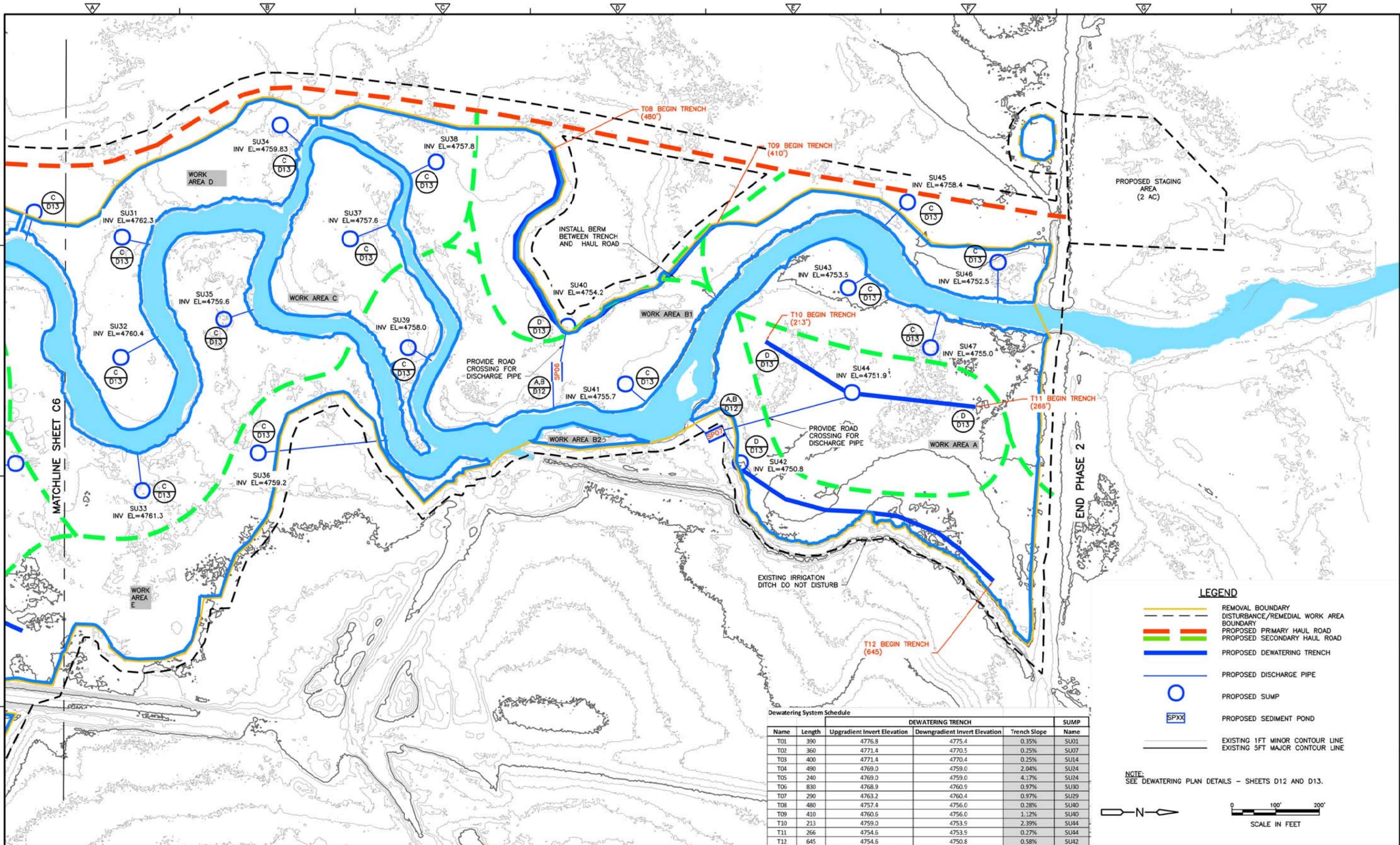
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 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

DEWATERING PLAN

PROJECT NO. 103068
 FILE NAME: CSTPL06.DWG
 SHEET NO. C6

REV. NO.	DATE	DRWN	CHKD	REMARKS

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Dewatering System Schedule

Name	Length	DEWATERING TRENCH			SUMP
		Upgradient Invert Elevation	Downgradient Invert Elevation	Trench Slope	
T01	390	4776.8	4775.4	0.35%	SU01
T02	360	4771.4	4770.5	0.25%	SU07
T03	400	4771.4	4770.4	0.25%	SU14
T04	490	4769.0	4759.0	2.04%	SU24
T05	240	4769.0	4759.0	4.17%	SU24
T06	830	4768.9	4760.9	0.97%	SU30
T07	290	4763.2	4760.4	0.97%	SU29
T08	480	4757.4	4756.0	0.28%	SU40
T09	410	4760.6	4756.0	1.12%	SU40
T10	213	4759.0	4753.9	2.39%	SU44
T11	266	4754.6	4753.9	0.27%	SU44
T12	645	4754.6	4750.8	0.58%	SU42

- LEGEND**
- REMOVAL BOUNDARY
 - - - - - DISTURBANCE/REMEDIAL WORK AREA BOUNDARY
 - PROPOSED PRIMARY HAUL ROAD
 - PROPOSED SECONDARY HAUL ROAD
 - PROPOSED DEWATERING TRENCH
 - PROPOSED DISCHARGE PIPE
 - PROPOSED SUMP
 - SPXX PROPOSED SEDIMENT POND
 - EXISTING 1FT MINOR CONTOUR LINE
 - EXISTING 5FT MAJOR CONTOUR LINE

NOTE: SEE DEWATERING PLAN DETAILS - SHEETS D12 AND D13.



REV. NO.	DATE	DRWN	CHKD	REMARKS

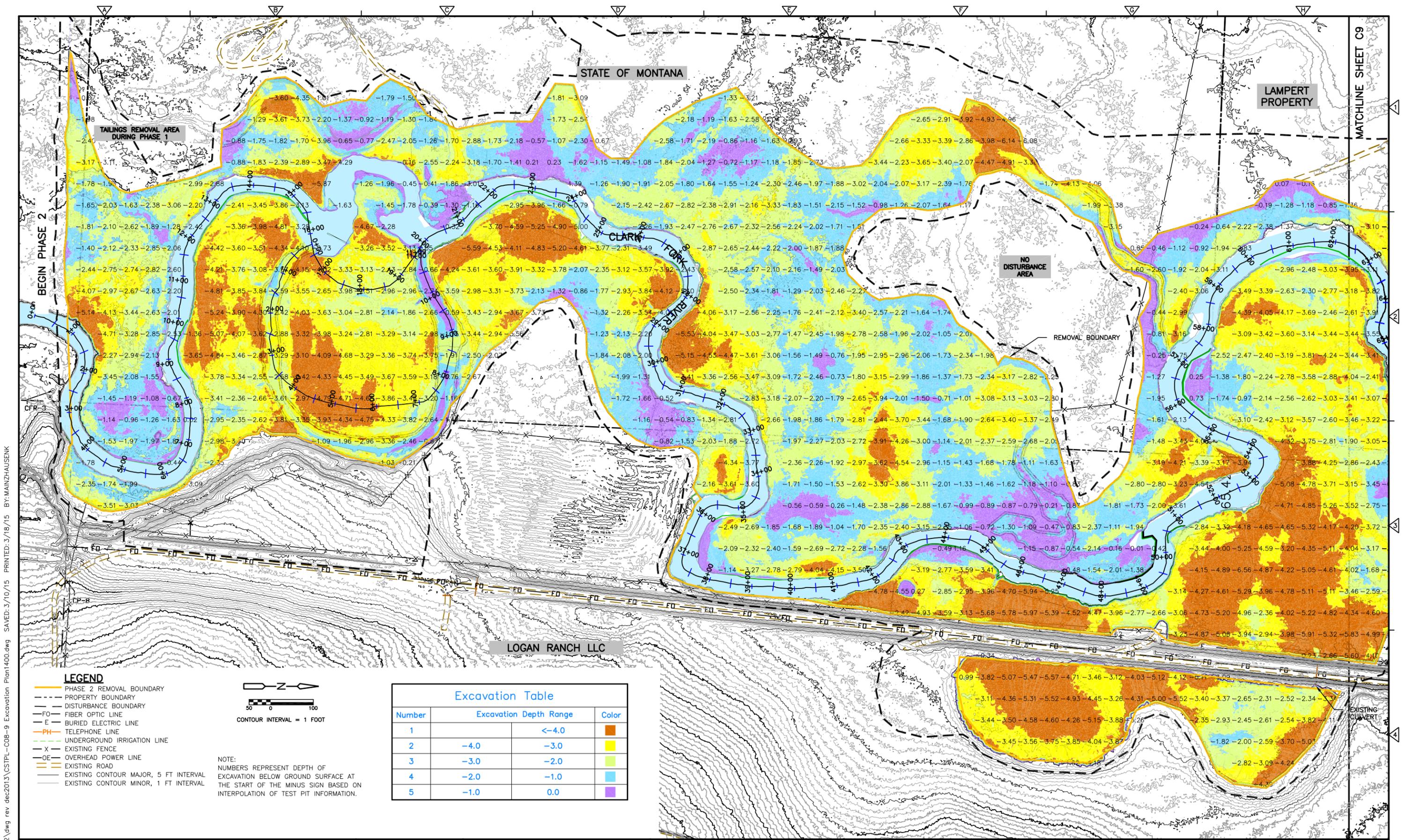
DESIGNED BY: MJP
 DRAWN BY: MJP
 SHEET CHK'D BY: TJ
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 APPROVED BY: WHB
 DATE: MARCH 2015

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 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

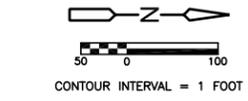
DEWATERING PLAN

PROJECT NO. 103068
 FILE NAME: CSTPL06.DWG
 SHEET NO. C7



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- LEGEND**
- PHASE 2 REMOVAL BOUNDARY
 - - - PROPERTY BOUNDARY
 - - - DISTURBANCE BOUNDARY
 - FO- FIBER OPTIC LINE
 - E- BURIED ELECTRIC LINE
 - PH- TELEPHONE LINE
 - - - UNDERGROUND IRRIGATION LINE
 - X- EXISTING FENCE
 - OE- OVERHEAD POWER LINE
 - - - EXISTING ROAD
 - - - EXISTING CONTOUR MAJOR, 5 FT INTERVAL
 - - - EXISTING CONTOUR MINOR, 1 FT INTERVAL



NOTE:
NUMBERS REPRESENT DEPTH OF
EXCAVATION BELOW GROUND SURFACE AT
THE START OF THE MINUS SIGN BASED ON
INTERPOLATION OF TEST PIT INFORMATION.

Excavation Table			
Number	Excavation Depth Range		Color
1	<-4.0		Orange
2	-4.0	-3.0	Yellow
3	-3.0	-2.0	Light Green
4	-2.0	-1.0	Light Blue
5	-1.0	0.0	Purple

REV. NO.	DATE	DRWN	CHKD	REMARKS

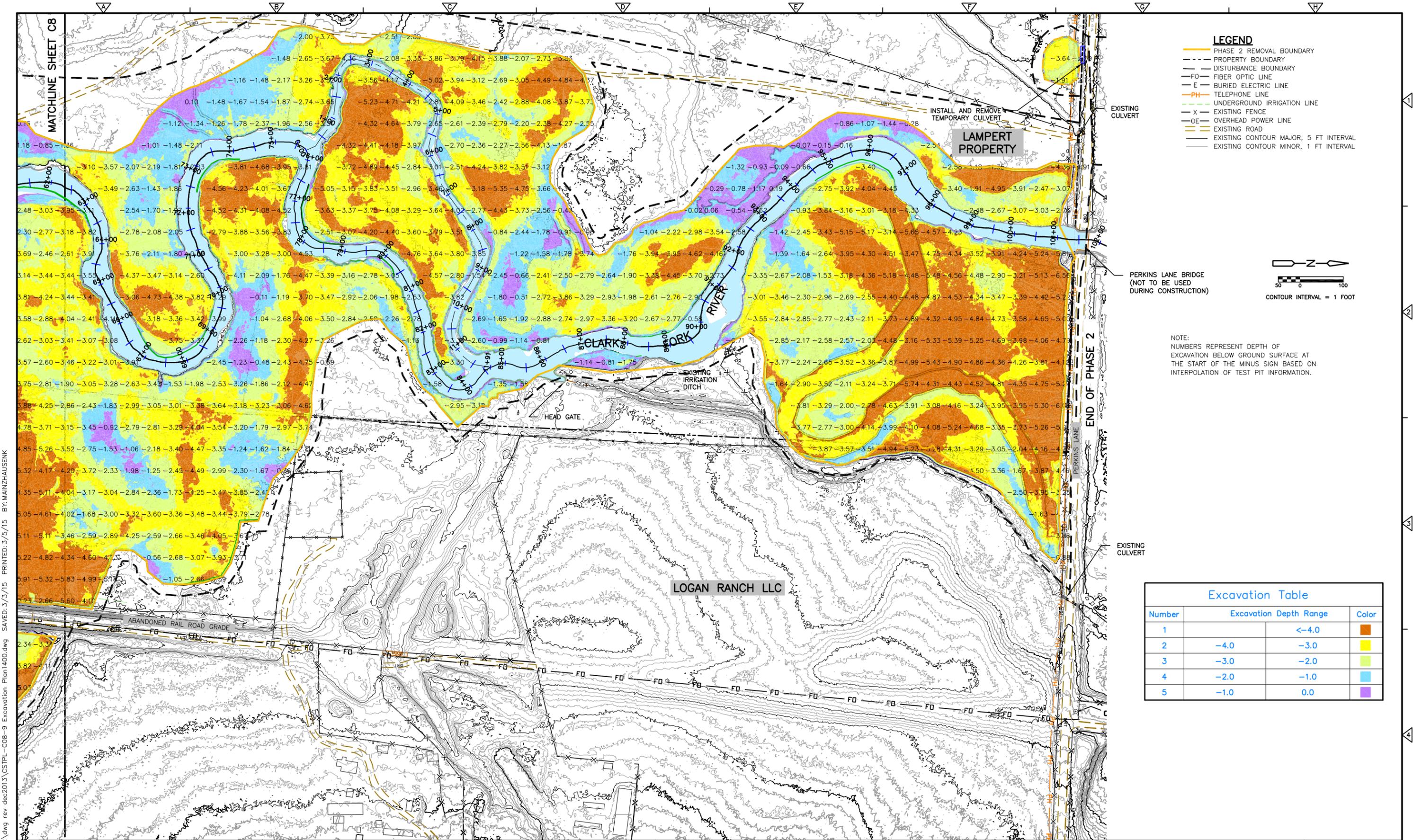
DESIGNED BY: _____ KM
 DRAWN BY: _____ KM
 SHEET CHK'D BY: _____ TJ
 CROSS CHK'D BY: _____ WHB
 APPROVED BY: _____ WHB
 DATE: _____ MARCH 2015

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 Tel: 406.441.1400
 consulting - engineering - construction - operations

DEPARTMENT OF ENVIRONMENTAL QUALITY
CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

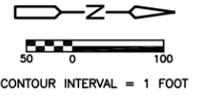
EXCAVATION PLAN

PROJECT NO.	103068
FILE NAME:	CSITPL-C7-8
SHEET NO.	C8



LEGEND

- PHASE 2 REMOVAL BOUNDARY
- PROPERTY BOUNDARY
- DISTURBANCE BOUNDARY
- FO FIBER OPTIC LINE
- E BURIED ELECTRIC LINE
- PH TELEPHONE LINE
- UNDERGROUND IRRIGATION LINE
- X EXISTING FENCE
- OE OVERHEAD POWER LINE
- EXISTING ROAD
- EXISTING CONTOUR MAJOR, 5 FT INTERVAL
- EXISTING CONTOUR MINOR, 1 FT INTERVAL



NOTE:
NUMBERS REPRESENT DEPTH OF
EXCAVATION BELOW GROUND SURFACE AT
THE START OF THE MINUS SIGN BASED ON
INTERPOLATION OF TEST PIT INFORMATION.

Excavation Table			
Number	Excavation Depth Range		Color
1	<-4.0		Orange
2	-4.0	-3.0	Yellow
3	-3.0	-2.0	Light Green
4	-2.0	-1.0	Light Blue
5	-1.0	0.0	Purple

K:\CFR - PHASE 2\dwg rev dec2013\CSITPL-C08-9 Excavation Plan1400.dwg SAVED: 3/3/15 PRINTED: 3/5/15 BY: MAINZHAUSENK

REV. NO.	DATE	DRWN	CHKD	REMARKS

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 CROSS CHK'D BY: WHB
 APPROVED BY: WHB
 DATE: MARCH 2015

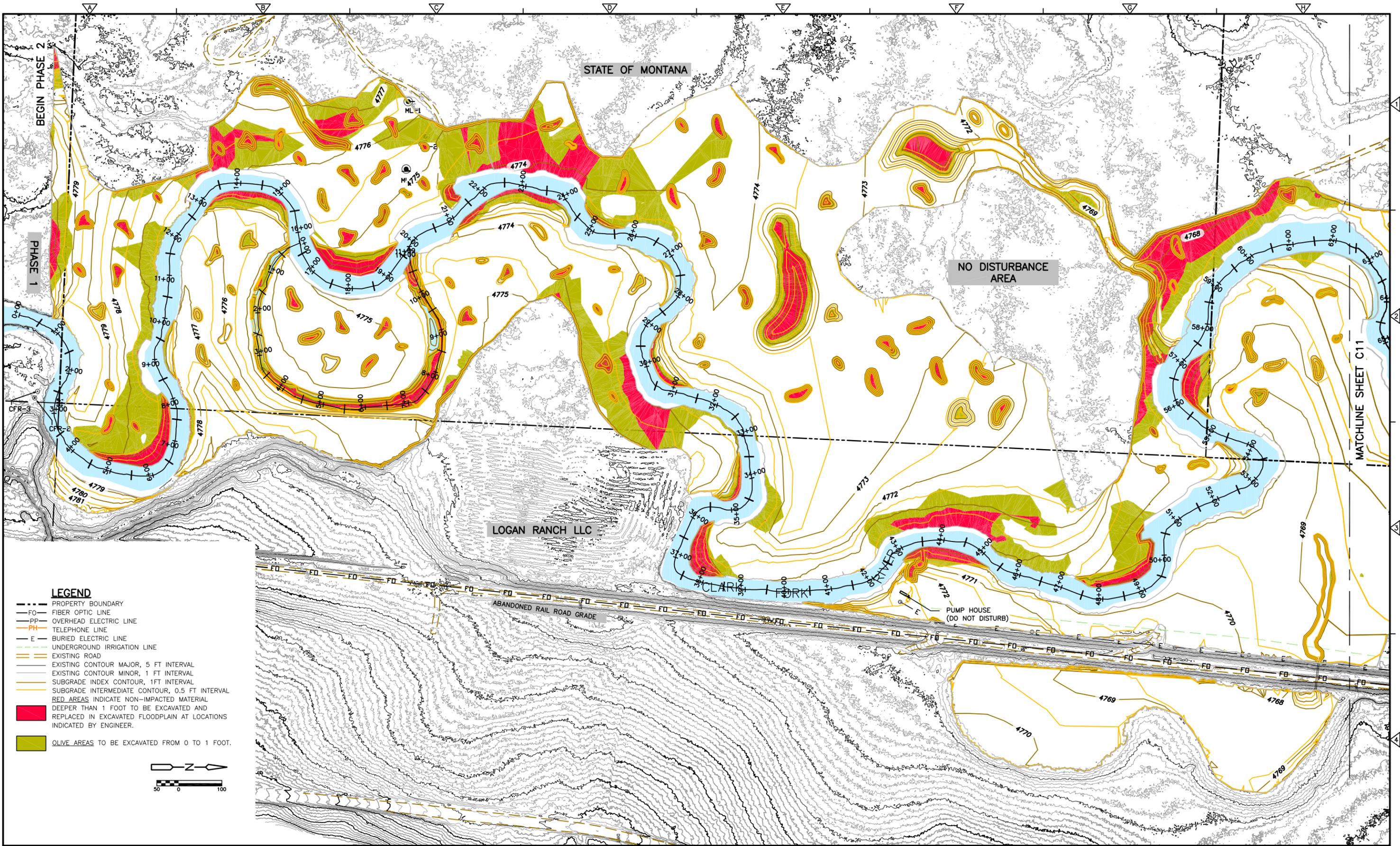
CDM Smith
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CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

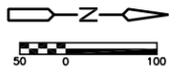
EXCAVATION PLAN

PROJECT NO. 103068
 FILE NAME: CSITPL-C8-9
 SHEET NO. C9

K:\CFR - PHASE 2\dwg rev dec2013\CSTPL-C10-11 Non-Impacted Material Plan.dwg SAVED:3/2/15 PRINTED:3/5/15 BY:MANZHAUSENK



- LEGEND**
- PROPERTY BOUNDARY
 - FO FIBER OPTIC LINE
 - PP OVERHEAD ELECTRIC LINE
 - PH TELEPHONE LINE
 - E BURIED ELECTRIC LINE
 - U UNDERGROUND IRRIGATION LINE
 - EXISTING ROAD
 - EXISTING CONTOUR MAJOR, 5 FT INTERVAL
 - EXISTING CONTOUR MINOR, 1 FT INTERVAL
 - SUBGRADE INDEX CONTOUR, 1 FT INTERVAL
 - SUBGRADE INTERMEDIATE CONTOUR, 0.5 FT INTERVAL
 - RED AREAS INDICATE NON-IMPACTED MATERIAL DEEPER THAN 1 FOOT TO BE EXCAVATED AND REPLACED IN EXCAVATED FLOODPLAIN AT LOCATIONS INDICATED BY ENGINEER.
 - OLIVE AREAS TO BE EXCAVATED FROM 0 TO 1 FOOT.



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: KM
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 SHEET CHK'D BY: TJ
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 APPROVED BY: WHB
 DATE: MARCH 2015

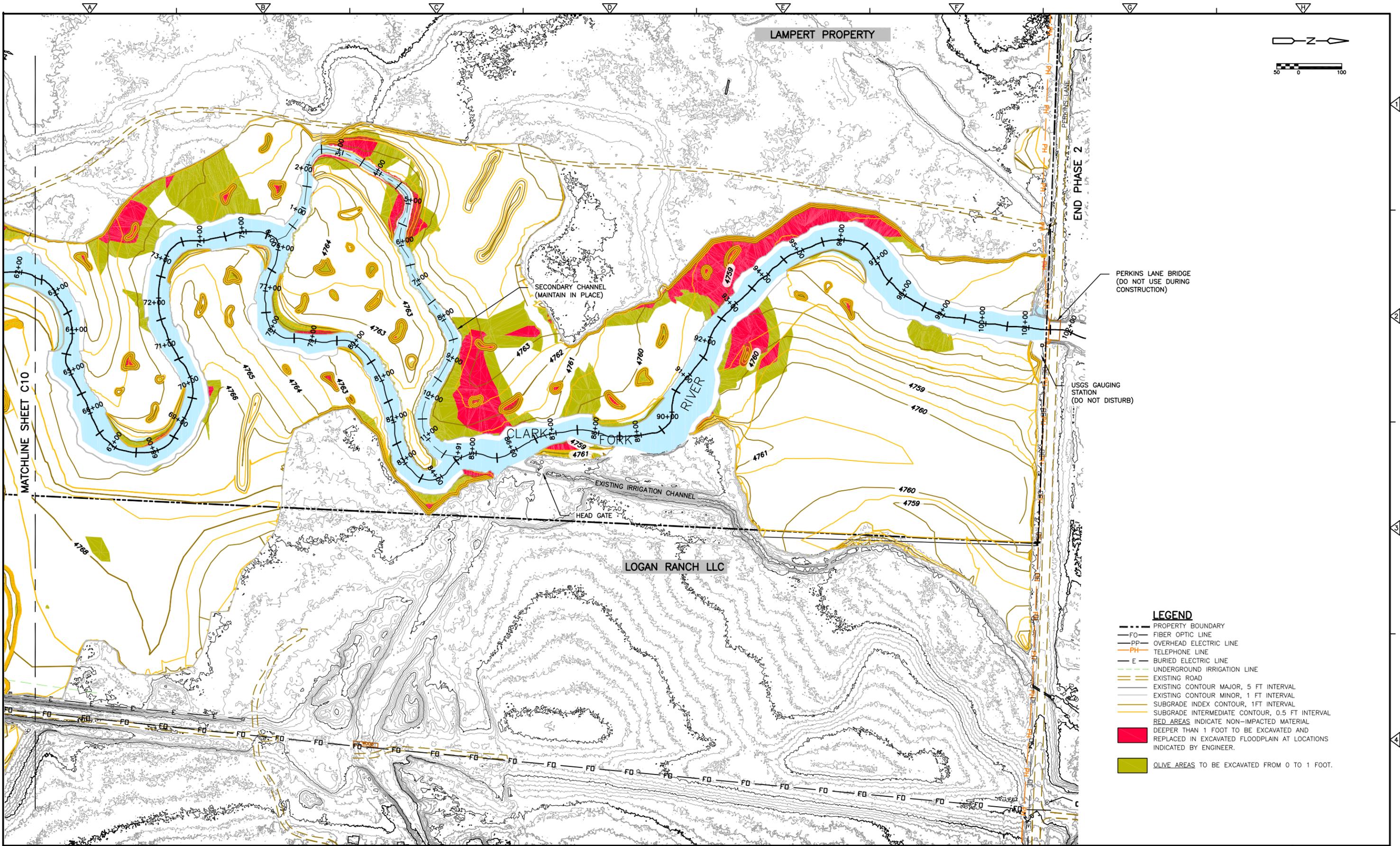
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 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

NON-IMPACTED MATERIAL EXCAVATION AREAS

PROJECT NO. 103068
 FILE NAME: CSTPL C10-11
 SHEET NO. C10

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PERKINS LANE BRIDGE
(DO NOT USE DURING
CONSTRUCTION)

USGS GAUGING
STATION
(DO NOT DISTURB)

- LEGEND**
- PROPERTY BOUNDARY
 - FO- FIBER OPTIC LINE
 - PP- OVERHEAD ELECTRIC LINE
 - PH- TELEPHONE LINE
 - E- BURIED ELECTRIC LINE
 - UI- UNDERGROUND IRRIGATION LINE
 - EXISTING ROAD
 - EXISTING CONTOUR MAJOR, 5 FT INTERVAL
 - EXISTING CONTOUR MINOR, 1 FT INTERVAL
 - SUBGRADE INDEX CONTOUR, 1 FT INTERVAL
 - SUBGRADE INTERMEDIATE CONTOUR, 0.5 FT INTERVAL
 - RED AREAS INDICATE NON-IMPACTED MATERIAL DEEPER THAN 1 FOOT TO BE EXCAVATED AND REPLACED IN EXCAVATED FLOODPLAIN AT LOCATIONS INDICATED BY ENGINEER.
 - OLIVE AREAS TO BE EXCAVATED FROM 0 TO 1 FOOT.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: _____ KM
 DRAWN BY: _____ KM
 SHEET CHK'D BY: _____ TJ
 CROSS CHK'D BY: _____ WHB
 APPROVED BY: _____ WHB
 DATE: _____ MARCH 2015

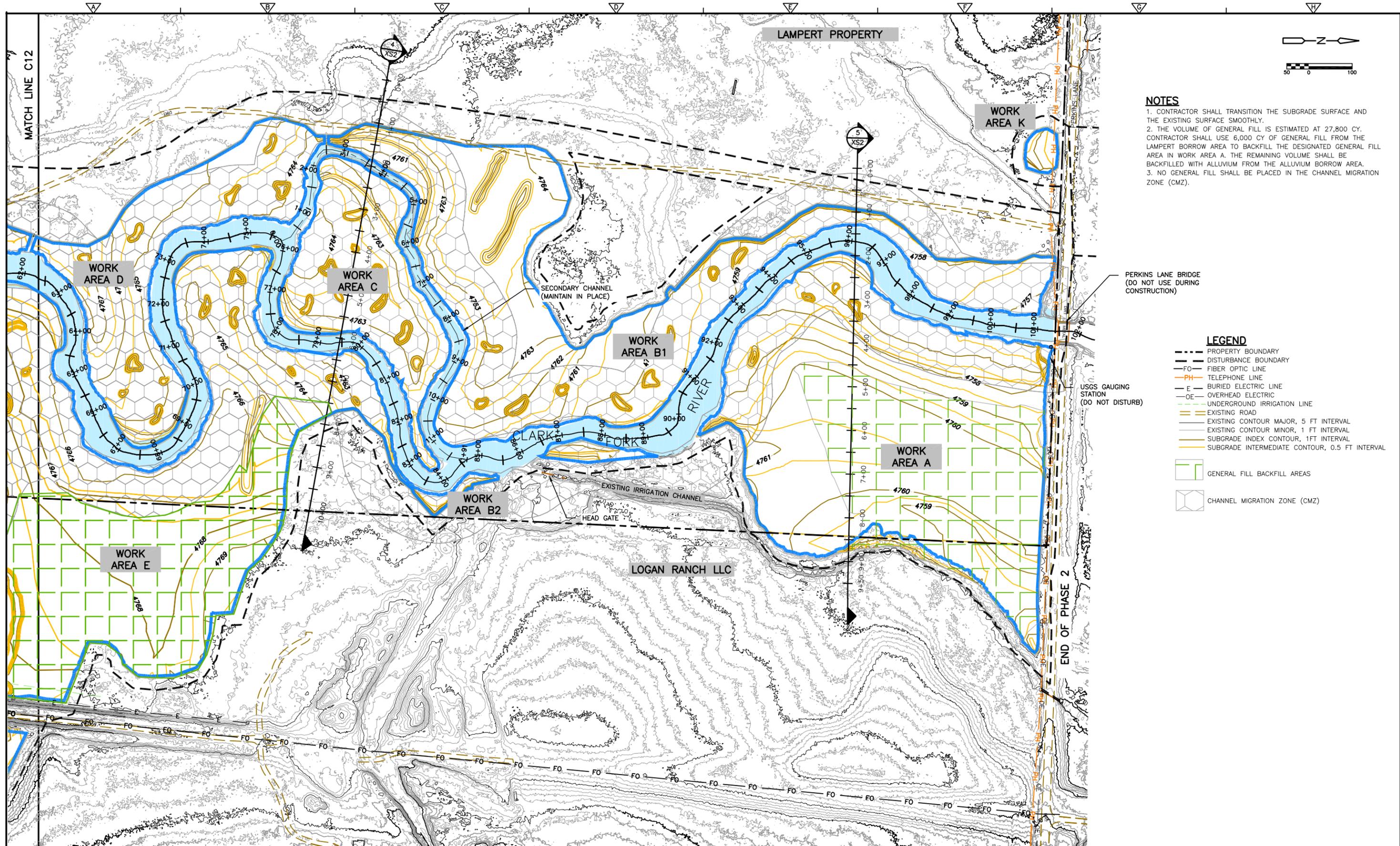
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 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

NON-IMPACTED MATERIAL EXCAVATION AREAS

PROJECT NO. 103068
 FILE NAME: CSTPL C10-11
 SHEET NO. C11

K:\CFR - PHASE 2\dwg rev dec2013\CSTPL-C12-13 Subgrade Grading Plan.dwg SAVED: 3/4/15 PRINTED: 3/6/15 BY: MAINZHAUSENK



- NOTES**
1. CONTRACTOR SHALL TRANSITION THE SUBGRADE SURFACE AND THE EXISTING SURFACE SMOOTHLY.
 2. THE VOLUME OF GENERAL FILL IS ESTIMATED AT 27,800 CY. CONTRACTOR SHALL USE 6,000 CY OF GENERAL FILL FROM THE LAMPERT BORROW AREA TO BACKFILL THE DESIGNATED GENERAL FILL AREA IN WORK AREA A. THE REMAINING VOLUME SHALL BE BACKFILLED WITH ALLUVIUM FROM THE ALLUVIUM BORROW AREA.
 3. NO GENERAL FILL SHALL BE PLACED IN THE CHANNEL MIGRATION ZONE (CMZ).

- LEGEND**
- PROPERTY BOUNDARY
 - DISTURBANCE BOUNDARY
 - FO- FIBER OPTIC LINE
 - PH- TELEPHONE LINE
 - E- BURIED ELECTRIC LINE
 - OE- OVERHEAD ELECTRIC
 - UE- UNDERGROUND IRRIGATION LINE
 - EXISTING ROAD
 - EXISTING CONTOUR MAJOR, 5 FT INTERVAL
 - EXISTING CONTOUR MINOR, 1 FT INTERVAL
 - SUBGRADE INDEX CONTOUR, 1FT INTERVAL
 - SUBGRADE INTERMEDIATE CONTOUR, 0.5 FT INTERVAL
 - GENERAL FILL BACKFILL AREAS
 - CHANNEL MIGRATION ZONE (CMZ)

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: KM
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 SHEET CHK'D BY: TJ
 CROSS CHK'D BY: WHB
 APPROVED BY: WHB
 DATE: MARCH 2015

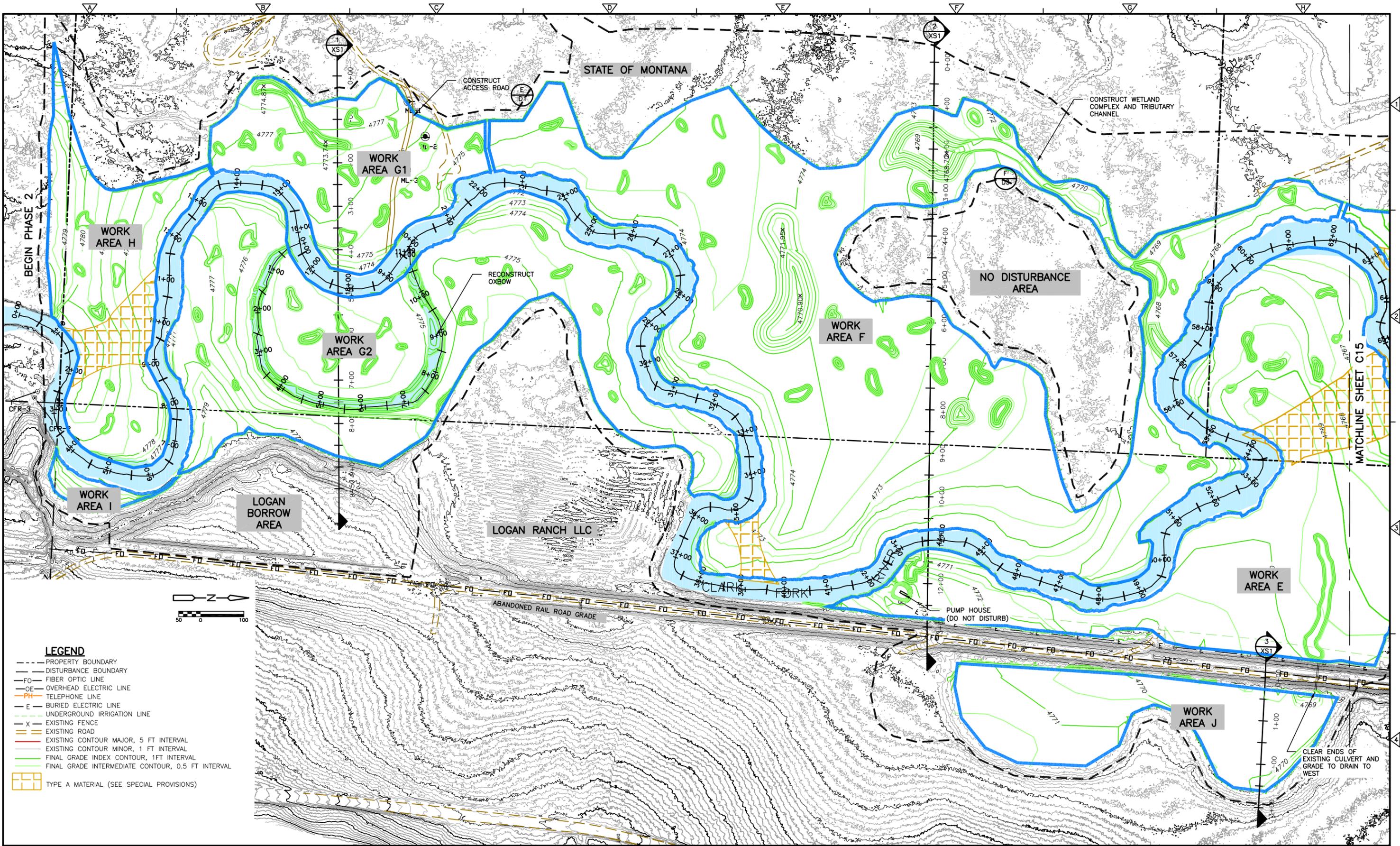
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DEPARTMENT OF ENVIRONMENTAL QUALITY
CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

PROJECT NO. 103068
 FILE NAME: CSTPL C12-13
 SHEET NO. C13

SUBGRADE PLAN

K:\CFR - PHASE 2\dwg rev dec2013\CSTPL-C14-15 Final Grading Plan.dwg
 PRINTED: 3/18/15 BY: MAINZHAUSENK
 FILE NAME: CSTPL C14-15



REV. NO.	DATE	DRWN	CHKD	REMARKS

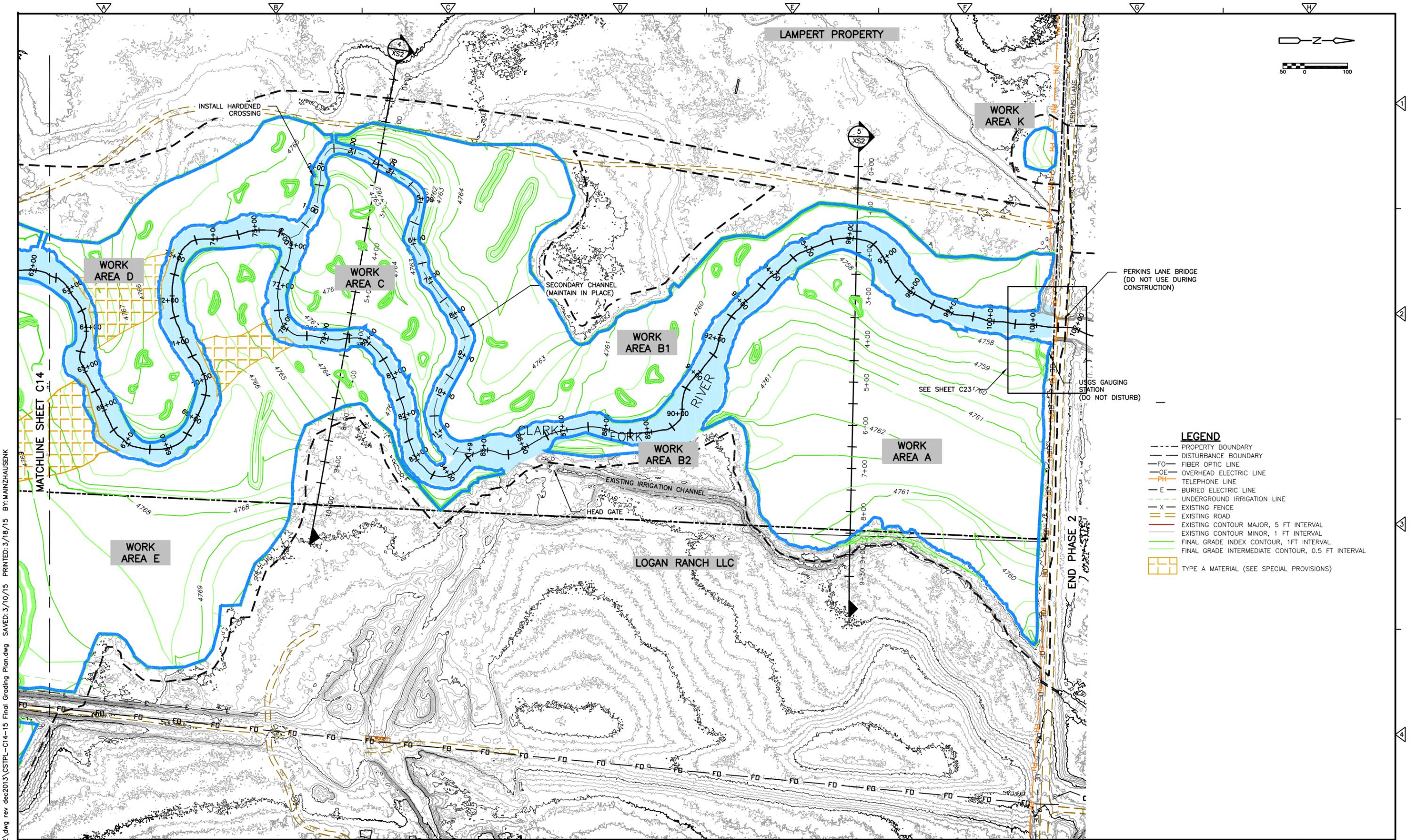
DESIGNED BY: KM
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 SHEET CHK'D BY: TJ
 CROSS CHK'D BY: WHB
 APPROVED BY: WHB
 DATE: MARCH 2015

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DEPARTMENT OF ENVIRONMENTAL QUALITY
 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

FINAL GRADING PLAN
 SHEET NO. C14

PROJECT NO. 103068
 FILE NAME: CSTPL C14-15
 SHEET NO. C14



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 DATE: MARCH 2015

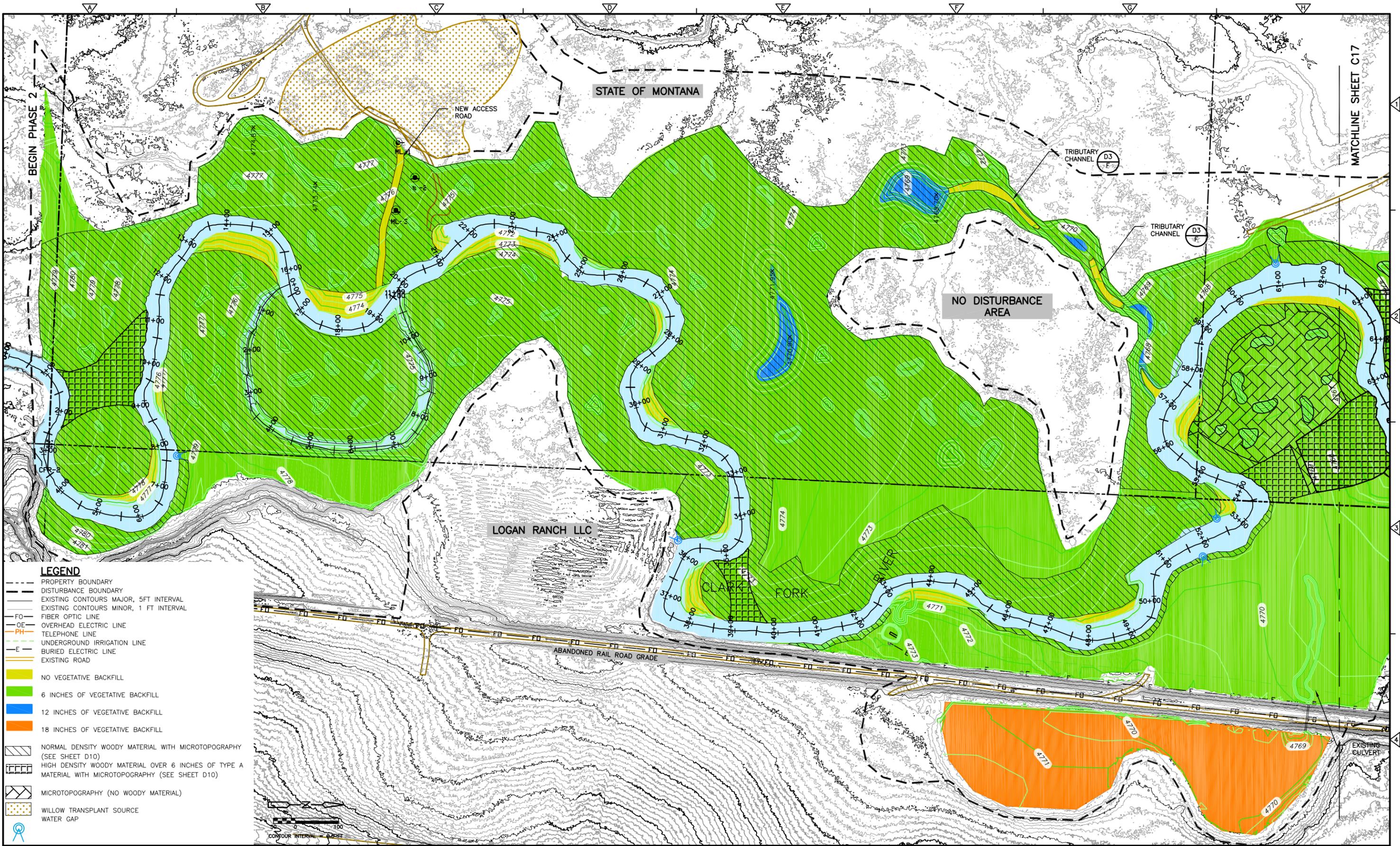
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DEPARTMENT OF ENVIRONMENTAL QUALITY
 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

FINAL GRADING PLAN
 SHEET NO. C15

PROJECT NO. 103068
 FILE NAME: CSTPL C14-15
 SHEET NO. C15

K:\CFR - PHASE 2\dwg rev dec2013\CSTPL-C16-17 Vegetative Backfill Depths.dwg SAVED: 3/10/15 PRINTED: 3/18/15 BY: MAINZHAUSENK



LEGEND

- PROPERTY BOUNDARY
- DISTURBANCE BOUNDARY
- EXISTING CONTOURS MAJOR, 5 FT INTERVAL
- EXISTING CONTOURS MINOR, 1 FT INTERVAL
- FO FIBER OPTIC LINE
- OE OVERHEAD ELECTRIC LINE
- PH TELEPHONE LINE
- UNDERGROUND IRRIGATION LINE
- BURIED ELECTRIC LINE
- EXISTING ROAD
- NO VEGETATIVE BACKFILL
- 6 INCHES OF VEGETATIVE BACKFILL
- 12 INCHES OF VEGETATIVE BACKFILL
- 18 INCHES OF VEGETATIVE BACKFILL
- NORMAL DENSITY WOODY MATERIAL WITH MICROTOPOGRAPHY (SEE SHEET D10)
- HIGH DENSITY WOODY MATERIAL OVER 6 INCHES OF TYPE A MATERIAL WITH MICROTOPOGRAPHY (SEE SHEET D10)
- MICROTOPOGRAPHY (NO WOODY MATERIAL)
- WILLOW TRANSPLANT SOURCE
- WATER GAP

REV. NO.	DATE	DRWN	CHKD	REMARKS

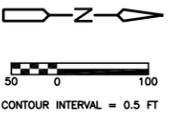
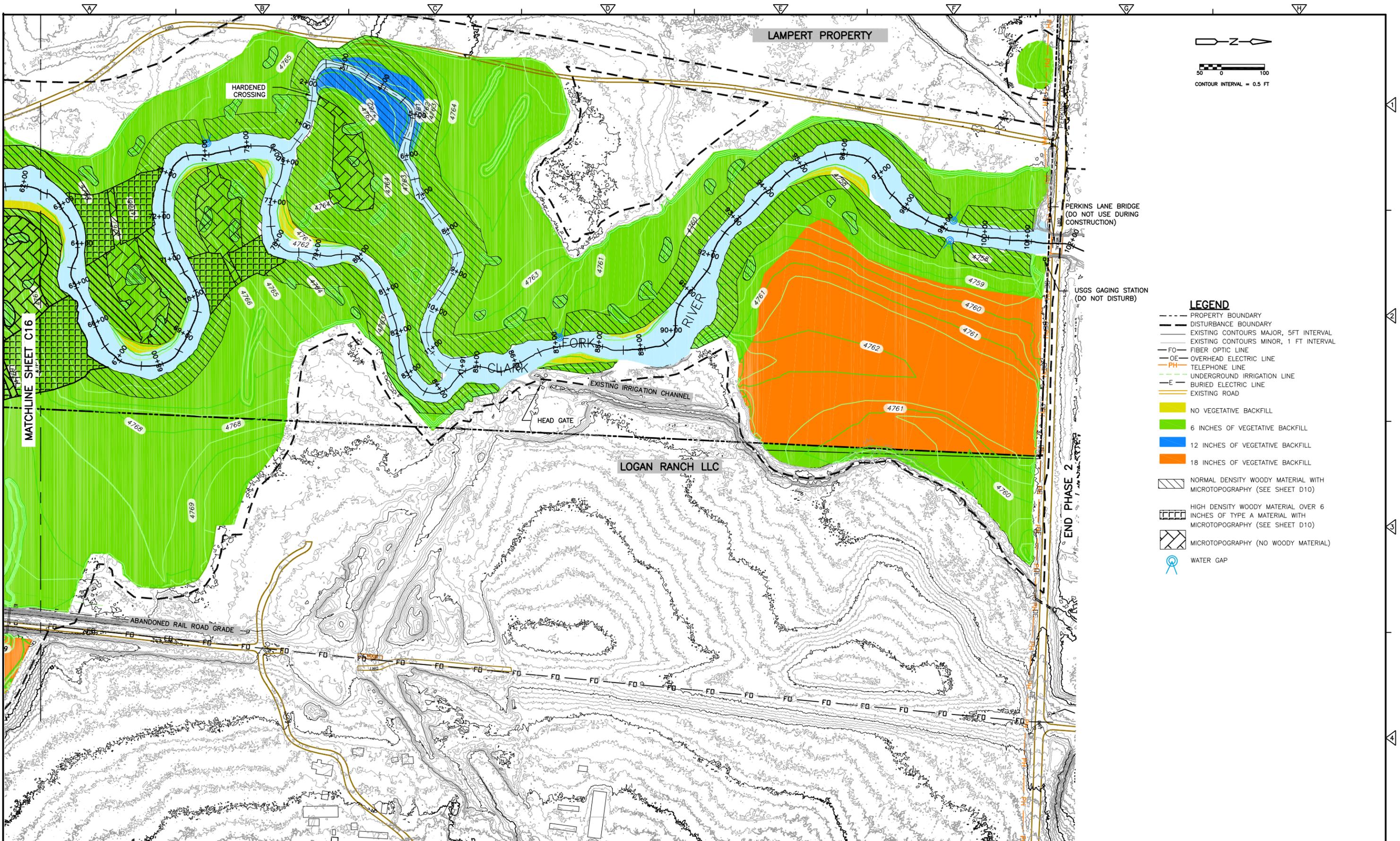
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 SHEET CHK'D BY: TJ
 CROSS CHK'D BY: WHB
 APPROVED BY: WHB
 DATE: MARCH 2015

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DEPARTMENT OF ENVIRONMENTAL QUALITY
 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

VEGETATIVE BACKFILL DEPTHS,
 MICROTOPOGRAPHY, WOOD AND BRUSH
 PLACEMENT

PROJECT NO. 103068
 FILE NAME: CSTPL-C16-17
 SHEET NO. C16



- LEGEND**
- PROPERTY BOUNDARY
 - DISTURBANCE BOUNDARY
 - EXISTING CONTOURS MAJOR, 5FT INTERVAL
 - EXISTING CONTOURS MINOR, 1 FT INTERVAL
 - FO FIBER OPTIC LINE
 - OE OVERHEAD ELECTRIC LINE
 - PH TELEPHONE LINE
 - UNDERGROUND IRRIGATION LINE
 - BURIED ELECTRIC LINE
 - EXISTING ROAD
 - NO VEGETATIVE BACKFILL
 - 6 INCHES OF VEGETATIVE BACKFILL
 - 12 INCHES OF VEGETATIVE BACKFILL
 - 18 INCHES OF VEGETATIVE BACKFILL
 - NORMAL DENSITY WOODY MATERIAL WITH MICROTOPOGRAPHY (SEE SHEET D10)
 - HIGH DENSITY WOODY MATERIAL OVER 6 INCHES OF TYPE A MATERIAL WITH MICROTOPOGRAPHY (SEE SHEET D10)
 - MICROTOPOGRAPHY (NO WOODY MATERIAL)
 - WATER GAP

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: AS
 DRAWN BY: KM
 SHEET CHK'D BY: TJ
 CROSS CHK'D BY: WHB
 APPROVED BY: WHB
 DATE: MARCH 2015

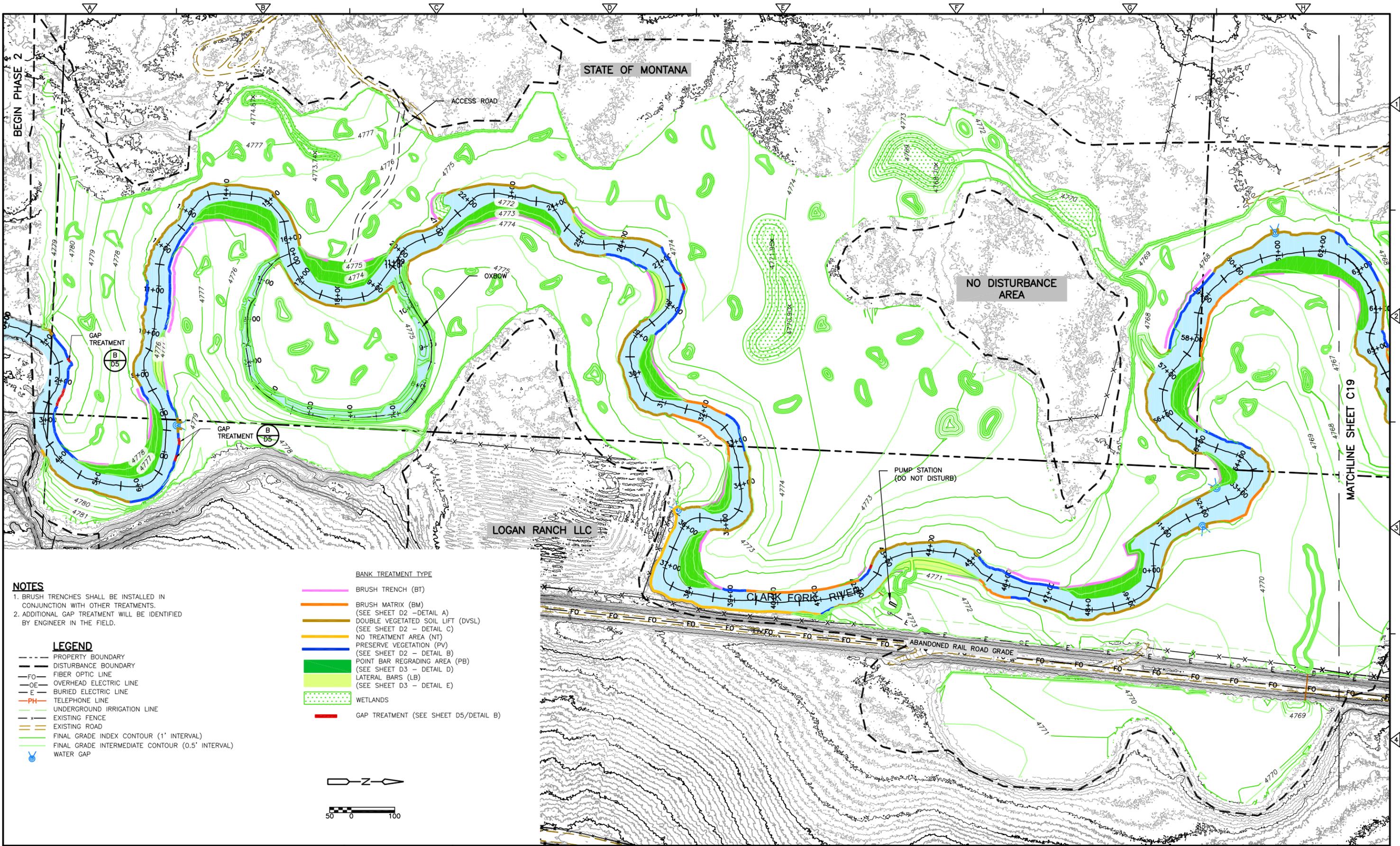
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DEPARTMENT OF ENVIRONMENTAL QUALITY
 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

VEGETATIVE BACKFILL DEPTHS,
 MICROTOPOGRAPHY, WOOD AND BRUSH
 PLACEMENT

PROJECT NO. 103068
 FILE NAME: CSTPL-C16-17
 SHEET NO. C17

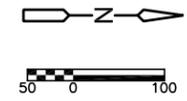
K:\CFR - PHASE 2\dwg rev dec2013\CSTPL-C18-19 Streambank Treatments.dwg SAVED:3/16/15 PRINTED:3/18/15 BY:MAINZHAUSENK



NOTES
 1. BRUSH TRENCHES SHALL BE INSTALLED IN CONJUNCTION WITH OTHER TREATMENTS.
 2. ADDITIONAL GAP TREATMENT WILL BE IDENTIFIED BY ENGINEER IN THE FIELD.

LEGEND
 - - - - - PROPERTY BOUNDARY
 - - - - - DISTURBANCE BOUNDARY
 -FO- FIBER OPTIC LINE
 -OE- OVERHEAD ELECTRIC LINE
 -E- BURIED ELECTRIC LINE
 -PH- TELEPHONE LINE
 - - - - - UNDERGROUND IRRIGATION LINE
 - - - - - EXISTING FENCE
 - - - - - EXISTING ROAD
 - - - - - FINAL GRADE INDEX CONTOUR (1' INTERVAL)
 - - - - - FINAL GRADE INTERMEDIATE CONTOUR (0.5' INTERVAL)
 ○ WATER GAP

BANK TREATMENT TYPE
 - - - - - BRUSH TRENCH (BT)
 - - - - - BRUSH MATRIX (BM)
 - - - - - DOUBLE VEGETATED SOIL LIFT (DVSL)
 - - - - - NO TREATMENT AREA (NT)
 - - - - - PRESERVE VEGETATION (PV)
 - - - - - POINT BAR REGRADING AREA (PB)
 - - - - - LATERAL BARS (LB)
 - - - - - WETLANDS
 - - - - - GAP TREATMENT (SEE SHEET D5/DETAIL B)



REV. NO.	DATE	DRWN	CHKD	REMARKS

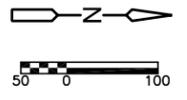
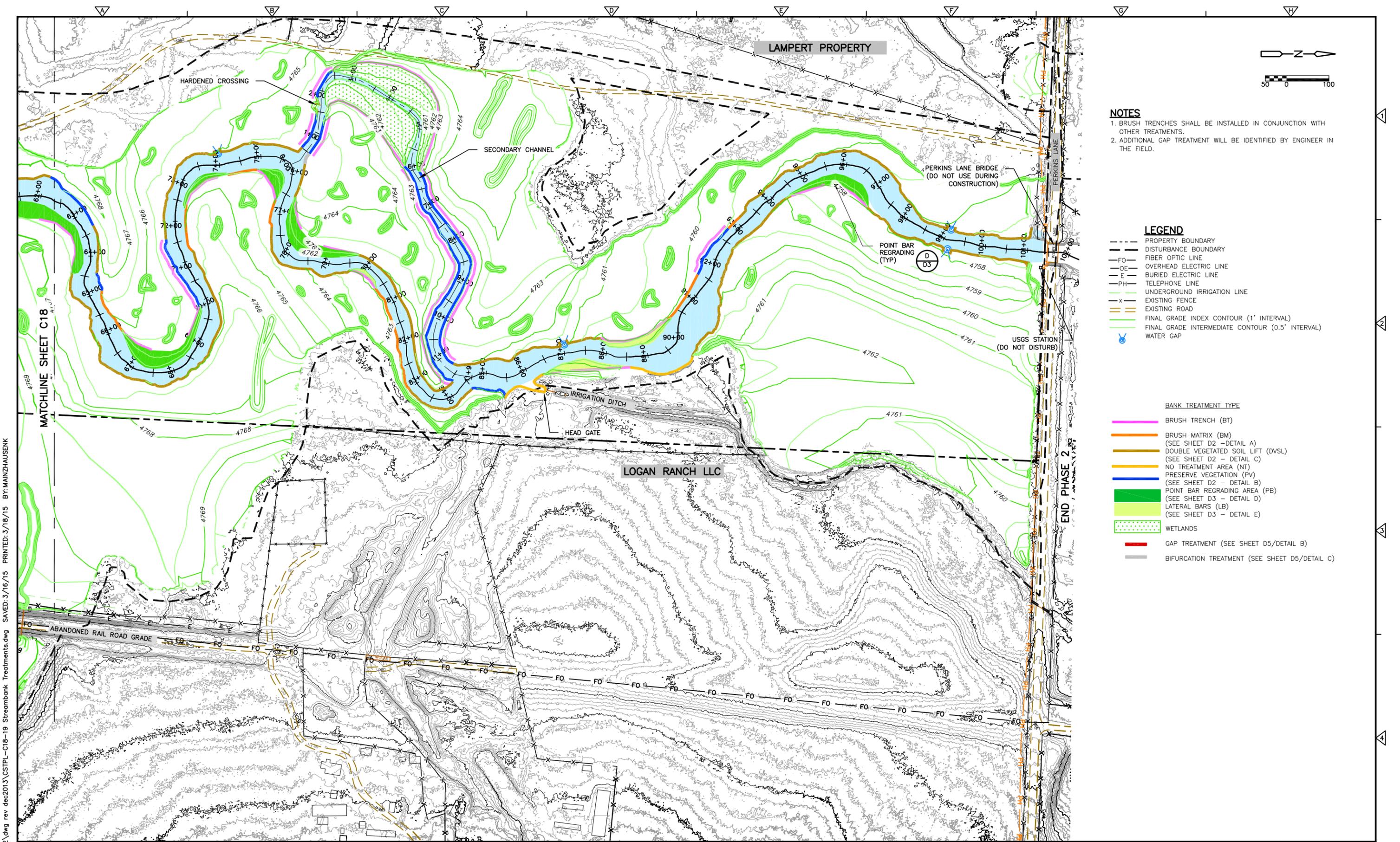
DESIGNED BY: _____ KM
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 SHEET CHK'D BY: _____ TJ
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 APPROVED BY: _____ WHB
 DATE: _____ MARCH 2015

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DEPARTMENT OF ENVIRONMENTAL QUALITY
 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

STREAMBANK TREATMENT PLAN

PROJECT NO. 103068
 FILE NAME: CSTPL-C18-19
 SHEET NO. C18



- NOTES**
- BRUSH TRENCHES SHALL BE INSTALLED IN CONJUNCTION WITH OTHER TREATMENTS.
 - ADDITIONAL GAP TREATMENT WILL BE IDENTIFIED BY ENGINEER IN THE FIELD.

- LEGEND**
- PROPERTY BOUNDARY
 - - - DISTURBANCE BOUNDARY
 - FO- FIBER OPTIC LINE
 - OE- OVERHEAD ELECTRIC LINE
 - E- BURIED ELECTRIC LINE
 - PH- TELEPHONE LINE
 - - - UNDERGROUND IRRIGATION LINE
 - x- EXISTING FENCE
 - - - EXISTING ROAD
 - - - FINAL GRADE INDEX CONTOUR (1' INTERVAL)
 - - - FINAL GRADE INTERMEDIATE CONTOUR (0.5' INTERVAL)
 - WATER GAP

- BANK TREATMENT TYPE**
- BRUSH TRENCH (BT)
 - BRUSH MATRIX (BM)
 - DOUBLE VEGETATED SOIL LIFT (DVSL) (SEE SHEET D2 - DETAIL A)
 - DOUBLE VEGETATED SOIL LIFT (DVSL) (SEE SHEET D2 - DETAIL C)
 - NO TREATMENT AREA (NT)
 - PRESERVE VEGETATION (PV) (SEE SHEET D2 - DETAIL B)
 - POINT BAR REGRADING AREA (PB) (SEE SHEET D3 - DETAIL D)
 - LATERAL BARS (LB) (SEE SHEET D3 - DETAIL E)
 - WETLANDS
 - GAP TREATMENT (SEE SHEET D5/DETAIL B)
 - BIFURCATION TREATMENT (SEE SHEET D5/DETAIL C)

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 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

STREAMBANK TREATMENT PLAN

PROJECT NO. 103068
 FILE NAME: CSTPL-C18-19
 SHEET NO. C19

LEGEND

- CHANNEL A BOUNDARY
- DISTURBANCE BOUNDARY
- EXISTING CONTOURS MAJOR, 5 FT INTERVAL
- EXISTING CONTOURS MINOR, 1 FT INTERVAL
- FINAL GRADE INDEX CONTOURS, 1 FT INTERVAL
- FINAL GRADE INTERMEDIATE CONTOURS, 0.5 FT INTERVAL
- FINAL CHANNEL INDEX CONTOURS, 1 FT INTERVAL
- FINAL CHANNEL INTERMEDIATE CONTOURS, 0.5 FT INTERVAL
- X EXISTING FENCE



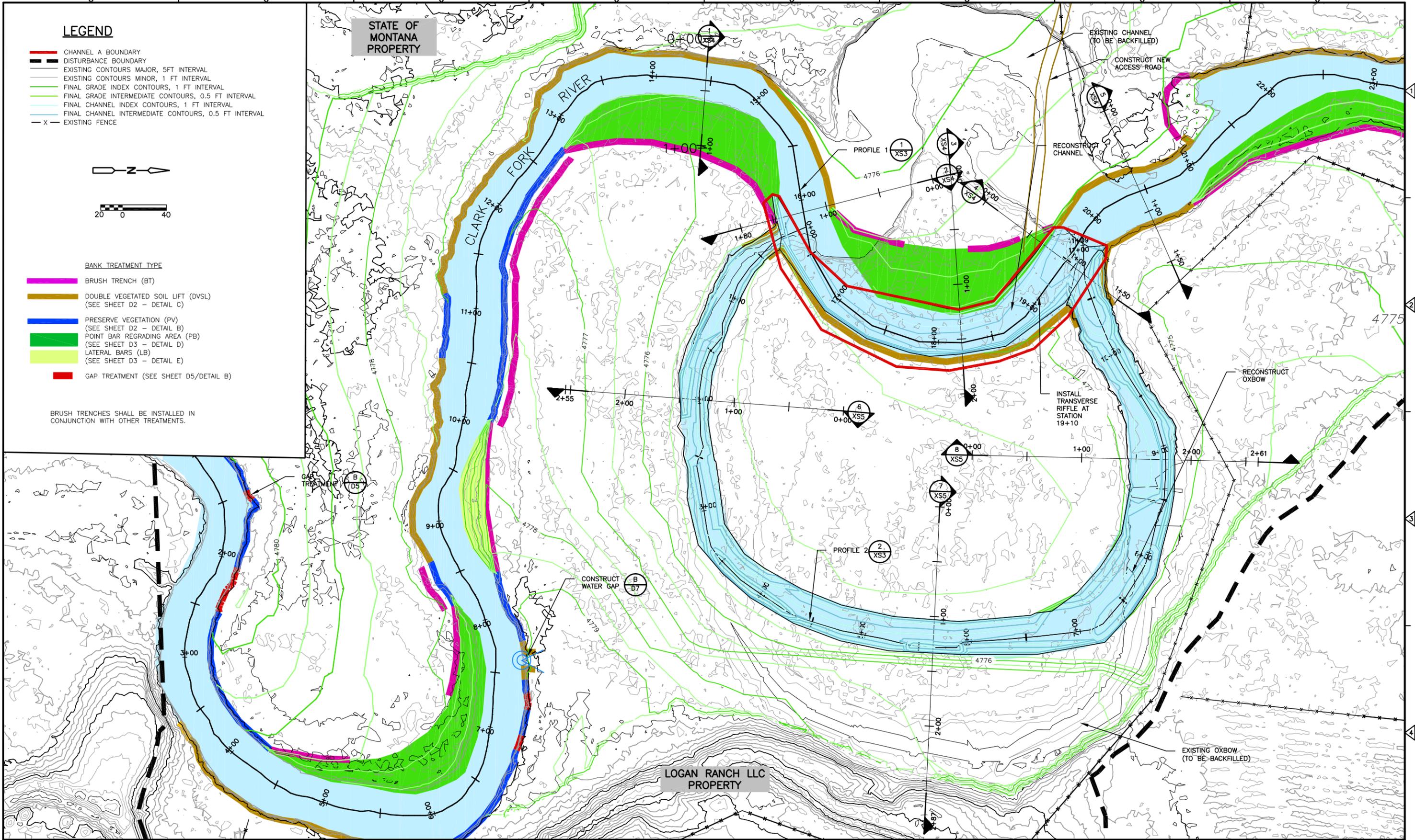
BANK TREATMENT TYPE

- BRUSH TRENCH (BT)
- DOUBLE VEGETATED SOIL LIFT (DVSL)
(SEE SHEET D2 - DETAIL C)
- PRESERVE VEGETATION (PV)
(SEE SHEET D2 - DETAIL B)
- POINT BAR REGRADING AREA (PB)
(SEE SHEET D3 - DETAIL D)
- LATERAL BARS (LB)
(SEE SHEET D3 - DETAIL E)
- GAP TREATMENT (SEE SHEET D5/DETAIL B)

BRUSH TRENCHES SHALL BE INSTALLED IN CONJUNCTION WITH OTHER TREATMENTS.

STATE OF MONTANA PROPERTY

LOGAN RANCH LLC PROPERTY



K:\CFR - PHASE 2\dwg rev dec2013\CSTPL-C20 Channel A and Oxbow Reconst.dwg SAVED:3/3/15 PRINTED:3/3/15 BY:MAINZHAUSENK

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 CROSS CHK'D BY: _____ WHB
 APPROVED BY: _____ WHB
 DATE: _____ MARCH 2015

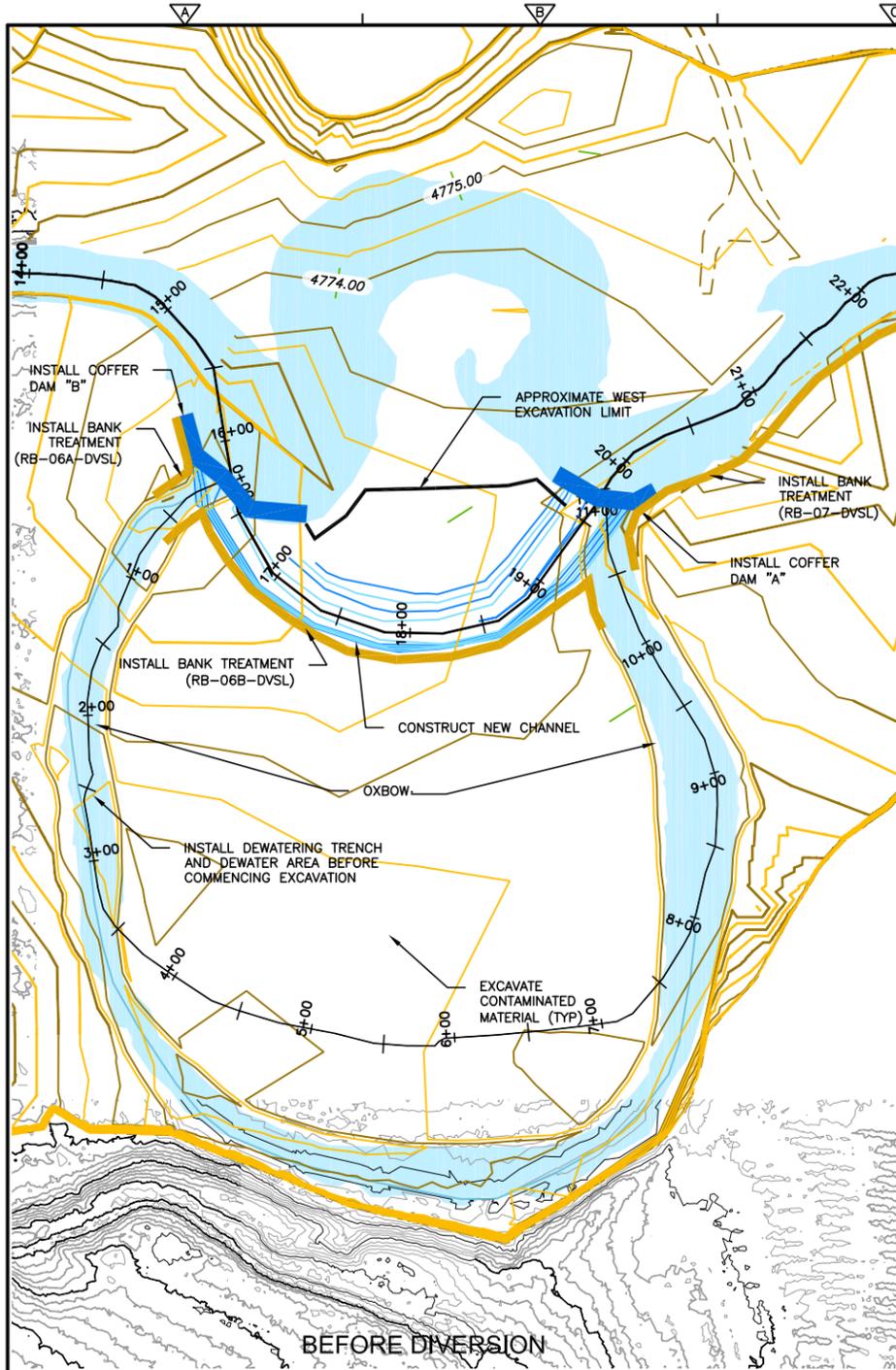
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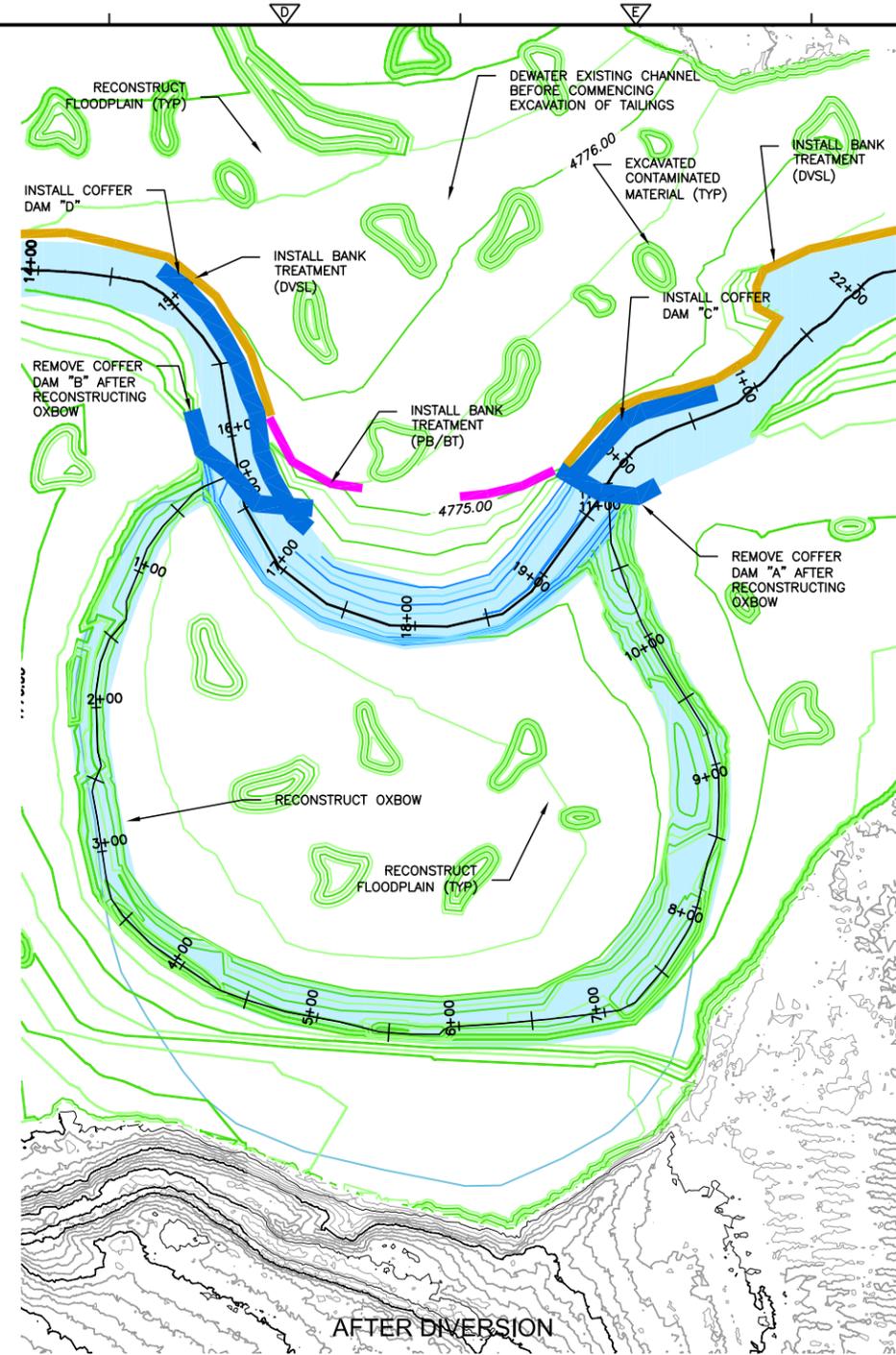
CHANNEL A AND OXBOW RECONSTRUCTION PLAN
 STATIONS 14+25 TO 20+75

PROJECT NO. 103068
 FILE NAME: CSTPL-C20
 SHEET NO. C20

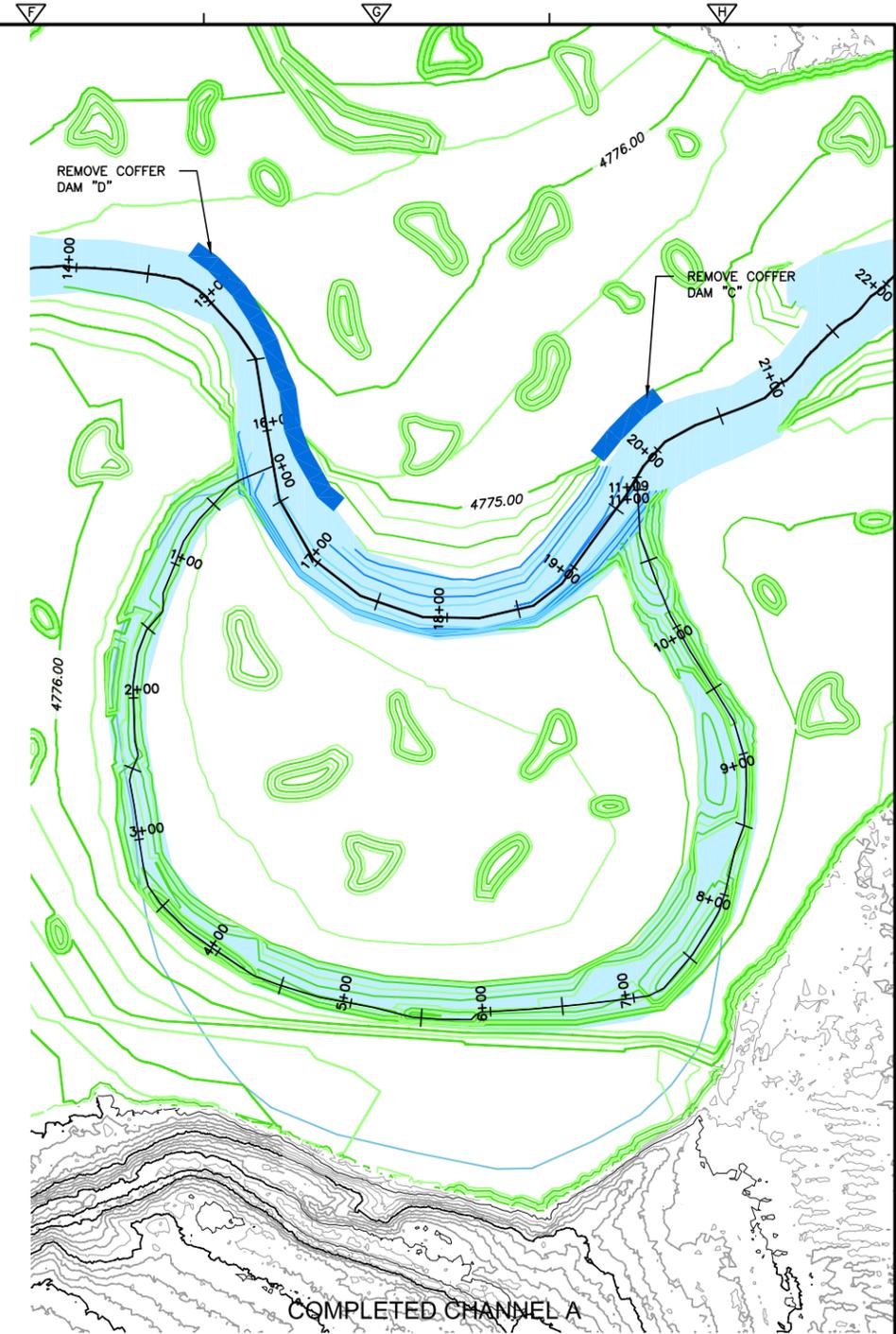
K:\CFR - PHASE 2\dwg rev dec2013\CS1PL-C21 Channel A Diversion Plan.dwg SAVED: 1/19/15 PRINTED: 3/3/15 BY: MAINZHAUSENK



BEFORE DIVERSION



AFTER DIVERSION



COMPLETED CHANNEL A

PROPOSED CONSTRUCTION SEQUENCE:

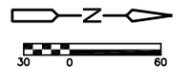
- STEP 1. INSTALL COFFER DAMS "A AND B" AT THE INLET AND OUTLET OF THE OXBOW. ACTUAL LENGTH WILL DEPEND ON THE CURRENT CONDITIONS DURING CONSTRUCTION ACTIVITIES. DEPTHS OF POOLS ARE UNKNOWN AND MAY REQUIRE HIGH COFFER DAMS.
- STEP 2. INSTALL DEWATERING TRENCHES IN OXBOW CHANNEL AND DEWATER AREA AS NECESSARY. SEE DEWATERING PLANS (SHEET C6) FOR ADDITIONAL INFORMATION.
- STEP 3. EXCAVATE CONTAMINATED MATERIAL TO THE ELEVATIONS PROVIDED ON SHEET C8 IN THE ALIGNMENT OF THE RECONSTRUCTED CHANNEL.
- STEP 4. REBUILD FLOODPLAIN AS SHOWN ON SHEETS C10 AND C12. CONSTRUCT NEW CHANNEL AS SHOWN ON SHEET C20 AND BUILD BANK TREATMENTS.

PROPOSED CONSTRUCTION SEQUENCE (CON'T):

- STEP 5. RECONSTRUCT OXBOW AS SHOWN ON SHEET C20.
- STEP 6. REMOVE COFFER DAM "A". ALLOW WATER TO EQUILIBRATE IN THE NEW CHANNEL. REMOVE COFFER DAM "B" AND ALLOW WATER TO FLOW IN BOTH CHANNELS.
- STEP 7. INSTALL COFFER DAMS "D" AND THEN "C" AND ALLOW WATER TO EQUILIBRATE IN NEW CHANNEL AND OXBOW.
- STEP 8. EXCAVATE CONTAMINATED MATERIAL EAST OF THE NEW CHANNEL.
- STEP 9. INSTALL BANK TREATMENTS.
- STEP 10. REMOVE COFFER DAMS "C" AND "D".
- STEP 11. REBUILD FLOODPLAIN AS SHOWN ON SHEETS C10 AND C12.

LEGEND

- EXISTING CONTOUR MAJOR, 5 FT INTERVAL
- EXISTING CONTOUR MINOR, 1 FT INTERVAL
- FINAL GRADE INDEX CONTOUR, 1FT INTERVAL
- FINAL GRADE INTERMEDIATE CONTOUR, 0.5 FT INTERVAL
- NEW CHANNEL CONTOUR MAJOR, 1 FT INTERVAL
- NEW CHANNEL CONTOUR MINOR, 0.5 FT INTERVAL
- BOTTOM OF EXCAVATION MAJOR, 1 FT INTERVAL
- BOTTOM OF EXCAVATION, MINOR, 0.5 FT INTERVAL
- COFFER DAM
- DOUBLE VEGETATED SOIL LIFT (DVSL) (SEE SHEET D2 - DETAIL C)
- BRUSH TRENCH (BT)



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY:	KM
DRAWN BY:	KM
SHEET CHK'D BY:	TJ
CROSS CHK'D BY:	WHB
APPROVED BY:	WHB
DATE:	MARCH 2015

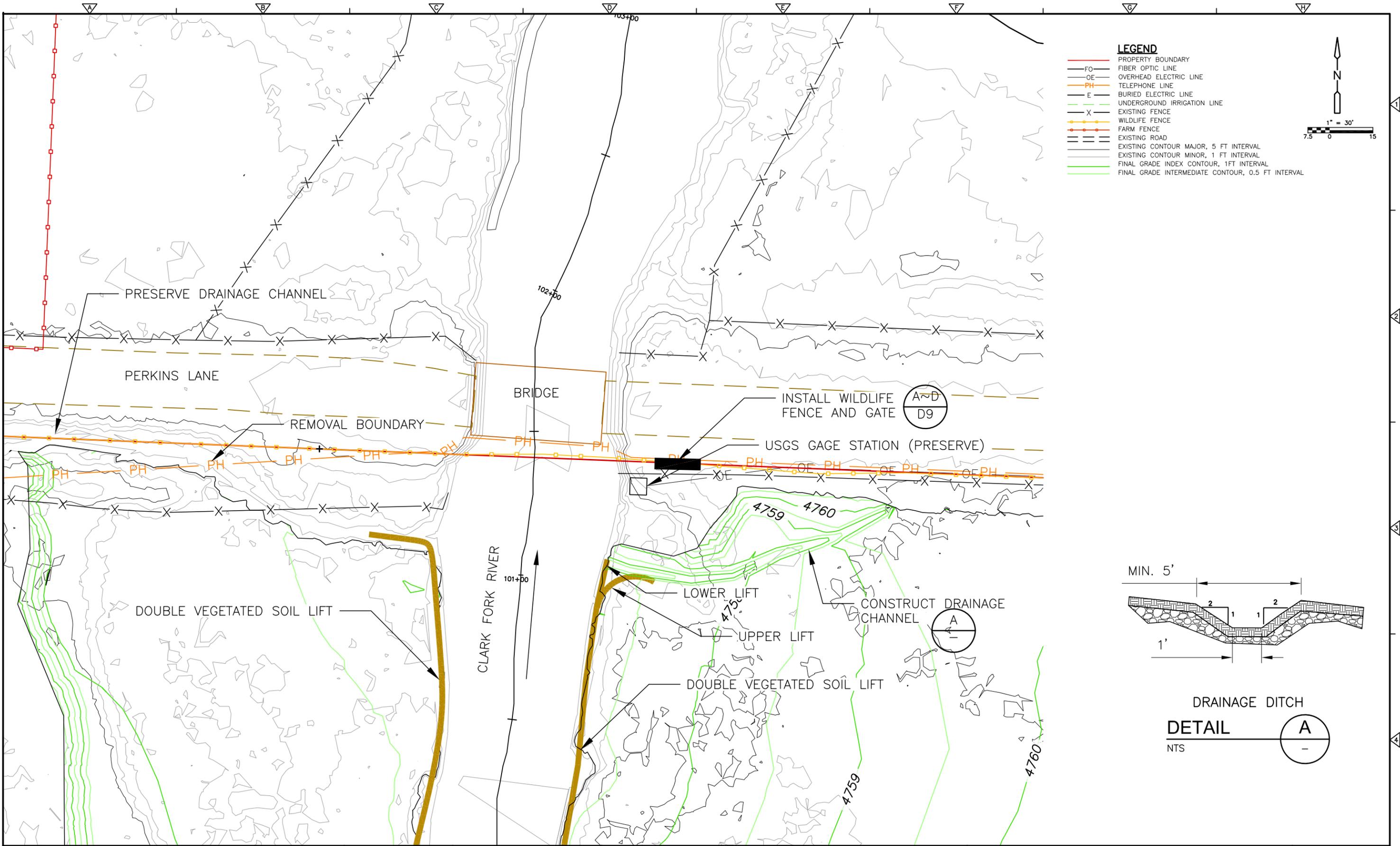
50 West 14th Street Suite 200
Helena, Montana 59701
Tel: 406.441.1400
consulting - engineering - construction - operations

DEPARTMENT OF ENVIRONMENTAL QUALITY
CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

CHANNEL A DIVERSION PLAN AND CONSTRUCTION SEQUENCE

PROJECT NO.	103068
FILE NAME:	CS1PL-C21
SHEET NO.	C21

K:\CFR - PHASE 2\dwg rev dec2013\CSTPL-C23 USGS_STATION.dwg SAVED:1/16/15 PRINTED:3/3/15 BY:MAINZHAUSENK



REV. NO.	DATE	DRWN	CHKD	REMARKS

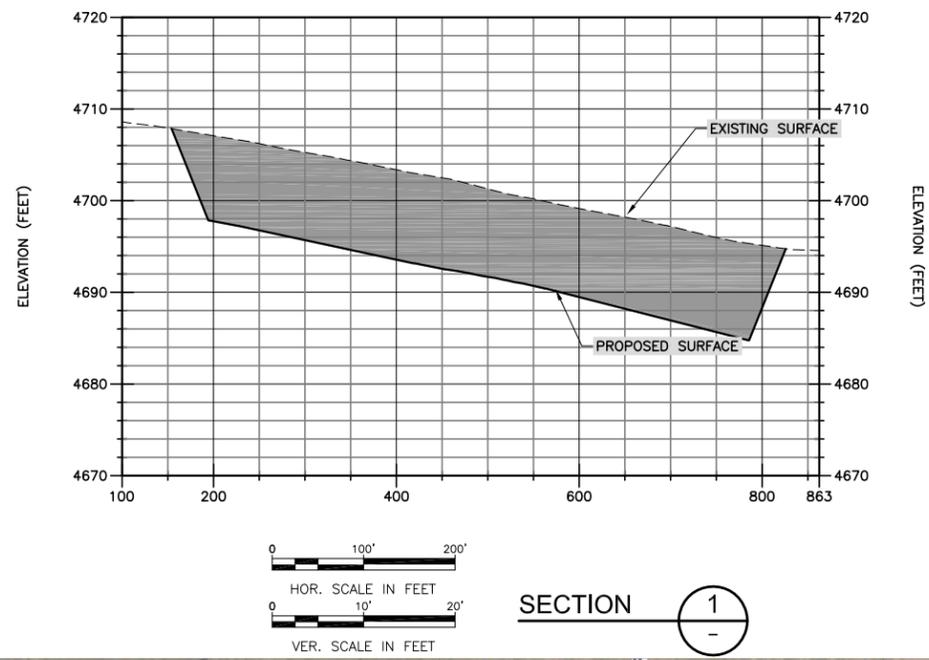
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 SHEET CHK'D BY: **TJ**
 CROSS CHK'D BY: **WHB**
 APPROVED BY: **WHB**
 DATE: **MARCH 2015**

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CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

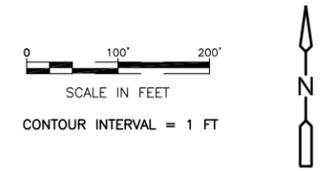
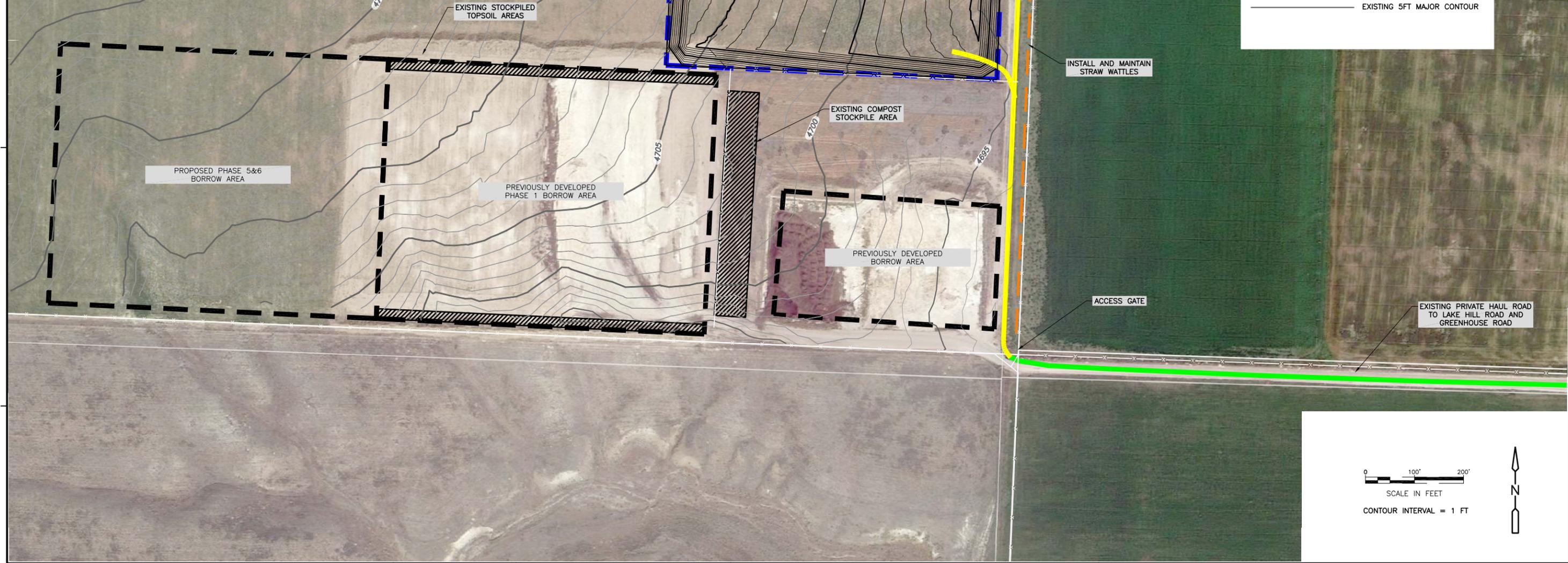
PERKINS LANE BRIDGE AREA FLOODPLAIN PLAN

PROJECT NO. 103068
 FILE NAME: CSTPL-C23
 SHEET NO. **C23**



LEGEND

- PHASE 2 BORROW AREA
- OTHER BORROW AREAS
- EXISTING PRIVATE HAUL ROAD MAGNESIUM CHLORIDE APPLICATION AND MAINTENANCE
- PROPOSED PRIVATE HAUL ROAD MAGNESIUM CHLORIDE APPLICATION AND MAINTENANCE
- STRAW WATTLE
- PROPOSED STOCKPILE AREA
- EXISTING STOCKPILE AREA
- PROPOSED 1FT MINOR CONTOUR
- PROPOSED 5FT MAJOR CONTOUR
- EXISTING 1FT MINOR CONTOUR
- EXISTING 5FT MAJOR CONTOUR



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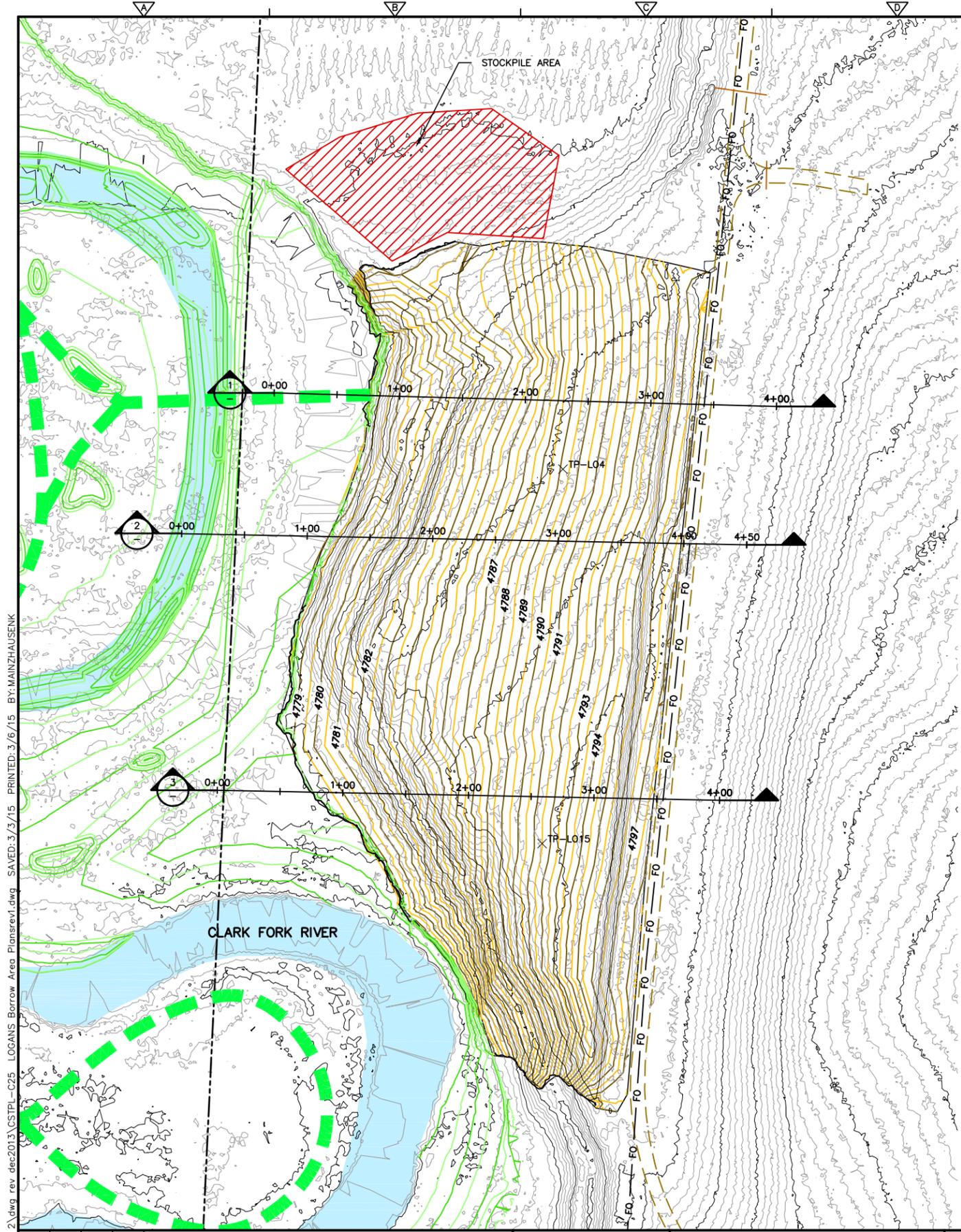
DESIGNED BY: MJP
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 APPROVED BY: WHB
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 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

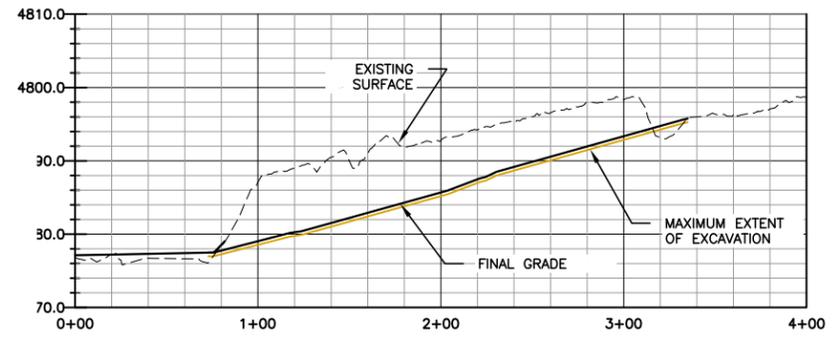
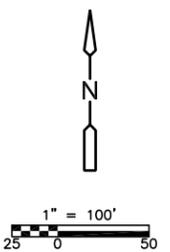
BECK BORROW AREA DEVELOPMENT
 AND RECLAMATION PLAN

PROJECT NO. 103068
 FILE NAME: CSTPL24.DWG
 SHEET NO. C24

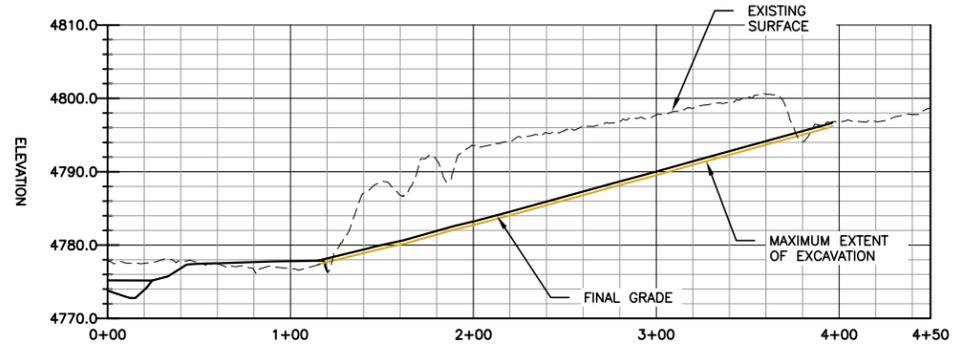


- LEGEND**
- █ SECONDARY HAUL ROAD
 - - - PROPERTY BOUNDARY
 - EXISTING ROAD
 - EXISTING CONTOUR MAJOR, 5 FT INTERVAL
 - EXISTING CONTOUR MINOR, 1 FT INTERVAL
 - FINAL GRADE INDEX CONTOUR, 1 FT INTERVAL
 - FINAL GRADE INTERMEDIATE CONTOUR, 0.5 FT INTERVAL
 - EXCAVATION SURFACE MAJOR, 1 FT INTERVAL
 - EXCAVATION SURFACE MINOR, 0.5 FT INTERVAL
 - x TP TEST PIT LOCATIONS

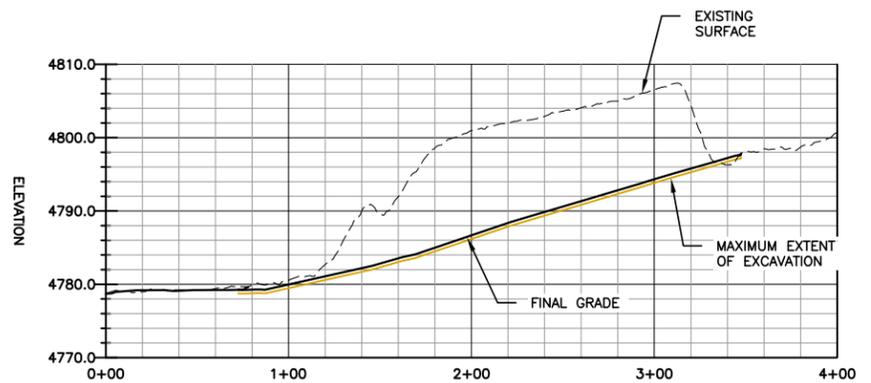
- NOTES:**
1. SALVAGE AND STOCKPILE 12 INCHES OF TOPSOIL TO BE USED DURING RECLAMATION.
 2. PLACE GENERAL BACKFILL IN GENERAL FILL BACKFILL AREAS IDENTIFIED ON THE DRAWINGS, SHEETS C12 AND C13 SUBGRADE PLAN. NO MATERIAL SHALL BE PLACED OUTSIDE THESE AREAS.
 3. GENERAL BACKFILL VOLUME ESTIMATE FOR THIS BORROW AREA IS 39,000 CY.
 4. STOCKPILE SALVAGEABLE FENCE AT LOCATION(S) APPROVED BY ENGINEER.
 5. NOT ALL TEST PITS ARE SHOWN. SEE APPENDIX B, BORROW AREA TEST PIT LOCATIONS AND ANALYSIS.



LOGAN'S BORROW AREA
SECTION 1
1" = 100' H
1" = 25' V



LOGAN'S BORROW AREA
SECTION 2
1" = 100' H
1" = 20' V



LOGAN'S BORROW AREA
SECTION 3
1" = 100' H
1" = 25' V

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: KM
DRAWN BY: KM
SHEET CHK'D BY: TJ
CROSS CHK'D BY: WHB
APPROVED BY: WHB
DATE: MARCH 2015



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CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

LOGAN BORROW AREA DEVELOPMENT
AND RECLAMATION PLAN

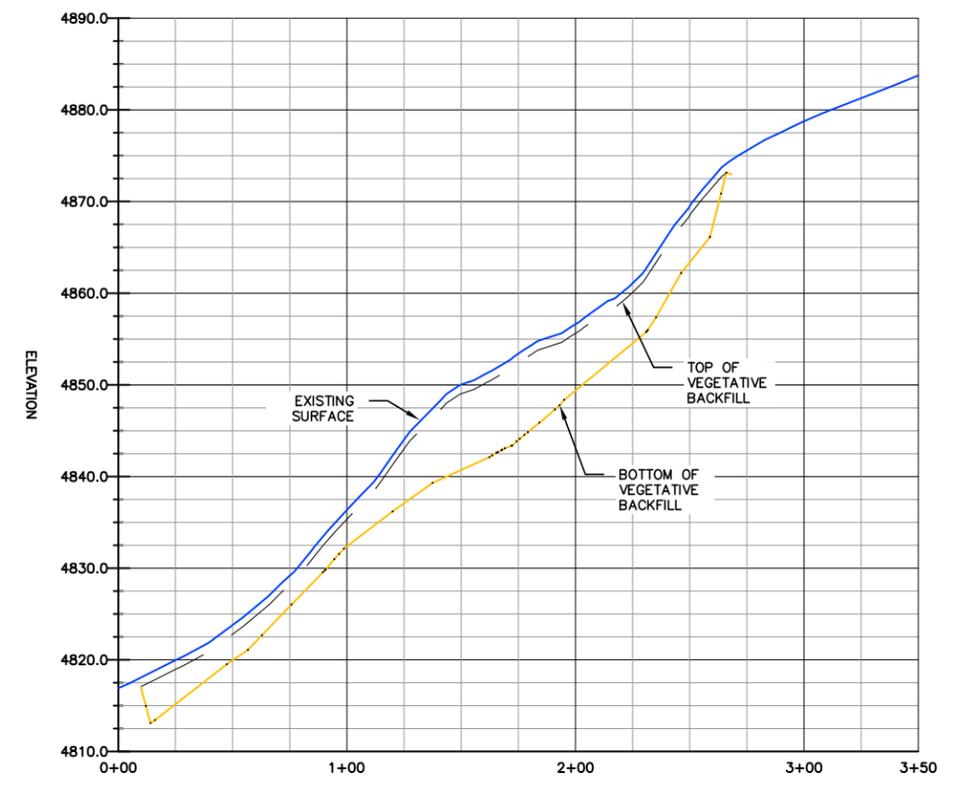
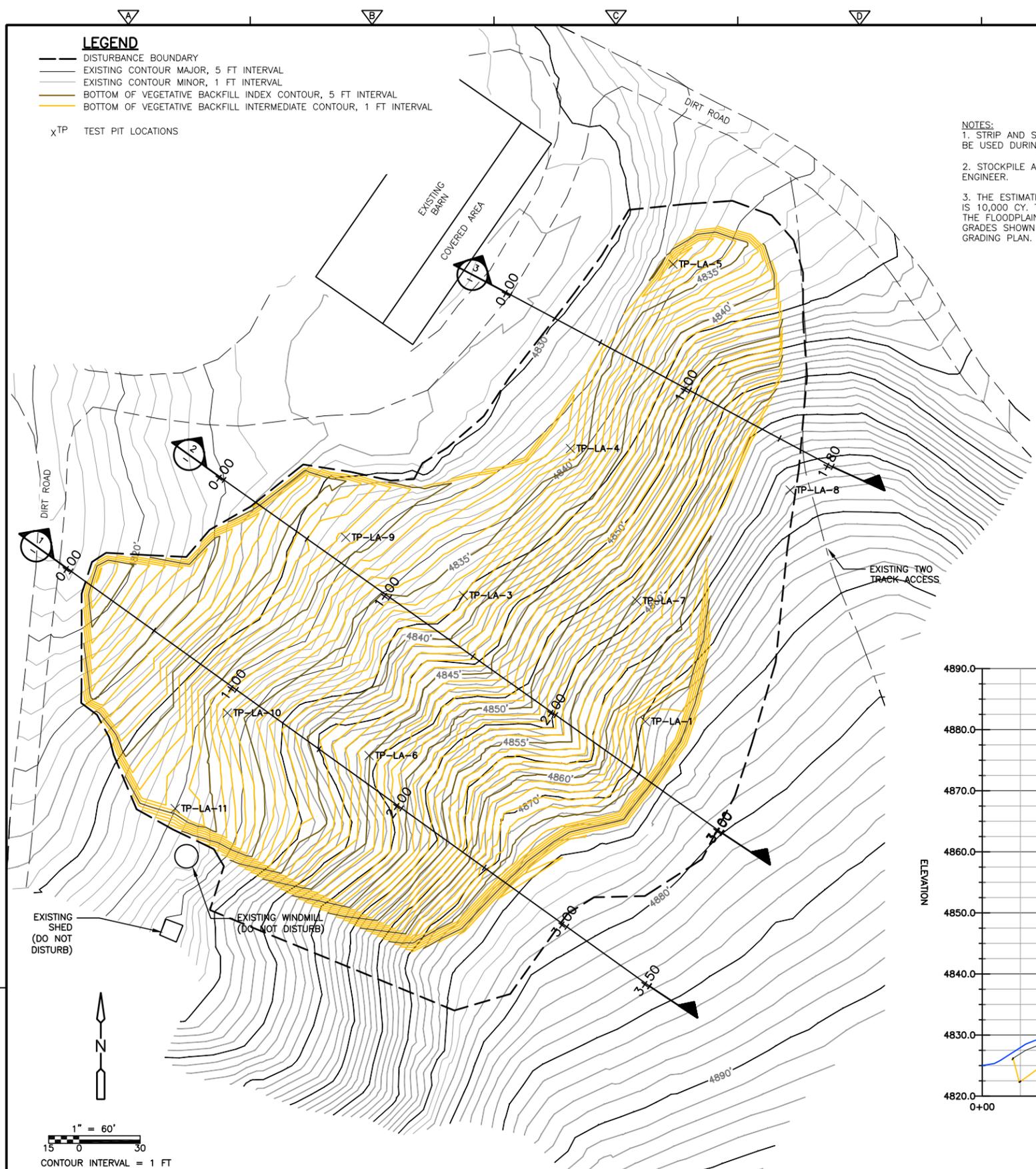
PROJECT NO. 103068
FILE NAME: CSTPL-25
REVISED SHEET NO.
C25

K:\CFR - PHASE 2\dwg rev dec2013\CSTPL-C25 LOGANS Borrow Area Plansrev1.dwg, SAVED: 3/3/15, PRINTED: 3/6/15 BY: MAINZHAUSENK

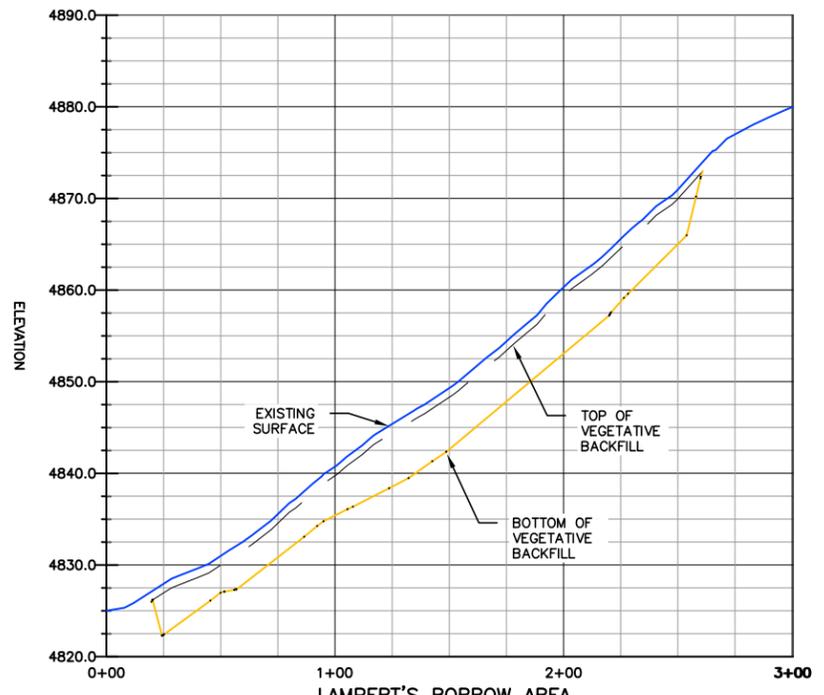
- LEGEND**
- DISTURBANCE BOUNDARY
 - EXISTING CONTOUR MAJOR, 5 FT INTERVAL
 - EXISTING CONTOUR MINOR, 1 FT INTERVAL
 - BOTTOM OF VEGETATIVE BACKFILL INDEX CONTOUR, 5 FT INTERVAL
 - BOTTOM OF VEGETATIVE BACKFILL INTERMEDIATE CONTOUR, 1 FT INTERVAL

xTP TEST PIT LOCATIONS

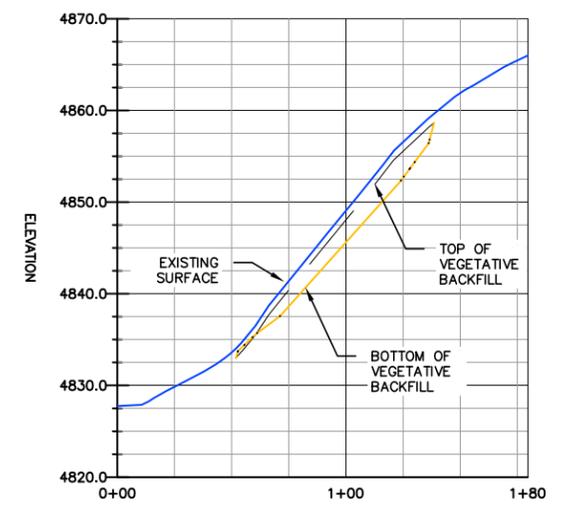
- NOTES:**
1. STRIP AND STOCKPILE 12 INCHES OF TOPSOIL TO BE USED DURING RECLAMATION.
 2. STOCKPILE AT LOCATION(S) APPROVED BY ENGINEER.
 3. THE ESTIMATED VOLUME OF VEGETATIVE BACKFILL IS 10,000 CY. THIS MATERIAL SHALL BE PLACED IN THE FLOODPLAIN ON LAMPERTS PROPERTY TO THE GRADES SHOWN ON SHEETS C14 AND C15-FINAL GRADING PLAN.



LAMPERT'S BORROW AREA
SECTION 1
1" = 80' H
1" = 20' V



LAMPERT'S BORROW AREA
SECTION 2
1" = 80' H
1" = 20' V



LAMPERT'S BORROW AREA
SECTION 3
1" = 80' H
1" = 20' V

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 CROSS CHK'D BY: WHB
 APPROVED BY: WHB
 DATE: MARCH 2015

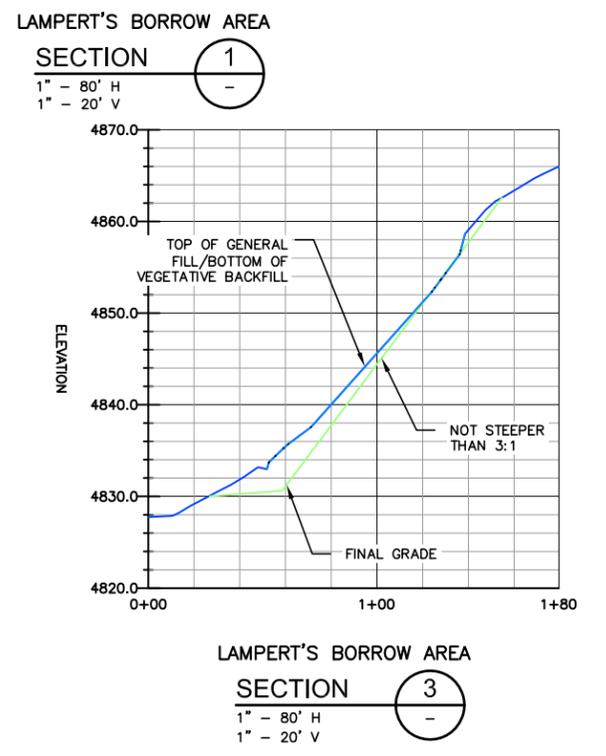
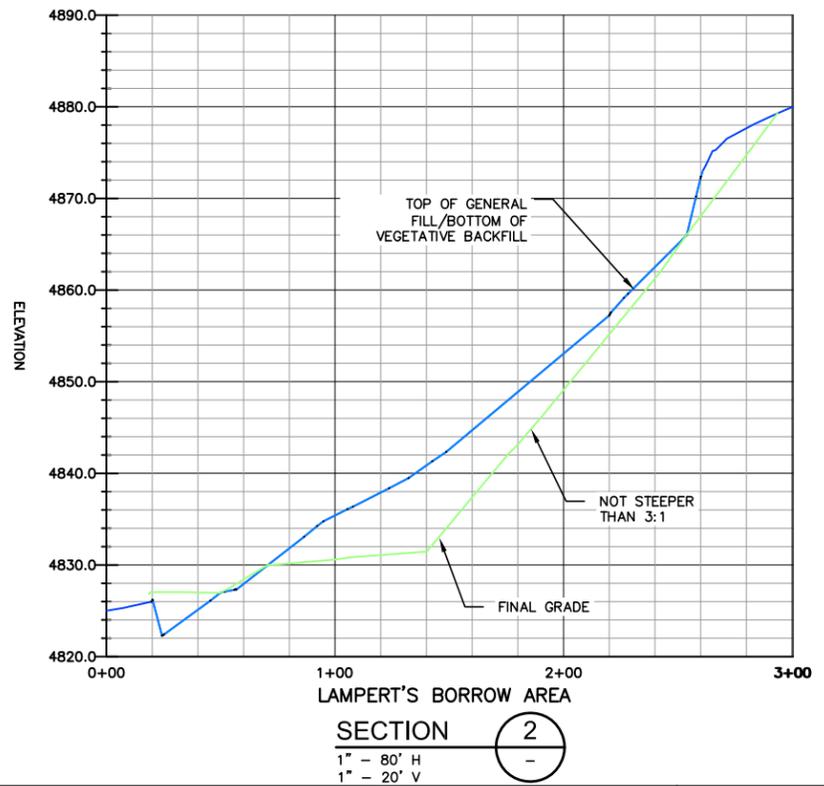
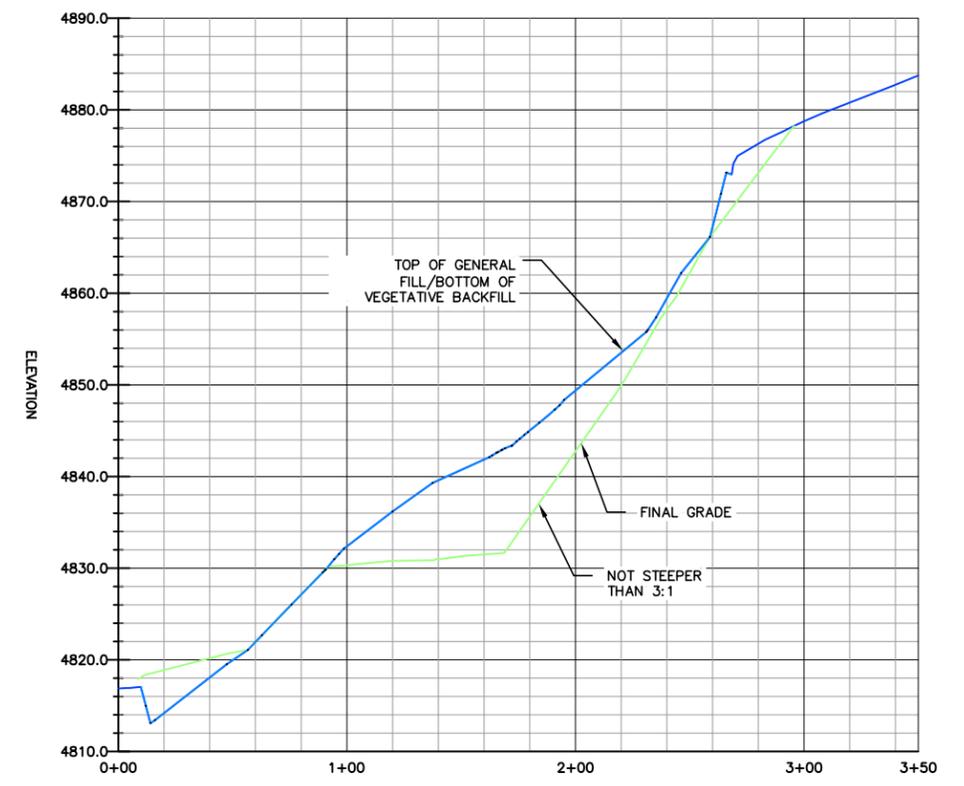
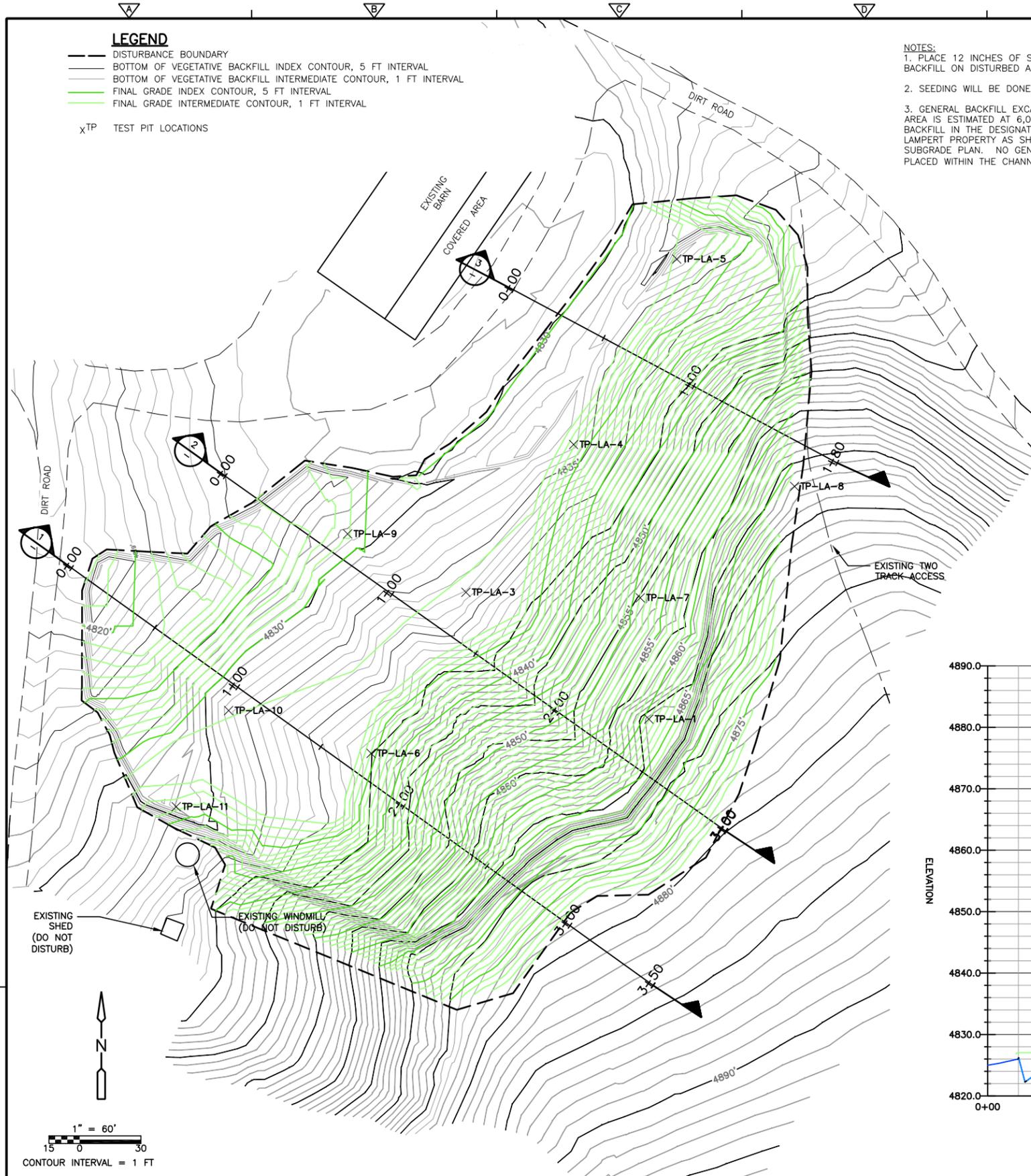
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DEPARTMENT OF ENVIRONMENTAL QUALITY
 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

LAMPERT BORROW AREA
 DEVELOPMENT PLAN

PROJECT NO. 103068
 FILE NAME: CSTPL-C26
 SHEET NO. C26

K:\CFR - PHASE 2\dwg rev dec2013\CSTPL-C27 LAMPERTS Borrow Area Reclamation Plans.dwg SAVED:1/19/15 PRINTED:3/3/15 BY:MAINZHAUSENK



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CROSS CHK'D BY: WHB
APPROVED BY: WHB
DATE: MARCH 2015

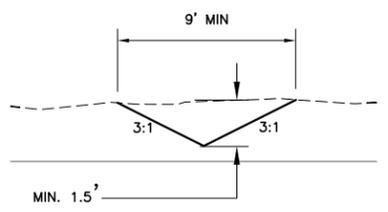
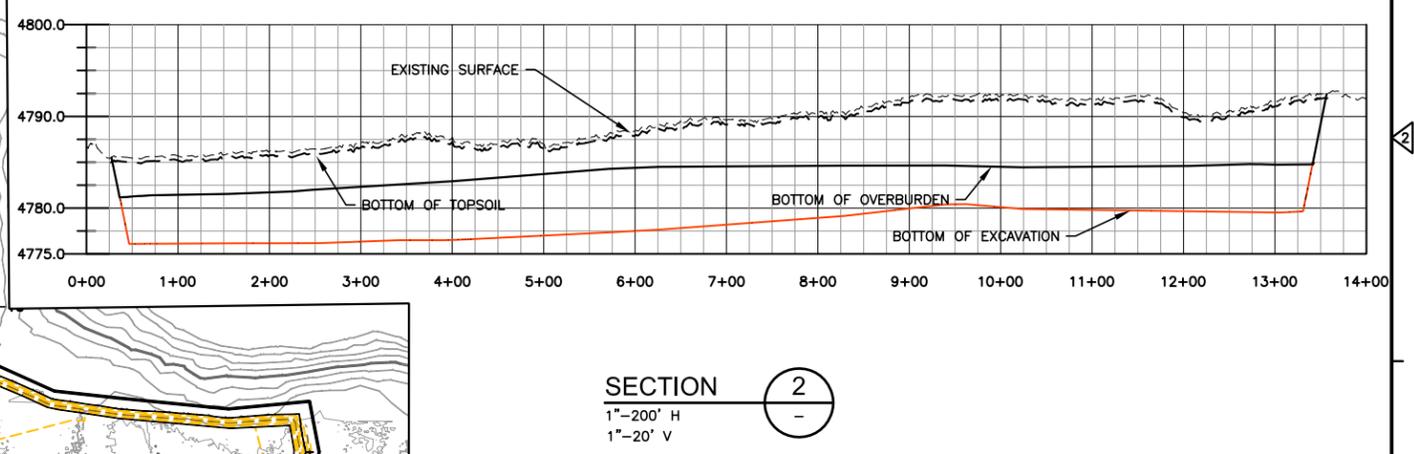
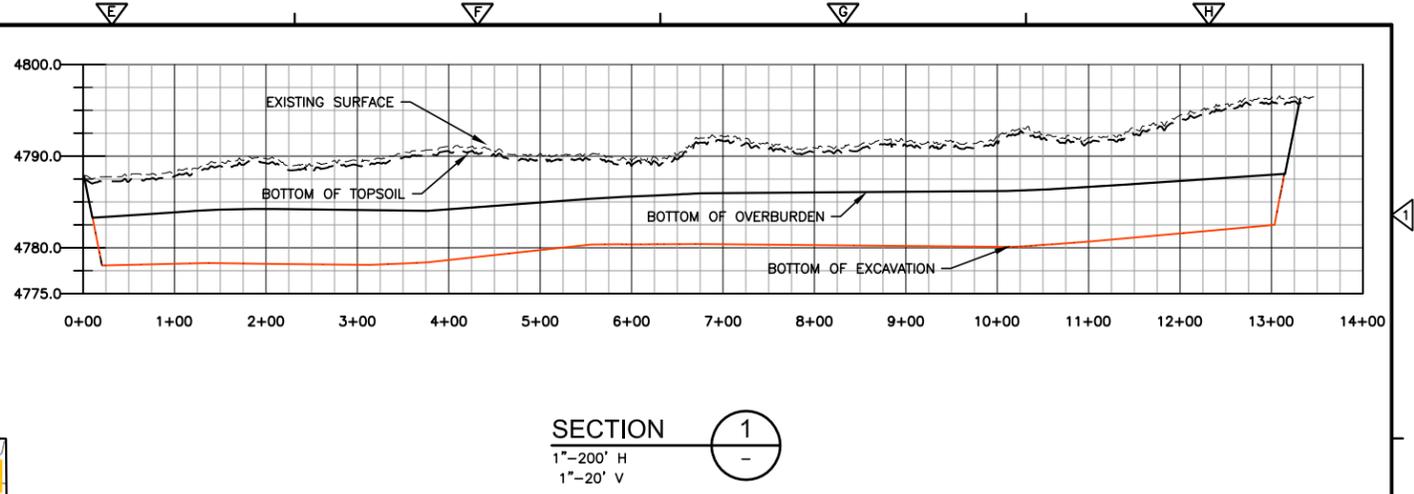
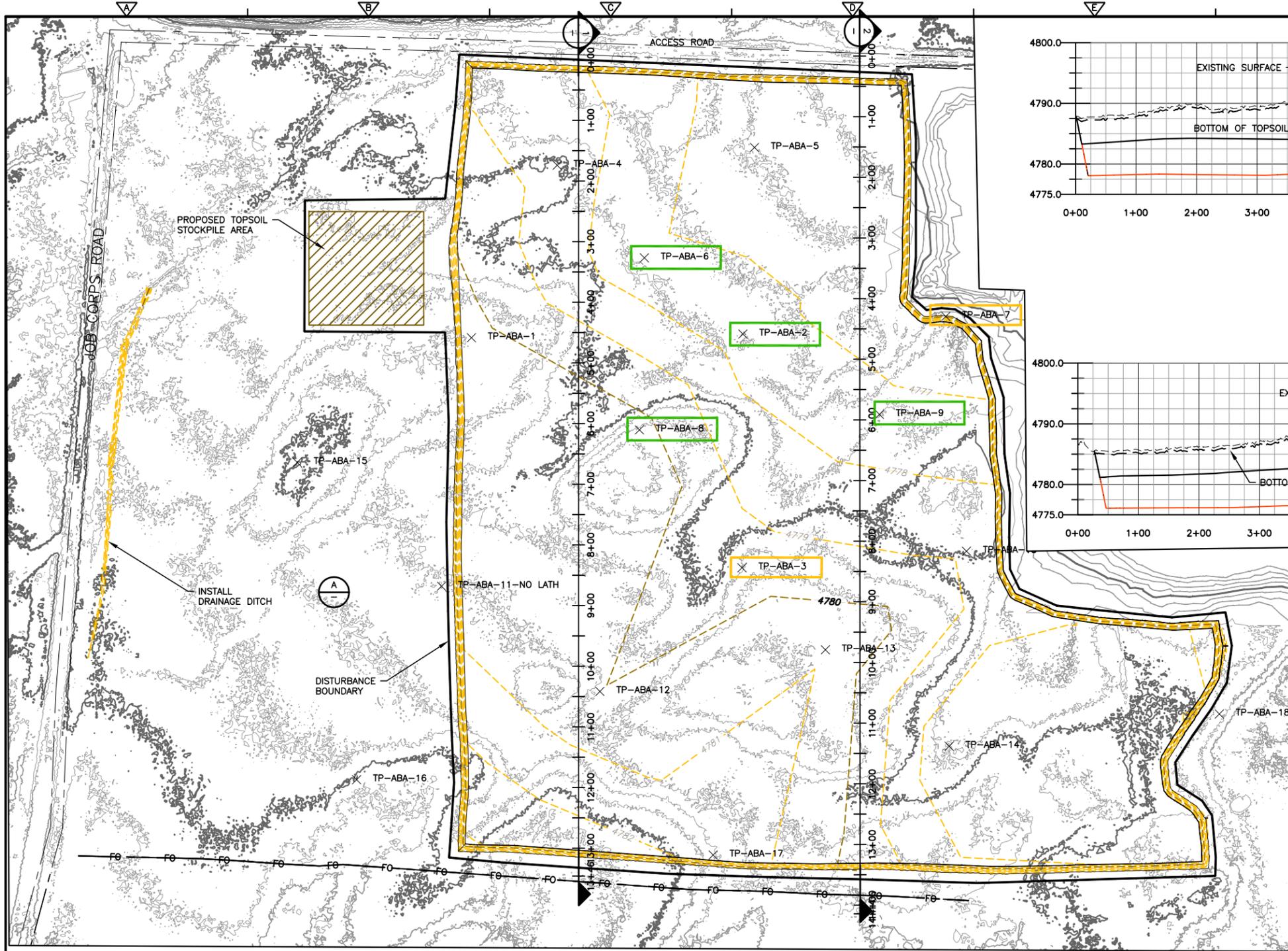
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CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

LAMPERT BORROW AREA RECLAMATION PLAN

PROJECT NO. 103068
FILE NAME: CSTPL-C27
SHEET NO. C27

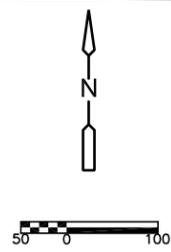
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- NOTES:
1. STRIP AND STOCKPILE 12 INCHES OF TOPSOIL AT LOCATIONS SHOWN ON THE DRAWING OR APPROVED BY ENGINEER.
 2. CONTRACTOR SHALL EXCAVATE OVERBURDEN TO ELEVATIONS PROVIDED BY ENGINEER AND STOCKPILE AT LOCATIONS DESIGNATED IN THE ALLUVIUM BORROW AREA DEVELOPMENT AND RECLAMATION PLAN PREPARED BY CONTRACTOR.
 3. CONTRACTOR SHALL DEVELOP A DEWATERING PLAN TO BE REVIEWED BY ENGINEER.
 4. WATER TABLE WAS 3-6 FEET BELOW GROUND SURFACE IN MARCH OF 2014.
 5. EXCAVATION SURFACE IS BASED ON EXCAVATION ABOUT 11 FEET BELOW GROUND SURFACE. GRAVEL WAS ENCOUNTERED AT LOWER ELEVATIONS AT MOST LOCATIONS.

LEGEND

- EXISTING CONTOURS MAJOR, 5 FT INTERVAL
- EXISTING CONTOURS MINOR, 1 FT INTERVAL
- - - BOTTOM OF EXCAVATION MAJOR, 5 FT INTERVAL
- - - BOTTOM OF EXCAVATION MINOR, 1 FT INTERVAL
- FO- FIBER OPTIC LINE
- X TP-ABA-1 TEST PIT IN TARGET RANGE
- X TP-ABA-1 TEST PIT FINER THAN TARGET RANGE
- X TP-ABA-1 TEST PIT COARSER THAN TARGET RANGE



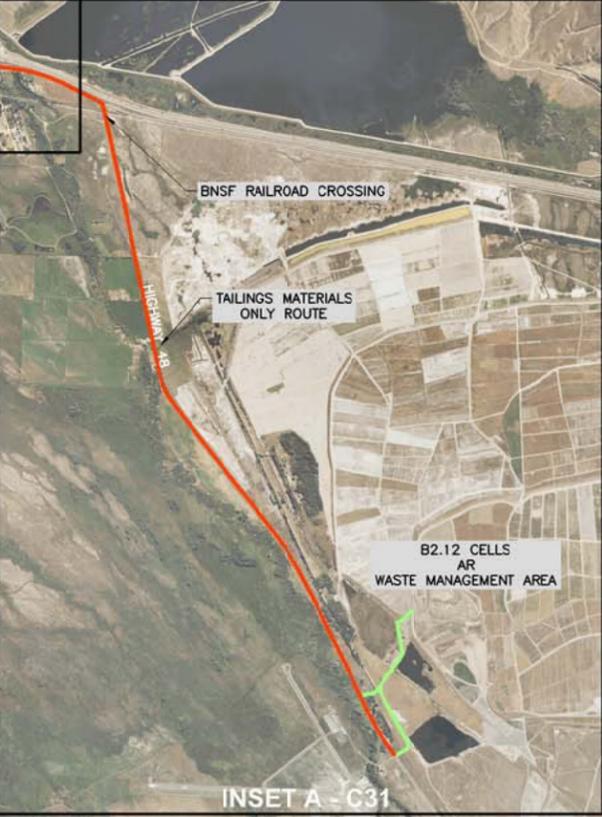
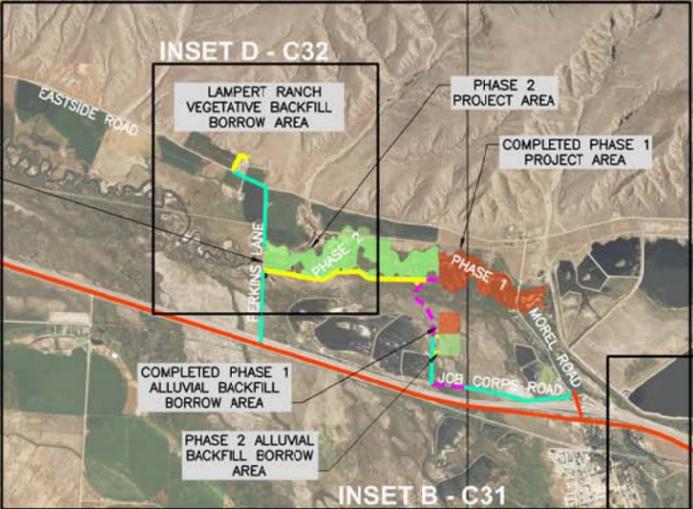
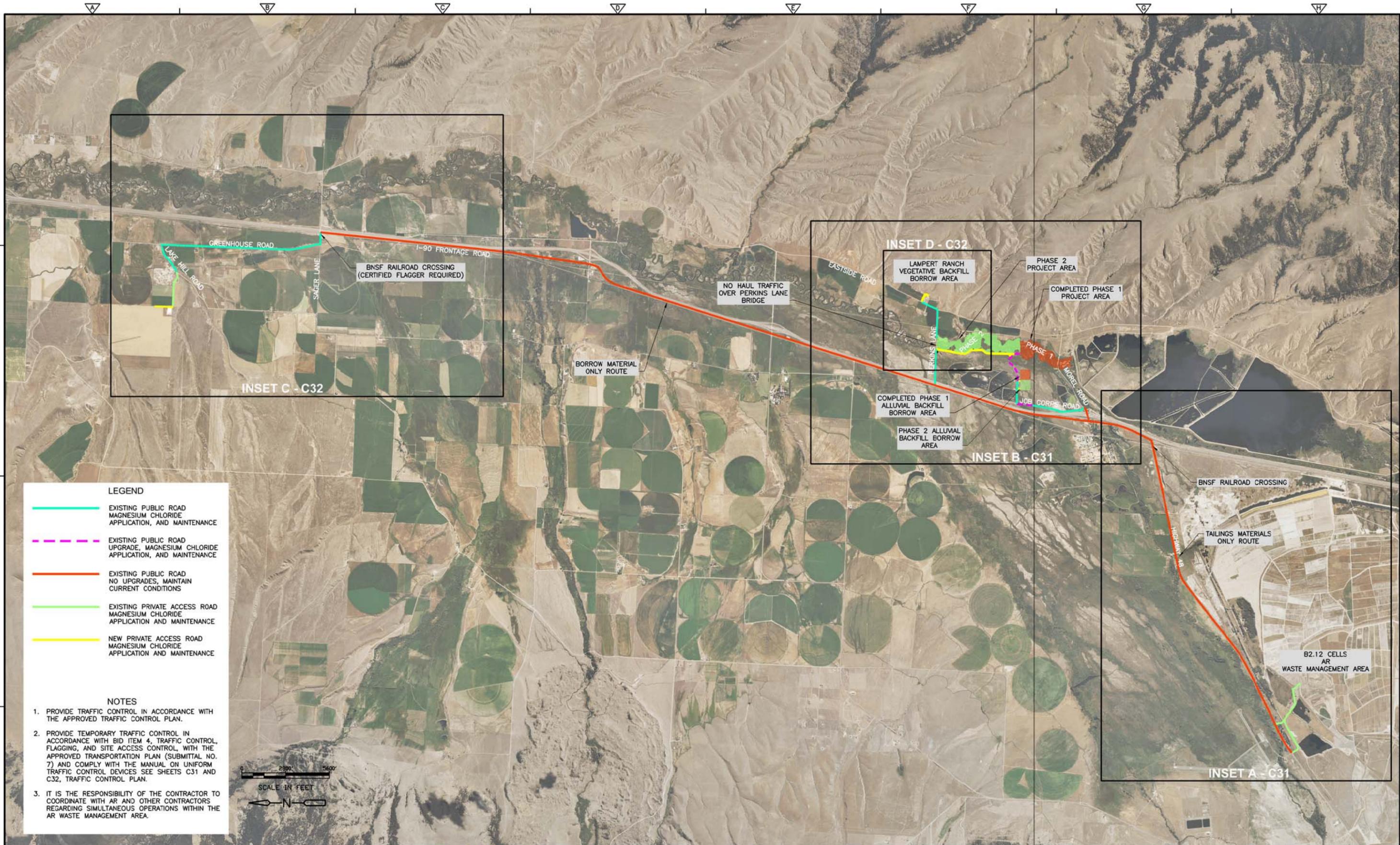
REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY:	KM
DRAWN BY:	KM
SHEET CHK'D BY:	TJ
CROSS CHK'D BY:	WHB
APPROVED BY:	WHB
DATE:	MARCH 2015

DEPARTMENT OF ENVIRONMENTAL QUALITY
CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

ALLUVIUM BORROW AREA
DEVELOPMENT PLAN

PROJECT NO.	103068
FILE NAME:	CSTL-28-29
SHEET NO.	C28



LEGEND

- EXISTING PUBLIC ROAD
MAGNESIUM CHLORIDE
APPLICATION, AND MAINTENANCE
- - - EXISTING PUBLIC ROAD
UPGRADE, MAGNESIUM CHLORIDE
APPLICATION, AND MAINTENANCE
- EXISTING PUBLIC ROAD
NO UPGRADES, MAINTAIN
CURRENT CONDITIONS
- EXISTING PRIVATE ACCESS ROAD
MAGNESIUM CHLORIDE
APPLICATION AND MAINTENANCE
- NEW PRIVATE ACCESS ROAD
MAGNESIUM CHLORIDE
APPLICATION AND MAINTENANCE

NOTES

1. PROVIDE TRAFFIC CONTROL IN ACCORDANCE WITH THE APPROVED TRAFFIC CONTROL PLAN.
2. PROVIDE TEMPORARY TRAFFIC CONTROL IN ACCORDANCE WITH BID ITEM 4, TRAFFIC CONTROL, FLAGGING, AND SITE ACCESS CONTROL, WITH THE APPROVED TRANSPORTATION PLAN (SUBMITTAL NO. 7) AND COMPLY WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES SEE SHEETS C31 AND C32, TRAFFIC CONTROL PLAN.
3. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH AR AND OTHER CONTRACTORS REGARDING SIMULTANEOUS OPERATIONS WITHIN THE AR WASTE MANAGEMENT AREA.



REV. NO.	DATE	DRWN	CHKD	REMARKS

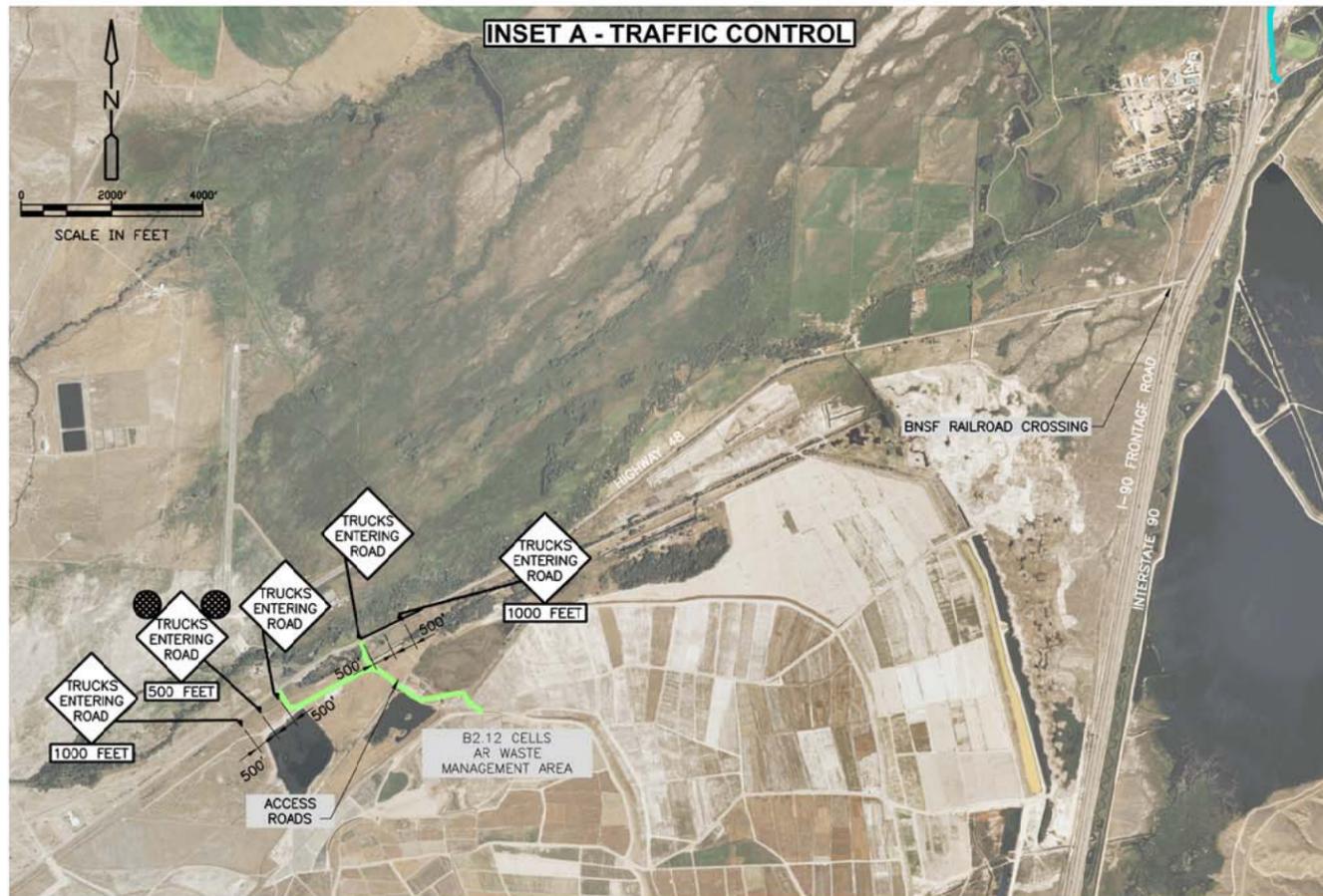
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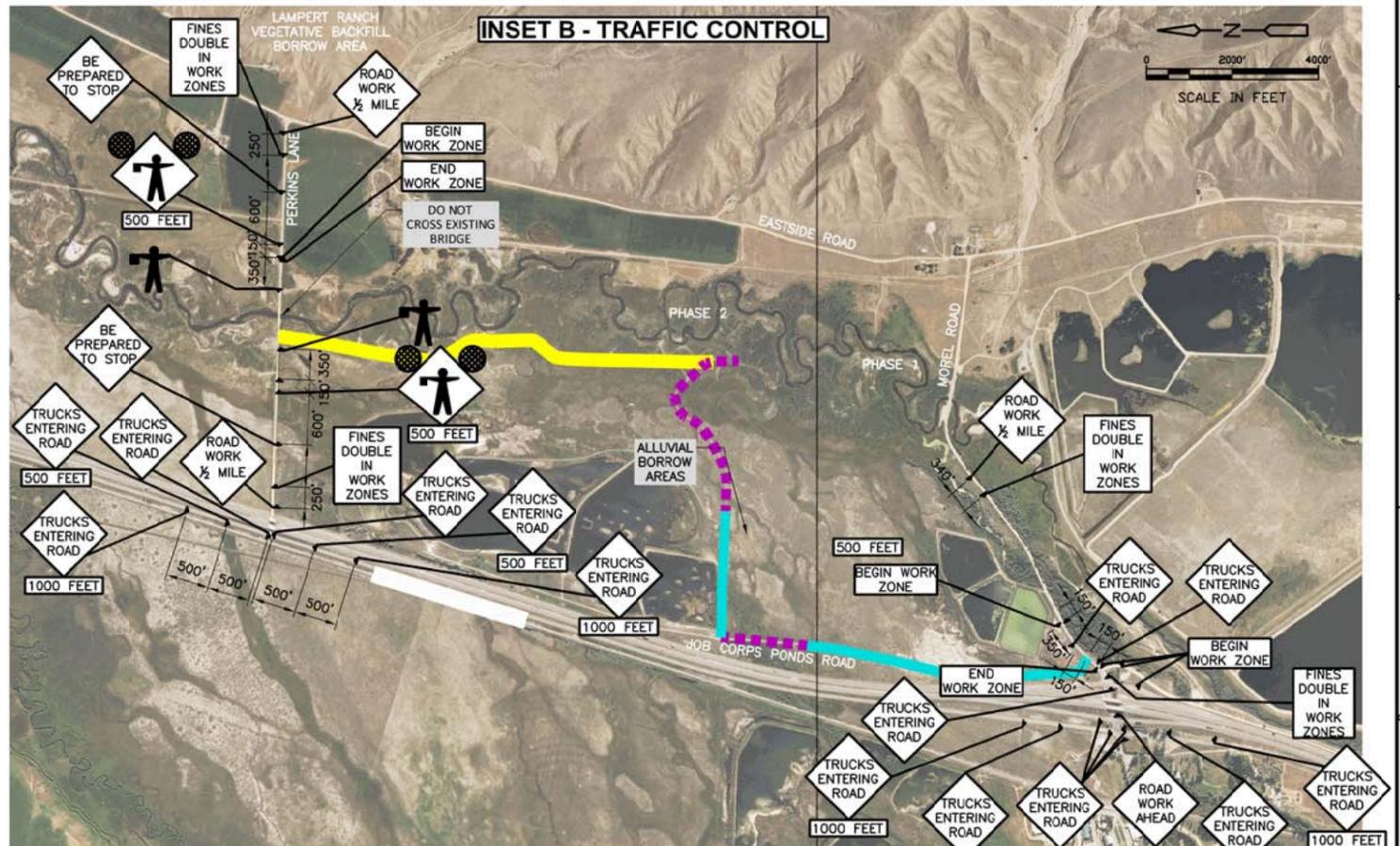
DEPARTMENT OF ENVIRONMENTAL QUALITY
 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

TRANSPORTATION PLAN

PROJECT NO. 103068
 FILE NAME: CSTPL32.DWG
 SHEET NO. C30



B2.12 CELL AT THE AR WASTE MANAGEMENT AREA



PROJECT SITE TO I-90

LEGEND

-  12-INCH AMBER FLASHING LIGHT (LED ACCEPTABLE) (TYP.) ATTACHED TO SIGN
-  EXISTING PRIVATE ROAD MAGNESIUM CHLORIDE APPLICATION AND MAINTENANCE
-  EXISTING PUBLIC ROAD MAGNESIUM CHLORIDE APPLICATION, AND MAINTENANCE
-  EXISTING PUBLIC ROAD UPGRADE, MAGNESIUM CHLORIDE APPLICATION, AND MAINTENANCE
-  NEW PRIVATE ACCESS ROAD MAGNESIUM CHLORIDE APPLICATION AND MAINTENANCE

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REV. NO.	DATE	DRWN	CHKD	REMARKS

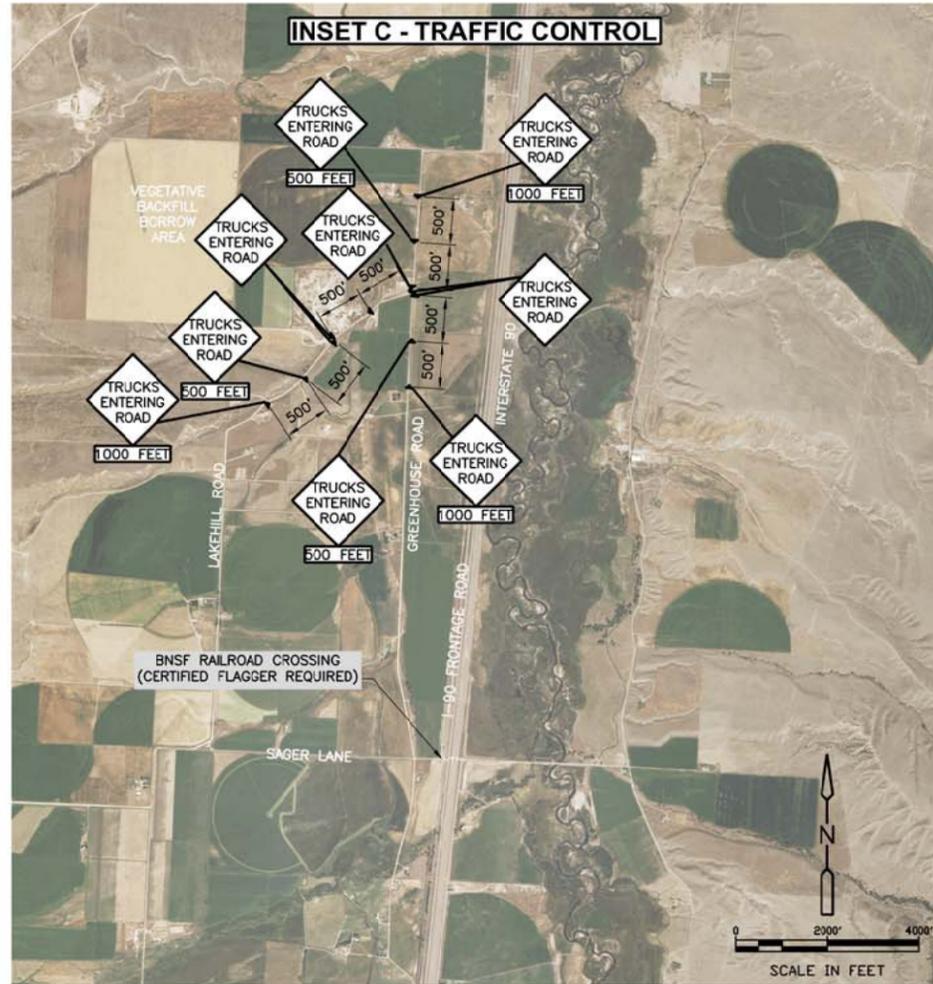
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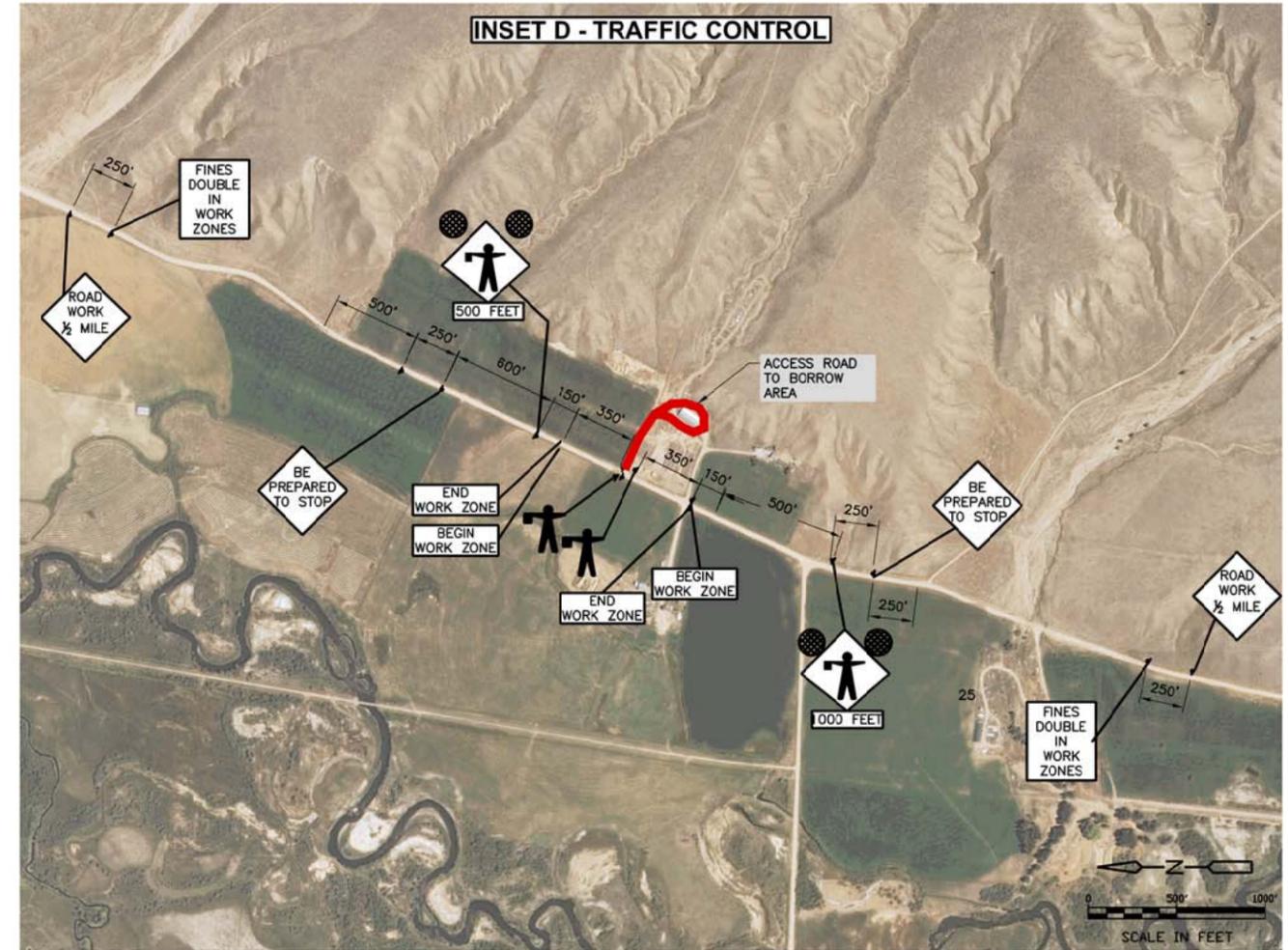
DEPARTMENT OF ENVIRONMENTAL QUALITY
 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

TRAFFIC CONTROL PLAN

PROJECT NO. 103068
 FILE NAME: CSTPL33.DWG
 SHEET NO. C31

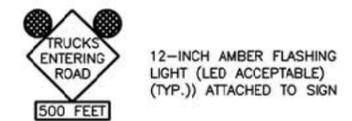


BECK BORROW



LAMPERT BORROW AREA

LEGEND



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REV. NO.	DATE	DRWN	CHKD	REMARKS

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 DRAWN BY: MJP
 SHEET CHK'D BY: TJ
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 APPROVED BY: WHB
 DATE: MARCH 2015

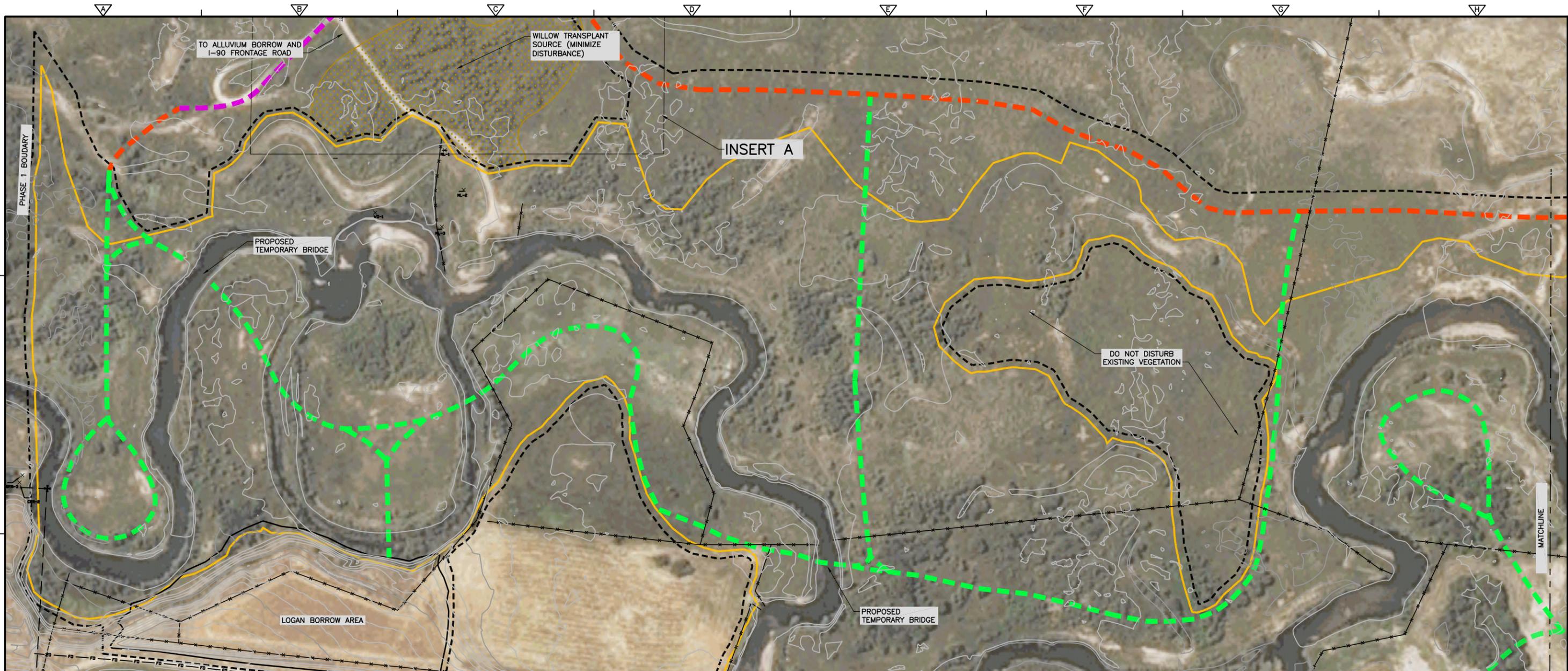
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 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

TRAFFIC CONTROL PLAN

PROJECT NO. 103068
 FILE NAME: CSTPL34.DWG
 SHEET NO. C32

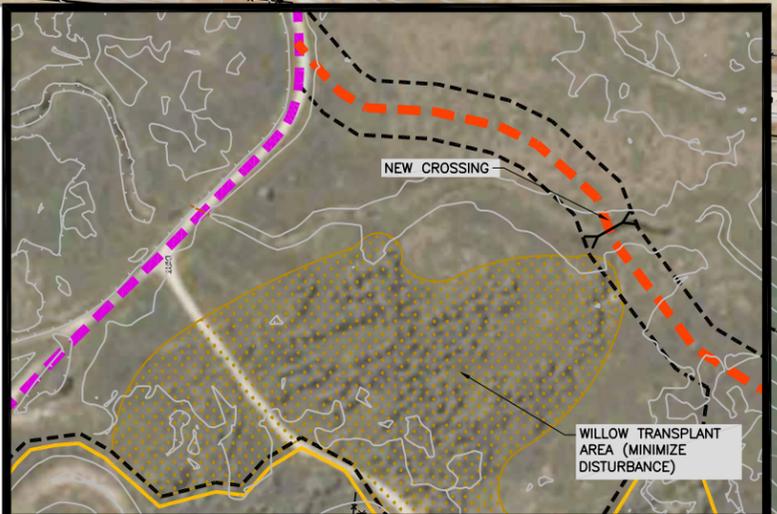
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LEGEND

- EXISTING PRIMARY HAUL ROAD
- NEW PRIMARY HAUL ROAD
- NEW SECONDARY HAUL ROAD
- - - DISTURBANCE BOUNDARY
- - - PHASE 2 REMOVAL BOUNDARY
- X - X - X EXISTING FENCE
- FO - FO - FO FIBER OPTIC LINE
- E - E - E UNDERGROUND ELECTRIC

- NOTES:**
- NO HAULING WITHIN 25 FEET OF WATERS EDGE.
 - REMOVE EXISTING FENCE AT THE DIRECTION OF THE ENGINEER.
 - STAGE HAUL TRUCKS ALONG PRIMARY HAUL ROUTE.
 - THIS IS A PROPOSED PLAN, CONTRACTOR SHALL DEVELOP ITS OWN PLAN FOR APPROVAL BY ENGINEER.
 - NEW CROSSING SHALL BE AT A MINIMUM 24" CMP.



REV. NO.	DATE	DRWN	CHKD	REMARKS

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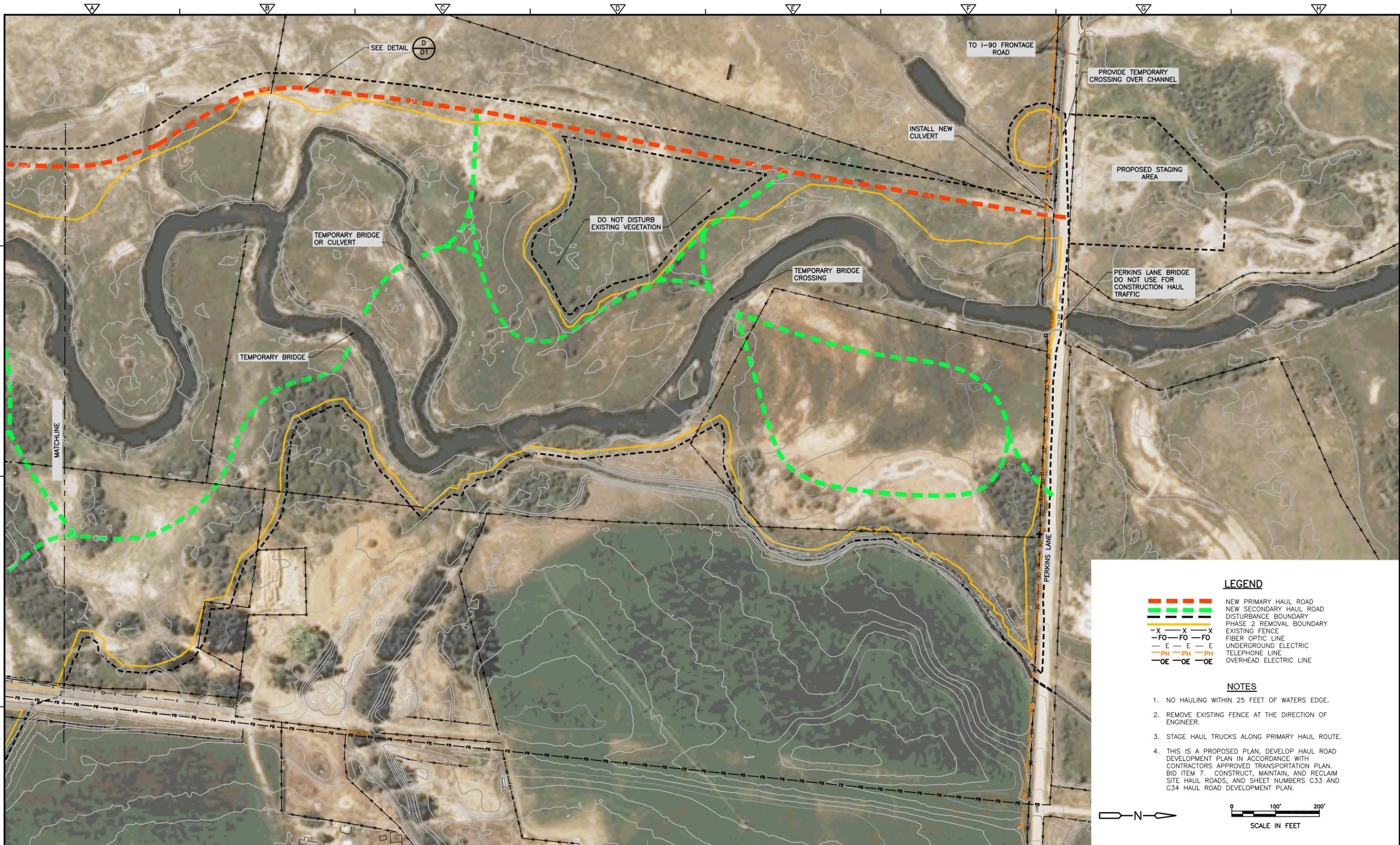
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HAUL ROAD DEVELOPMENT PLAN

PROJECT NO. 103068
 FILE NAME: CSTPL34.DWG
 SHEET NO. C33

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LEGEND

- NEW PRIMARY HAUL ROAD
- NEW SECONDARY HAUL ROAD
- - - DISTURBANCE BOUNDARY
- - - PHASE 2 REMOVAL BOUNDARY
- X -X -X EXISTING FENCE
- FO -FO -FO FIBER OPTIC LINE
- E -E -E UNDERGROUND ELECTRIC
- PH -PH -PH TELEPHONE LINE
- OE -OE -OE OVERHEAD ELECTRIC LINE

NOTES

- NO HAULING WITHIN 25 FEET OF WATERS EDGE.
- REMOVE EXISTING FENCE AT THE DIRECTION OF ENGINEER.
- STAGE HAUL TRUCKS ALONG PRIMARY HAUL ROUTE.
- THIS IS A PROPOSED PLAN, DEVELOP HAUL ROAD DEVELOPMENT PLAN IN ACCORDANCE WITH CONTRACTORS APPROVED TRANSPORTATION PLAN. BID ITEM 7. CONSTRUCT, MAINTAIN, AND RECLAIM SITE HAUL ROADS, AND SHEET NUMBERS C33 AND C34 HAUL ROAD DEVELOPMENT PLAN.

0 100' 200'
SCALE IN FEET

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: MJP
 DRAWN BY: MJP
 SHEET CHK'D BY: TJ
 CROSS CHK'D BY: WHB
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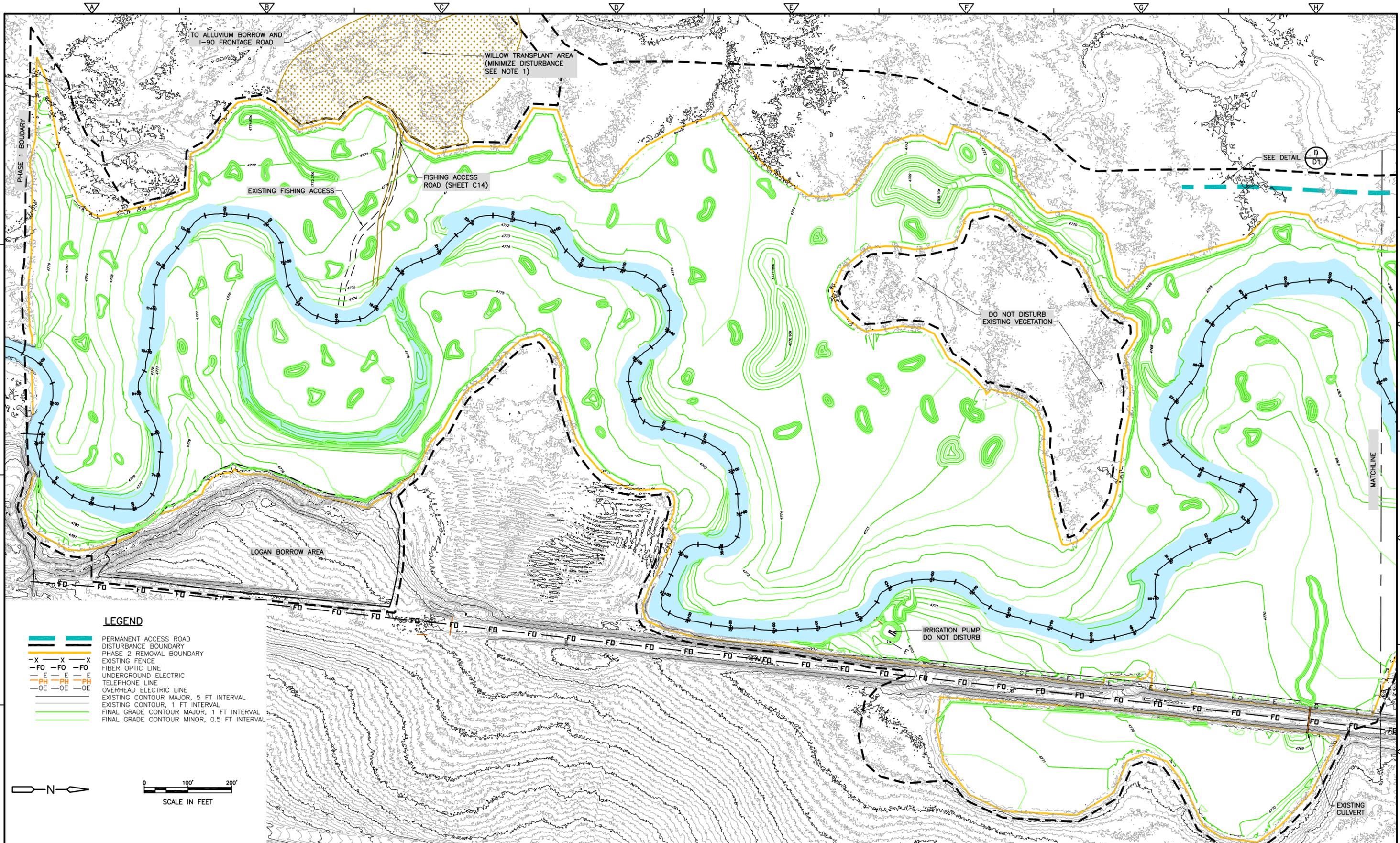
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HAUL ROAD DEVELOPMENT PLAN

PROJECT NO. 103068
 FILE NAME: CSTPL35.DWG
 SHEET NO. C34

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LEGEND

- PERMANENT ACCESS ROAD
- DISTURBANCE BOUNDARY
- PHASE 2 REMOVAL BOUNDARY
- EXISTING FENCE
- FIBER OPTIC LINE
- UNDERGROUND ELECTRIC
- TELEPHONE LINE
- OVERHEAD ELECTRIC LINE
- EXISTING CONTOUR MAJOR, 5 FT INTERVAL
- EXISTING CONTOUR, 1 FT INTERVAL
- FINAL GRADE CONTOUR MAJOR, 1 FT INTERVAL
- FINAL GRADE CONTOUR MINOR, 0.5 FT INTERVAL



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: MJP
 DRAWN BY: MJP
 SHEET CHK'D BY: TJ
 CROSS CHK'D BY: WHB
 APPROVED BY: WHB
 DATE: MARCH 2015

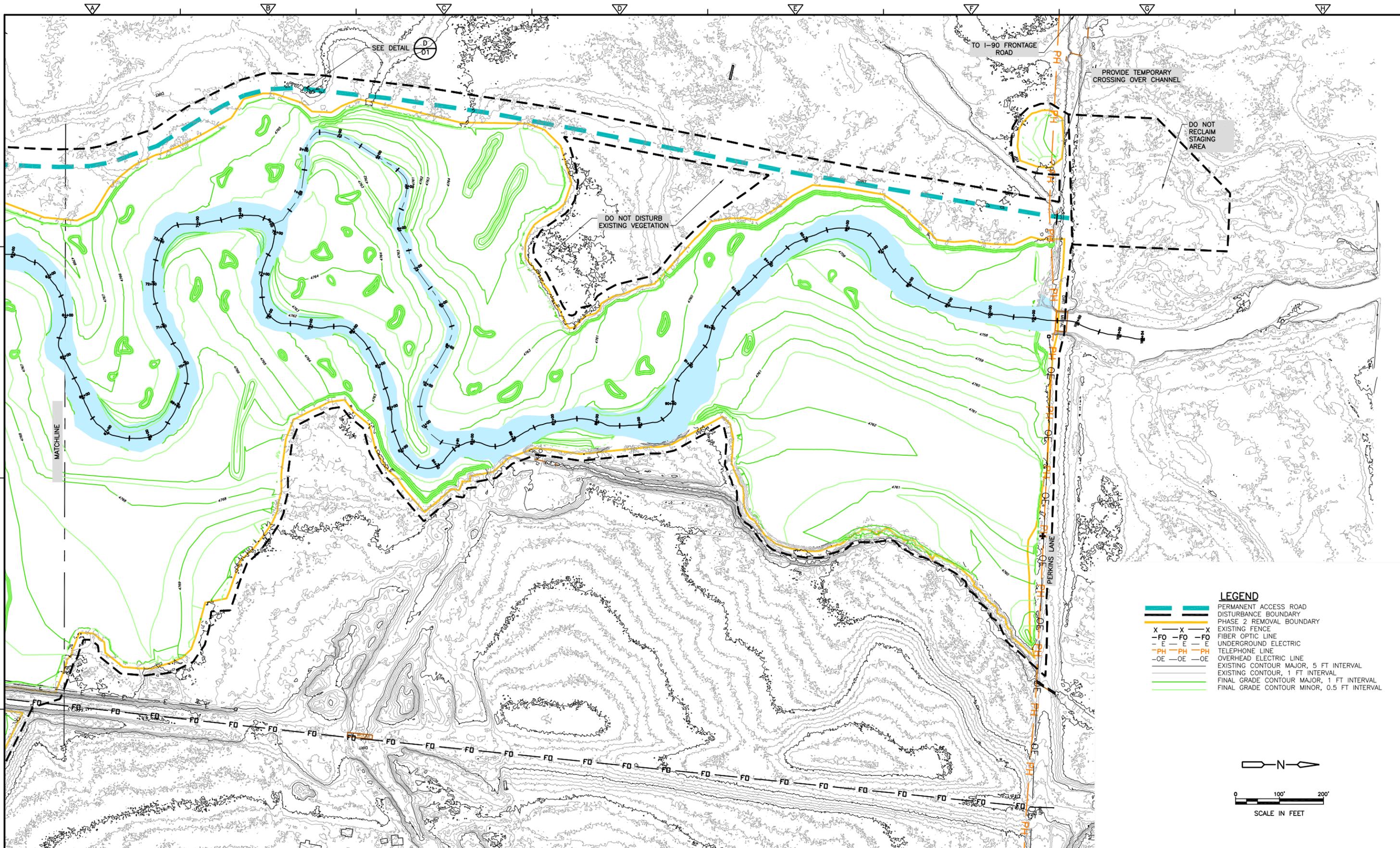
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DEPARTMENT OF ENVIRONMENTAL QUALITY
 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

HAUL ROAD RECLAMATION PLAN

PROJECT NO. 103068
 FILE NAME: CSTPL35.DWG
 SHEET NO. C35

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LEGEND

	PERMANENT ACCESS ROAD
	DISTURBANCE BOUNDARY
	PHASE 2 REMOVAL BOUNDARY
	EXISTING FENCE
	FIBER OPTIC LINE
	UNDERGROUND ELECTRIC
	TELEPHONE LINE
	OVERHEAD ELECTRIC LINE
	EXISTING CONTOUR MAJOR, 5 FT INTERVAL
	EXISTING CONTOUR, 1 FT INTERVAL
	FINAL GRADE CONTOUR MAJOR, 1 FT INTERVAL
	FINAL GRADE CONTOUR MINOR, 0.5 FT INTERVAL

REV. NO.	DATE	DRWN	CHKD	REMARKS

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 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

HAUL ROAD RECLAMATION PLAN

PROJECT NO. 103068
 FILE NAME: CSTPL36.DWG
 SHEET NO. C36



LEGEND

- B2.12 BOUNDARY
- EXISTING PRIVATE HAUL ROAD MAGNESIUM CHLORIDE APPLICATION AND MAINTENANCE
- EXISTING PUBLIC ROAD NO UPGRADES OR IMPROVEMENTS ANTICIPATED
- 1 FT MINOR CONTOUR EXISTING
- 5 FT MAJOR CONTOUR EXISTING

NOTES:

1. CONTRACTOR SHALL COORDINATE WITH AR AND OTHER CONTRACTORS REGARDING SIMULTANEOUS OPERATIONS WITH AR WASTE MANAGEMENT AREA.
2. CONTRACTOR SHALL PLACE TAILINGS/IMPACTED SOILS MATERIAL IN AREA B IN ACCORDANCE WITH BID ITEM 19, EXCAVATE HAUL AND PLACE TAILING IMPACTED SOILS.

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REV. NO.	DATE	DRWN	CHKD	REMARKS

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 DATE: **MARCH 2015**

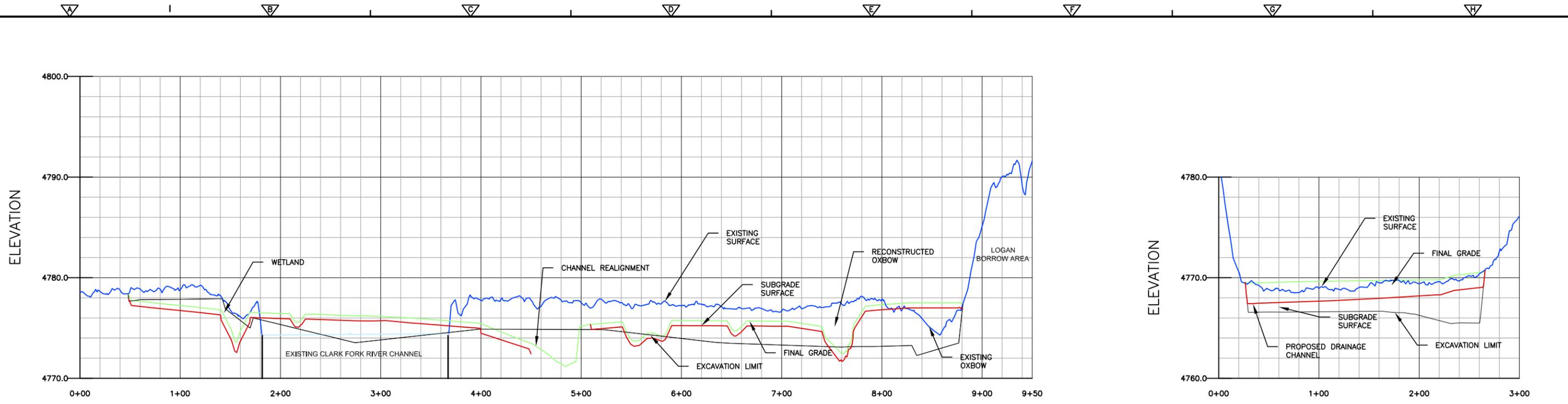
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 Helena, MT 59601
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WASTE MANAGEMENT AREA PLAN

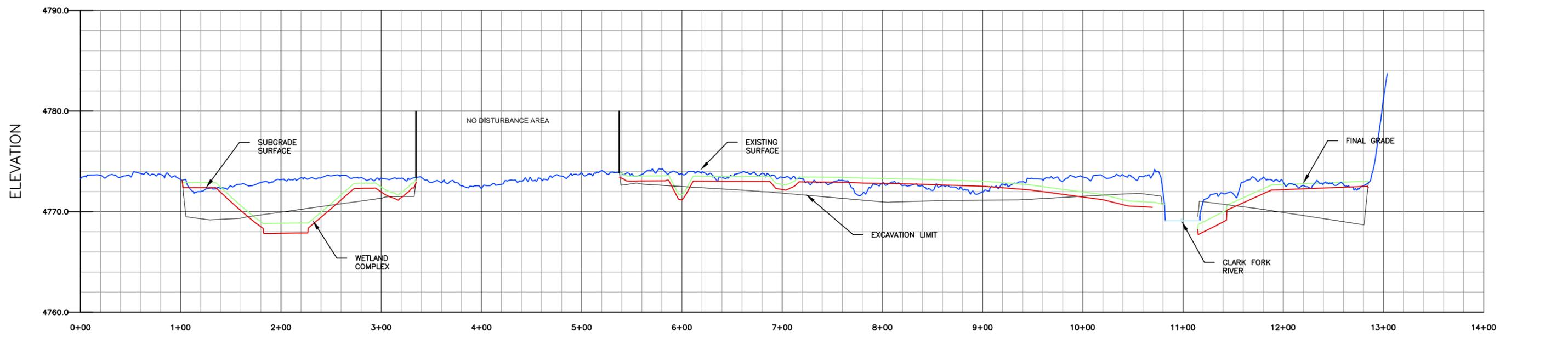
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 SHEET NO. **C37**

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SECTION 1
 1" = 100' H
 1" = 10' V
 C12,14

SECTION 3
 1" = 100' H
 1" = 10' V
 C12,14



SECTION 2
 1" = 100' H
 1" = 10' V
 C12,14

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: KM
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 APPROVED BY: WHB
 DATE: MARCH 2015

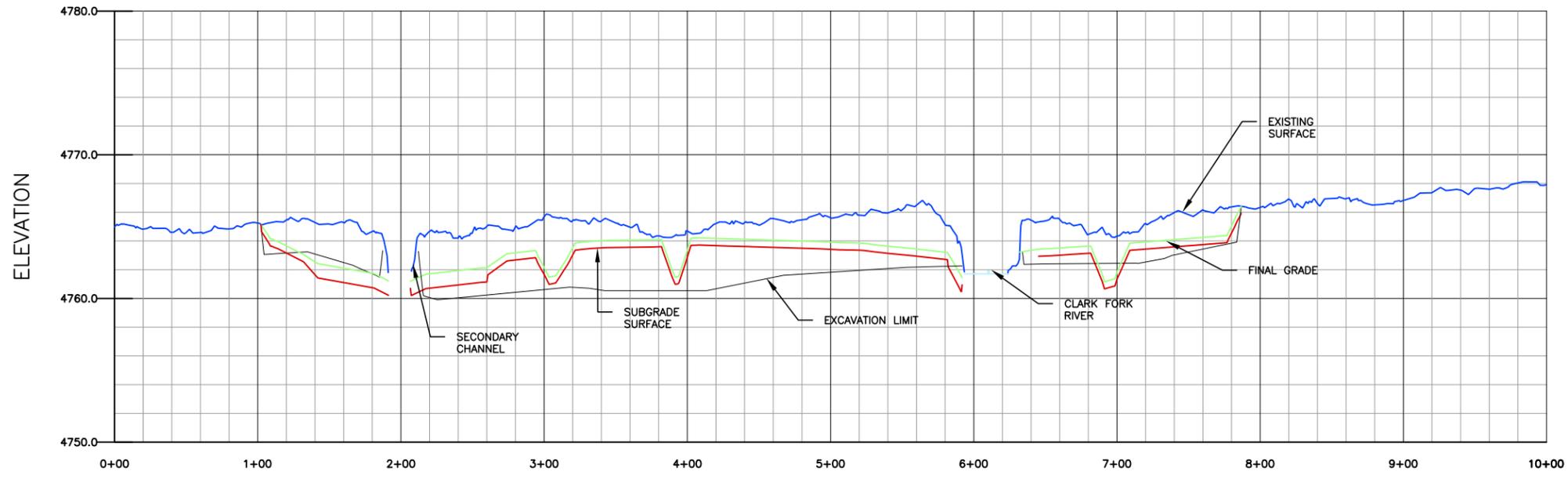
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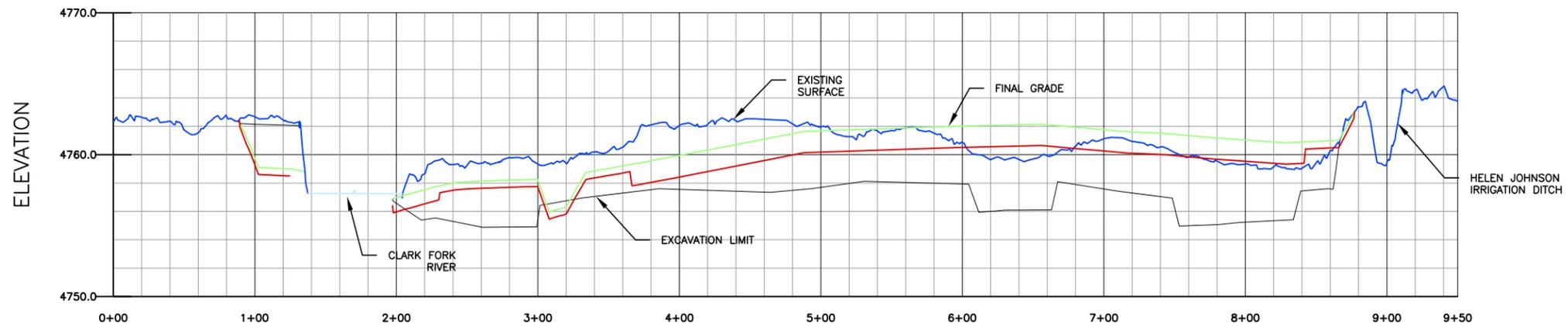
FLOODPLAIN
 CROSS SECTIONS

PROJECT NO. 103068
 FILE NAME: CSTPL-XS1-2
 SHEET NO. XS1

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SECTION 4
 1" = 100' H
 1" = 10' V
 C13,15



SECTION 5
 1" = 100' H
 1" = 10' V
 C13,15

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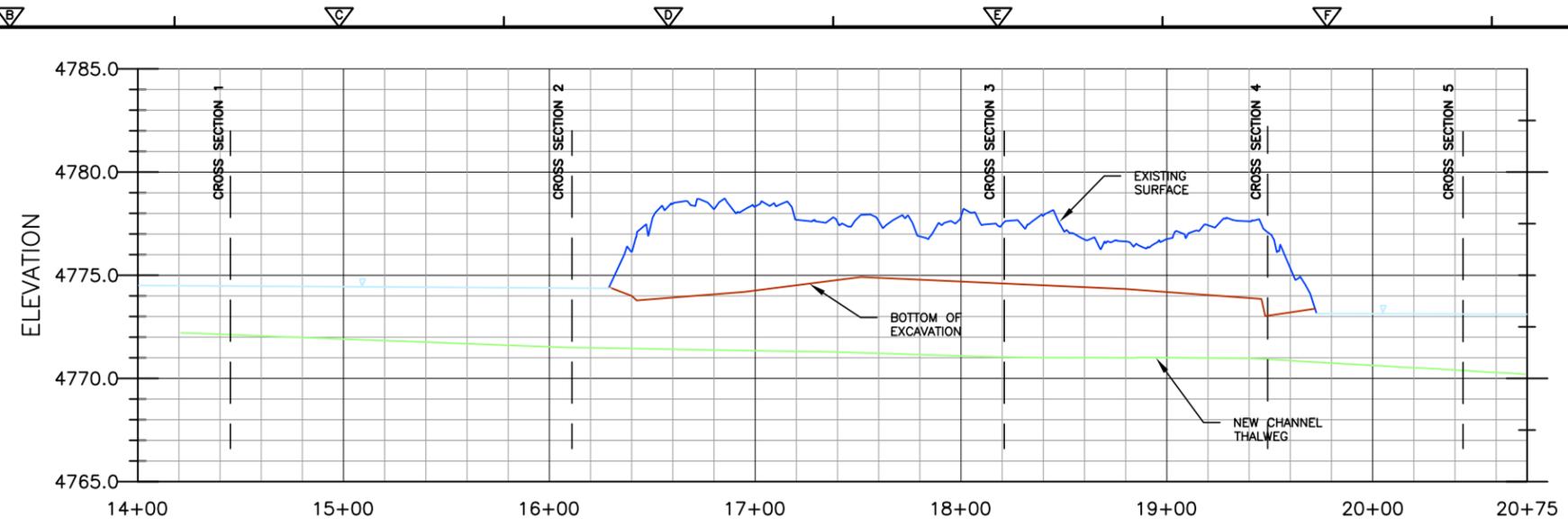
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FLOODPLAIN
 CROSS SECTIONS

PROJECT NO. 103068
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 SHEET NO. XS2

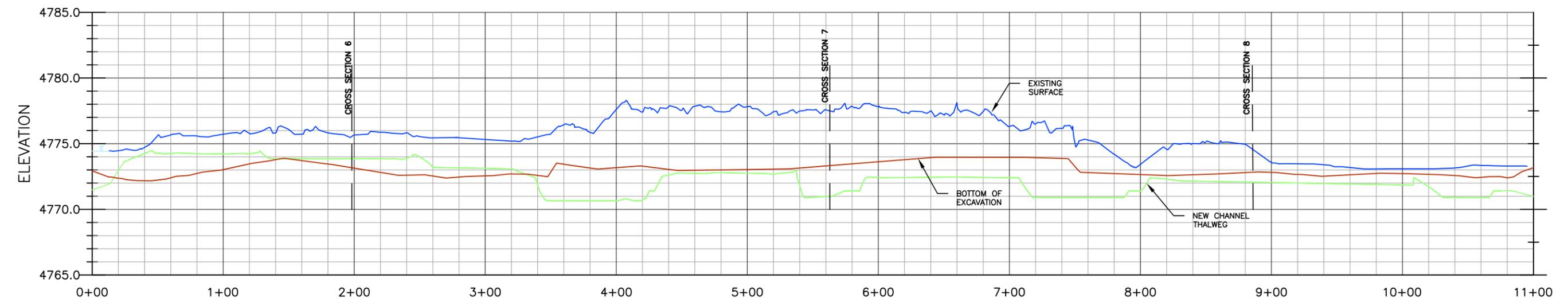
K:\CFR - PHASE 2\dwg rev dec2013\CSTPL-C20 Channel A and Oxbow Reconstr.dwg
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NOTE:
 1. WHERE EXISTING SURFACE IS NOT SHOWN, IT IS BELOW THE CURRENT WATER SURFACE.

MAIN CHANNEL THALWEG (STA 14+00 TO 20+75)

PROFILE 1
 SCALE:
 1" = 8' V
 1" = 80' H



OXBOW THALWEG
PROFILE 2
 SCALE:
 1" = 8' V
 1" = 80' H

REV. NO.	DATE	DRWN	CHKD	REMARKS

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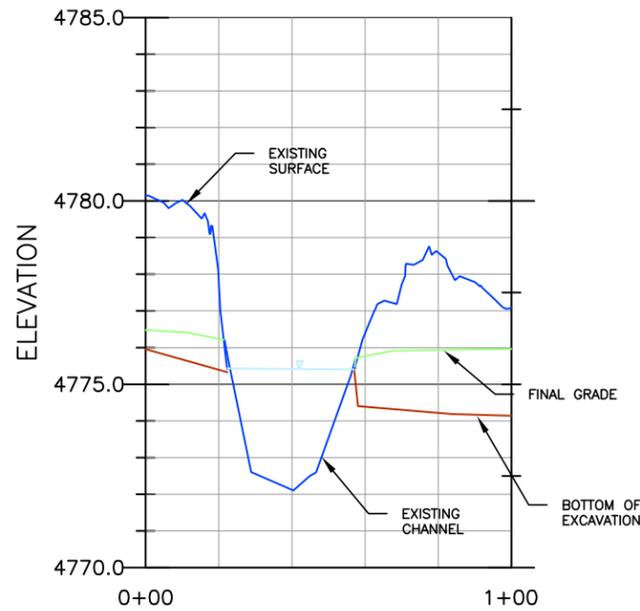
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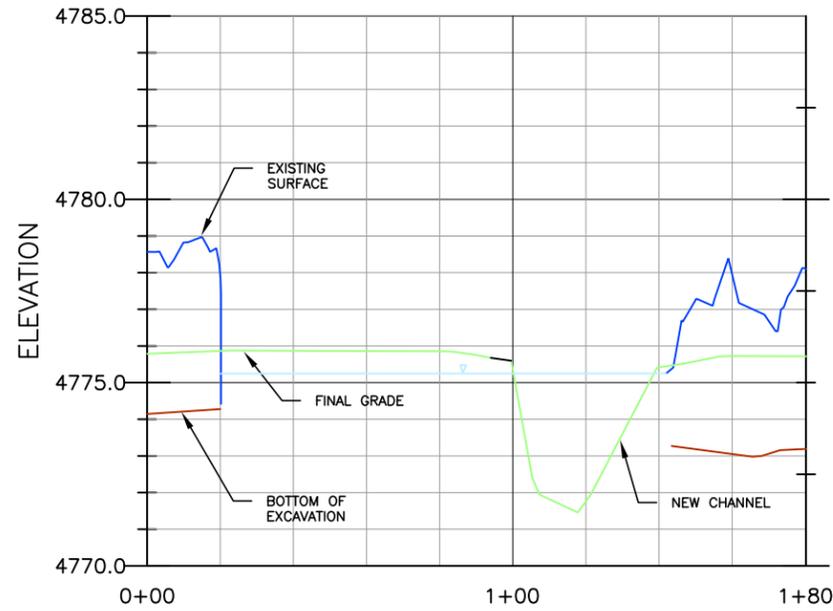
CHANNEL A AND OXBOW
 RECONSTRUCTION PROFILES

PROJECT NO. 103068
 FILE NAME: CSTPL-C20
 SHEET NO. XS3

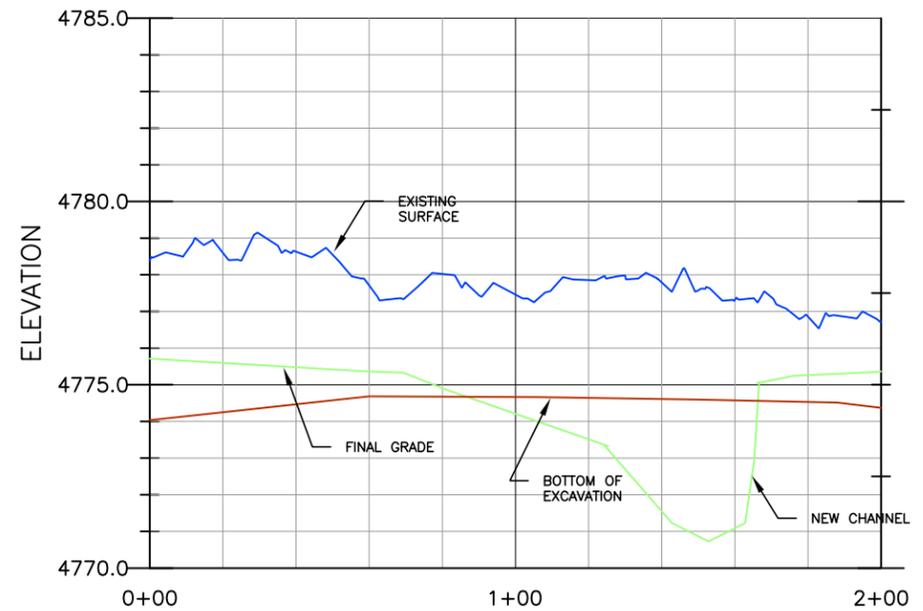
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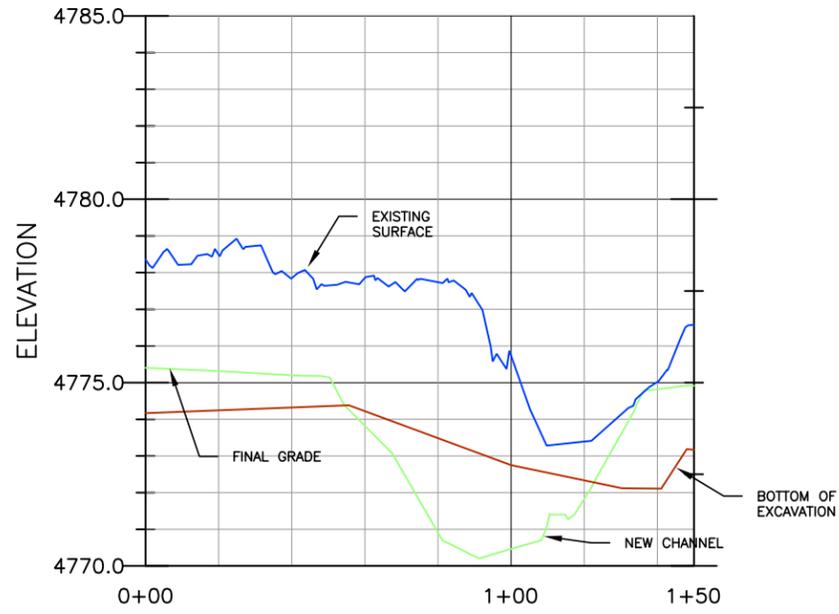
STATION 14+45
SECTION 1
1" = 50' H
1" = 5' V



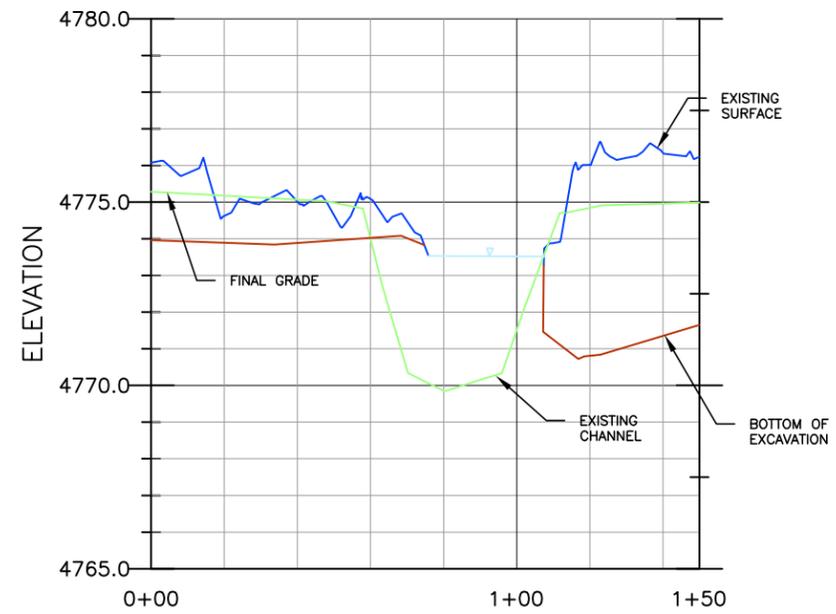
STATION 15+50
SECTION 2
1" = 50' H
1" = 5' V



STATION 18+20
SECTION 3
1" = 50' H
1" = 5' V



STATION 19+48
SECTION 4
1" = 50' H
1" = 5' V



STATION 20+45
SECTION 5
1" = 50' H
1" = 5' V

REV. NO.	DATE	DRWN	CHKD	REMARKS

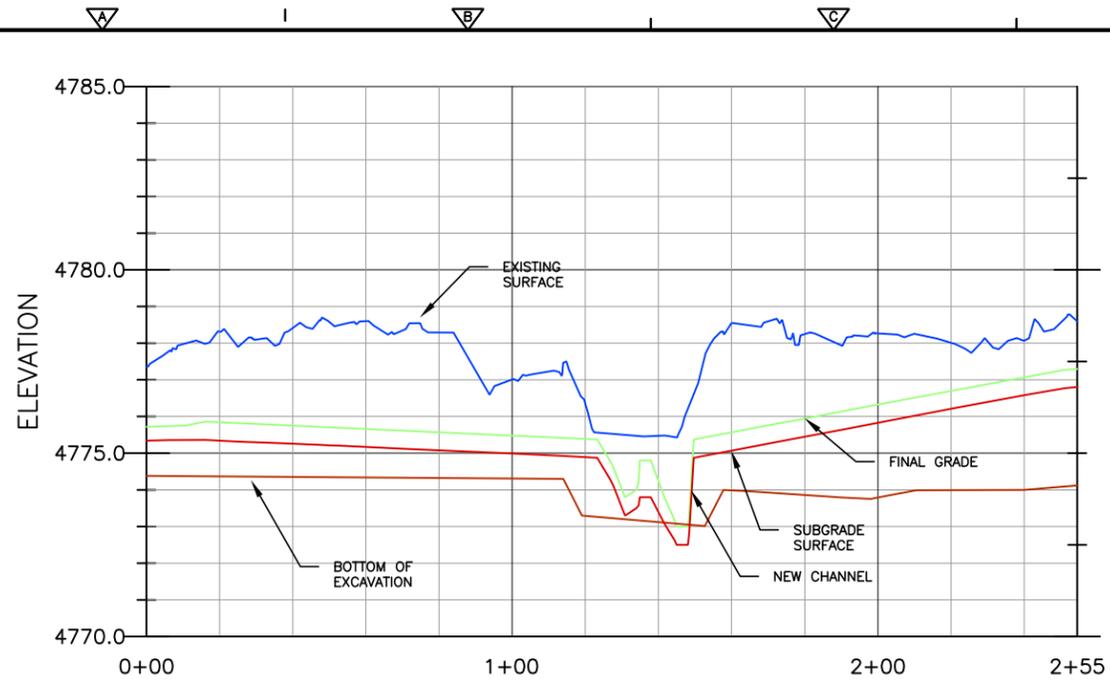
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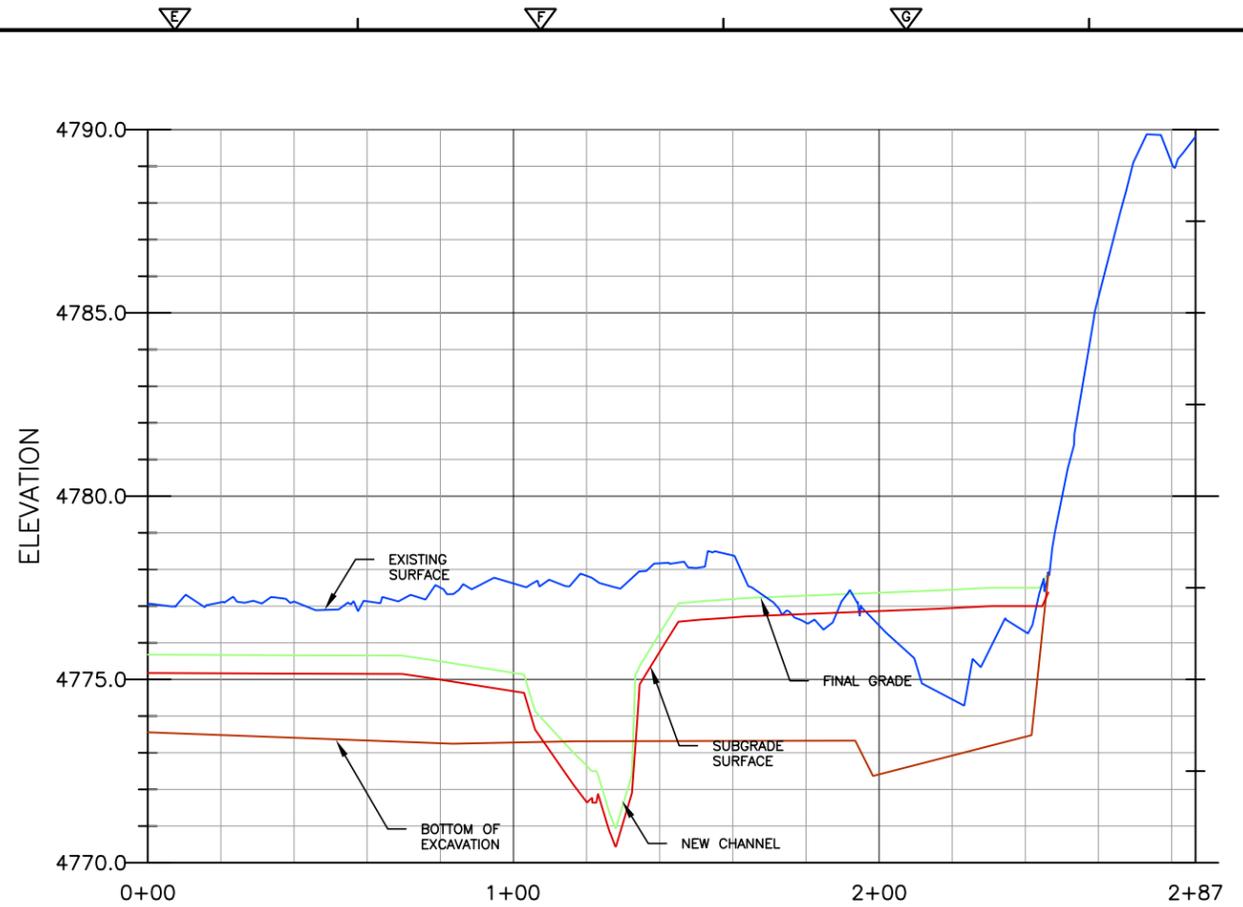
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 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

CHANNEL A RECONSTRUCTION
 CROSS SECTIONS

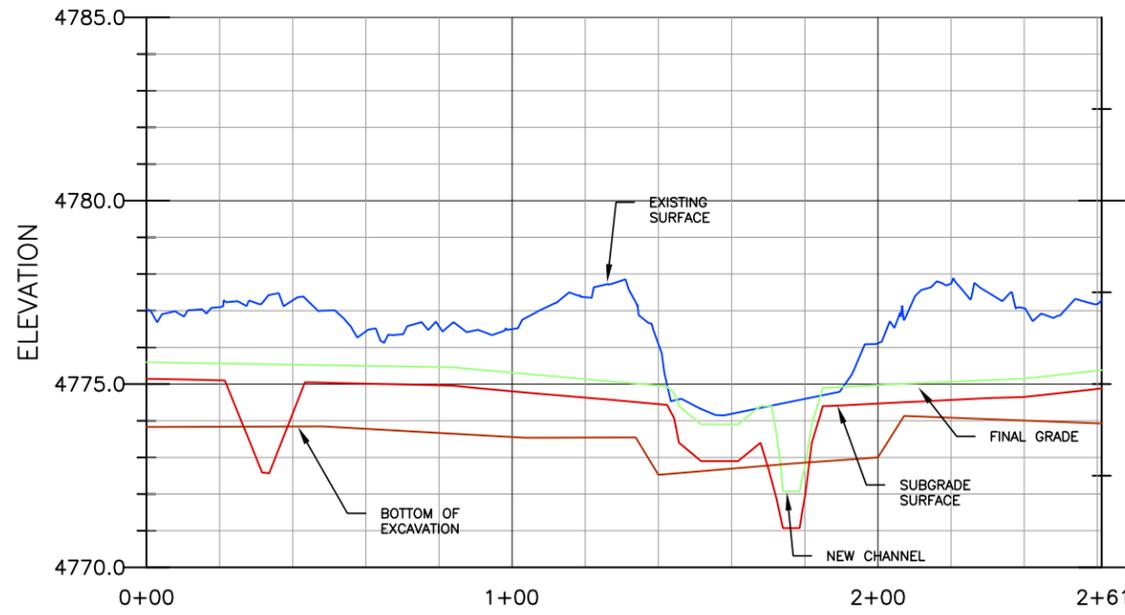
PROJECT NO. 103068
 FILE NAME: CSTPL-C20
 SHEET NO. XS4



STATION 1+97
SECTION 6
 1" = 50' H
 1" = 5' V
 C20



STATION 5+63
SECTION 7
 1" = 50' H
 1" = 5' V
 C20



STATION 8+86
SECTION 8
 1" = 50' H
 1" = 5' V
 C20

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REV. NO.	DATE	DRWN	CHKD	REMARKS

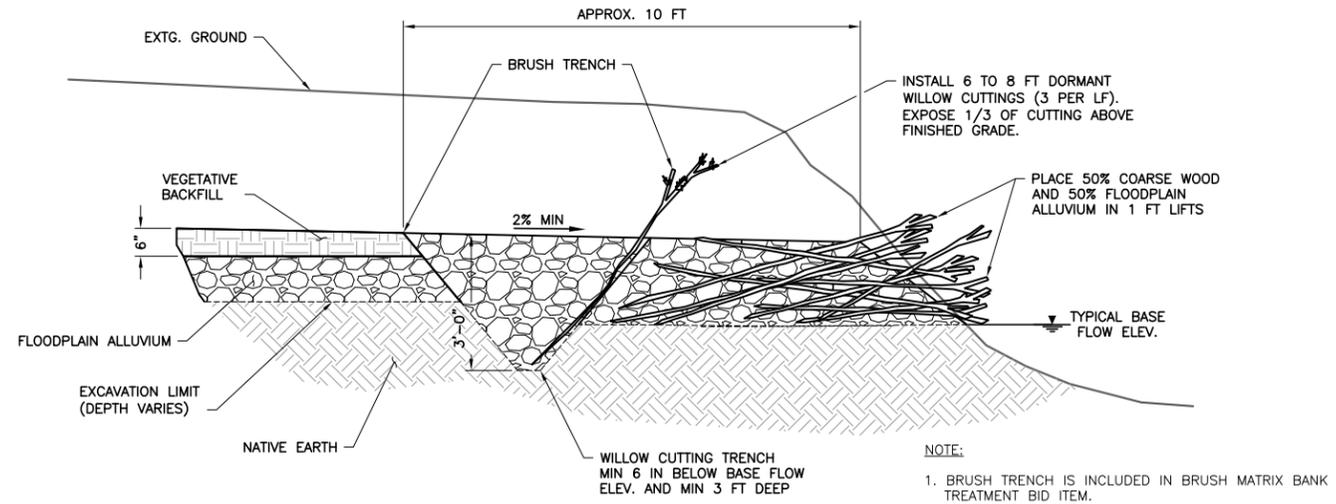
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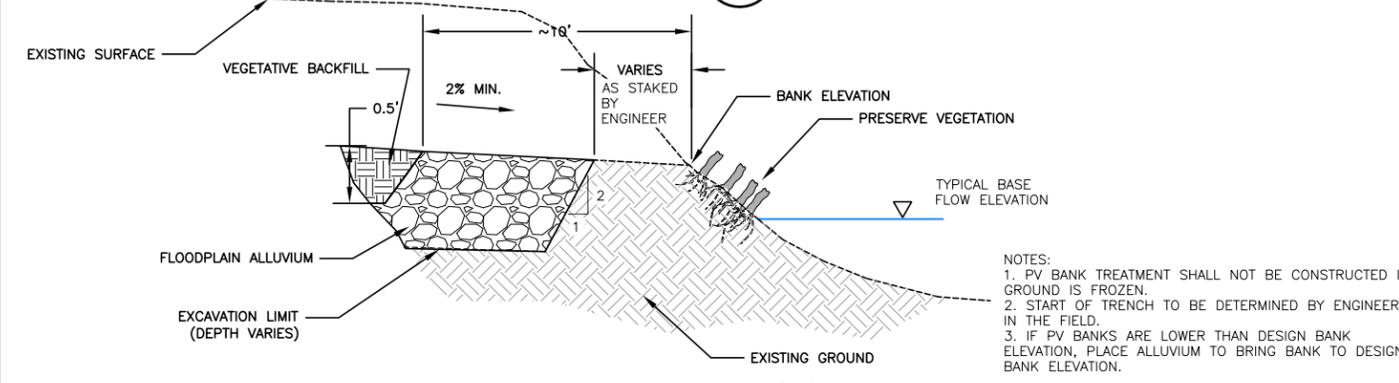
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OXBOW RECONSTRUCTION
 CROSS SECTIONS

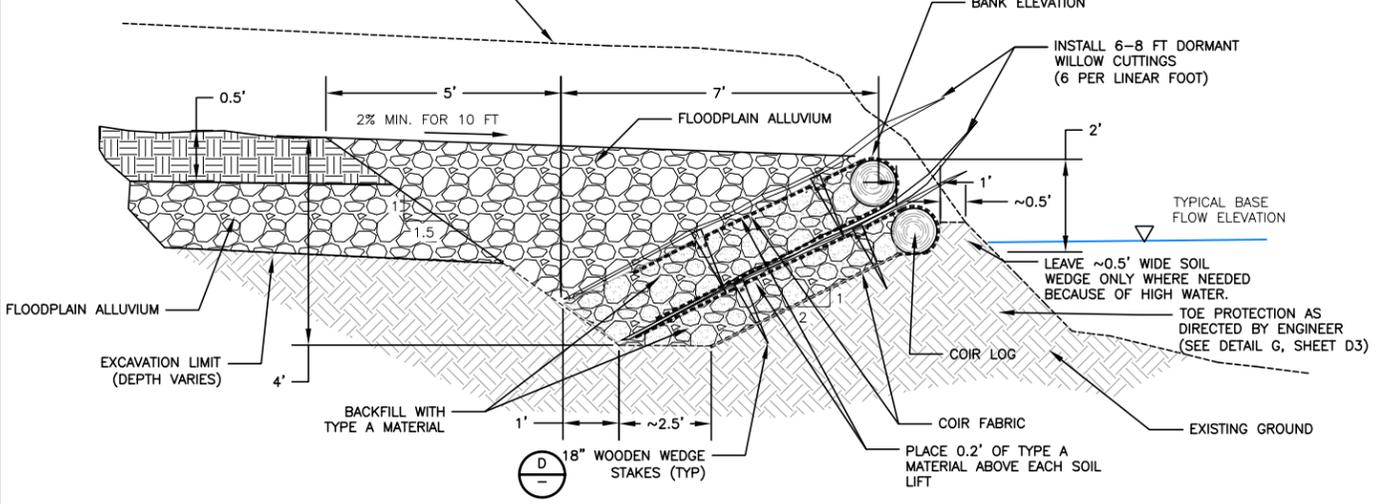
PROJECT NO. 103068
 FILE NAME: CSTPL-C20
 SHEET NO. XS5



BRUSH MATRIX (BM)
DETAIL A
 NTS
 C18,19



PRESERVE VEGETATION (PV)
DETAIL B
 NTS
 C18,19



DOUBLE VEGETATED SOIL LIFT (DVSL)
DETAIL C
 NTS
 C18,19

GENERAL NOTES:

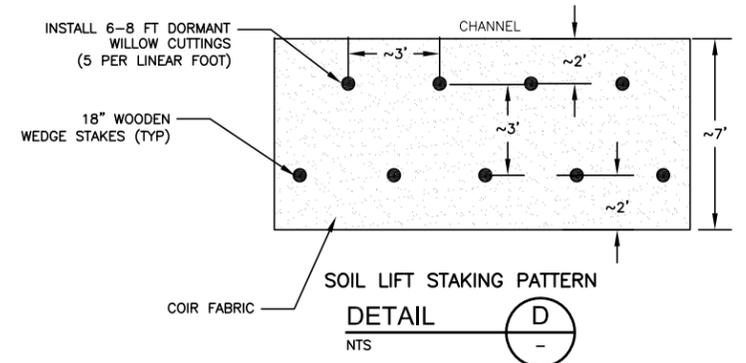
- IF STREAMBANK CONSTRUCTION WILL OCCUR AFTER FLOODPLAIN EXCAVATION IS COMPLETE IN THE VICINITY OF THE STREAM BANKS, LEAVE ABOUT 4 FEET OF MATERIAL BETWEEN EXCAVATION AND EXISTING STREAMBANKS TO MAINTAIN STABILITY UNTIL STREAMBANK CONSTRUCTION OCCURS.
- BANK EXCAVATION SLOPE VARIES DEPENDING ON THE EXISTING MATERIAL'S ANGLE OF REPOSE.
- THE FLOODPLAIN SHALL BE BACKFILLED AND SLOPED 2 PERCENT TOWARDS THE BANKS. IF HIGH WATER PREVENTS REDUCTION OF THE BANK HEIGHT, THIS WORK WILL NEED TO BE PERFORMED AFTER WATER RECEDES.
- MICROTOPOGRAPHY AND WOODY MATERIAL EXTENDS TO STREAMBANK SEE SHEET D10 FOR DETAILS.

NOTES ON COIR FABRIC INSTALLATION

- UNROLL COIR FABRIC PARALLEL TO THE CHANNEL.
- OVERLAPS SHALL BE MADE SO THAT THE UPSTREAM FABRIC LIES OVER DOWNSTREAM FABRIC. ALL OVERLAPS IN COIR FABRIC SHALL BE STAKED WITH A MINIMUM OF 2 STAKES. OVERLAPS SHALL BE A MINIMUM OF 3 FT.
- WHERE VEGETATED SOILS LIFTS END, CONTRACTOR SHALL SECURE THE COIR FABRIC ENDS TIGHTLY BY FOLDING THE COIR FABRIC WITH THE TOP EDGE OF FOLDS GOING WITH THE DIRECTION OF STREAM FLOW.

DOUBLE VEGETATED SOIL LIFT INSTALLATION (DVSL) NOTES:

- EXCAVATE TO LIMITS OF BANK CONSTRUCTION. THIS EXCAVATED MATERIAL IS CONSIDERED CONTAMINATED AND SHALL BE HAULED TO THE REPOSITORY AS DESCRIBED IN BID ITEM NO. 19 - EXCAVATE, HAUL AND PLACE TAILINGS/IMPACTED SOILS.
- AFTER EXCAVATION TO LIMITS OF BANK CONSTRUCTION IS COMPLETED, THE ENGINEER SHALL DETERMINE IF ADEQUATE TOE MATERIAL IS PRESENT. IF NO ADEQUATE BANK TOE IS LOCATED AT BASE OF EXCAVATION, EXCAVATION SHALL CONTINUE UNTIL GRAVEL AND COBBLES ARE ENCOUNTERED. IF NO GRAVELS AND COBBLES ARE ENCOUNTERED BEFORE THE SCOUR DEPTH IS REACHED, EXCAVATION SHALL CEASE AT THE SCOUR DEPTH. SCOUR DEPTH SHALL BE DETERMINED BY ENGINEER. SEE BID ITEM NO. 36, CONSTRUCT BANK TOE FOR DISCUSSION OF BANK TOE REQUIREMENTS.
- CONSTRUCT BANK TOE BY PLACING BANK TOE ALLUVIUM AS SHOWN ON SHEET D3 DETAIL G. BUCKET COMPACT TO THE EXTENT POSSIBLE.
- IF EXCAVATION IS LOWER THAN BOTTOM OF SOIL LIFT, PLACE AND BUCKET COMPACT FLOODPLAIN ALLUVIUM BEHIND THE EXISTING BANK TO CREATE THE BASE FOR THE FIRST LIFT OF THE DVSL.
- LAY COIR OUTER FABRIC ON BASE FOR THE LOWER LIFT OF THE DVSL WITH APPROXIMATELY TWO-THIRDS EXTENDING BEYOND THE FRONT EDGE OF THE BASE. PLACE INNER FABRIC ON TOP OF OUTER COIR FABRIC.
- PLACE COIR LOGS AT POSITION SHOWN ON DRAWINGS AND BACKFILL BEHIND COIR LOGS WITH FLOODPLAIN ALLUVIUM APPROXIMATELY 1 FOOT THICK. COMPACT BACKFILL WITH BUCKET. VERIFY THAT COIR LOG IS PLACED WITH ITS TOP AT THE CORRECT ELEVATION AS DETERMINED FROM FINAL GRADING SURFACE.
- WRAP INNER FABRIC AND OUTER COIR FABRIC OVER TOP OF COIR LOGS. PULL FABRICS TIGHT WITH MINIMUM WRINKLES AND STAKE IN PLACE USING STAKING PATTERN SHOWN ON DETAIL D.
- PLACE 6 TO 8 FOOT LONG DORMANT WILLOW CUTTINGS ON LOWER SOIL LIFT AS SHOWN ON DETAIL C. PLACE WILLOW CUTTINGS AT A DENSITY OF 3 STEMS PER LINEAR FOOT. WILLOW CUTTINGS STEMS MAY OVERLAP. THE CUT ENDS SHALL BE PLACED AT THE BASE OF THE SLOPE WITH THE UN-CUT ENDS EXTENDING BEYOND THE EDGE OF COIR LOG SO THAT APPROXIMATELY ONE-THIRD OF THE TOTAL CUTTING LENGTH IS EXPOSED. PLACE 0.2' OF TYPE A MATERIAL OVER WILLOWS.
- LAY COIR OUTER FABRIC ON COMPLETED FIRST LIFT OF THE DVSL WITH APPROXIMATELY TWO-THIRDS EXTENDING BEYOND THE FRONT EDGE OF THE FIRST LIFT. PLACE INNER FABRIC ON TOP OF OUTER COIR FABRIC.
- PLACE COIR LOGS AT POSITION SHOWN ON THE DRAWINGS AND BACKFILL BEHIND COIR LOGS WITH TYPE A MATERIAL. BID ITEM NO. 27, PRODUCE HAUL, AND PLACE TYPE A BACKFILL. COMPACT BACKFILL WITH BUCKET.
- WRAP INNER AND OUTER COIR FABRIC OVER TOP OF COIR LOGS AND FILL. PULL FABRIC TIGHT WITH MINIMUM WRINKLES AND STAKE IN PLACE AS SHOWN USING STAKING PATTERN SHOWN ON DETAIL D.
- PLACE 6 TO 8 FOOT LONG DORMANT WILLOW CUTTING ON UPPER SOIL LIFT AND ON BACK SLOPE OF EXCAVATION AS SHOWN ON DETAIL C. PLACE WILLOW CUTTINGS AT A DENSITY OF 3 STEMS PER LINEAR FOOT ON TOP OF UPPER SOIL LIFT AND AT A DENSITY OF 3 STEMS PER LINEAR FOOT ON THE BACK SLOPE. WILLOW CUTTINGS STEMS MAY OVERLAP. THE CUT ENDS SHALL BE PLACED AT THE BASE OF THE SLOPE WITH THE UN-CUT ENDS EXTENDING BEYOND THE EDGE OF COIR LOG OR TRENCH SO THAT APPROXIMATELY ONE-THIRD OF THE TOTAL CUTTING LENGTH IS EXPOSED.
- PLACE AND BUCKET COMPACT FLOODPLAIN ALLUVIUM OVER DVSL AS SHOWN ON DETAIL C. FINAL GRADE SHALL SLOPE TOWARDS THE TOP OF THE DVSL WITH APPROXIMATELY 2 PERCENT SLOPE. NO LOW AREAS SHALL BE LEFT BEHIND THE CONSTRUCTED BANK.



SOIL LIFT STAKING PATTERN
DETAIL D
 NTS

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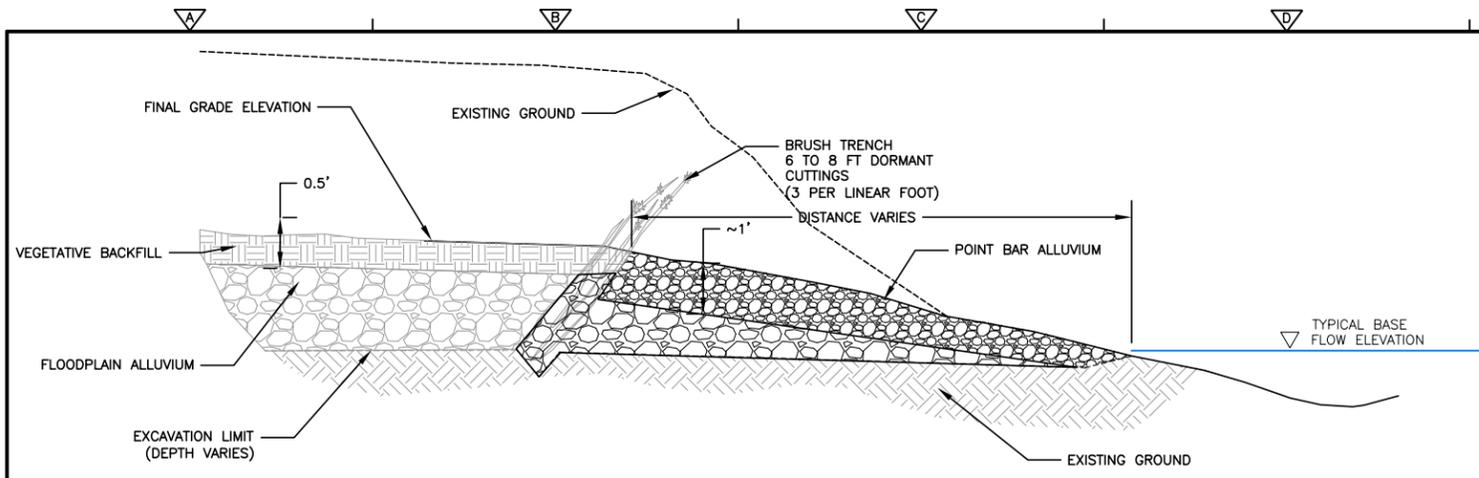
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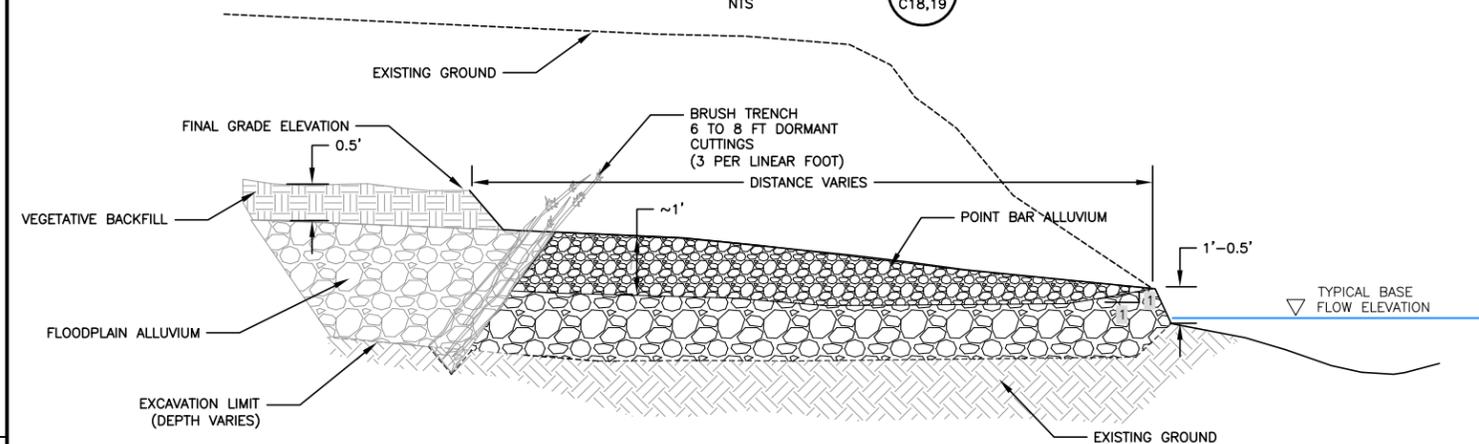
STREAMBANK TREATMENT DETAILS
 SHEET NO. D2

PROJECT NO. 103068
FILE NAME: CSDT002-3
SHEET NO. D2



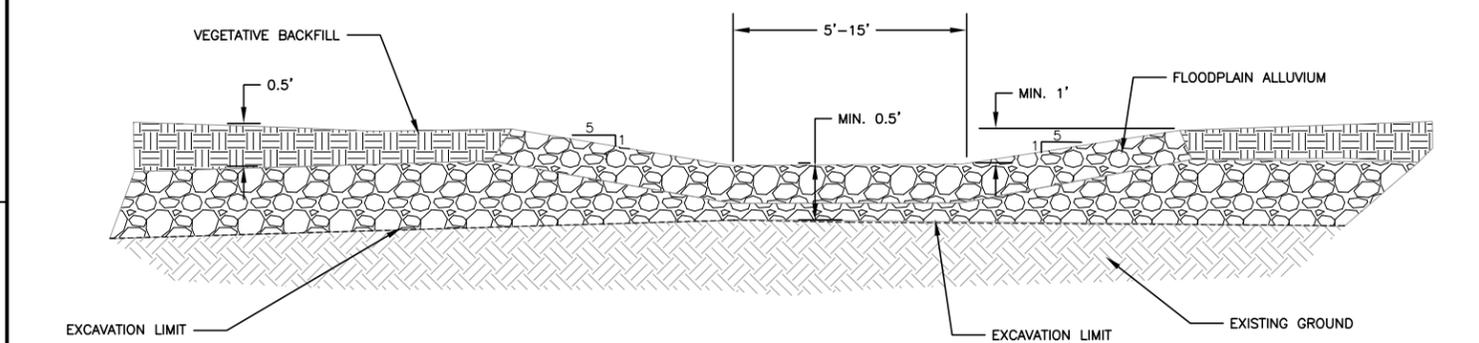
POINT BAR REGRADING WITH BRUSH TRENCH

DETAIL **D**
NTS C18,19



LATERAL BAR WITH BRUSH TRENCH

DETAIL **E**
NTS C18,19

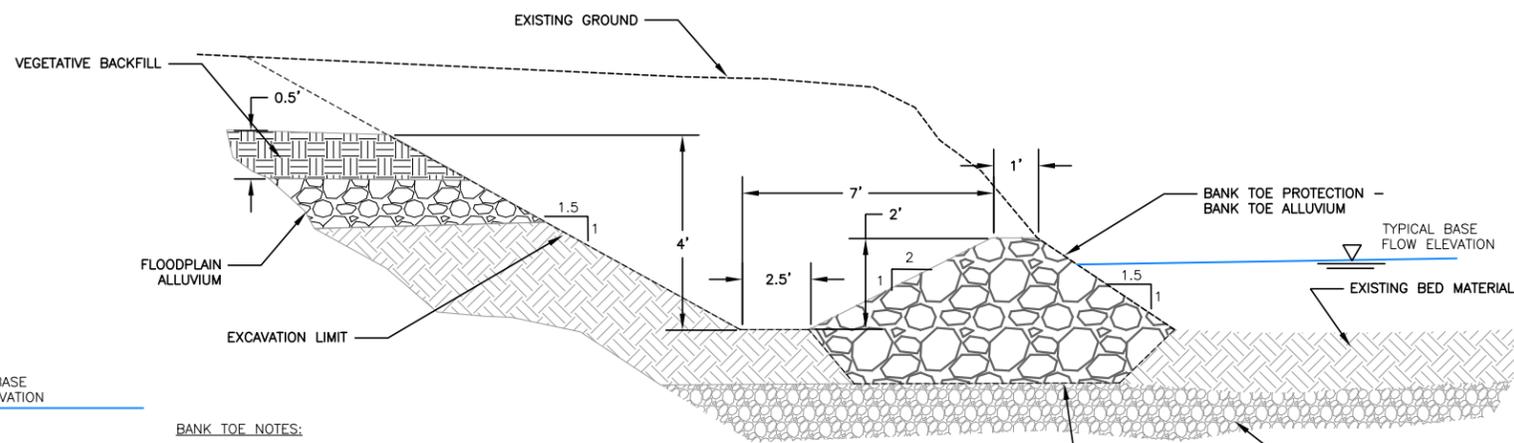


TRIBUTARY CHANNEL DETAIL

DETAIL **F**
NTS C12

BRUSH TRENCH

- BRUSH TRENCHES ARE INSTALLED BEHIND POINT BARS, LATERAL BARS, PRESERVE VEGETATION BANKS, BRUSH MATRIX BANKS OR DOUBLE VEGETATED SOIL LIFTS AS SHOWN ON DRAWINGS. NOT ALL LOCATIONS REQUIRE BRUSH TRENCHES.
- EXCAVATE FOR BRUSH TRENCH AT THE SAME TIME GROUND BETWEEN BRUSH TRENCH AND STREAM IS EXCAVATED AND BACKFILLED.
- COMPLETE BACKFILL IF THIS AREA WILL BECOME INACCESSIBLE AFTER CONSTRUCTION OF BRUSH TRENCH.
- PLACE 6 TO 8 FEET LONG DORMANT WILLOW CUTTINGS ON THE STREAM SIDE SLOPE OF BRUSH TRENCH EXCAVATION AS SHOWN ON DETAIL A, DRAWING D2. PLACE WILLOW CUTTINGS AT A DENSITY OF 3 STEMS PER LINEAR FOOT. WILLOW CUTTING STEMS MAY OVERLAP. THE CUT ENDS SHALL BE PLACED AT THE BASE OF THE SLOPES WITH THE UN-CUT ENDS EXTENDING BEYOND THE EDGE OF THE TRENCH SO THAT APPROXIMATELY ONE-THIRD OF THE TOTAL CUTTINGS LENGTH IS EXPOSED.

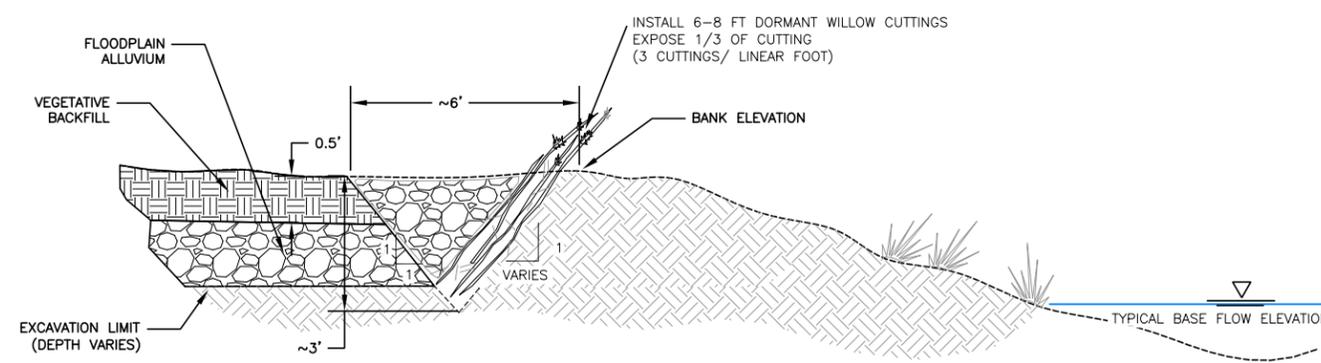


BANK TOE NOTES:

- ELEVATION OF BASE OF BANK TOE PROTECTION IS THE ELEVATION OF EXISTING ALLUVIUM OR SCOUR DEPTH, WHICH EVER IS HIGHER. ELEVATION OF TOP OF BANK TOE PROTECTION IS 2 FT. BELOW TOP OF FINAL BANK. SCOUR DEPTH TO BE DETERMINED BY ENGINEER WHERE REQUIRED.
- TYPICAL SCOUR DEPTH ON BENDS IS 7 FT BELOW FINISH BANK ELEVATION.
- UPPER BANK IS DVSL BANK TREATMENT.
- INSTALL COFFER DAM AS NECESSARY.

BANK TOE PROTECTION

DETAIL **G**
NTS C18,19



BRUSH TRENCH BANK TREATMENT (BT)

DETAIL **H**
NTS C18,19

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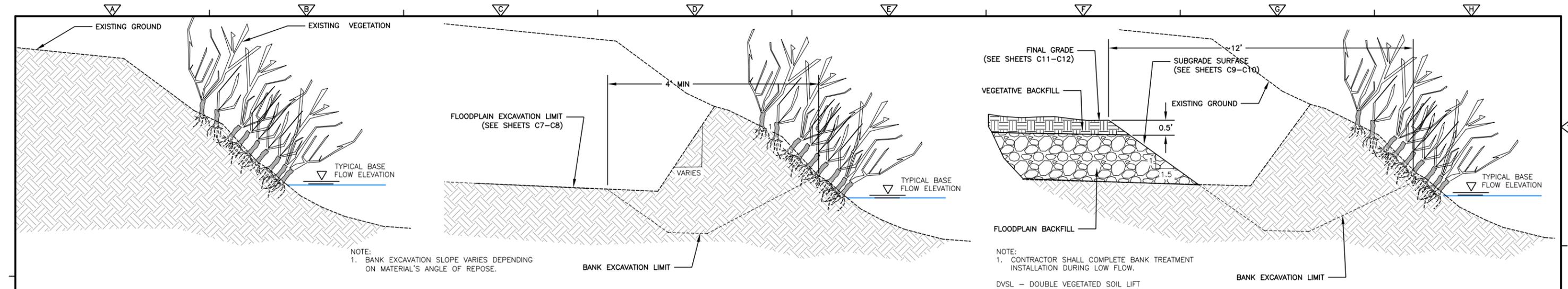
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CROSS CHK'D BY: WHB	
APPROVED BY: WHB	
DATE: MARCH 2015	

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CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

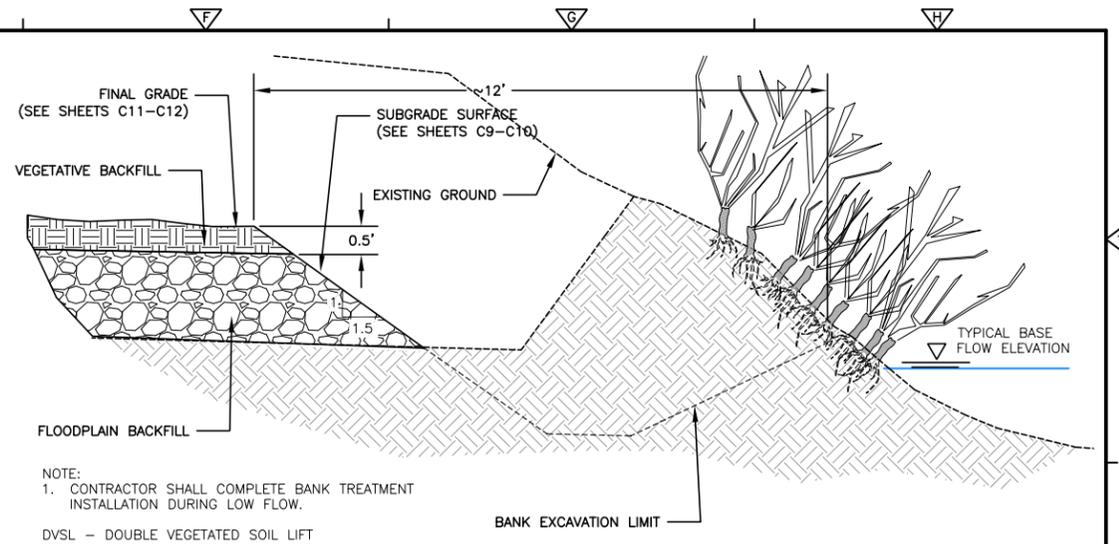
STREAMBANK TREATMENTS, BANK TOE AND TRIBUTARY CHANNEL DETAILS

PROJECT NO. 103068
FILE NAME: CSDT002-3
SHEET NO. D3

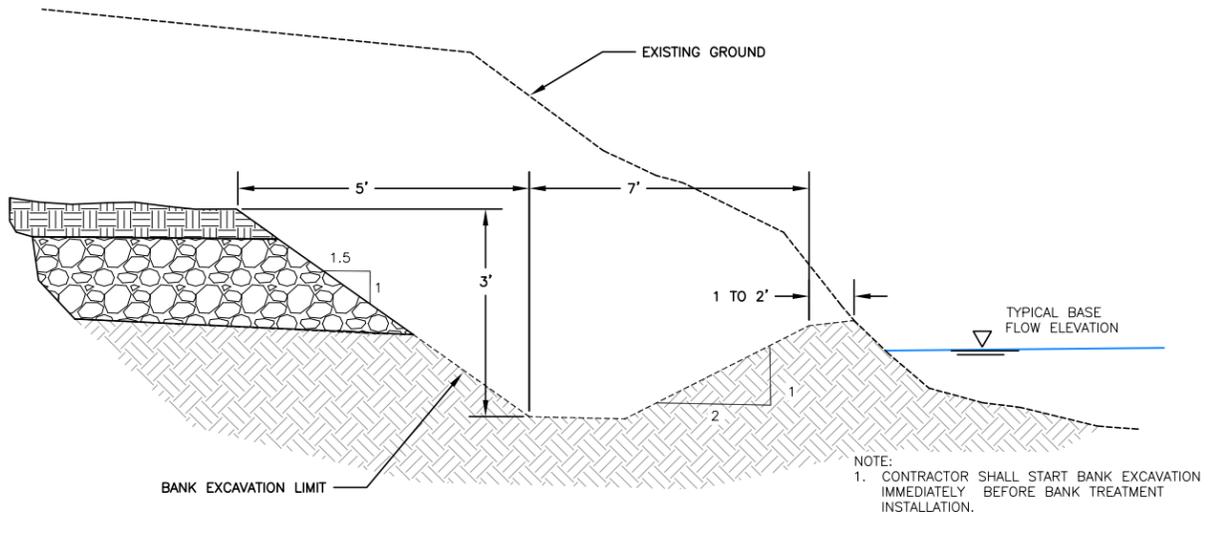


STEP 1: DVSL BANK TREATMENT – EXISTING CONDITIONS

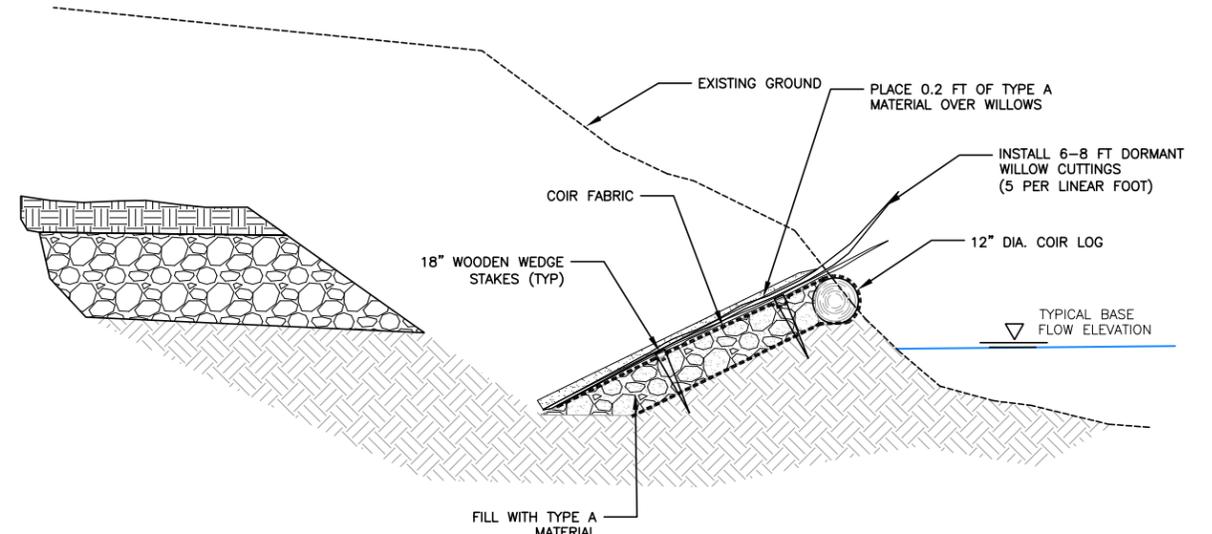
STEP 2 : DVSL BANK TREATMENT – FLOODPLAIN EXCAVATION



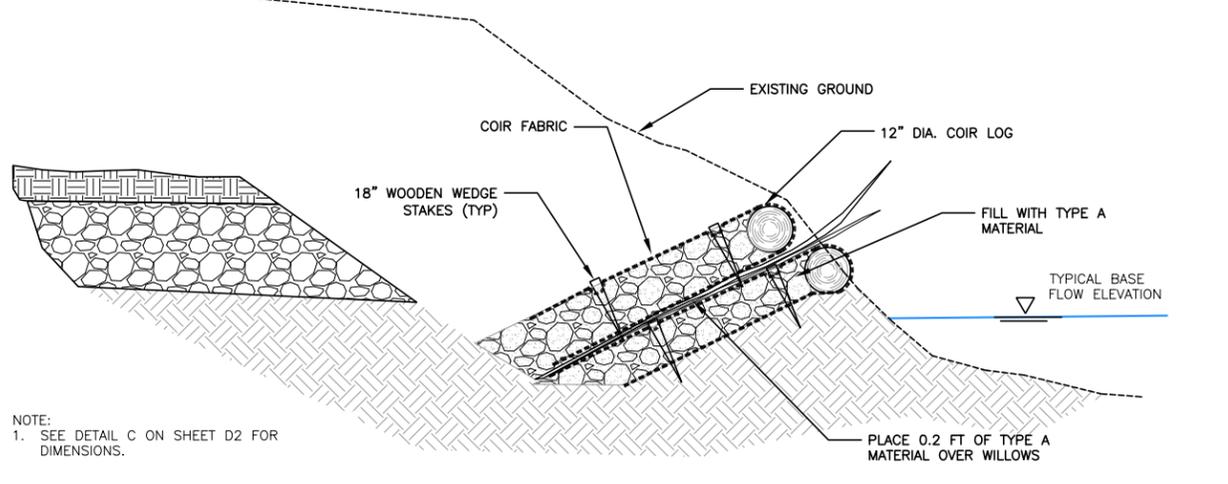
STEP 3: DVSL BANK TREATMENT – FLOODPLAIN BACKFILL



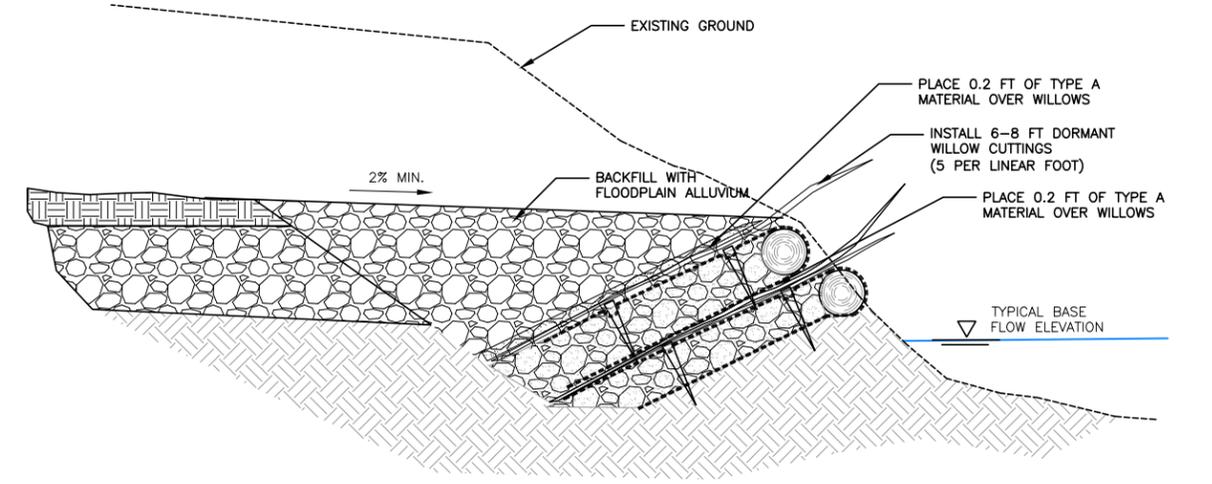
STEP 4: DVSL BANK TREATMENT – BANK EXCAVATION



STEP 5: DVSL BANK TREATMENT – LOWER COIR LIFT INSTALLATION



STEP 6: DVSL BANK TREATMENT – UPPER COIR LIFT INSTALLATION



STEP 7: DVSL BANK TREATMENT – CUTTING INSTALLATION AND BANK BACKFILL

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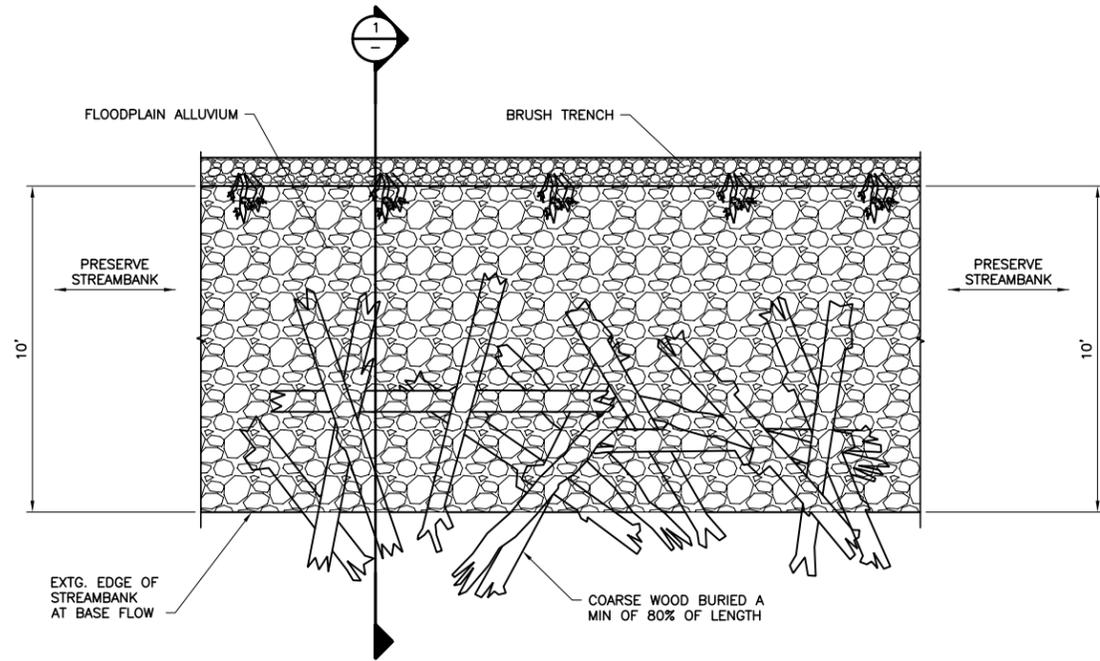
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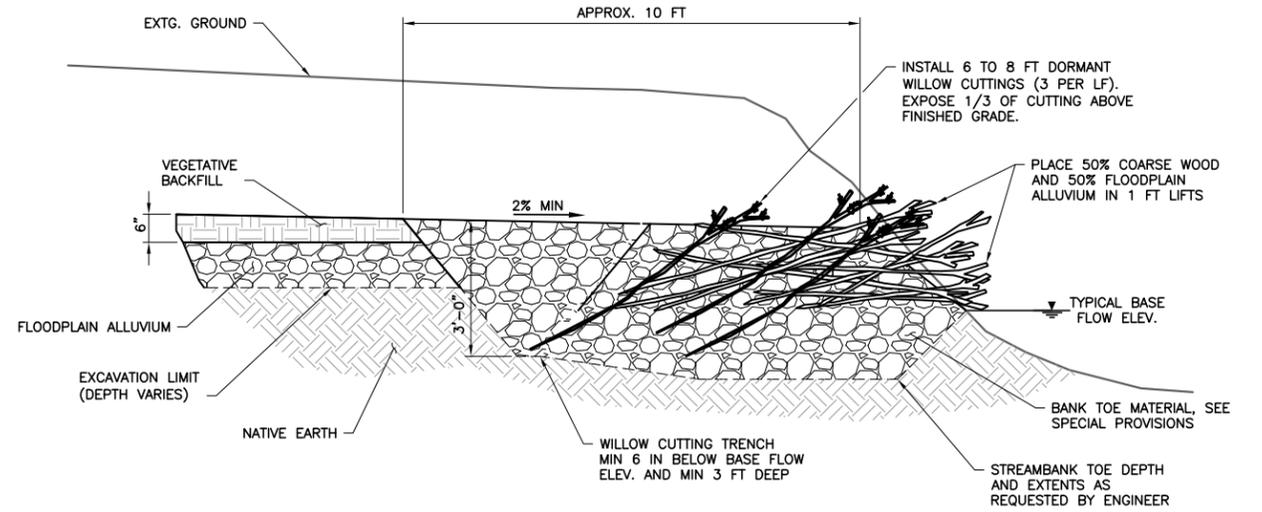
TYPICAL DOUBLE VEGETATED SOIL LIFT
 BANK TREATMENT
 CONSTRUCTION SEQUENCE

PROJECT NO. 103068
 FILE NAME: CSDT004
 SHEET NO. **D4**



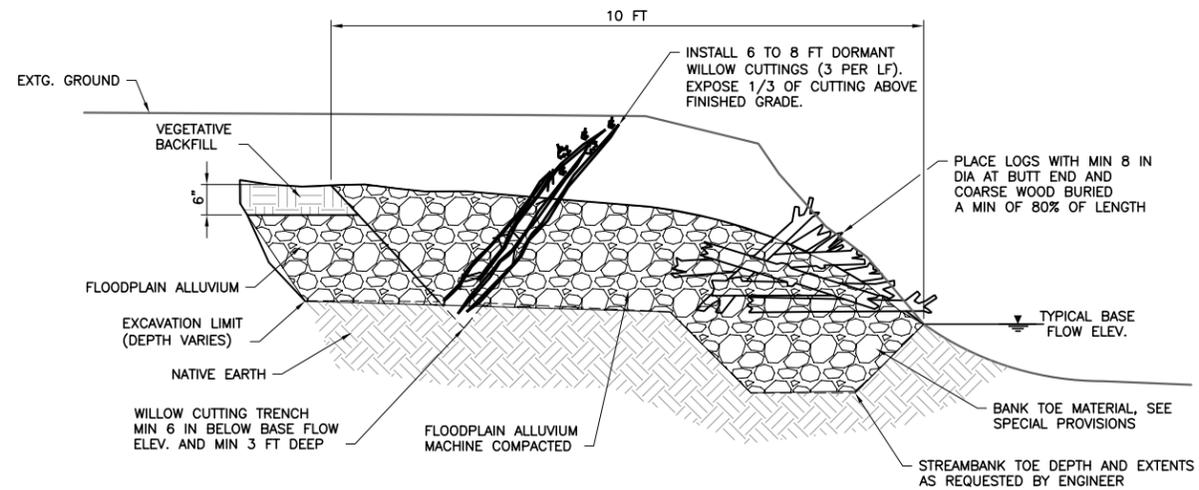
BIFURCATION STREAMBANK TREATMENT PLAN VIEW (BIF)

DETAIL C
NTS C19



GAP STREAMBANK TREATMENT CROSS SECTION

DETAIL B
NTS C18,19



BIFURCATION STREAMBANK TREATMENT CROSS SECTION (BIF)

SECTION 1
NTS C19

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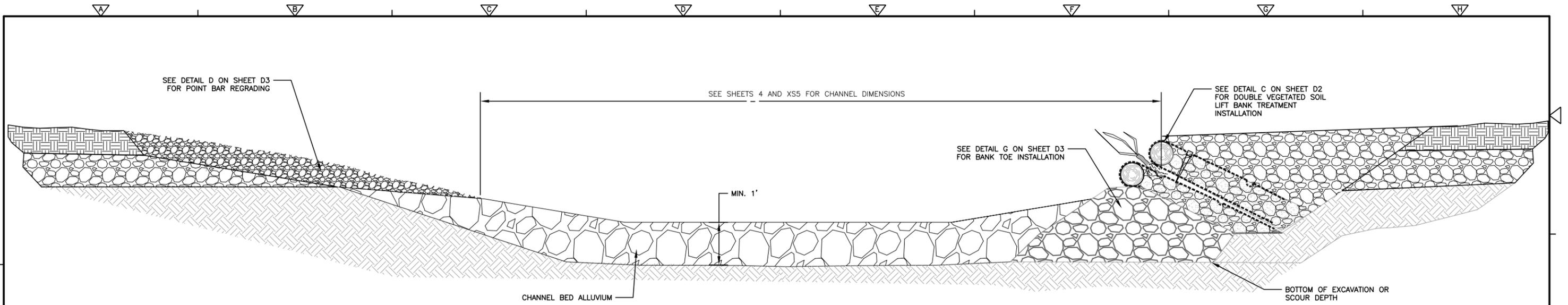
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BIFURCATION AND GAP STREAMBANK
 TREATMENT DETAILS

PROJECT NO.	103068
FILE NAME:	CSDT005
SHEET NO.	D5

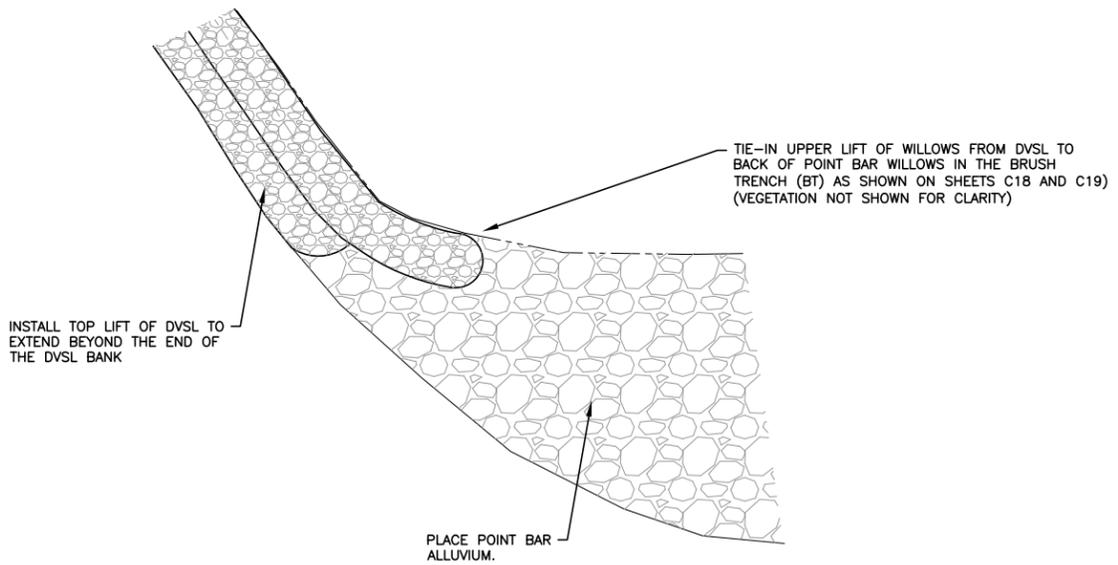
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- NOTES:**
1. SEE SHEET XS3 FOR CHANNEL A RECONSTRUCTION PROFILES AND SHEET XS4 FOR CROSS SECTIONS.
 2. FINISH CHANNEL GRADE WILL BE PROVIDED BY ENGINEER.
 3. BANK TOE EXTENDS TO BOTTOM OF EXCAVATION OR SCOUR DEPTH, WHICHEVER IS LOWER (SEE SPECIAL PROVISIONS FOR FURTHER EXPLANATION).

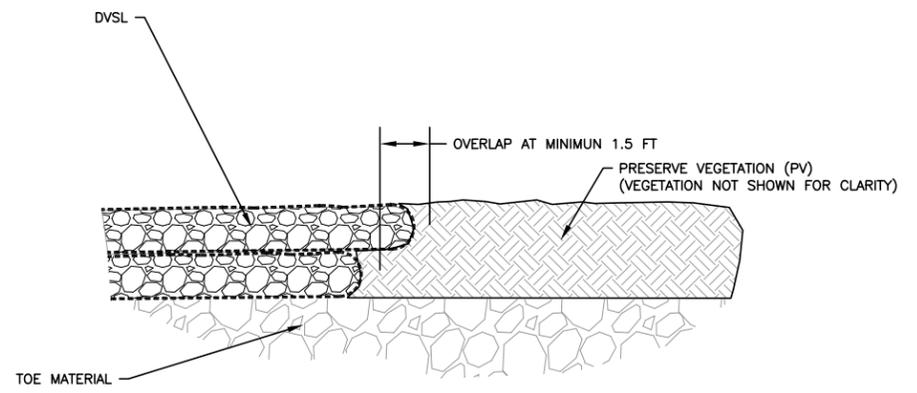
TYPICAL CHANNEL SECTION (STATIONS 16+20 TO 19+70)

SECTION 1
NTS



DVSL TO POINT BAR TRANSITION - PLAN VIEW

DETAIL A
NTS C18,19



DVSL TO PV TRANSITION - SECTION LOOKING INTO BANK

DETAIL B
NTS C18,19

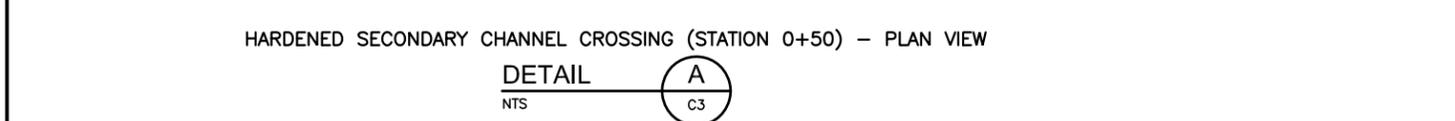
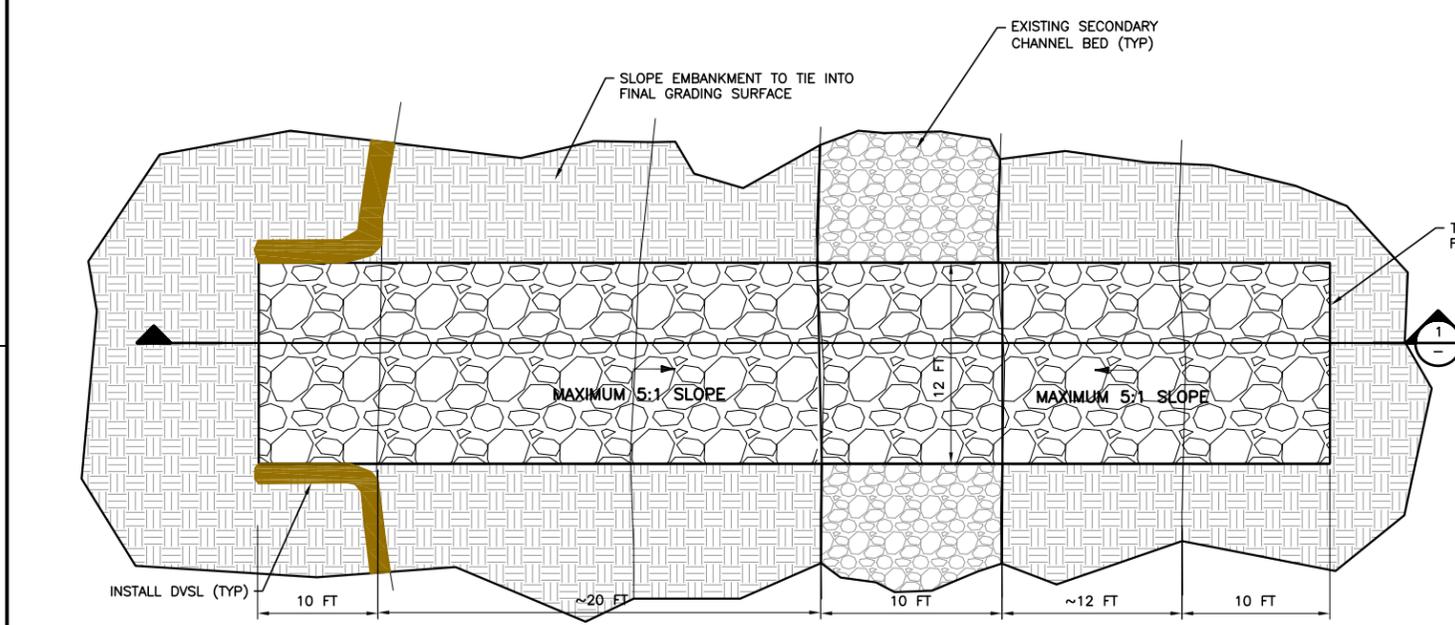
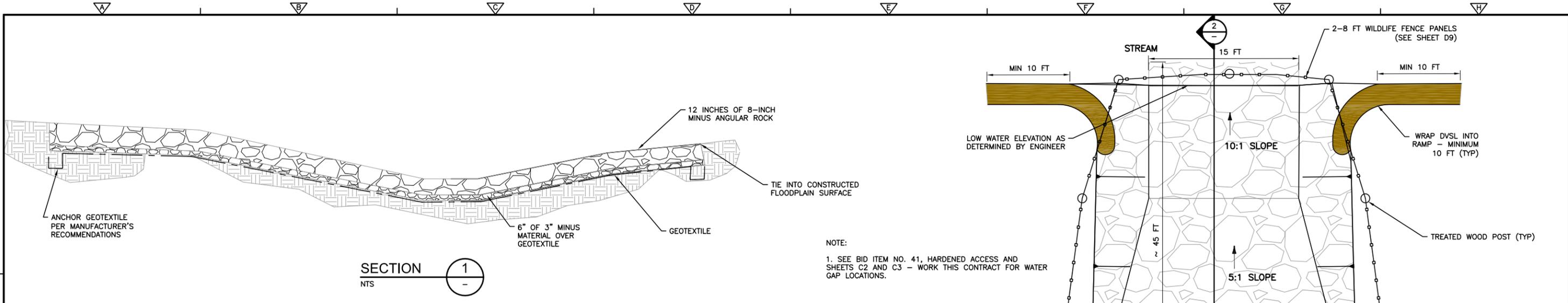
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CROSS CHK'D BY: WHB	Tel: (406) 441-1400
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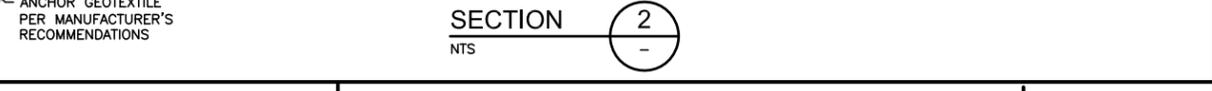
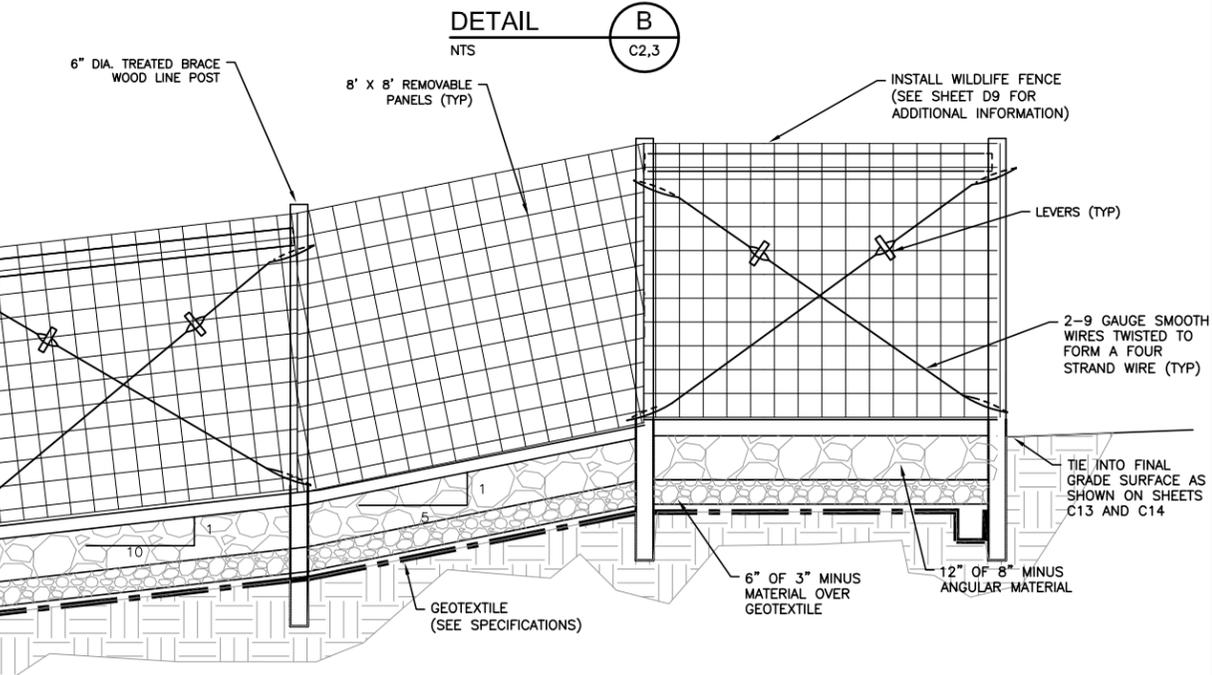
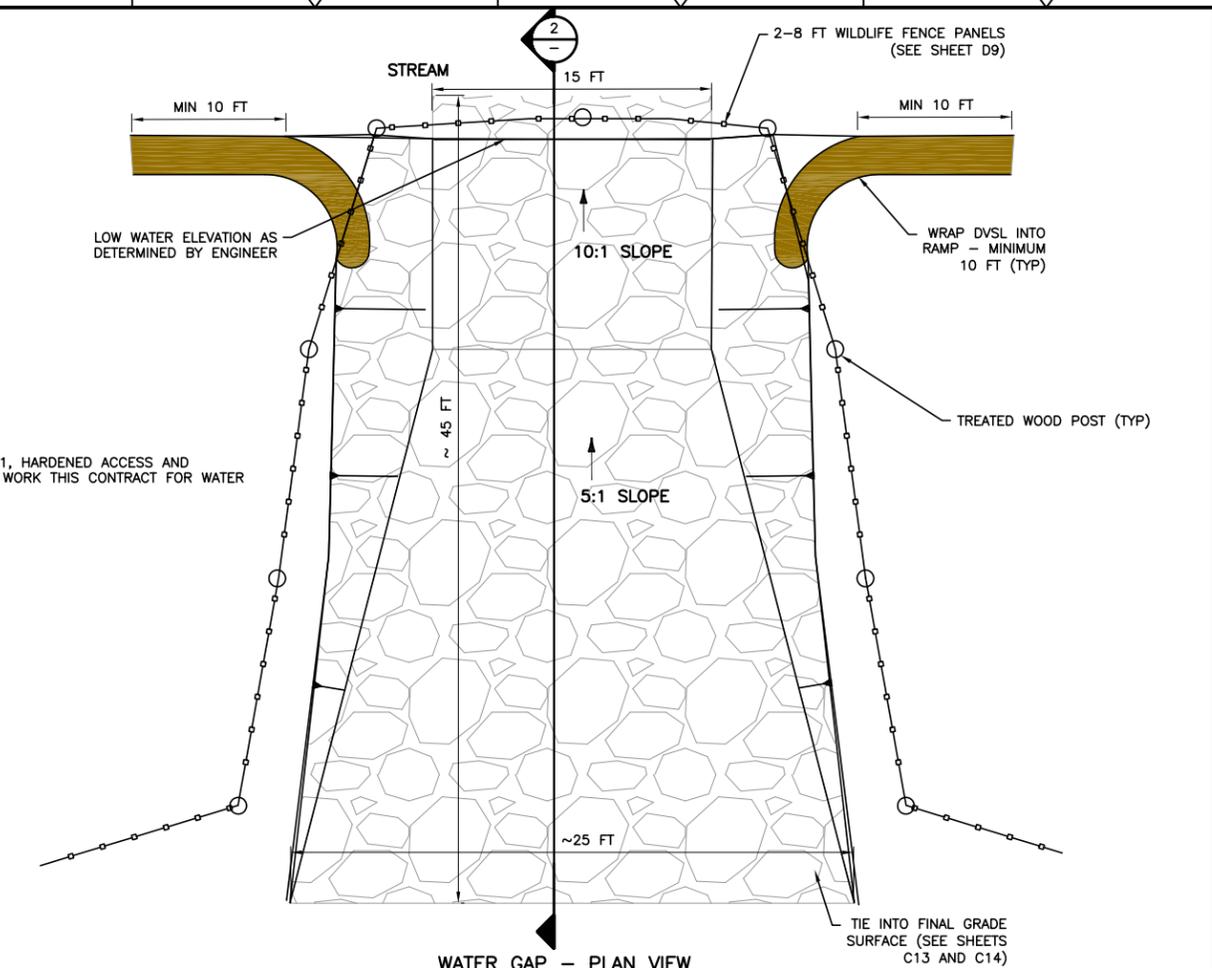
CHANNEL A RECONSTRUCTION AND STREAMBANK TRANSITION DETAILS

PROJECT NO. 103068
FILE NAME: CSDT006
SHEET NO. D6



NOTE:
1. ENGINEER WILL PROVIDE HARDENED CROSSING AUTOCAD SURFACE.
2. SECTION 2 SHOWS INSTALLATION OF WATER GAP AND WILDLIFE FENCING AT WATER GAP. INSTALL ONLY THOSE ITEMS REQUIRED IN THE SPECIAL PROVISIONS AT EACH LOCATION.
3. INSTALL CROSSING AND/OR WILDLIFE FENCE WHERE APPLICABLE. SEE BID ITEM NO. 41 HARDENED ACCESS.

NOTE:
1. SEE BID ITEM NO. 41, HARDENED ACCESS AND SHEETS C2 AND C3 - WORK THIS CONTRACT FOR WATER GAP LOCATIONS.



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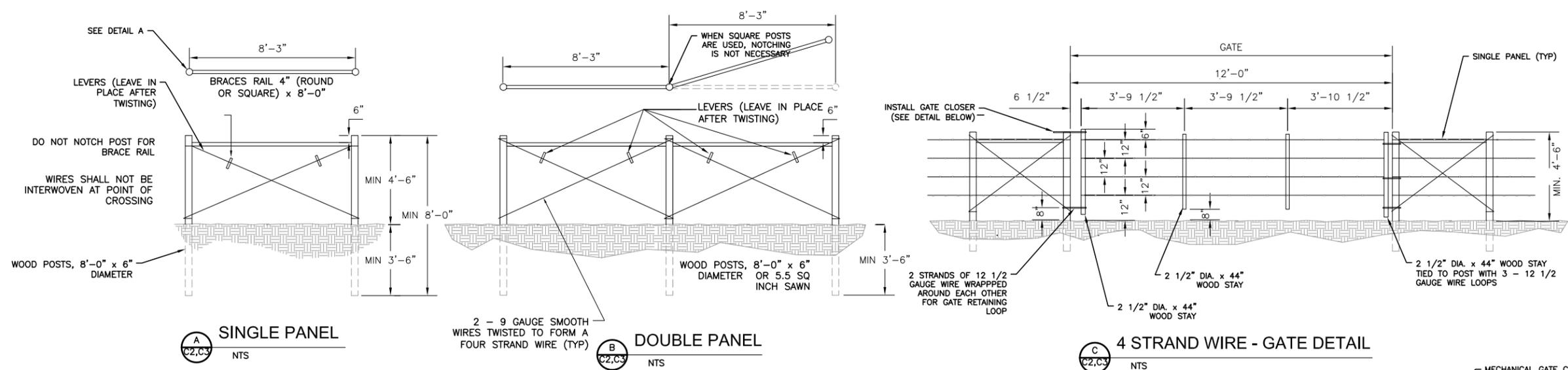
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HARDENED SECONDARY CHANNEL CROSSING AND WATER GAP DETAILS

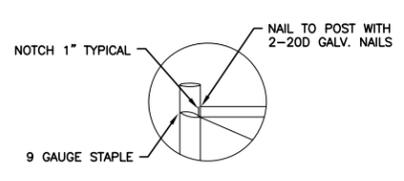
PROJECT NO. 103068
FILE NAME: CSDT006-8
SHEET NO. **D7**



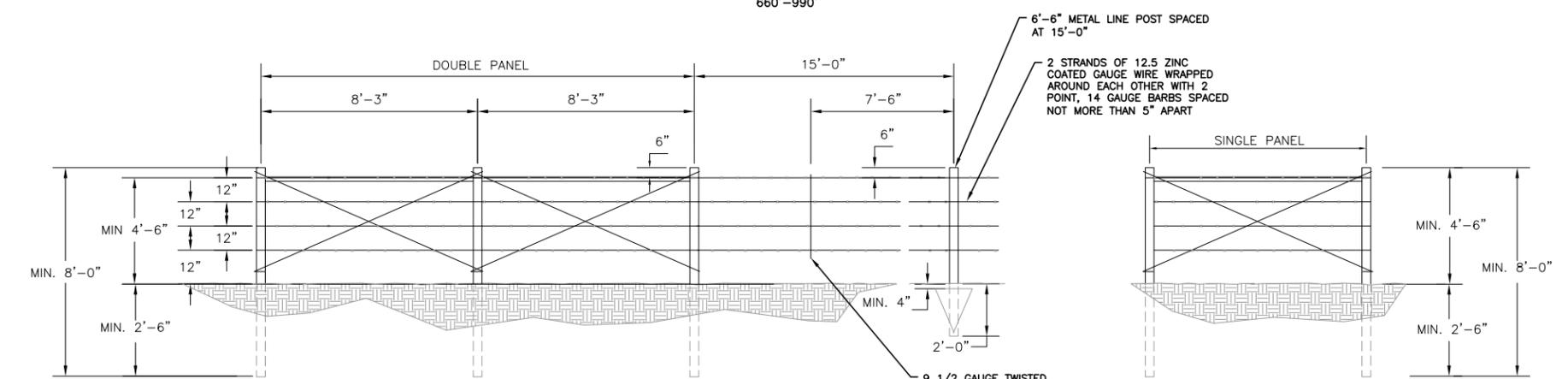
A SINGLE PANEL
NTS

B DOUBLE PANEL
NTS

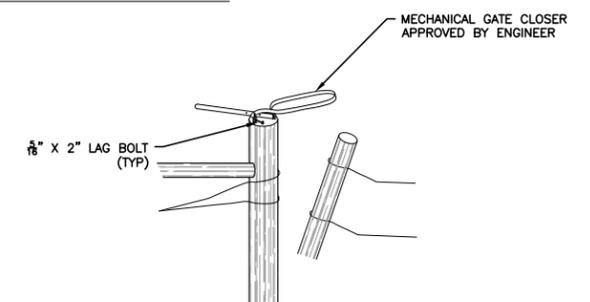
C 4 STRAND WIRE - GATE DETAIL
NTS



D FENCE POST DETAIL
NTS



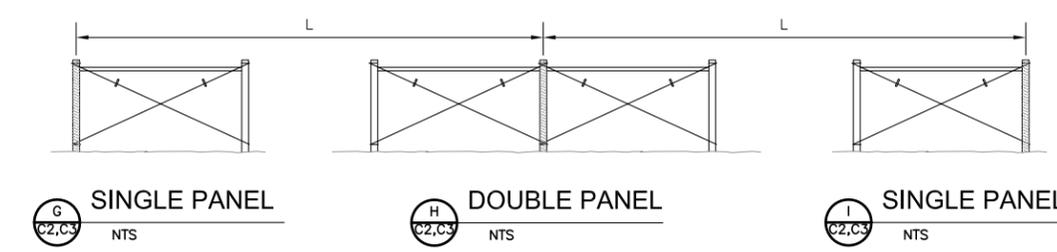
E PANEL DETAILS
NTS



F GATE CLOSER DETAIL
NTS

- NOTES:
1. ALL FENCE WIRE TO BE PLACED ON SIDE OF POST AS DIRECTED BY ENGINEER. THE WIRE SHALL BE PLACED ON THE OUTSIDE OF THE CURVE. IN AREAS SUBJECT TO HIGH VELOCITY WINDS AND MOVING DEBRIS, WIRES MAY ALL BE PLACED ON WINDWARD SIDE OF POSTS, EXCEPT ON CURVES.
 2. POST SPACING MEASURED GENERALLY PARALLEL TO GROUND.
 3. LINE POST SHALL NORMALLY BE SPACED 15'-0" APART. ALSO 15'-0" FROM BRACE OR PANEL POSTS.
 4. A DEADMAN MAY BE A CONCRETE BLOCK, A CAST-IN-PLACE CONCRETE BLOCK, A ROCK OR OTHER APPROVED OBJECT, WEIGHING AT LEAST 150 POUNDS AND COVERED AT LEAST 2 FEET.
 5. FOR AREAS BORDERING STATE LAND, TOP WIRE SHALL BE SMOOTH 12.5 GAUGE OR LARGER WIRE.

STRAIGHT RUN REQUIREMENTS		
FENCE TYPE	PANELS L=RUN	REQ'D.
BARBED	66' - 660'	SINGLE
	660' - 990'	DOUBLE



G SINGLE PANEL
NTS

H DOUBLE PANEL
NTS

I SINGLE PANEL
NTS

J DOUBLE PANEL
NTS

USE WHERE RUNS ARE LESS THAN 660 FEET OR WHERE CHANGES IN HORIZONTAL ALIGNMENT ARE GREATER THAN 14 DEGREES.

K CORNER PANEL
NTS

USE WHERE RUNS ARE 660' TO 990'.

NOTE: TIE OFF WIRE ON SHADED POST.

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 CLARK FORK RIVER - PHASE 2 REMEDIAL ACTION

FARM FENCE DETAILS

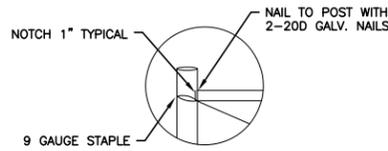
PROJECT NO. 103068
 FILE NAME: CSDT006-8

SHEET NO. D8

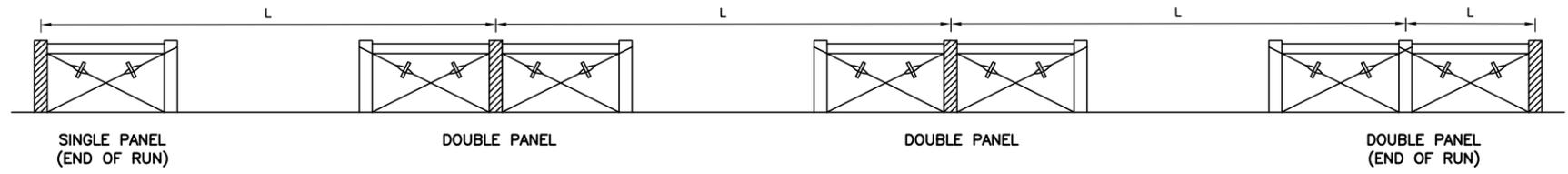
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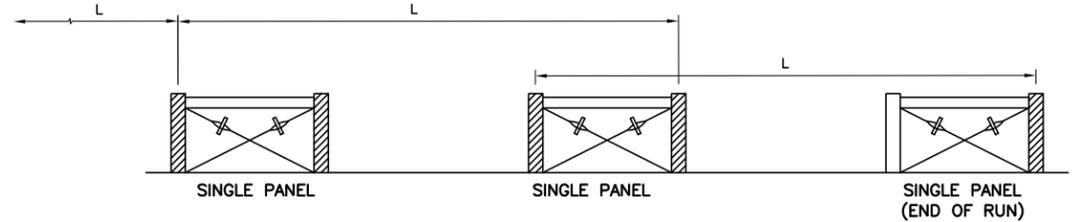
- FENCING NOTES:
- SEE TECHNICAL SPECIFICATIONS FOR POST AND GATE REQUIREMENTS.
 - PLACE ALL FENCE WIRE ON PASTURE SIDE OF POST, EXCEPT CURVES, THEN WIRE SHALL BE PLACED ON THE OUTSIDE OF THE CURVE. IN AREAS SUBJECT TO HIGH VELOCITY WINDS AND MOVING DEBRIS, WIRES MAY BE PLACED ON WINDWARD SIDE OF POSTS, EXCEPT ON CURVES.
 - POST SPACING MEASURED GENERALLY PARALLEL TO GROUND.
 - LINE POST SHALL NORMALLY BE SPACED 12.5 FT CENTER TO CENTER APART. ALSO 12.5 FT. FROM BRACE OR PANEL POSTS.
 - TO ATTACH WOVEN WIRE TO AN END POST, REMOVE TWO OR THREE VERTICAL STAY WIRES FROM THE END OF THE FENCE. PLACE THE FIRST COMPLETE VERTICAL STAY WIRE AGAINST THE POST. START AT THE MIDDLE OF THE HORIZONTAL LINE WIRES, WRAPPING AROUND THE END POST AT LEAST TWO TIMES AND THEN WRAPPING AROUND ITSELF FIVE TIMES.
 - A DEADMAN MAY BE A PRECAST CONCRETE BLOCK, A CAST-IN-PLACE CONCRETE BLOCK, A ROCK OR OTHER APPROVED OBJECT, WEIGHING AT LEAST 265 POUNDS AND COVERED AT LEAST 2 FEET. ATTACH THE DEADMAN TO THE FENCE WITH 3 STRANDS OF 9 GAUGE WIRE OR 6 STRANDS FOR 12.5 GAUGE WIRE.
 - STAPLE THE BOTTOM, TOP, CENTER AND ALTERNATE WIRES OF WOVEN FENCE TO WOOD LINE POSTS.
 - STAPLE ALL WIRES OF WOVEN WIRE TO WOOD CORNER POSTS OR POST USED TO TIE-OFF WIRE.



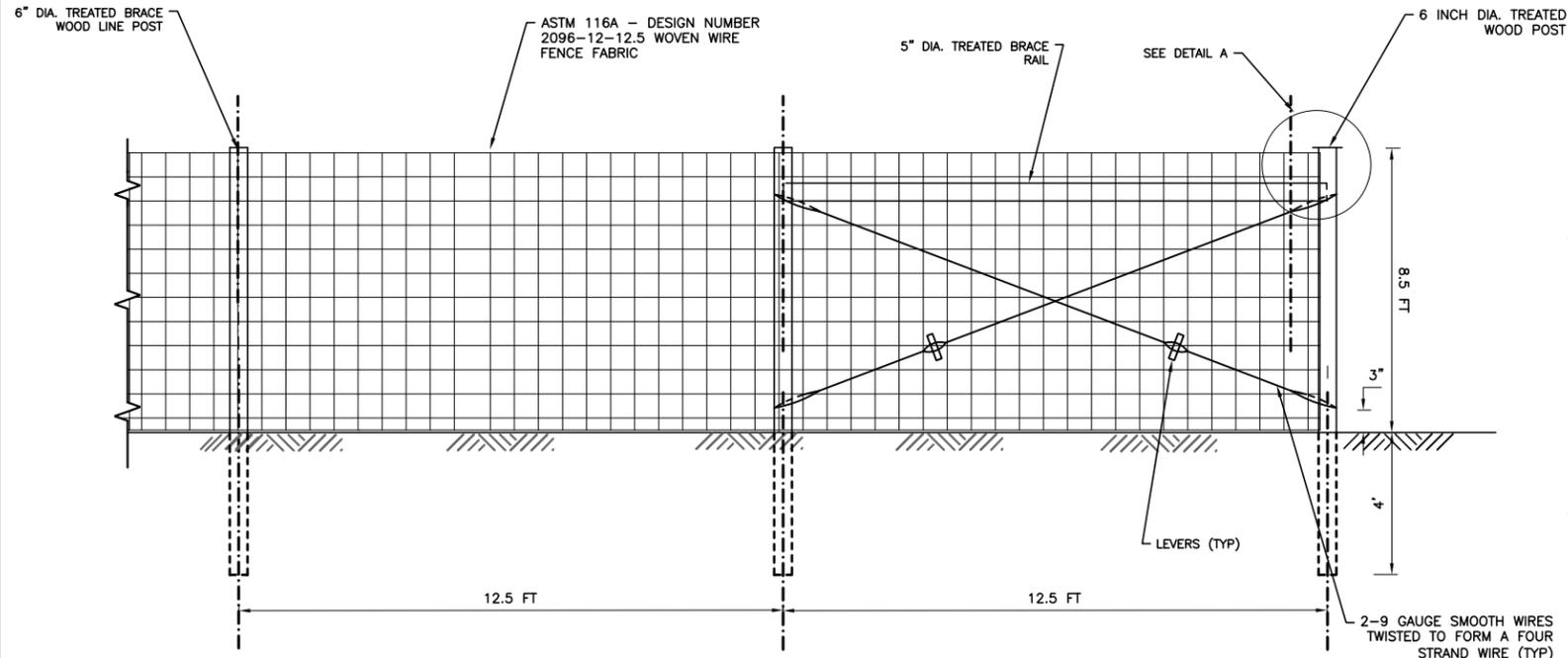
FENCE POST DETAIL
DETAIL A
NTS



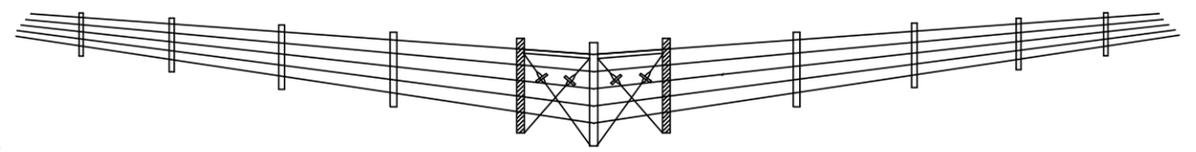
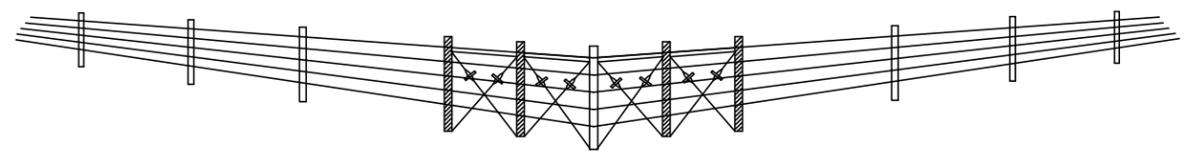
STRAIGHT RUN REQUIREMENTS		
FENCE TYPE	PANELS L=RUN	PANELS REQUIRED
WILDLIFE	66' OR LESS	TERMINAL POST
	66' - 660'	SINGLE
	660' - 990'	DOUBLE



PANEL DETAILS
NTS



WILDLIFE FENCE
DETAIL B
NTS



CORNER PANELS
DETAIL D
NTS

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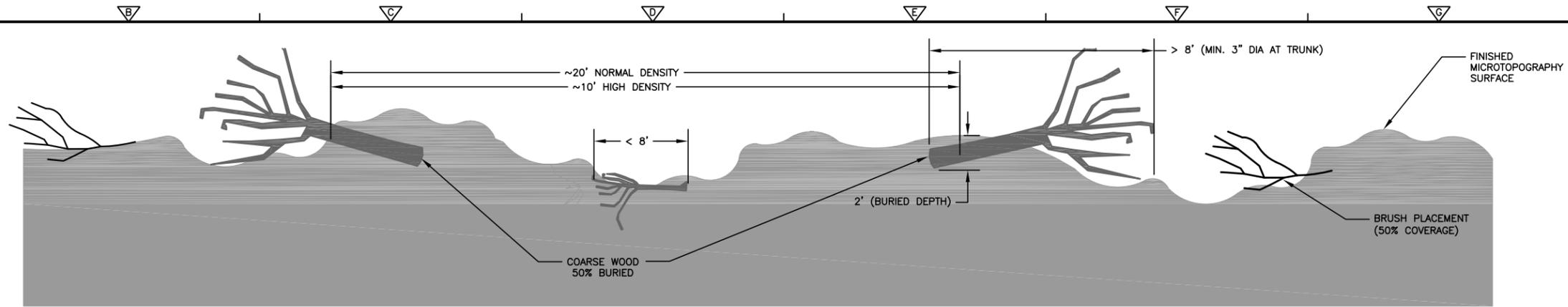
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WILDLIFE FENCING DETAILS

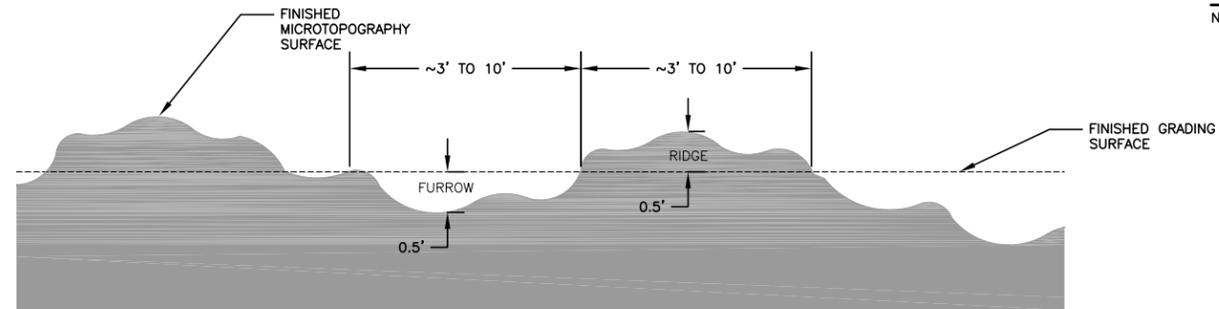
SHEET NO.
 D9

PROJECT NO. 103068
 FILE NAME: CSDT006-8
 SHEET NO.
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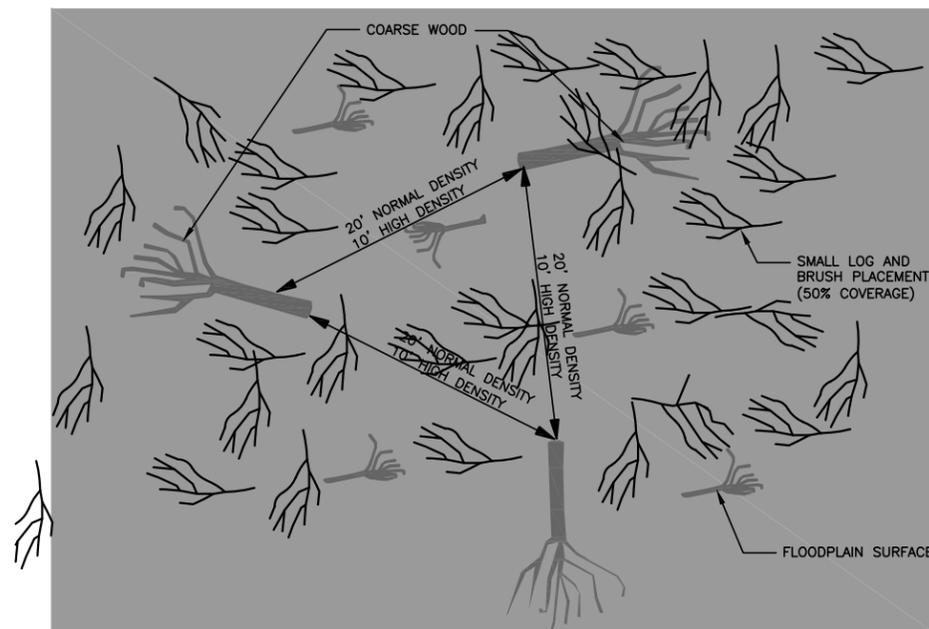
TYPICAL WOOD AND BRUSH PLACEMENT

SECTION 1
NTS



TYPICAL MICROTOPOGRAPHY GRADING

SECTION 2
NTS



WOOD AND BRUSH PLACEMENT - PLAN VIEW

DETAIL C
NTS



NOTES

1. PLACE COARSE WOOD IN ACCORDANCE WITH BID ITEM NO. 39. PLACE NORMAL DENSITY WOODY MATERIAL IN ACCORDANCE WITH BID ITEM NO. 40, PLACE HIGH DENSITY WOODY MATERIAL, IN THE LOCATIONS SHOWN ON SHEETS C16 AND C17, VEGETATIVE BACKFILL DEPTHS.
2. BURY COARSE WOOD WITHIN THE FLOODPLAIN SURFACE WITH ONE HALF OF THE LENGTH BURIED TO A DEPTH OF 2 FEET AND ONE HALF EXPOSED AS SHOWN ON DETAILS.
3. CONSTRUCT LOW AND HIGH FEATURES (RIDGES AND FURROWS) AS SHOWN ON DETAILS. MAXIMUM HEIGHT OF RIDGES AND DEPTH OF FURROWS SHALL BE NO GREATER THAN 0.5 FOOT RELATIVE TO FINAL GRADE, IN ACCORDANCE WITH BID ITEM NO. 38, DEVELOP MICROTOPOGRAPHY.

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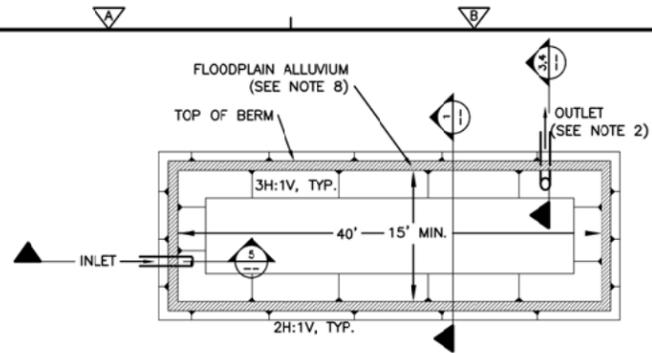
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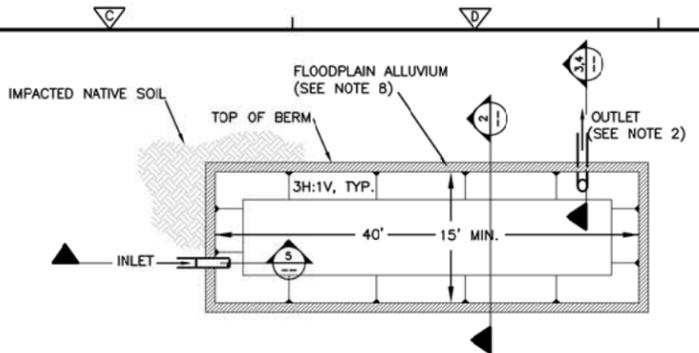
MICROTOPOGRAPHY, WOOD AND BRUSH PLACEMENT DETAILS

PROJECT NO.	103068
FILE NAME:	CSDT010
SHEET NO.	D10



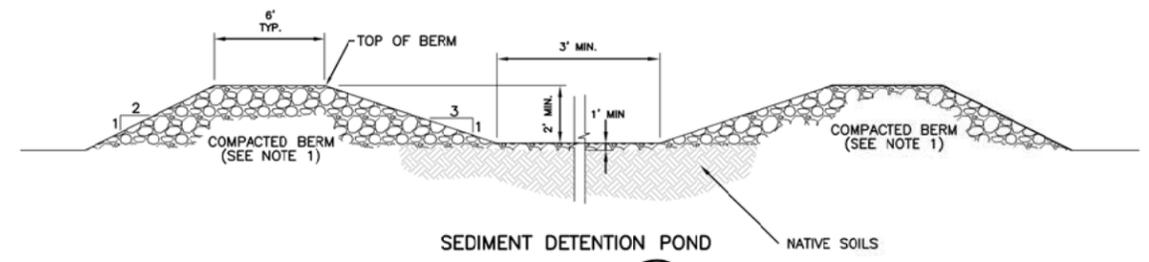
RAISED SEDIMENT DETENTION POND

DETAIL A
NTS C6,C7



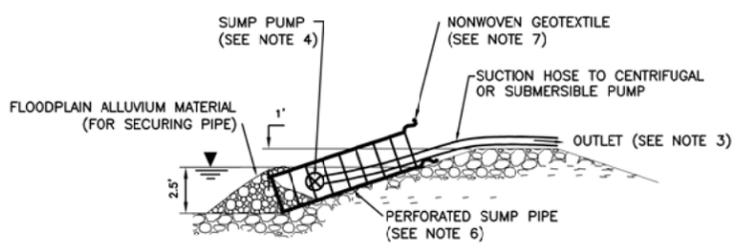
RECESSED SEDIMENT DETENTION POND

DETAIL B
NTS C6,C7



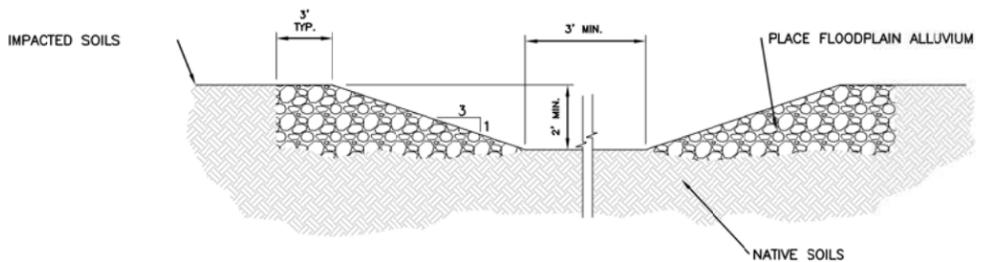
SECTION 1

NTS



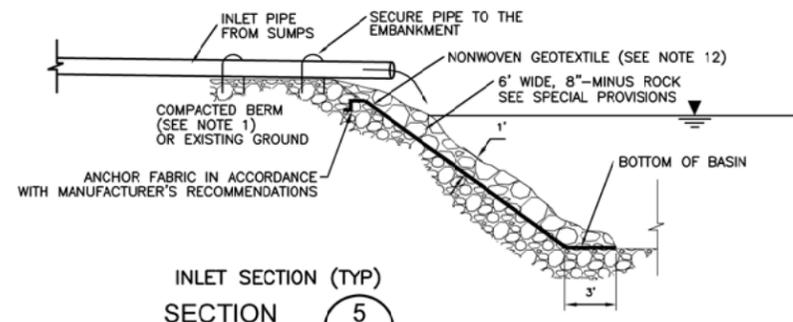
PUMP OUTLET (TYP) SEE NOTE 11

SECTION 4
NTS



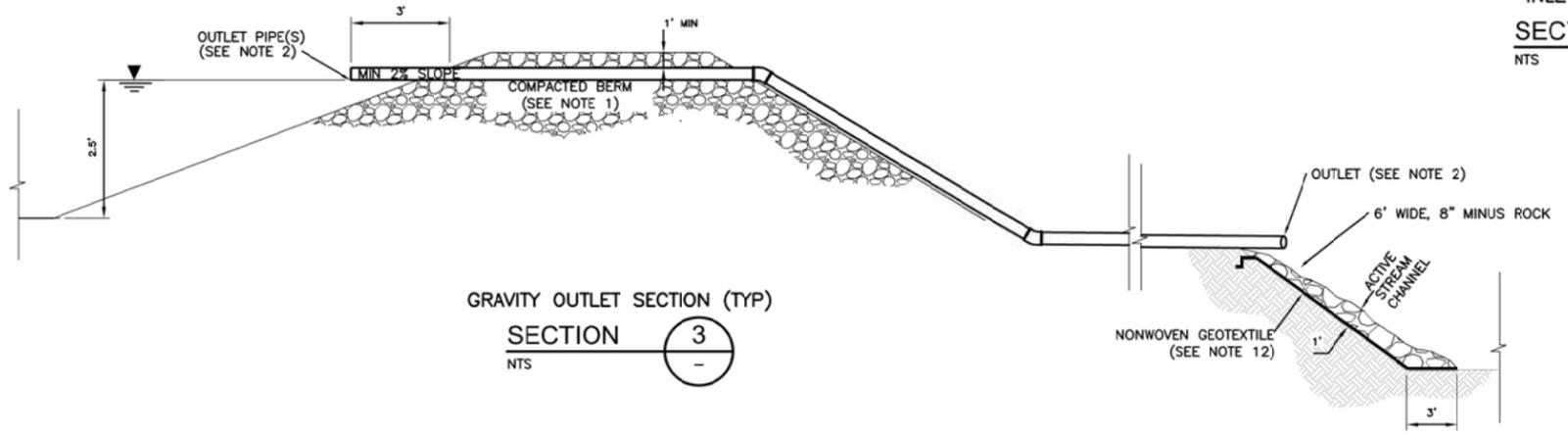
SECTION 2

NTS



INLET SECTION (TYP)

SECTION 5
NTS



GRAVITY OUTLET SECTION (TYP)

SECTION 3
NTS

GENERAL NOTES:

1. FILL FOR CONSTRUCTING SEDIMENT DETENTION PONDS SHALL BE CLEAN LOCAL FLOODPLAIN ALLUVIUM. FILL SHALL BE PLACED BY 1' LIFTS AND MECHANICALLY COMPACTED. FILL SHALL HAVE NO ROCKS LARGER THAN 6" DIAMETER. EACH COMPACTED LIFT SHALL BE SCARIFIED TO A DEPTH OF AT LEAST 2" PRIOR TO THE PLACEMENT OF THE NEXT LIFT.
2. OUTLET PIPE CAPACITY SHALL MEET OR EXCEED POND INFLUENT RATES.
3. STREAM CHANNEL BANKS SHALL BE PROTECTED FROM EROSION AT THE SEDIMENT POND PUMP OUTLET DISCHARGES IN A SIMILAR MANNER AS THE GRAVITY OUTLET DISCHARGES (SECTION 3).
4. SEDIMENT DETENTION POND PUMP OUTLET SHALL HAVE A MINIMUM CAPACITY EQUAL TO SEDIMENT POND INFLUENT FLOW RATE.
5. THE PUMP SHALL HAVE A MINIMUM CAPACITY OF 100GAL/MIN/100FT OF TRENCH, OR 100GAL/MIN PER WELL POINT SUMP.
6. SUMP PIPE SHALL HAVE MINIMUM DIAMETER OF 24". OPEN SPACE OF PERFORATIONS IN SUMP PIPE SHALL EXCEED 80 SQUARE INCHES PER 100 FEET OF TRENCH. WRAP PERFORATED SUMP PIPE WITH GEOTEXTILE AS DESCRIBED IN BID ITEM NO. 14, GROUNDWATER DEWATERING SUMPS.
7. PROVIDE SUITABLE RIGID SUPPORT FOR PIPING AND ELECTRICAL CROSSINGS OF DEWATERING TRENCHES, AND ACTIVE STREAM CHANNEL.
8. SEDIMENT ACCUMULATED IN PONDS AND FLOODPLAIN ALLUVIUM USED AS FILL IN THE DEWATERING SYSTEM SHALL BE CONSIDERED CONTAMINATED UPON ABANDONMENT. FILL SHALL BE DISPOSED OF IN ACCORDANCE WITH BID ITEM NO. 19. EXCAVATE, HAUL AND PLACE TAILINGS/IMPACTED SOIL.
9. ALL PETROLEUM POWERED PUMPS AND FUEL CONTAINERS SHALL BE PLACED IN SECONDARY CONTAINMENT WITH A MINIMUM CAPACITY OF 200% OF THE FUEL VOLUME.
10. IF GRAVITY OUTLET TO THE SEDIMENT DETENTION POND CANNOT BE INSTALLED, A PUMP OUTLET WILL BE USED.
11. SEDIMENT PONDS ARE DESIGNED TO TREAT UP TO 500 GPM. OTHER TREATMENT CAPACITIES AND DIMENSIONS CAN BE CONSTRUCTED WITH APPROVAL OF ENGINEER

NOTES FOR SECTIONS 3 & 5:

12. THE DISCHARGE AREAS FROM THE PONDS INTO THE EXISTING OR RECONSTRUCTED STREAM CHANNEL SHALL ALSO BE PROTECTED WITH NONWOVEN GEOTEXTILE AND 8-INCH MINUS ROCK. CONTRACTOR SHALL FURNISH AND PLACE PERMEATEX 4040 NONWOVEN GEOTEXTILE MATERIAL SPECIFICATIONS TO ENGINEER IN ACCORDANCE WITH SPECIAL PROVISIONS, PARAGRAPH 23, SUBMITTALS.
13. PLACE AND ANCHOR GEOTEXTILE ON THE APPROVED SMOOTH-GRADED SURFACE. FOR SLOPE PROTECTION, PLACE THE LONG DIMENSION OF THE GEOTEXTILE DOWN THE SLOPE. FOR STREAM BANK PROTECTION, PLACE THE LONG DIMENSION OF THE GEOTEXTILE PARALLEL TO THE CENTERLINE OF THE CHANNEL.
14. OVERLAP THE GEOTEXTILE A MINIMUM OF 12 INCHES AT THE ENDS AND SIDES OF ADJOINING SHEETS OR SEW THE GEOTEXTILE JOINTS ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. OVERLAP THE UPHILL OR UPSTREAM SHEET OVER THE DOWNHILL OR DOWNSTREAM SHEET. OFFSET END JOINTS OR ADJACENT SHEETS A MINIMUM OF 5 FEET. PINS MAY BE USED TO HOLD THE GEOTEXTILE IN PLACE. SPACE PINS ALONG THE OVERLAPS AT APPROXIMATELY 3 FOOT CENTERS.
15. PLACE AGGREGATE, SLOPE PROTECTION OR RIPRAP ON THE GEOTEXTILE STARTING AT THE TOE OF THE SLOPE AND PROCEED UPWARD. PLACE 8-INCH MINUS ROCK ONTO THE GEOTEXTILE FROM A HEIGHT OF LESS THAN 12 INCHES. PLACE SLOPE PROTECTION ROCK OR AGGREGATE BACKFILL ONTO THE GEOTEXTILE FROM A HEIGHT OF LESS THAN 3 FEET. IN UNDER WATER APPLICATIONS, PLACE THE GEOTEXTILE AND COVER MATERIAL WITHIN THE SAME DAY.

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 APPROVED BY: WHB
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DEWATERING PLAN DETAILS

PROJECT NO. 103068
 FILE NAME: DSTPL12.DWG
 SHEET NO. D12

