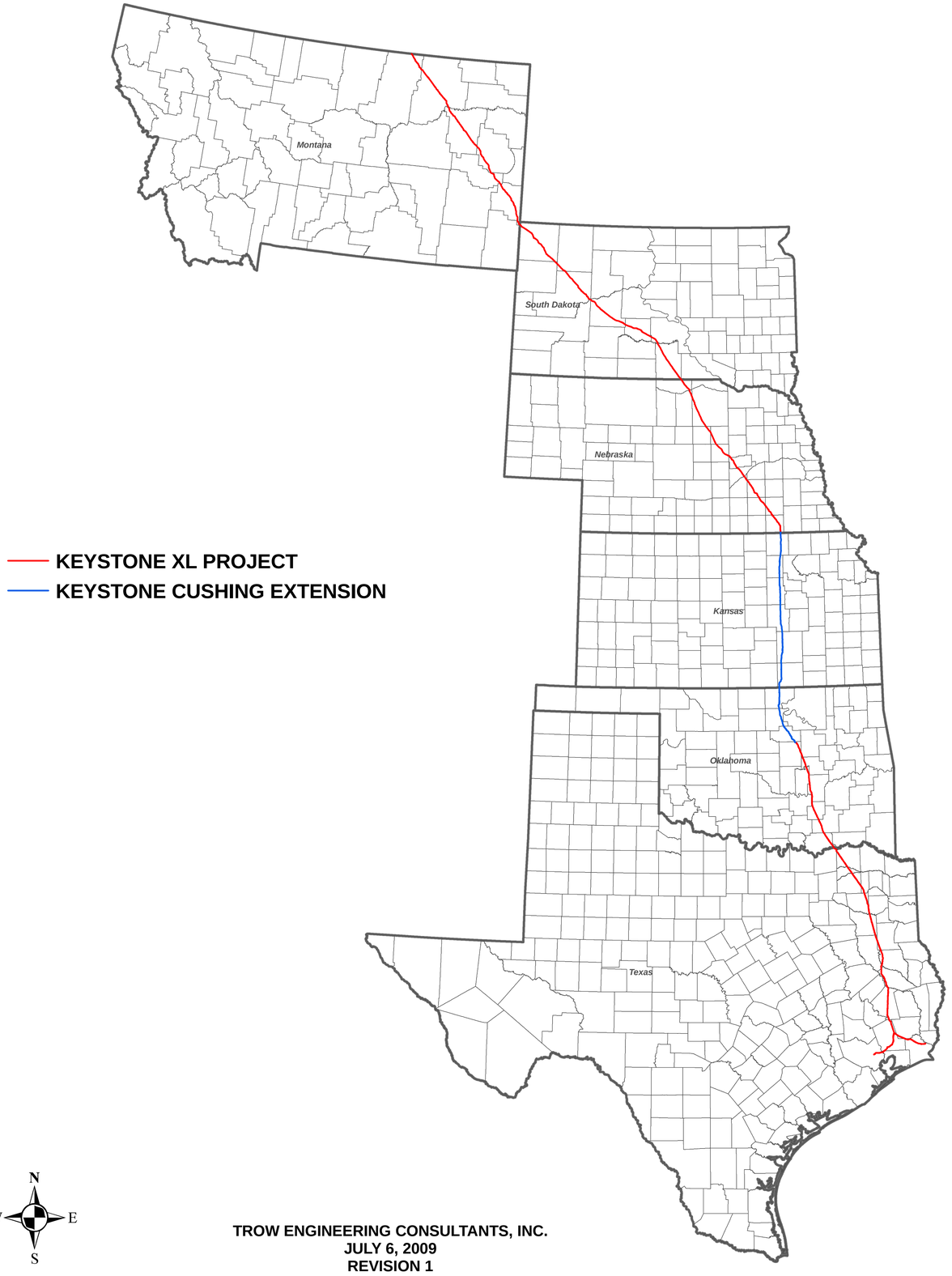
TransCanada Keystone Pipeline, L.P.
United States Department of State
Keystone XL Project
Appendix D

Site Specific Waterbody Crossing Plans



TROW ENGINEERING CONSULTANTS, INC.
JULY 6, 2009
REVISION 1

Morgan, MT to Steele City, NE

Crossing	Milepost	Drawing #
Milk River	82.7	4360-03-ML-03-001
Missouri River	89.0	4360-03-ML-03-002
Yellowstone River	196.0	4361-03-ML-03-001
Little Missouri	292.1	4365-03-ML-03-001
Cheyenne River	425.9	4367-03-ML-03-001
White River	537.0	4369-03-ML-03-001
Keya Paha River	599.8	4371-03-ML-03-001
Niobrara River	615.3	4371-03-ML-03-002
Cedar River	696.5	4373-03-ML-03-001
Loup River	739.7	4373-03-ML-03-002
Platte River	755.4	4374-03-ML-03-001

Cushing, OK to Nederland, TX

Crossing	Milepost	Drawing #
Deep Fork	22.3	1866-03-ML-03-001
North Canadian River	38.7	1866-03-ML-03-002
Little River	70.5	4378-03-ML-03-001
Canadian River	74.6	4378-03-ML-03-002
Clear Boggy Creek	126.6	4379-03-ML-03-001
Red River	155.1	4380-03-ML-03-001
Bois D'Arc Creek	161.6	4380-03-ML-03-002
North Sulphur	190.2	4380-03-ML-03-004
South Sulphur	201.2	4382-03-ML-03-001
White Oak Creek	212.3	4382-03-ML-03-002
Big Cyprus Creek	227.5	4382-03-ML-03-003
MP254	254.0	4383-03-ML-03-001
Big Sandy Creek	256.1	4383-03-ML-03-002
Sabine River	262.7	4383-03-ML-03-003
East Fork Angelina River	312.2	4384-03-ML-03-001
Angelina River	333.3	4384-03-ML-03-003
Highway 59 / UPRR	365.6	4385-03-ML-03-202
Neches River	367.4	4385-03-ML-03-001
Menard Creek	413.8	4386-03-ML-03-001
Aggie Road Lower NechesValley Canal Authority	459.1	4387-03-ML-03-103
Lower Neches Valley Canal Authority	459.9	4387-03-ML-03-004
Hwy. 90 & Railroad	462.1	4387-03-ML-03-202
Walden Road & Smith Road	464.6	4387-03-ML-03-104
Golf Green & Brooks Rd.	466.4	4387-03-ML-03-105
Willow Marsh Bayou	467.0	4387-03-ML-03-005
Railroad, I-10 and Canal	467.8	4387-03-ML-03-106
Hillebrandt Bayou	471.0	4387-03-ML-03-006
Entergy Pipeline Corridor	476.8	4387-03-ML-03-601
Prison & Highway 69	477.2	4387-03-ML-03-109

Centerline Dates:

Morgan, Montana to Steele City, Nebraska - 2.15.09
Cushing, Oklahoma to Nederland, Texas - 2.19.09
Houston Lateral - 3.18.09

PREPARED BY:
TROW ENGINEERING CONSULTANTS INC.
1300 Metropolitan Boulevard, Suite 200
Tallahassee, Florida , USA 32308
Phone: 1-850-385-5441
Fax: 1-850-385-5523

Trow

ConocoPhillips | TransCanada In business to deliver

NO.	REVISION	DATE
1	ISSUED FOR SUPPLEMENTAL U.S DEPT. OF STATE FILING	7.6.09
0	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)	11.19.08

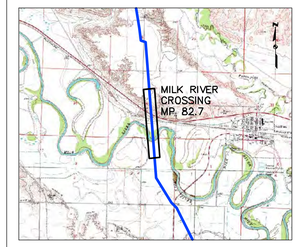
KEYSTONE XL PROJECT
SITE SPECIFIC DRAWINGS

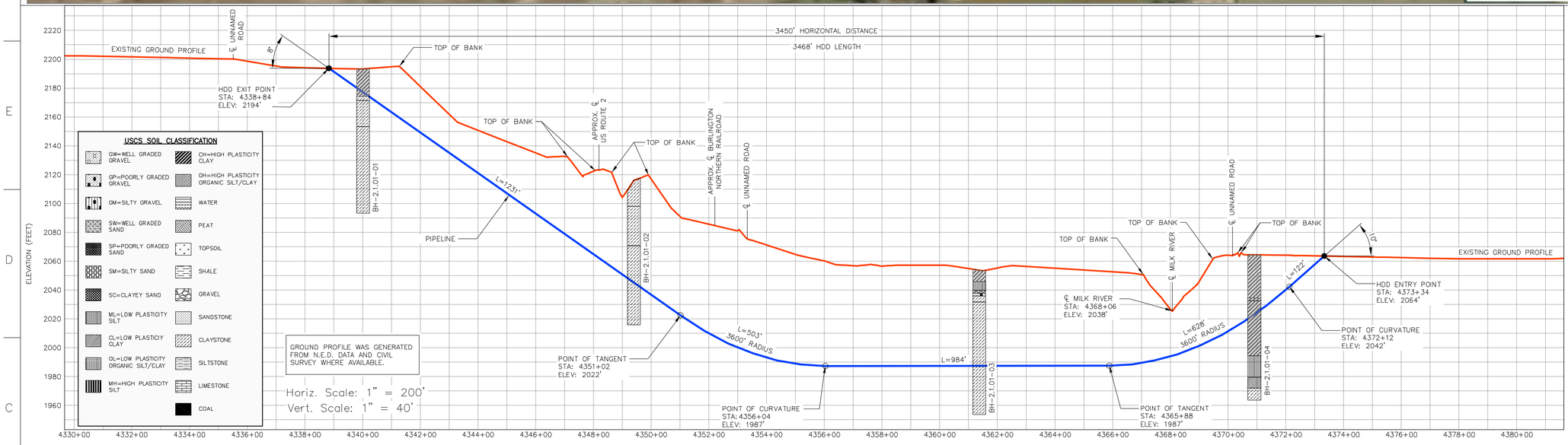
MAP PARAMETERS
PROJECTION: NAD83, UTM: 13/14/15N
NTS

PROJECT: 50388X

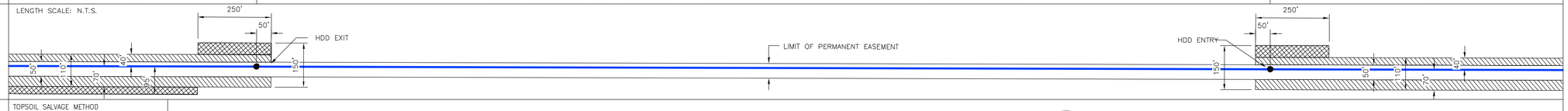
SHEET: COVER SHEET

DRAWING NUMBER	DRAWN BY	CHECKED BY	APPROVED BY
XL-FIPS-ML-2002-P-000	GS	SS	RG





CROSSING INFORMATION (DESCRIPTION STATIONING)	4335+52 ℄ UNNAMED ROAD	4338+84 HDD EXIT POINT	4340+00 BH-2.1.01-01	4341+28 TOP OF BANK	4347+12 TOP OF BANK	4348+05 TOP OF BANK	4348+20 APPROX. ℄ US ROUTE 2	4348+64 TOP OF BANK	4349+41 BH-2.1.01-02	4349+90 TOP OF BANK	4351+02 PT OF TANGENT	4352+20 APPROX. ℄ BURLINGTON NORTHERN RAILROAD	4353+33 ℄ UNNAMED ROAD	4356+04 PT OF CURVATURE	4361+38 BH-2.1.01-03	4365+88 PT OF TANGENT	4367+07 TOP OF BANK	4368+06 ℄ MILK RIVER	4369+47 TOP OF BANK	4370+15 ℄ UNNAMED ROAD	4370+33 TOP OF BANK	4370+45 TOP OF BANK	4371+41 BH-2.1.01-04	4372+12 PT OF CURVATURE	4373+34 HDD ENTRY POINT
PIPELINE DATA	MLP	PIPELINE DATA: 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING.																							MLP



ENVIRONMENTAL MITIGATION/RECLAMATION	
	TOPSOIL SALVAGE METHOD
	STREAMS
	WETLANDS
	TIMING CONSRAINTS
	MILEPOST
	MONITORING
	RECLAMATION
	SPECIAL CONSIDERATIONS

TO BE DETERMINED

INSTALLATION NOTES

1) ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.

2) VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE ENVIRONMENTAL INSPECTOR.

3) WORK SPACE: WORK SPACE LIMITS ARE DEPICTED. CLEARING WILL BE RESTRICTED TO THE WORK SPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA ALONG THE RIGHT-OF-WAY. CLEARING BETWEEN THE ENTRY AND EXIT POINTS IS LIMITED TO THE MINIMUM AMOUNT NECESSARY TO STRING LOCATION WIRES AND INSTALL PUMPS AND PIPING TO OBTAIN WATER (WHERE APPROVED).

4) WATER SOURCE: DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. THE CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT THE ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH THE CONSTRUCTION MITIGATION AND RECLAMATION PLAN (CMRP) AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATER BODY.

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6) SPILL-PREVENTION: ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATER BODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATER BODIES AND WETLANDS. EACH CONSTRUCTION CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.

7) EROSION AND SEDIMENT CONTROL: CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH CONTRACT DOCUMENTS. CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.

8) TOPSOIL SHALL BE STRIPPED AS REQUIRED BY PROJECT SPECIFICATIONS.

9) PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO KEYSTONE FOR APPROVAL.

10) INSTALLATION: THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK.

11) MUD DISPOSAL: CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISPOSED OF IN WATER BODIES OR WETLANDS. ANY DRILLING MUD WHICH INADVERTENTLY EXITS AT POINTS OTHER THAN THE ENTRY AND EXIT POINTS SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PRACTICAL AND DISPOSED OF AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS.

12) CLEANUP/STABILIZATION/RESTORATION: ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED IN PROJECT DOCUMENTS.

13) NOMINAL WORKING SPACE DIMENSIONS ARE SHOWN. LARGER AREAS MAY BE REQUIRED IN IRREGULAR TERRAIN. UPDATED DIMENSIONS MAY BE PROVIDED AFTER LOCAL TOPOGRAPHICAL SURVEYS ARE PERFORMED.

LEGEND

- POINT OF INTERSECTION (P.I.)
- ENTRY OR EXIT POINT
- GEOTECHNICAL BOREHOLE
- POWERPOLE
- MLP — MAINLINE PIPE
- PIPELINE
- FOREIGN PIPELINE
- EDGE OF WATER
- PRIVATE ACCESS SHOO FLY ROAD
- COUNTY BOUNDARY
- WATER LEVEL
- USACOE CONSTRUCTION REFERENCE POINT
- WETLANDS
- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
3	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (02.15.09 CL)	THES0050388XS	JB	AH	FP	FP	RG	TROW
2	04.21.09	ISSUED FOR REVIEW (02.15.09 CL)	THES0050388XS	AH	AH	FP	FP	RG	TROW
1	12.08.08	ISSUED FOR REVIEW (12.1.08 CL)	THES0050388X	JB	AH	HF	RB	RG	TROW
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (07.31.08 CL)	THES0050388X	JB	JP	FP	RB	RG	TROW

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

Trow TROW ENGINEERING CONSULTANTS INC. | ConocoPhillips | TransCanada *In business to deliver*

VALLEY SECTION

FIA # 4360 | CHAINAGE: MP 82.7 | DISCIPLINE # 03

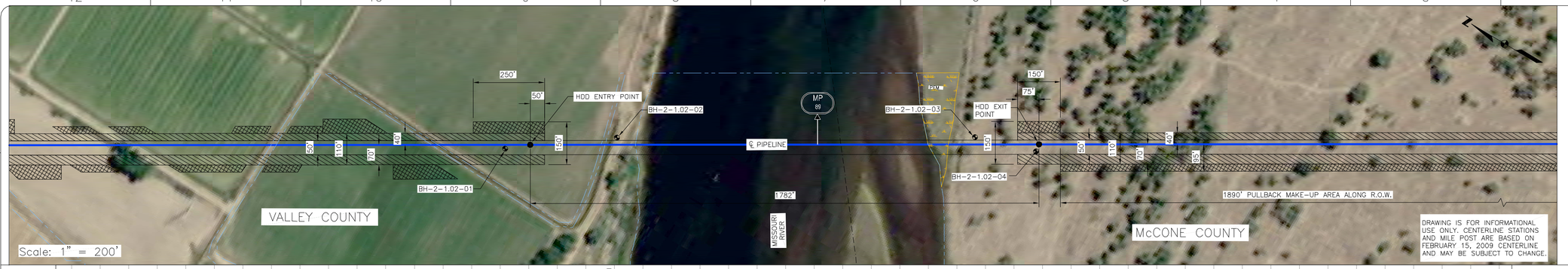
MILK RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
VALLEY COUNTY, MONTANA

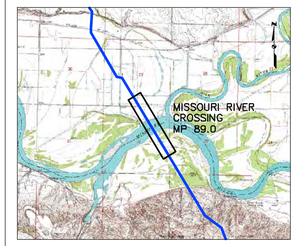
SCALE AS SHOWN | DRAWING No 4360-03-ML-03-001 | REV 3

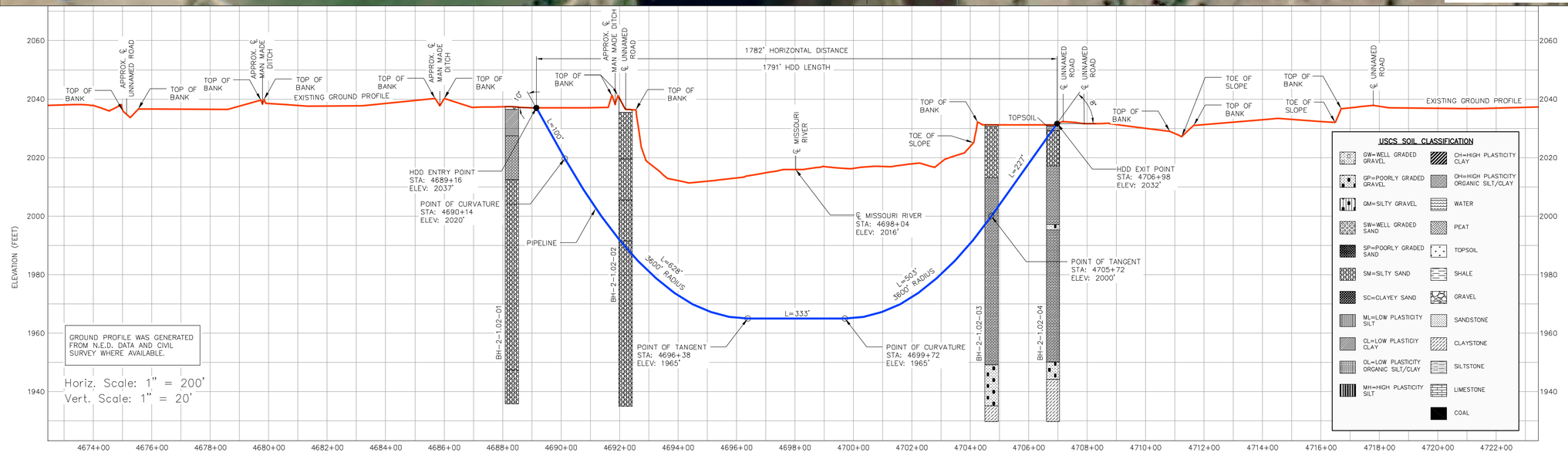
PLOTTED SIZE: ANSI D (22x34)

ID — TC_UD_BR.DWG 22X34

TIME — DESIGNFILE



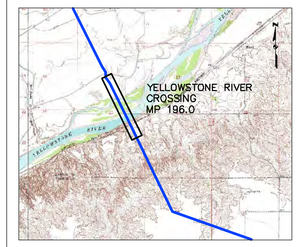


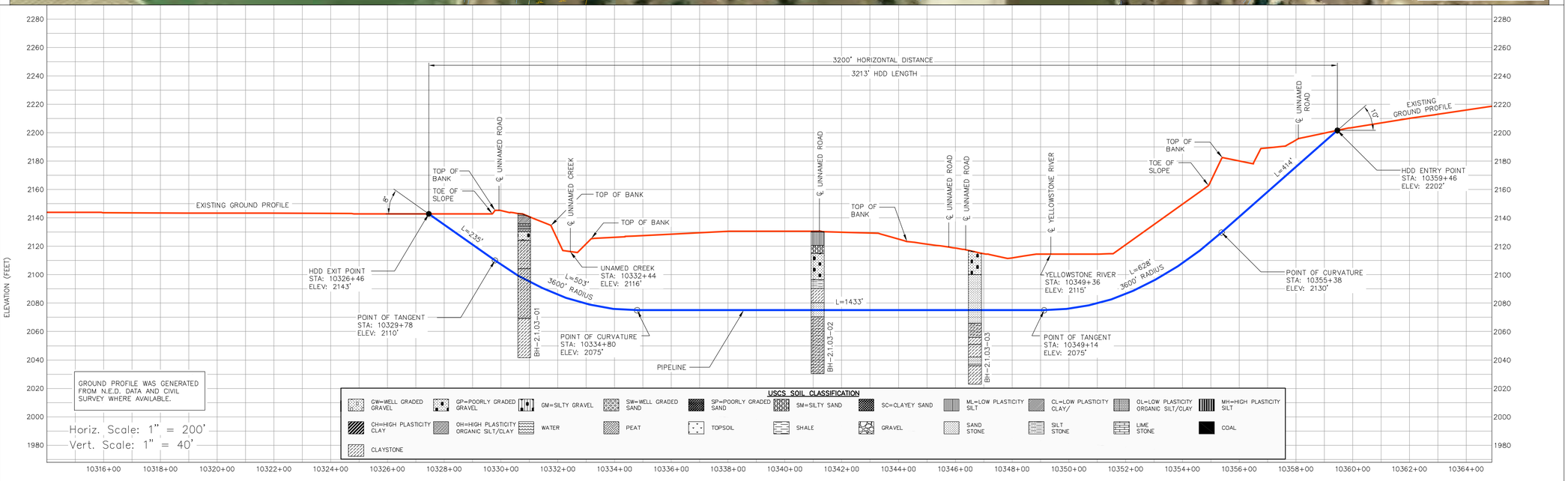


USCS SOIL CLASSIFICATION

GW=WELL GRADED GRAVEL	CH=HIGH PLASTICITY CLAY
GP=POORLY GRADED GRAVEL	OH=HIGH PLASTICITY ORGANIC SILT/CLAY
GM=SILTY GRAVEL	WATER
SW=WELL GRADED SAND	PEAT
SP=POORLY GRADED SAND	TOPSOIL
SM=SILTY SAND	SHALE
SC=CLAYEY SAND	GRAVEL
ML=LOW PLASTICITY SILT	SANDSTONE
CL=LOW PLASTICITY CLAY	CLAYSTONE
OL=LOW PLASTICITY ORGANIC SILT/CLAY	SILTSTONE
MH=HIGH PLASTICITY SILT	LIMESTONE
	COAL

| | | |





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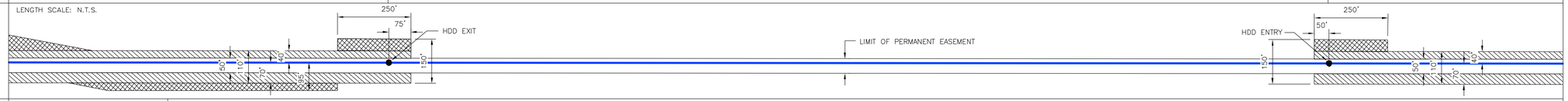
OL=LOW PLASTICITY ORGANIC SILT/CLAY	MH=HIGH PLASTICITY SILT	CH=HIGH PLASTICITY CLAY	OH=HIGH PLASTICITY ORGANIC SILT/CLAY	WATER	PEAT	TOPSOIL	SHALE	GRAVEL
SAND STONE	SILT STONE	LIME STONE	COAL	CLAYSTONE				

CROSSING INFORMATION (CENTERLINE STATIONING)	PIPELINE DATA
10318+90 P.I. 08°34'58" RT.	MLP
10326+46 HDD EXIT POINT	PIPELINE DATA: 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING
10329+69 TOE OF SLOPE	
10329+78 PT OF TANGENT AND TOP OF BANK	
10329+82 ℄ UNNAMED ROAD	
10330+82 BH-2.1.03-01	
10331+78 TOP OF BANK	
10332+44 ℄ UNNAMED CREEK	
10333+58 TOP OF BANK	
10334+80 PT OF CURVATURE	
10341+16 BH-2.1.03-02	
10341+22 ℄ UNNAMED ROAD	
10344+29 TOP OF BANK	
10345+78 ℄ UNNAMED ROAD	
10346+36 ℄ UNNAMED ROAD	
10346+69 BH-2.1.03-03	
10349+14 PT OF TANGENT	
10349+36 ℄ YELLOWSTONE RIVER	
10354+92 TOE OF SLOPE	
10355+38 PT OF CURVATURE	
10355+40 TOP OF BANK	
10358+08 ℄ UNNAMED ROAD	
10359+46 HDD ENTRY POINT	
10362+03 P.I. 00°00'02" RT.	
MLP	

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION

TOPSOIL SALVAGE METHOD
STREAMS
WETLANDS
TIMING CONSRAINTS
MILEPOST
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REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
3	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (02.15.09 CL)	THES0050388XS	JB	AH	FP	YC	RG	TROW
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1	12.08.08	ISSUED FOR REVIEW (12.1.08 CL)	THES0050388X	JB	AH	HF	RB	RG	TROW
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PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

Trow TROW ENGINEERING CONSULTANTS INC. | ConocoPhillips | TransCanada In business to deliver

FORT PECK SECTION

FIA #	CHAINAGE:	DISCIPLINE #
4361	MP 196.0	03

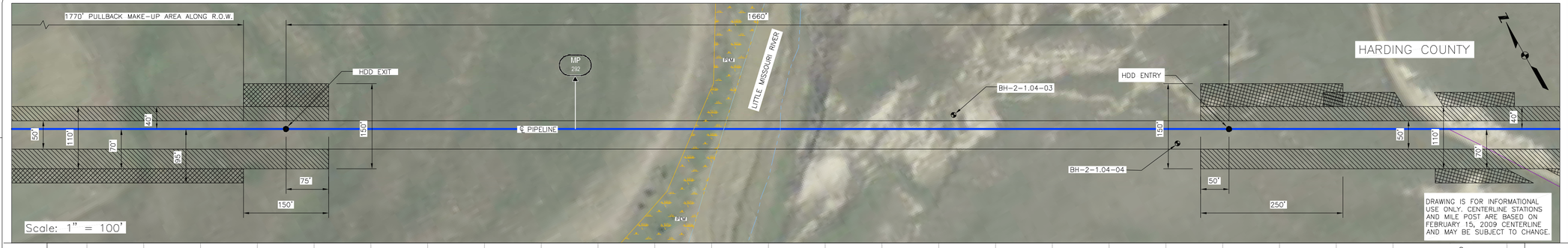
YELLOWSTONE RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
DAWSON & PRAIRIE COUNTY, MONTANA

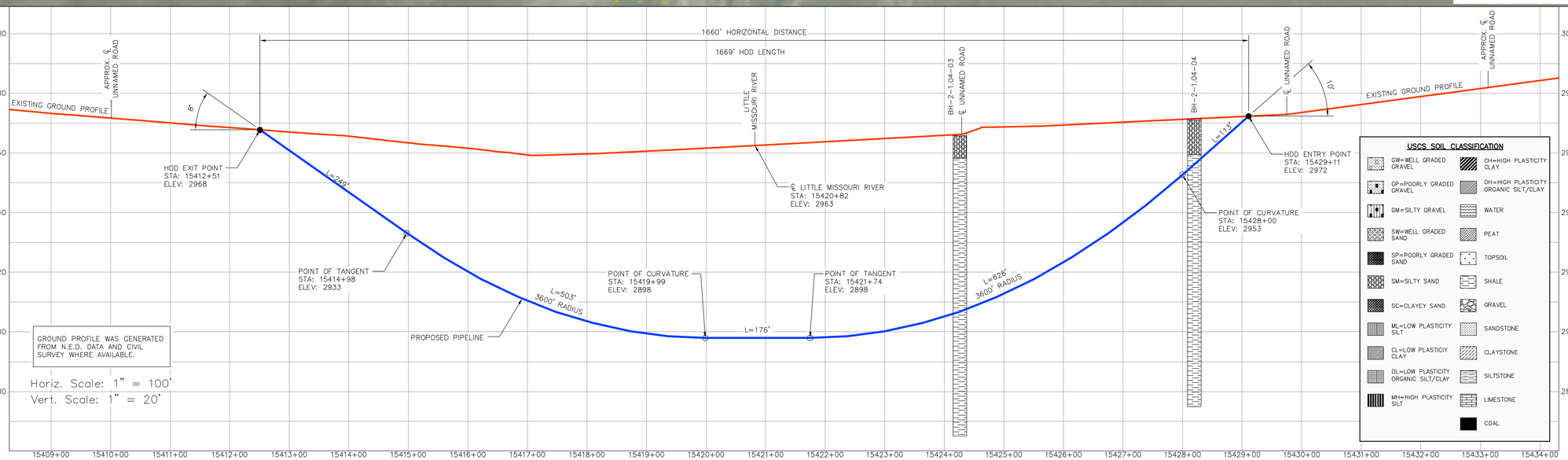
SCALE	DRAWING No	REV
AS SHOWN	4361-03-ML-03-001	3

PLOTTED SIZE: ANSI D (22x34)

ID — TC_UD_BR.DWG 22X34

TIME — DESIGNFILE





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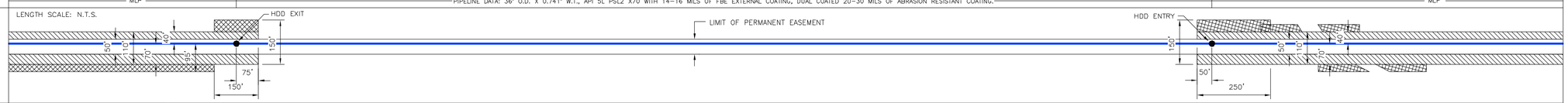
- GP=POORLY GRADED GRAVEL
- GM=SILTY GRAVEL
- SW=WELL GRADED SAND
- SP=POORLY GRADED SAND
- SM=SILTY SAND
- SC=CLAYEY SAND
- ML=LOW PLASTICITY SILT
- CL=LOW PLASTICITY CLAY
- OL=LOW PLASTICITY ORGANIC SILT/CLAY
- MH=HIGH PLASTICITY SILT
- CH=HIGH PLASTICITY CLAY
- OH=HIGH PLASTICITY ORGANIC SILT/CLAY
- WATER
- PEAT
- TOPSOIL
- SHALE
- GRAVEL
- SANDSTONE
- CLAYSTONE
- SILTSTONE
- LIMESTONE
- COAL

CROSSING INFORMATION (CENTERLINE STATIONING)	15410+02 APPROX. ℄ UNNAMED ROAD	15412+51 HDD EXIT POINT	15414+98 PT OF TANGENT	15419+99 PT OF CURVATURE	15420+82 LITTLE MISSOURI RIVER	15421+74 PT OF TANGENT	15424+26 BH-2-1.04-03	15424+29 ℄ UNNAMED ROAD	15428+00 PT OF CURVATURE	15428+20 BH-2-1.04-04	15429+11 HDD ENTRY POINT	15429+75 ℄ UNNAMED ROAD	15433+13 APPROX. ℄ UNNAMED ROAD

PIPELINE DATA	MLP	PIPELINE DATA: 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING.	MLP

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION	
TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSRAINTS	
MILEPOST	
MONITORING	
RECLAMATION	
SPECIAL CONSIDERATIONS	

TO BE DETERMINED

INSTALLATION NOTES

1) ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.
2) VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE ENVIRONMENTAL INSPECTOR.
3) WORK SPACE: WORK SPACE LIMITS ARE DEPICTED. CLEARING WILL BE RESTRICTED TO THE WORK SPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA ALONG THE RIGHT-OF-WAY. CLEARING BETWEEN THE ENTRY AND EXIT POINTS IS LIMITED TO THE MINIMUM AMOUNT NECESSARY TO STRING LOCATION WIRES AND INSTALL PUMPS AND PIPING TO OBTAIN WATER (WHERE APPROVED).
4) WATER SOURCE: DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. THE CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT THE ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH THE CONSTRUCTION MITIGATION AND RECLAMATION PLAN (CMRP) AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATER BODY.
5) HYDROSTATIC TEST: PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. THE CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PROJECT PERMITS. DISCHARGES WILL BE BACK TO THE WATER SOURCE UNLESS OTHERWISE DIRECTED BY THE ENVIRONMENTAL INSPECTOR. DISCHARGES SHALL NOT CAUSE EROSION OR SEDIMENTATION. TO REDUCE THE VELOCITY OF THE DISCHARGE, THE CONTRACTOR SHALL UTILIZE AN ENERGY-DISSIPATING DEVICE AS DESCRIBED IN THE CMRP.
6) SPILL-PREVENTION: ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATER BODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATER BODIES AND WETLANDS. EACH CONSTRUCTION CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.
7) EROSION AND SEDIMENT CONTROL: CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH CONTRACT DOCUMENTS. CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
8) TOPSOIL SHALL BE STRIPPED AS REQUIRED BY PROJECT SPECIFICATIONS.
9) PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO KEYSTONE FOR APPROVAL.
10) INSTALLATION: THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK.
11) MUD DISPOSAL: CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISPOSED OF IN WATER BODIES OR WETLANDS. ANY DRILLING MUD WHICH INADVERTENTLY EXITS AT POINTS OTHER THAN THE ENTRY AND EXIT POINTS SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PRACTICAL AND DISPOSED OF AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS.
12) CLEANUP/STABILIZATION/RESTORATION: ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED IN PROJECT DOCUMENTS.
13) NOMINAL WORKING SPACE DIMENSIONS ARE SHOWN. LARGER AREAS MAY BE REQUIRED IN IRREGULAR TERRAIN. UPDATED DIMENSIONS MAY BE PROVIDED AFTER LOCAL TOPOGRAPHICAL SURVEYS ARE PERFORMED.

LEGEND

- POINT OF INTERSECTION (P.I.)
- ENTRY OR EXIT POINT
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- POWERPOLE
- MLP MAINLINE PIPE
- PIPELINE
- FOREIGN PIPELINE
- EDGE OF WATER
- PRIVATE ACCESS SHOO FLY ROAD
- COUNTY BOUNDARY
- WATER LEVEL
- USACOE CONSTRUCTION REFERENCE POINT
- WETLANDS
- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (02.15.09 CL)	THES0050388X	JB	AH	HF	RB	RG	TROW
1	12.08.08	ISSUED FOR REVIEW (12.1.08 CL)	THES0050388X	JB	AH	HF	RB	RG	TROW
0	07.07.08	PRELIMINARY DESIGN	THES0050388X	BM	JP	HF	RB	RG	TROW

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

Trow TROW ENGINEERING CONSULTANTS INC.

ConocoPhillips

TransCanada in business to deliver

HARDING SECTION

FIA # 4365	CHAINAGE: MP 292.1	DISCIPLINE # 03

LITTLE MISSOURI RIVER HDD INSTALLATION PROPOSED KEYSTONE XL PROJECT HARDING COUNTY, SOUTH DAKOTA

SCALE AS SHOWN	DRAWING No 4365-03-ML-03-001	REV 2

TC_UD_BR.DWG 22X34

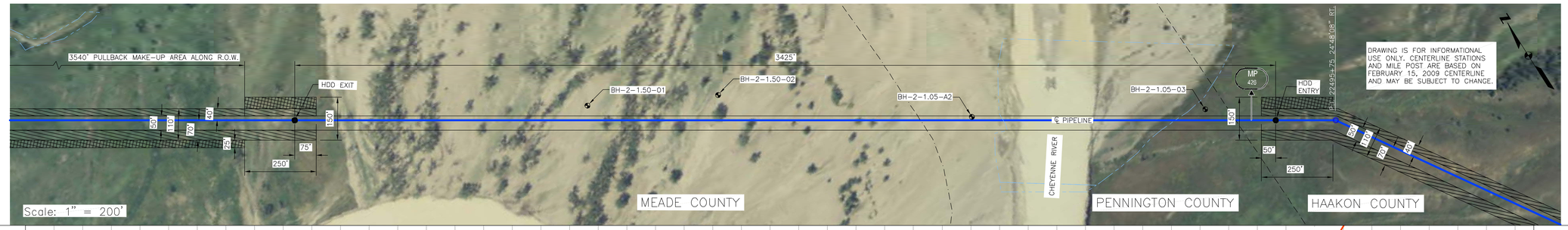
CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

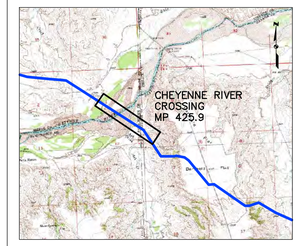
PLOTTED SIZE: ANSI D (22x34)

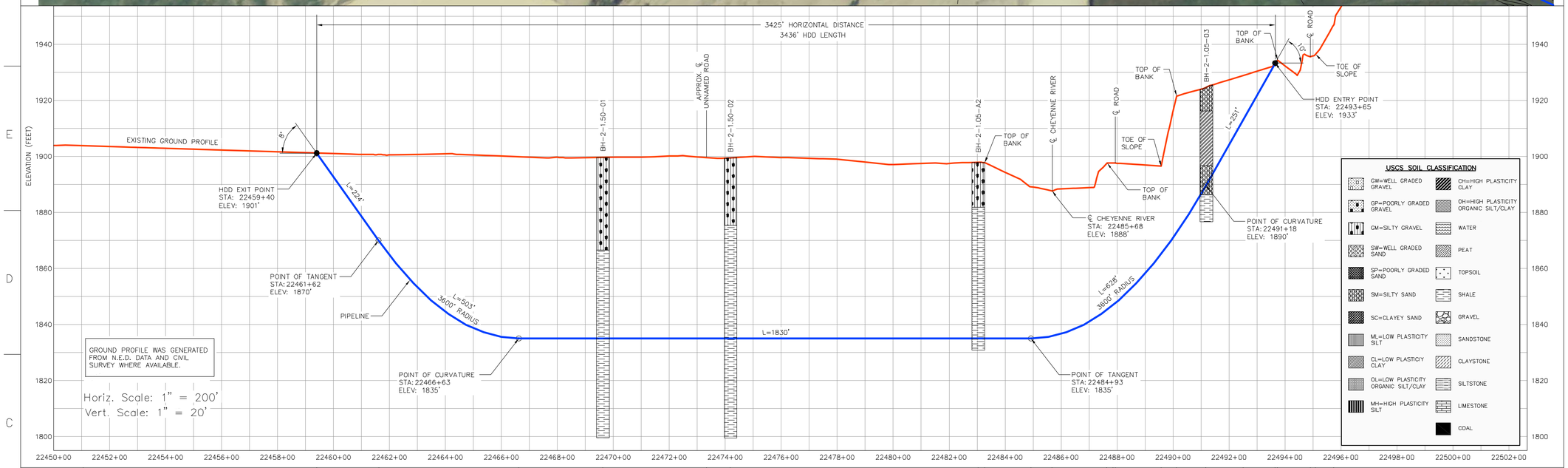
ID

TIME

DESIGNFILE







USCS SOIL CLASSIFICATION

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SM=SILTY SAND	SHALE
SC=CLAYEY SAND	GRAVEL
ML=LOW PLASTICITY SILT	SANDSTONE
CL=LOW PLASTICIY CLAY	CLAYSTONE
OL=LOW PLASTICITY ORGANIC SILT/CLAY	SILTSTONE
MH=HIGH PLASTICITY SILT	LIMESTONE
	COAL

CROSSING INFORMATION (DESCRIPTION STATIONING)	PIPELINE DATA	CONSTRUCTION WORKSPACE	ENVIRONMENTAL MITIGATION/RECLAMATION
22459+40 HDD EXIT POINT	MLP	LENGTH SCALE: N.T.S. HDD EXIT	TOPSOIL SALVAGE METHOD
22461+62 PT OF TANGENT	PIPELINE DATA: 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING.		STREAMS
22466+63 PT OF CURVATURE			WETLANDS
22469+62 BH-2-1.05-01			TIMING CONSRAINTS
22473+33 APPROX. ℄ UNNAMED ROAD		LIMIT OF PERMANENT EASEMENT	MILEPOST
22474+18 BH-2-1.05-02			MONITORING
22483+04 BH-2-1.05-03			RECLAMATION
22483+27 TOP OF BANK			SPECIAL CONSIDERATIONS
22484+93 PT OF TANGENT			
22485+68 ℄ CHEYENNE RIVER			
22487+64 TOP OF BANK			
22487+86 BH-2-1.05-04			
22487+93 ℄ UNNAMED ROAD			
22489+58 TOE OF SLOPE			
22490+13 TOP OF BANK			
22491+18 PT OF CURVATURE			
22491+19 BH-2-1.05-05			
22492+45 BH-2-1.05-06			
22493+65 HDD ENTRY POINT		HDD ENTRY	
22493+73 TOP OF BANK			
22494+91 ℄ UNNAMED ROAD			
22495+09 TOE OF SLOPE			
22495+75 P.I. 24°48'08" RT.			

TO BE DETERMINED

INSTALLATION NOTES

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- GEOTECHNICAL BOREHOLE
- POWERPOLE
- MLP — MAINLINE PIPE
- PIPELINE
- FOREIGN PIPELINE
- EDGE OF WATER
- PRIVATE ACCESS SHOO FLY ROAD
- COUNTY BOUNDARY
- WATER LEVEL
- USACOE CONSTRUCTION REFERENCE POINT
- WETLANDS
- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (02.15.09 CL)	THES0050388X	JB	AH	HF	RB	RG	TROW
1	12.08.08	ISSUED FOR REVIEW (12.1.08 CL)	THES0050388X	BM	AH	HF	RB	RG	TROW
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)	THES0050388X	BM	JP	HF	RB	RG	TROW

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

Trow ENGINEERING CONSULTANTS INC. | ConocoPhillips | TransCanada — In business to deliver

FAITH SECTION

FIA # 4367 | CHAINAGE: MP 425.9 | DISCIPLINE # 03

CHEYENNE RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
MEADE & HAAKON COUNTY, SOUTH DAKOTA

SCALE AS SHOWN | DRAWING No 4367-03-ML-03-001 | REV 2

TC_UD_BR.DWG 22x34

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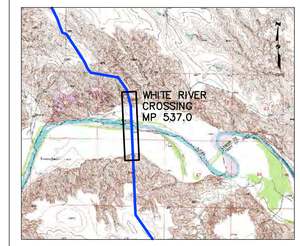
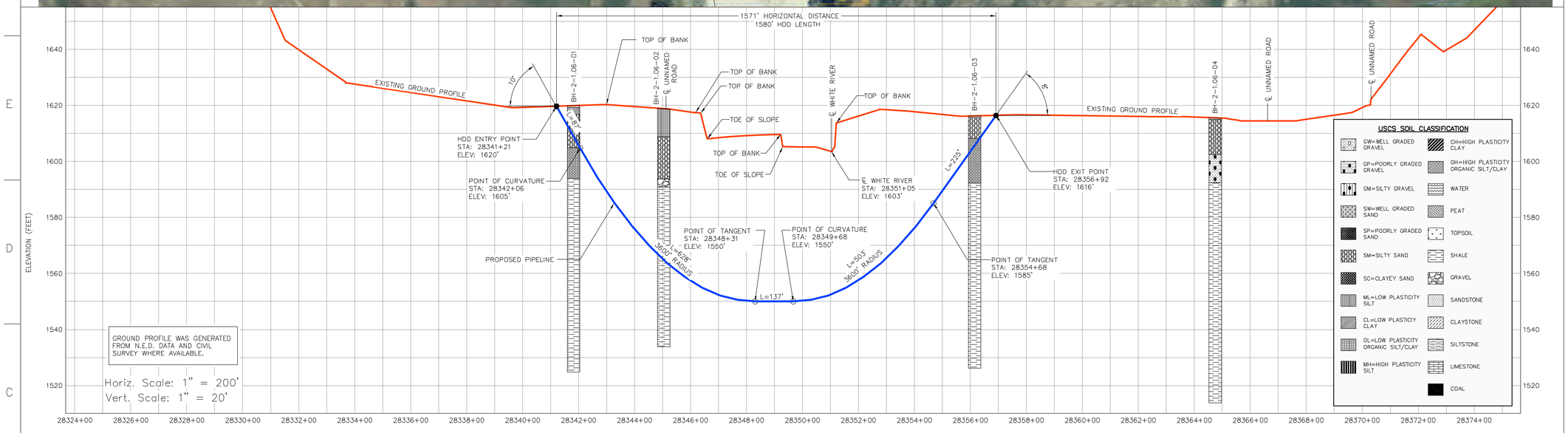
PLOTTED SIZE: ANSI D (22x34)

ID — TIME — DESIGNFILE





GROUND PROFILE WAS GENERATED FROM N.E.D. DATA AND CIVIL SURVEY WHERE AVAILABLE.

Horiz. Scale: 1" = 200'
Vert. Scale: 1" = 20'

USCS SOIL CLASSIFICATION

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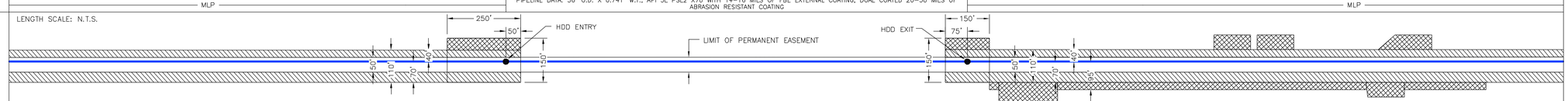
	COAL

CROSSING INFORMATION (FROM HDD STATIONING)	28333+66 P.I. 12.30°48" RT.	28341+21 HDD ENTRY POINT	28341+82 BH-2-1.06-01	28342+06 PT OF CURVATURE	28343+00 TOP OF BANK	28345+05 BH-2-1.06-02	28345+12 ℄ UNNAMED ROAD	28346+19 TOP OF BANK	28346+37 TOP OF BANK	28346+68 TOE OF SLOPE	28348+31 PT OF TANGENT	28349+22 TOP OF BANK	28349+29 TOE OF SLOPE	28349+68 PT OF CURVATURE	28351+05 ℄ WHITE RIVER	28351+22 TOP OF BANK	28354+68 PT OF TANGENT	28356+15 BH-2-1.06-03	28356+92 HDD EXIT POINT	28364+75 BH-2-1.06-04	28366+63 ℄ UNNAMED ROAD	28370+31 ℄ UNNAMED ROAD
PIPELINE DATA	MLP	PIPELINE DATA: 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING																				MLP



ENVIRONMENTAL MITIGATION/RECLAMATION	
	TOPSOIL SALVAGE METHOD
	STREAMS
	WETLANDS
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	MILEPOST
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	RECLAMATION
	SPECIAL CONSIDERATIONS

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REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
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PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

TROW ENGINEERING CONSULTANTS INC.

ConocoPhillips

TransCanada — In business to deliver

MURDO SECTION

FIA # 4369 | CHAINAGE: MP 537.0 | DISCIPLINE # 03

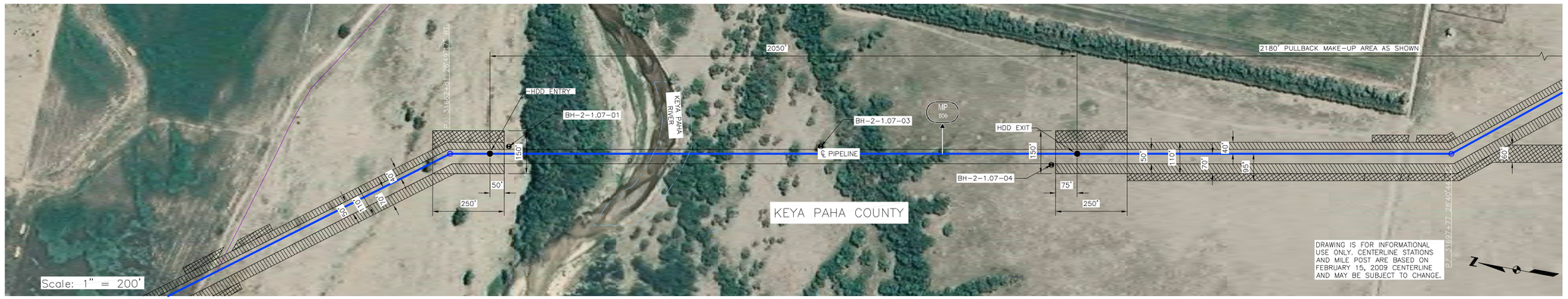
WHITE RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
LYMAN COUNTY, SOUTH DAKOTA

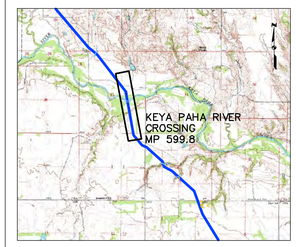
SCALE AS SHOWN | DRAWING No 4369-03-ML-03-001 | REV 2

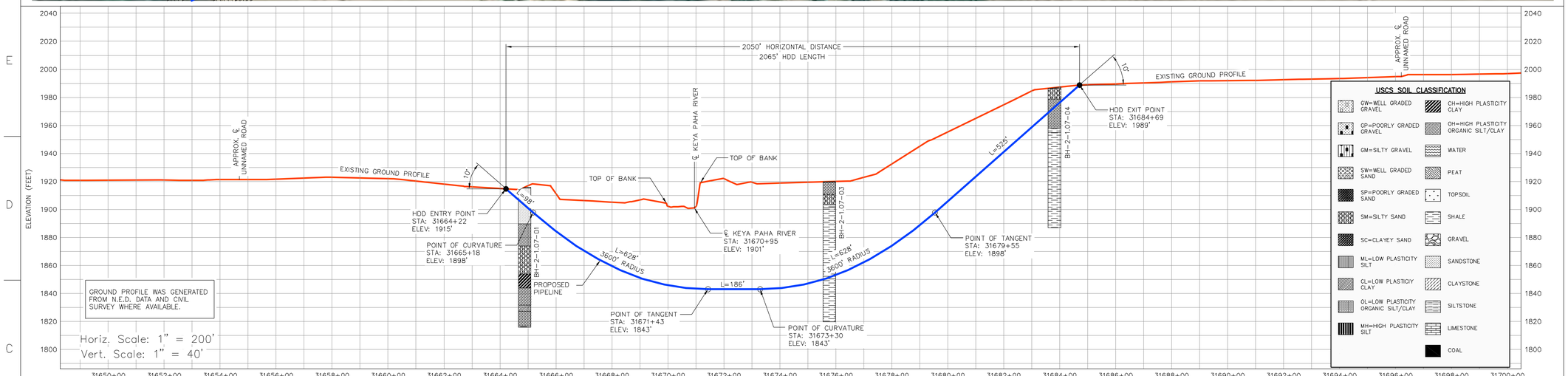
PLOTTED SIZE: ANSI D (22x34)

ID: TC_UD_BR.DWG 22X34

TIME: DESIGNFILE







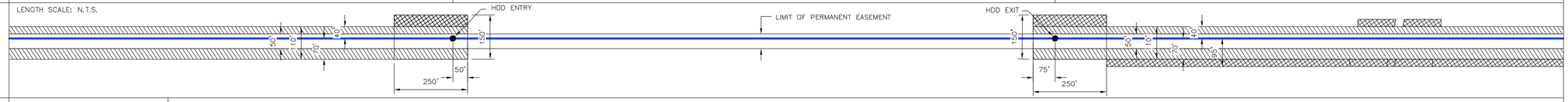
USCS SOIL CLASSIFICATION

GW=WELL GRADED GRAVEL	CH=HIGH PLASTICITY CLAY
GP=POORLY GRADED GRAVEL	OH=HIGH PLASTICITY ORGANIC SILT/CLAY
GM=SILTY GRAVEL	WATER
SW=WELL GRADED SAND	PEAT
SP=POORLY GRADED SAND	TOPSOIL
SM=SILTY SAND	SHALE
SC=CLAYEY SAND	GRAVEL
ML=LOW PLASTICITY SILT	SANDSTONE
CL=LOW PLASTICITY CLAY	CLAYSTONE
OL=LOW PLASTICITY ORGANIC SILT/CLAY	SILTSTONE
MH=HIGH PLASTICITY SILT	LIMESTONE
	COAL

CROSSING INFORMATION (DRAWING STATIONING)	31654+68 APPROX. ℄ UNNAMED ROAD	31662+81 P.I. 26°49'17" RT.	31664+22 HDD ENTRY POINT	31664+88 BH-2-1.07-01	31665+18 PT OF CURVATURE	31669+95 TOP OF BANK	31670+95 ℄ KEYA PAHA RIVER	31671+16 TOP OF BANK	31671+43 PT OF TANGENT	31673+30 PT OF CURVATURE	31675+77 BH-2-1.07-03	31679+55 PT OF TANGENT	31683+82 BH-2-1.07-04	31684+69 HDD EXIT POINT	31695+21 ℄ UNNAMED ROAD	31697+77 P.I. 28°40'44" LT.
PIPELINE DATA	MLP	PIPELINE DATA: 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING.														MLP

CONSTRUCTION WORKSPACE

LENGTH SCALE: N.T.S.



ENVIRONMENTAL MITIGATION/RECLAMATION	
	TOPSOIL SALVAGE METHOD
	STREAMS
	WETLANDS
	TIMING CONSRAINTS
	MILEPOST
	MONITORING
	RECLAMATION
	SPECIAL CONSIDERATIONS

TO BE DETERMINED

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3) WORK SPACE: WORK SPACE LIMITS ARE DEPICTED. CLEARING WILL BE RESTRICTED TO THE WORK SPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA ALONG THE RIGHT-OF-WAY. CLEARING BETWEEN THE ENTRY AND EXIT POINTS IS LIMITED TO THE MINIMUM AMOUNT NECESSARY TO STRING LOCATION WIRES AND INSTALL PUMPS AND PIPING TO OBTAIN WATER (WHERE APPROVED).

4) WATER SOURCE: DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. THE CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT THE ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH THE CONSTRUCTION MITIGATION AND RECLAMATION PLAN (CMRP) AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATER BODY.

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6) SPILL-PREVENTION: ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATER BODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATER BODIES AND WETLANDS. EACH CONSTRUCTION CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.

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12) CLEANUP/STABILIZATION/RESTORATION: ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED IN PROJECT DOCUMENTS.

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LEGEND

- POINT OF INTERSECTION (P.I.)
- ENTRY OR EXIT POINT
- GEOTECHNICAL BOREHOLE
- POWERPOLE
- MLP — MAINLINE PIPE
- PIPELINE
- FOREIGN PIPELINE
- EDGE OF WATER
- PRIVATE ACCESS SHOO FLY ROAD
- COUNTY BOUNDARY
- WATER LEVEL
- USACOE CONSTRUCTION REFERENCE POINT
- WETLANDS
- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
3	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.15.09 CL)	THES0050388XS	BM	AH	FP	YC	RG	TROW
2	04.21.09	ISSUED FOR REVIEW (02.15.09 CL)	THES0050388XS	AH	AH	FP	YC	RG	TROW
1	12.08.08	ISSUED FOR REVIEW (12.1.08 CL)	THES0050388X	BM	AH	HF	RB	RG	TROW
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)	THES0050388X	JB	JP	HF	RB	RG	TROW

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL

DATE

PRELIMINARY

REV. NO.	DATE	PERMIT NUMBER:

Trow
TROW ENGINEERING CONSULTANTS INC.

ConocoPhillips

TransCanada
In business to deliver

COLOME SECTION

FIA #	CHAINAGE:	DISCIPLINE #
4371	MP 599.8	03

KEYA PAHA RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
KEYA PAHA COUNTY, NEBRASKA

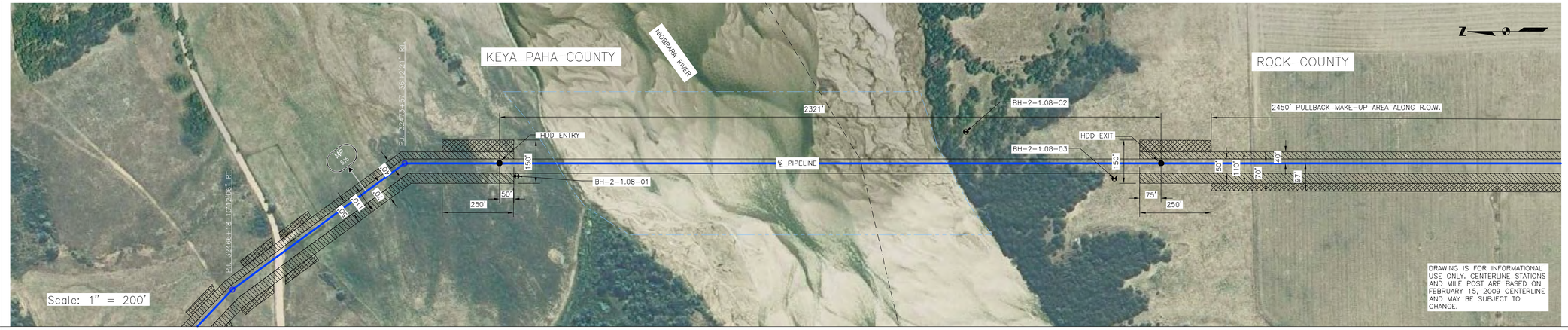
SCALE	DRAWING No	REV
AS SHOWN	4371-03-ML-03-001	3

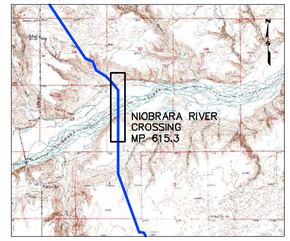
ID — TC_UD_BR.DWG 22x34

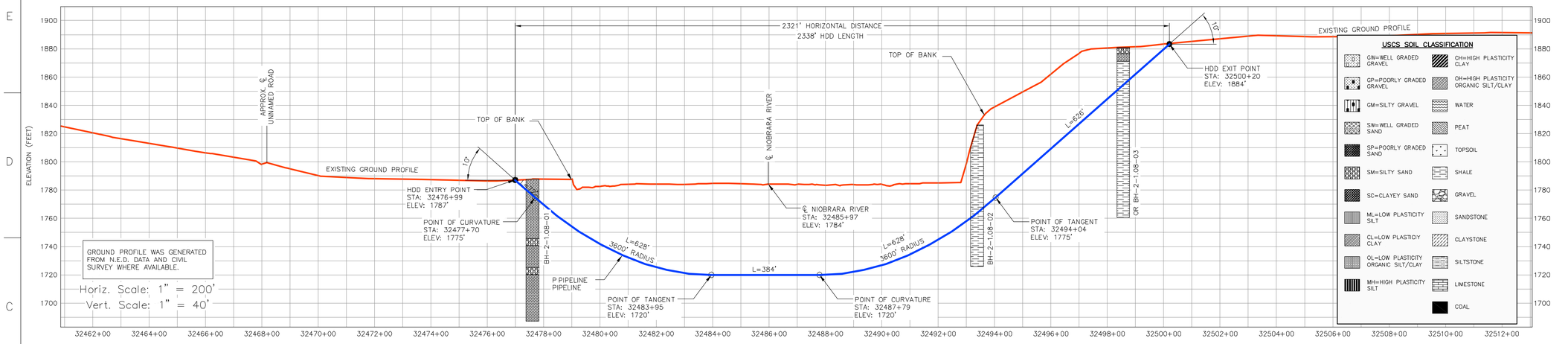
TIME — DESIGNFILE

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)

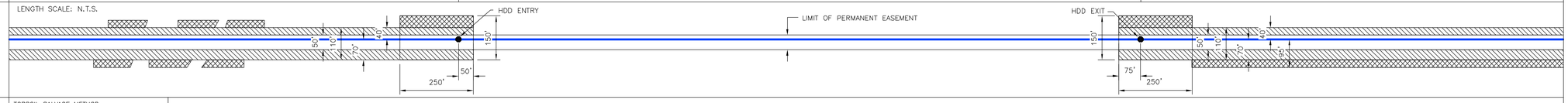






CROSSING INFORMATION (NOT TO SCALE)	32466+18 P.I. 10°12'06" RT.	32468+18 APPROX. ℄ UNNAMED ROAD	32473+67 P.I. 36°12'21" RT.	32476+99 HDD ENTRY POINT STA: 32477+70 BH-2-1.08-01	32477+70 PT OF CURVATURE	32479+61 TOP OF BANK	32483+95 PT OF TANGENT	32485+97 ℄ NIOBRARA RIVER	32487+79 PT OF CURVATURE	32493+36 BH-2-1.08-02	32493+64 TOP OF BANK	32494+04 PT OF TANGENT	32498+56 BH-2-1.08-03	32500+20 HDD EXIT POINT
PIPELINE DATA	MLP													MLP

PIPELINE DATA: 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING.



ENVIRONMENTAL MITIGATION/RECLAMATION	
	TOPSOIL SALVAGE METHOD
	STREAMS
	WETLANDS
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REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.15.09 CL)	THES0050388X	BM	AH	HF	RB	RG	TROW
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PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

Trow ENGINEERING CONSULTANTS INC. | ConocoPhillips | TransCanada In business to deliver

COLOME SECTION

FIA # 4371 | CHAINAGE: MP 615.3 | DISCIPLINE # 03

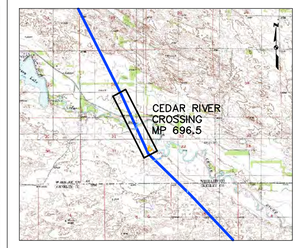
NIOBRARA RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
KEYA PAHA & ROCK COUNTY, NEBRASKA

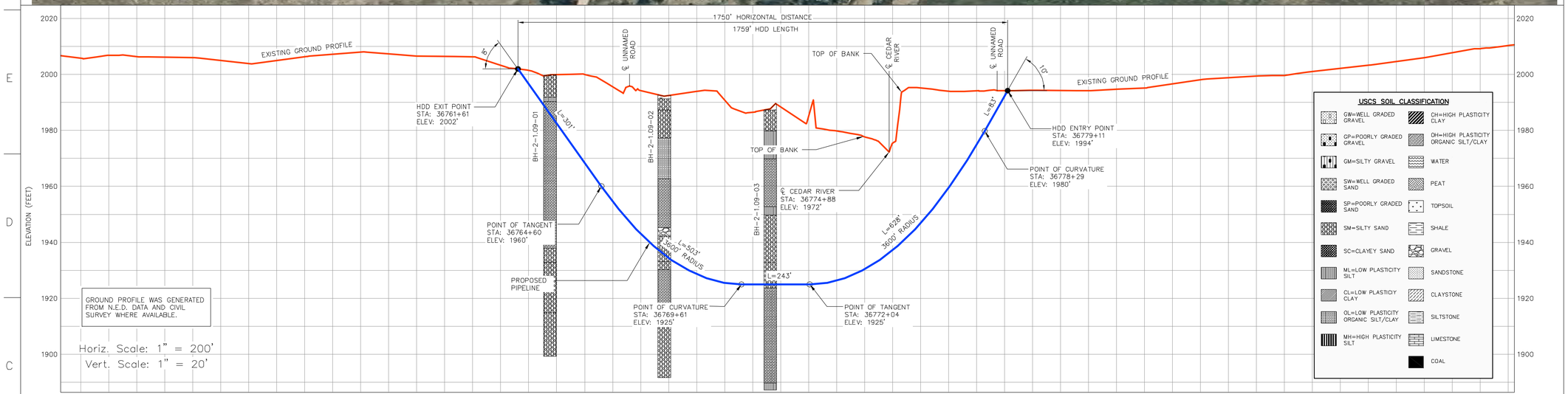
SCALE AS SHOWN | DRAWING No 4371-03-ML-03-002 | REV 2

PLOTTED SIZE: ANSI D (22x34)

TC_UD_BR.DWG 22x34

DESIGNFILE TIME





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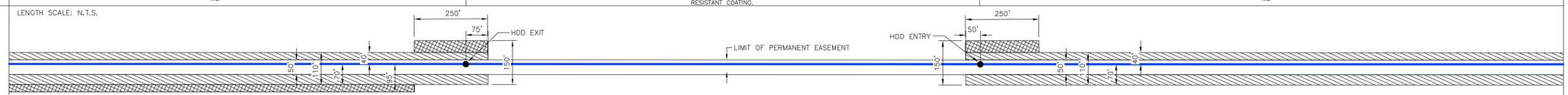
	COAL

CROSSING INFORMATION (DRAWING STATIONING)	36746+09 P.I. 02°02'49" RT.	36761+61 HDD EXIT POINT	36762+77 BH-2-1.11-02	36764+60 PT OF TANGENT	36765+60 ℄ UNNAMED ROAD	36766+85 BH-2-1.11-02	36769+61 PT OF CURVATURE	36770+63 BH-2-1.11-02	36772+04 PT OF TANGENT	36773+96 TOP OF BANK	36774+88 ℄ CEDAR RIVER	36775+32 TOP OF BANK	36778+29 PT OF CURVATURE	36778+74 ℄ UNNAMED ROAD	36779+11 HDD ENTRY POINT	36797+23 P.I. 20°59'37" LT.
PIPELINE DATA	MLP	PIPELINE DATA: 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING.													MLP	

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION	
	TOPSOIL SALVAGE METHOD
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GROUND PROFILE WAS GENERATED FROM N.E.D. DATA AND CIVIL SURVEY WHERE AVAILABLE.

Horiz. Scale: 1" = 200'
Vert. Scale: 1" = 20'

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION

REV No	DATE	DESCRIPTION
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.15.09 CL)
1	12.08.08	ISSUED FOR REVIEW (12.1.08 CL)
0	08.06.08	PRELIMINARY DESIGN

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
THES0050388X	BM	AH	HF	RB	RG	TROW
THES0050388X	AH	AH	FP	RB	RG	TROW
THES0050388X	JB	JP	FP	RB	RG	TROW

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL

DATE

PRELIMINARY

REV. NO.	DATE	PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

Trow
TROW ENGINEERING CONSULTANTS INC.

ConocoPhillips

TransCanada
In business to deliver

ERICSON SECTION

FIA #	CHAINAGE:	DISCIPLINE #
4373	MP 696.5	03

CEDAR RIVER HDD INSTALLATION
PROPOSED KEYSTONE XL PROJECT
WHEELER COUNTY, NEBRASKA

SCALE	DRAWING No	REV
AS SHOWN	4373-03-ML-03-001	2

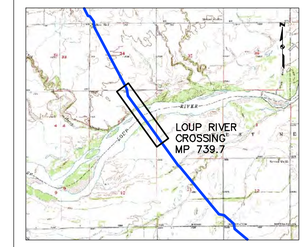
PLOTTED SIZE: ANSI D (22x34)

ID

TC_UD_BR.DWG 22X34

TIME

DESIGNFILE



GROUND PROFILE WAS GENERATED FROM N.E.D. DATA AND CIVIL SURVEY WHERE AVAILABLE.

Horiz. Scale: 1" = 200'
Vert. Scale: 1" = 20'

USCS SOIL CLASSIFICATION

GW=WELL GRADED GRAVEL	CH=HIGH PLASTICITY CLAY
GP=POORLY GRADED GRAVEL	OH=HIGH PLASTICITY ORGANIC SILT/CLAY
GM=SILTY GRAVEL	WATER
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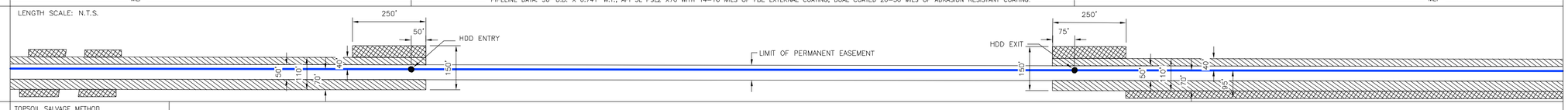
SP=POORLY GRADED SAND	TOPSOIL
SM=SILTY SAND	SHALE
SC=CLAYEY SAND	GRAVEL
ML=LOW PLASTICITY SILT	SANDSTONE
CL=LOW PLASTICITY CLAY	CLAYSTONE
OL=LOW PLASTICITY ORGANIC SILT/CLAY	SILTSTONE
MH=HIGH PLASTICITY SILT	LIMESTONE
	COAL

CROSSING INFORMATION (DEGREE OF STATIONING)	39032+48 P.I. 1°23'11" RT.	39033+90 ℄ PLEASANT VALLEY ROAD	39034+57 P.I. 00°43'13" LT.	39038+02 P.I. 2°45'56" LT.	39045+64 HDD ENTRY POINT	39045+85 BH-2-1.10-01	39046+74 PT OF CURVATURE	39048+68 BH-2-1.10-02	39052+99 PT OF TANGENT	39057+84 ℄ LOUP RIVER	39062+40 PT OF CURVATURE	39065+49 TOP OF BANK	39067+34 BH-2-1.10-03	39067+40 PT OF TANGENT	39068+24 HDD EXIT POINT	39068+67 BH-2-1.10-04	39074+92 P.I. 00°01'00" RT.
PIPELINE DATA	MLP — PIPELINE DATA: 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP																



ENVIRONMENTAL MITIGATION/RECLAMATION	
	TOPSOIL SALVAGE METHOD
	STREAMS
	WETLANDS
	TIMING CONSRAINTS
	MILEPOST
	MONITORING
	RECLAMATION
	SPECIAL CONSIDERATIONS

TO BE DETERMINED

INSTALLATION NOTES

1) ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.

2) VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE ENVIRONMENTAL INSPECTOR.

3) WORK SPACE: WORK SPACE LIMITS ARE DEPICTED. CLEARING WILL BE RESTRICTED TO THE WORK SPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA ALONG THE RIGHT-OF-WAY. CLEARING BETWEEN THE ENTRY AND EXIT POINTS IS LIMITED TO THE MINIMUM AMOUNT NECESSARY TO STRING LOCATION WIRES AND INSTALL PUMPS AND PIPING TO OBTAIN WATER (WHERE APPROVED).

4) WATER SOURCE: DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. THE CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT THE ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH THE CONSTRUCTION MITIGATION AND RECLAMATION PLAN (CMRP) AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATER BODY.

5) HYDROSTATIC TEST: PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. THE CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PROJECT PERMITS. DISCHARGES WILL BE BACK TO THE WATER SOURCE UNLESS OTHERWISE DIRECTED BY THE ENVIRONMENTAL INSPECTOR. DISCHARGES SHALL NOT CAUSE EROSION OR SEDIMENTATION. TO REDUCE THE VELOCITY OF THE DISCHARGE, THE CONTRACTOR SHALL UTILIZE AN ENERGY-DISSIPATING DEVICE AS DESCRIBED IN THE CMRP.

6) SPILL-PREVENTION: ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATER BODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATER BODIES AND WETLANDS. EACH CONSTRUCTION CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.

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8) TOPSOIL SHALL BE STRIPPED AS REQUIRED BY PROJECT SPECIFICATIONS.

9) PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO KEYSTONE FOR APPROVAL.

10) INSTALLATION: THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK.

11) MUD DISPOSAL: CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISPOSED OF IN WATER BODIES OR WETLANDS. ANY DRILLING MUD WHICH INADVERTENTLY EXITS AT POINTS OTHER THAN THE ENTRY AND EXIT POINTS SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PRACTICAL AND DISPOSED OF AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS.

12) CLEANUP/STABILIZATION/RESTORATION: ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED IN PROJECT DOCUMENTS.

13) NOMINAL WORKING SPACE DIMENSIONS ARE SHOWN. LARGER AREAS MAY BE REQUIRED IN IRREGULAR TERRAIN. UPDATED DIMENSIONS MAY BE PROVIDED AFTER LOCAL TOPOGRAPHICAL SURVEYS ARE PERFORMED.

LEGEND

- POINT OF INTERSECTION (P.I.)
- ENTRY OR EXIT POINT
- GEOTECHNICAL BOREHOLE
- POWERPOLE
- MLP — MAINLINE PIPE
- PIPELINE
- FOREIGN PIPELINE
- EDGE OF WATER
- PRIVATE ACCESS SHOO FLY ROAD
- COUNTY BOUNDARY
- WATER LEVEL
- USACOE CONSTRUCTION REFERENCE POINT
- WETLANDS
- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.15.09 CL)	THES0050388X	BM	AH	HF	RB	RG	TROW
1	12.08.08	ISSUED FOR REVIEW (12.1.08 CL)	THES0050388X	AH	AH	HF	RB	RG	TROW
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)	THES0050388X	JB	JP	HF	RB	RG	TROW

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

Trow
TROW ENGINEERING CONSULTANTS INC.

ConocoPhillips

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In business to deliver

ERICSON SECTION

FIA # 4373 | CHAINAGE: MP 739.7 | DISCIPLINE # 03

LOUP RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
NANCE COUNTY, NEBRASKA

SCALE AS SHOWN | DRAWING No 4373-03-ML-03-002 | REV 2

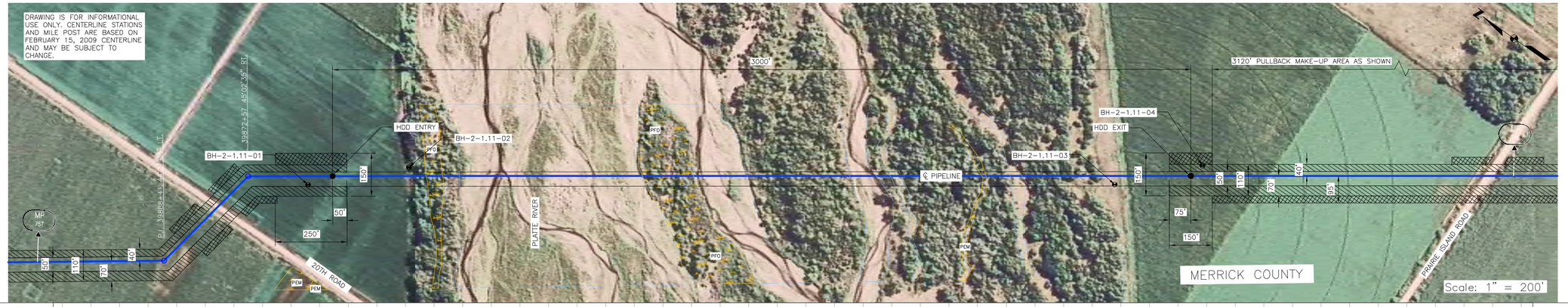
PLOTTED SIZE: ANSI D (22x34)

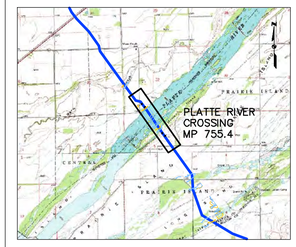
TC_UD_BR.DWG 22X34

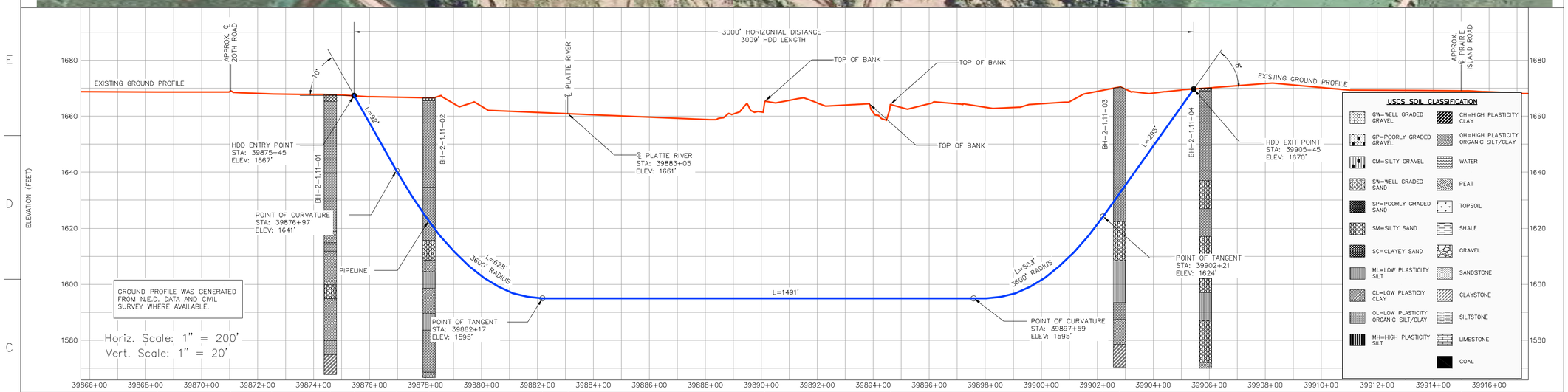
ID

TIME — DESIGNFILE

DRAWING IS FOR INFORMATIONAL USE ONLY. CENTERLINE STATIONS AND MILE POST ARE BASED ON FEBRUARY 15, 2009 CENTERLINE AND MAY BE SUBJECT TO CHANGE.



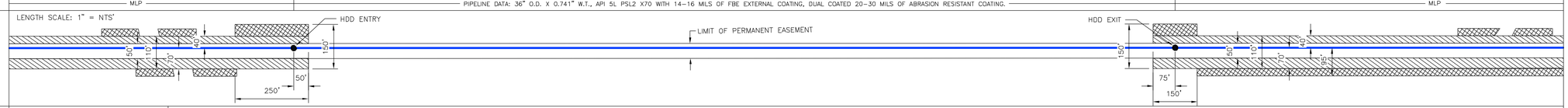




GROUND PROFILE WAS GENERATED FROM N.E.D. DATA AND CIVIL SURVEY WHERE AVAILABLE.

Horiz. Scale: 1" = 200'
Vert. Scale: 1" = 20'

CROSSING INFORMATION (CENTERLINE STATIONING)	39868+41 P.I. 44°27'08" LT.	39871+04 APPROX. ℄ 20TH ROAD	39872+57 P.I. 45°02'35" RT.	39874+60 BH-2-1.11-01	39875+45 HDD ENTRY POINT	39876+97 PT OF CURVATURE	39878+13 BH-2-1.11-02	39882+17 PT OF TANGENT	39883+05 ℄ PLATTE RIVER	39890+12 TOP OF BANK	39893+85 TOP OF BANK	39894+61 TOP OF BANK	39897+59 PT OF CURVATURE	39902+21 PT OF TANGENT	39902+80 BH-2-1.11-03	39905+45 HDD EXIT POINT	39905+86 BH-2-1.11-04	39915+01 APPROX. ℄ PRAIRIE ISLAND ROAD
PIPELINE DATA	MLP	PIPELINE DATA: 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING.																MLP



ENVIRONMENTAL MITIGATION/RECLAMATION	
	TOPSOIL SALVAGE METHOD
	STREAMS
	WETLANDS
	TIMING CONSRAINTS
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	MONITORING
	RECLAMATION
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GW=WELL GRADED GRAVEL	CH=HIGH PLASTICITY CLAY
GP=POORLY GRADED GRAVEL	OH=HIGH PLASTICITY ORGANIC SILT/CLAY
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SW=WELL GRADED SAND	PEAT
SP=POORLY GRADED SAND	TOPSOIL
SM=SILTY SAND	SHALE
SC=CLAYEY SAND	GRAVEL
ML=LOW PLASTICITY SILT	SANDSTONE
CL=LOW PLASTICITY CLAY	CLAYSTONE
OL=LOW PLASTICITY ORGANIC SILT/CLAY	SILTSTONE
MH=HIGH PLASTICITY SILT	LIMESTONE
	COAL

LEGEND

- POINT OF INTERSECTION (P.I.)
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- POWERPOLE
- MLP — MAINLINE PIPE
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- FOREIGN PIPELINE
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- WATER LEVEL
- USACOE CONSTRUCTION REFERENCE POINT
- WETLANDS
- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.15.09 CL)	THES0050388X	BM	AH	HF	RB	RG	TROW
1	12.08.08	ISSUED FOR REVIEW (12.1.08.CL)	THES0050388X	AH	AH	HF	RB	RG	TROW
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PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

Trow ENGINEERING CONSULTANTS INC.

ConocoPhillips

TransCanada — In business to deliver

CENTRAL CITY SECTION

FIA # 4374 | CHAINAGE: MP 755.4 | DISCIPLINE # 03

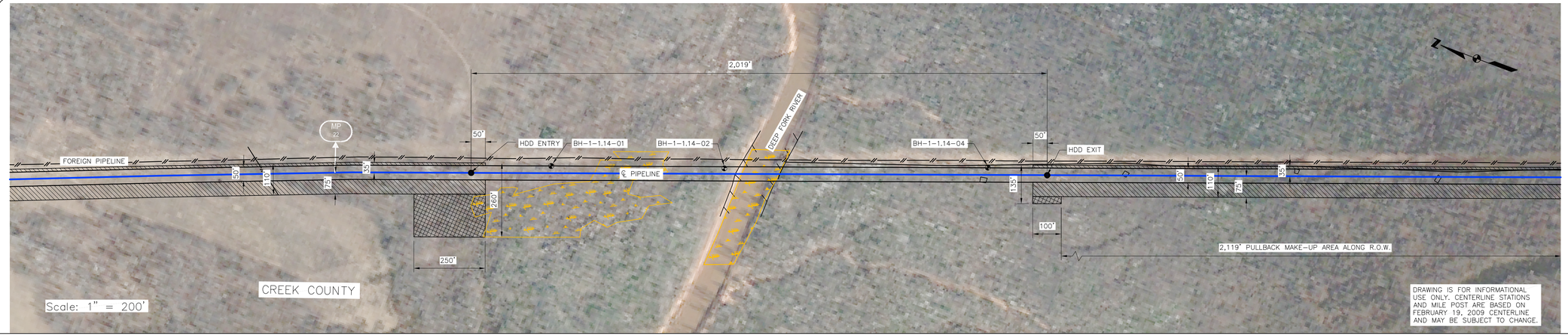
PLATTE RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
MERRICK COUNTY, NEBRASKA

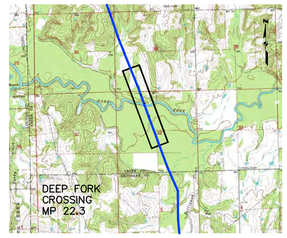
SCALE AS SHOWN | DRAWING No 4374-03-ML-03-001 | REV 2

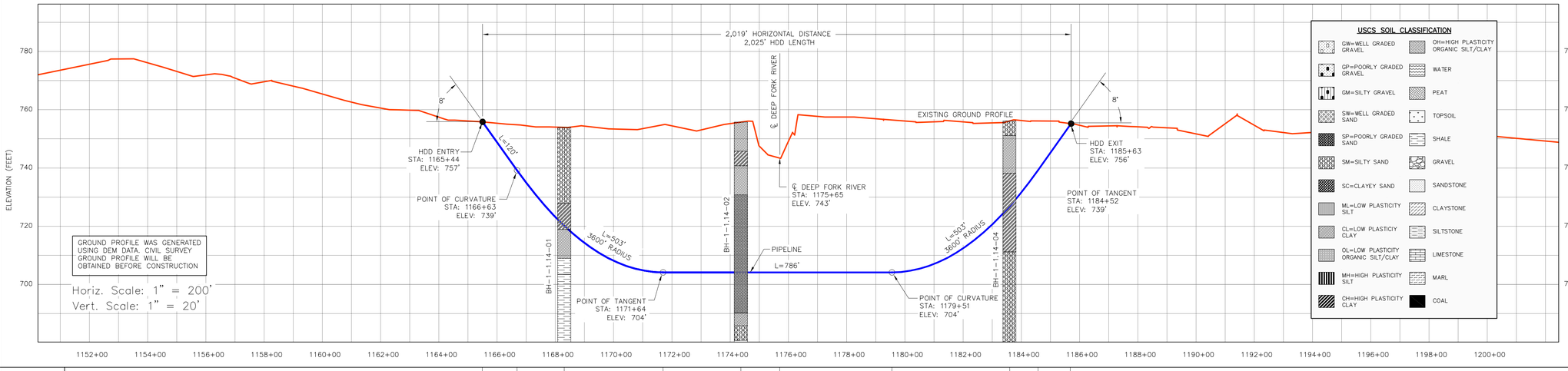
PLOTTED SIZE: ANSI D (22x34)

TC_UD_BR.DWG 22X34

ID — TIME — DESIGNFILE







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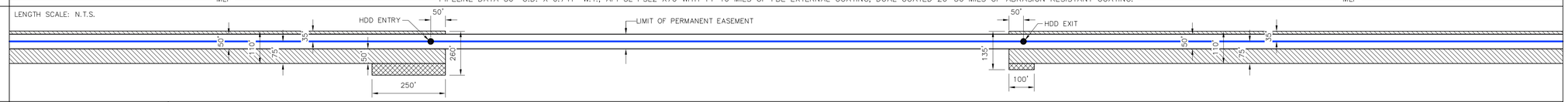
MH=HIGH PLASTICITY SILT	MARL
CH=HIGH PLASTICITY CLAY	COAL

CROSSING INFORMATION (ESTIMATED STATIONING)	1165+44 HDD ENTRY	1166+63 PT OF CURVATURE	1168+30 BH-1-1.14-01	1171+64 PT OF TANGENT	1174+37 BH-1-1.14-02	1175+65 ℄ DEEP FORK RIVER	1179+51 PT OF CURVATURE	1183+60 BH-1-1.14-04	1184+52 PT OF TANGENT	1185+63 HDD EXIT

PIPELINE DATA: MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION	
TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSRAINTS	
MILEPOST	
MONITORING	
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SPECIAL CONSIDERATIONS	

TO BE DETERMINED

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LEGEND

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- ENTRY OR EXIT POINT
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- POWERPOLE
- MLP — MAINLINE PIPE
- PIPELINE
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REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_14	11042 HDD XREF_14.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (02.19.09 CL)	11042	UEI	UEI	DW	JW	JH	UEI
1	03.19.09	ISSUED FOR TROW REVIEW	11042	UEI	UEI	DW	JW	JH	UEI
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)	11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL — DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada — In business to deliver

FIA #	CHAINAGE:	DISCIPLINE #
1866	M.P. 22.3	03

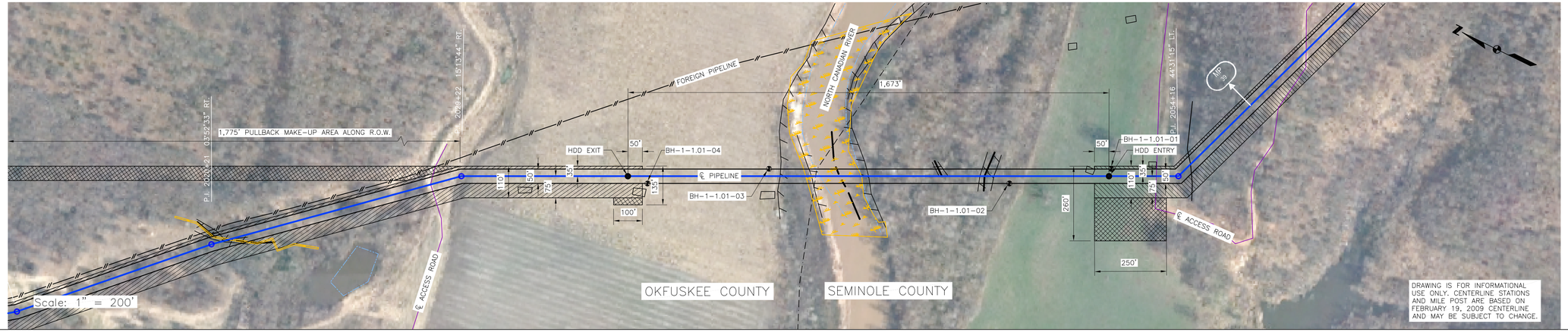
DEEP FORK HDD INSTALLATION
KEYSTONE XL PROJECT
CREEK COUNTY, OKLAHOMA

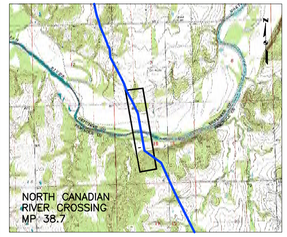
SCALE	DRAWING No	REV
AS SHOWN	1866-03-ML-03-001	2

TC_UD_BR.DWG 22X34

PLOTTED SIZE: ANSI D (22x34)

DESIGNFILE — TIME





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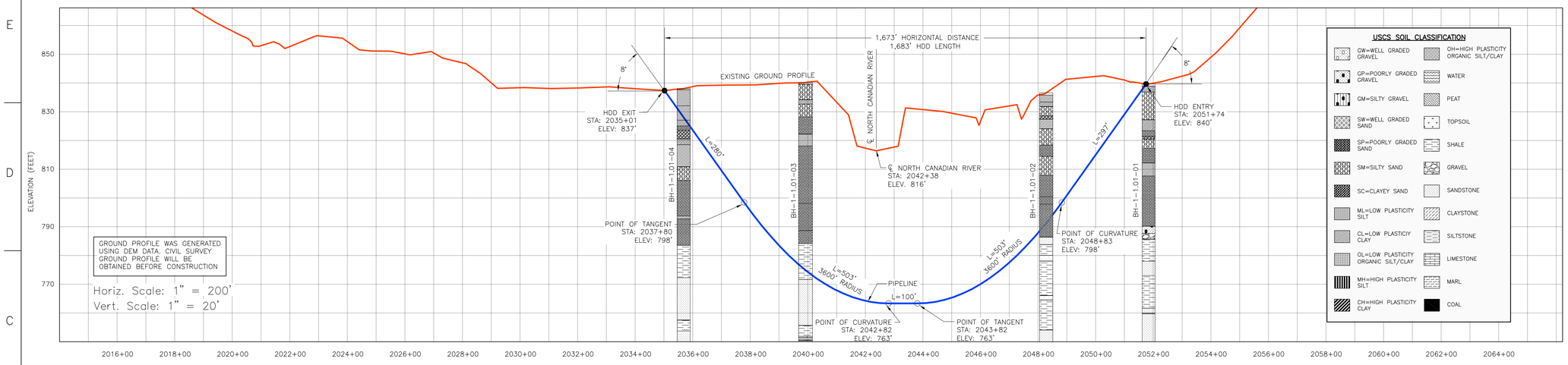
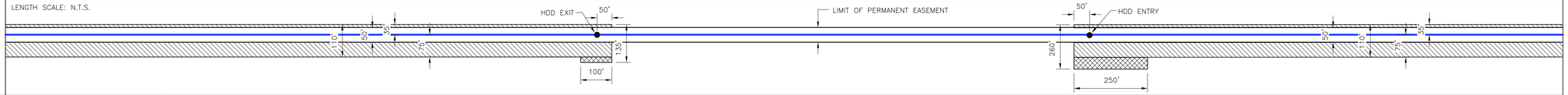


USCS SOIL CLASSIFICATION

- GW=WELL GRADED GRAVEL
- GP=POORLY GRADED GRAVEL
- GM=SILTY GRAVEL
- SW=WELL GRADED SAND
- SP=POORLY GRADED SAND
- SM=SILTY SAND
- SC=CLAYEY SAND
- ML=LOW PLASTICITY SILT
- CL=LOW PLASTICIY CLAY
- OL=LOW PLASTICITY ORGANIC SILT/CLAY
- MH=HIGH PLASTICITY SILT
- CH=HIGH PLASTICITY CLAY
- OH=HIGH PLASTICITY ORGANIC SILT/CLAY
- WATER
- PEAT
- TOPSOIL
- SHALE
- GRAVEL
- SANDSTONE
- CLAYSTONE
- SILTSTONE
- LIMESTONE
- MARL
- COAL

CROSSING INFORMATION (ESTIMATED STATIONING)	2020+21 P.I. 03°52'33" RT.	2029+22 P.I. 15°13'44" RT.	2035+01 HDD EXIT	2035+69 BH-1-1.01-04	2037+80 PT OF TANGENT	2039+92 BH-1-1.01-03	2042+38 ℄ NORTH CANADIAN RIVER	2042+82 PT OF CURVATURE	2043+82 PT OF TANGENT	2048+28 BH-1-1.01-02	2048+83 PT OF CURVATURE	2051+74 HDD ENTRY	2051+82 BH-1-1.01-01	2054+16 P.I. 44°31'15" LT.
PIPELINE DATA	MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP													



ENVIRONMENTAL MITIGATION/RECLAMATION	
TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSRAINTS	
MILEPOST	
MONITORING	
RECLAMATION	
SPECIAL CONSIDERATIONS	

TO BE DETERMINED

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DRAWING No	TITLE
11042 HDD XREF_14	11042 HDD XREF_14.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
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REVISION

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
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0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)	11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL — DATE

PRELIMINARY

REV. NO.	DATE	PERMIT NUMBER:

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA # 1866	CHAINAGE: M.P. 38.7	DISCIPLINE # 03

NORTH CANADIAN RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
OKFUSKEE & SEMINOLE COUNTY, OKLAHOMA

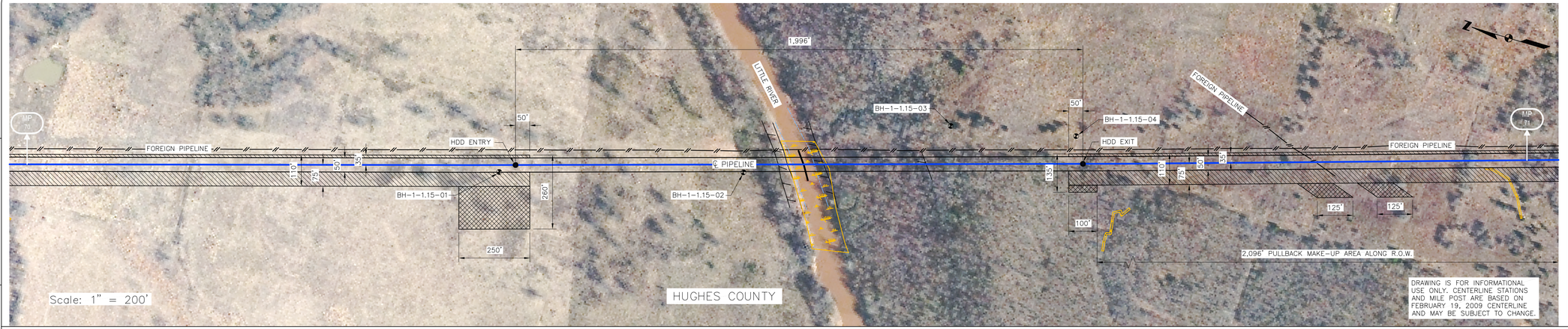
SCALE AS SHOWN	DRAWING No 1866-03-ML-03-002	REV 2

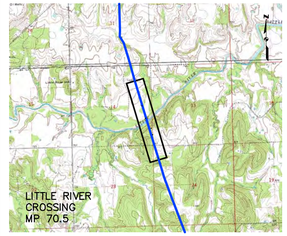
TC_UD_BR.DWG 22X34

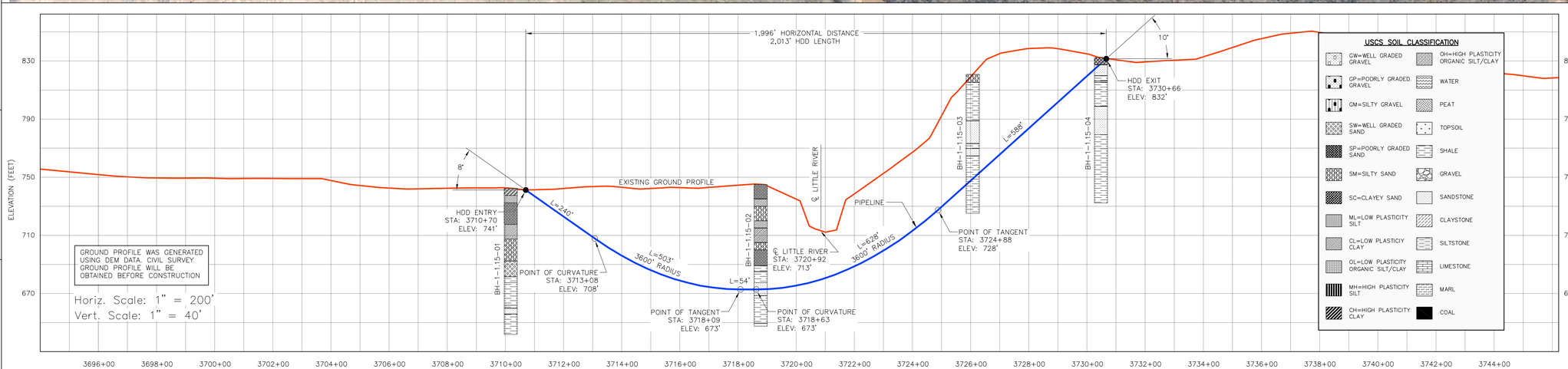
CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)

ID — TIME — DESIGNFILE







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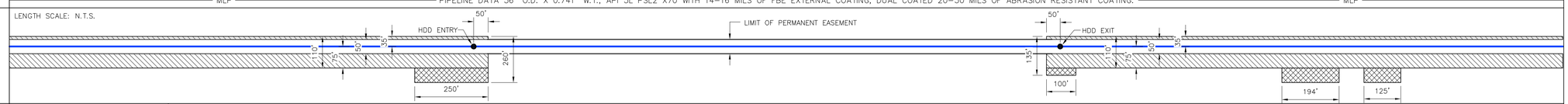
CROSSING INFORMATION (ESTIMATED STATIONING)

3710+44 BH-1-1.15-01 3710+70 HDD ENTRY
3713+08 PT OF CURVATURE
3718+09 PT OF TANGENT
3718+63 PT OF CURVATURE
3718+78 BH-1-1.15-02
3720+92 ℄ LITTLE RIVER
3724+88 PT OF TANGENT
3726+07 BH-1-1.15-03
3730+48 BH-1-1.15-04
3730+66 HDD EXIT

PIPELINE DATA: MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION

TOPSOIL SALVAGE METHOD
STREAMS
WETLANDS
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SPECIAL CONSIDERATIONS

TO BE DETERMINED

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REVISION

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
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PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL — DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA # 4378 | CHAINAGE: M.P. 70.5 | DISCIPLINE # 03

LITTLE RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
HUGHES COUNTY, OKLAHOMA

SCALE AS SHOWN | DRAWING No 4378-03-ML-03-001 | REV 2

TIME — DESIGNFILE

TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

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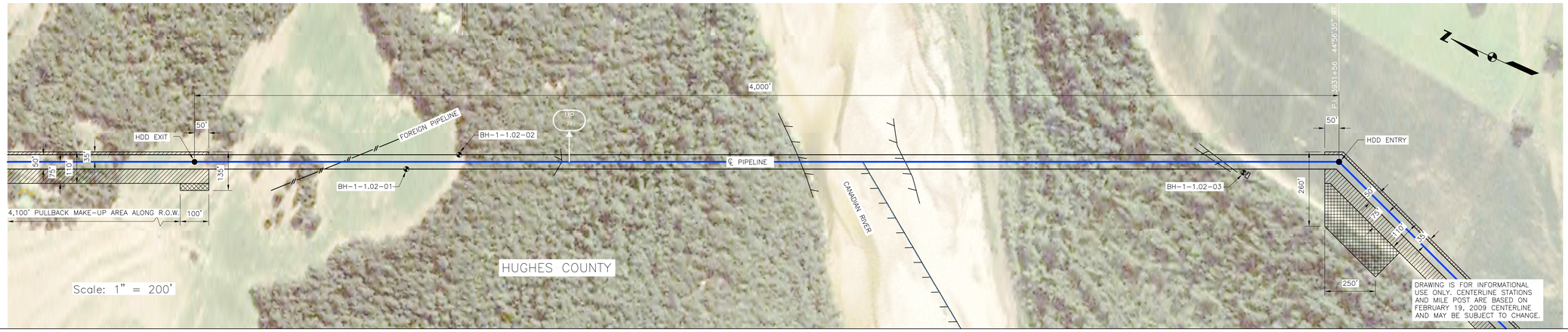

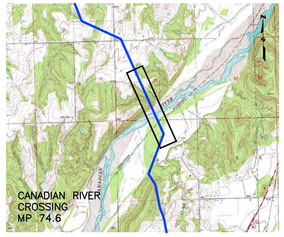

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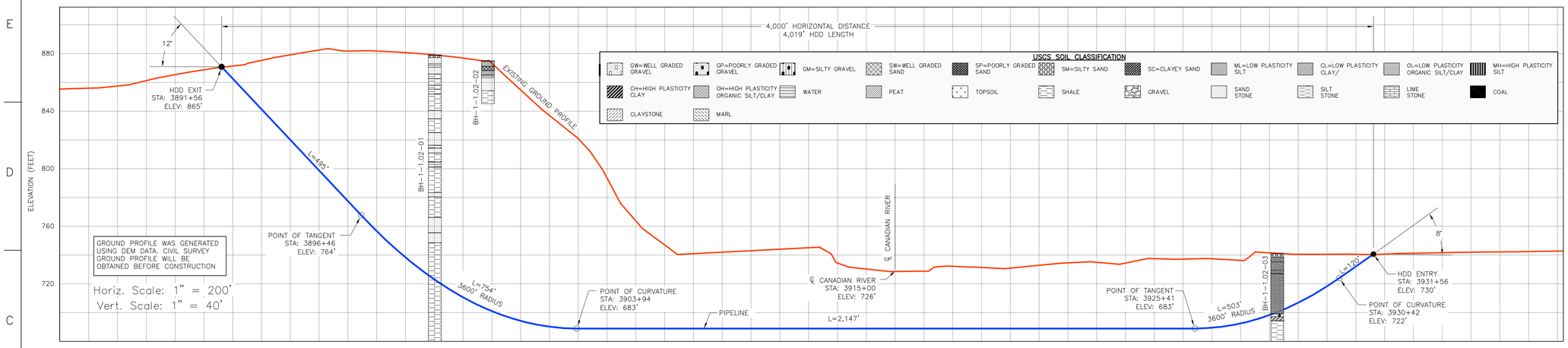
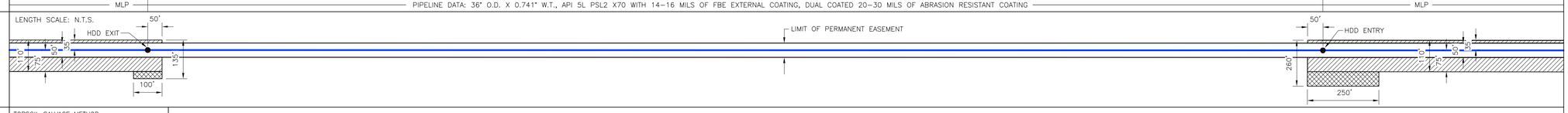
13) NOMINAL WORKING SPACE DIMENSIONS ARE SHOWN. LARGER AREAS MAY BE REQUIRED IN IRREGULAR TERRAIN. UPDATED DIMENSIONS MAY BE PROVIDED AFTER LOCAL TOPOGRAPHICAL SURVEYS ARE PERFORMED.



CROSSING INFORMATION (ESTIMATED STATIONING)	3891+56 HDD EXIT	3896+46 PT OF TANGENT	3899+02 BH-1-1.02-01	3900+86 BH-1-1.02-02	3903+94 PT OF CURVATURE	3915+00 ℄ CANADIAN RIVER	3925+41 PT OF TANGENT	3928+27 BH-1-1.02-03	3930+42 PT OF CURVATURE	3931+56 HDD ENTRY P.I. 44°56'35" RT.
PIPELINE DATA	MLP	PIPELINE DATA: 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING								MLP



ENVIRONMENTAL MITIGATION/RECLAMATION	
TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSRAINTS	
MILEPOST	
MONITORING	
RECLAMATION	
SPECIAL CONSIDERATIONS	

TO BE DETERMINED

LEGEND

- POINT OF INTERSECTION (P.I.)
- ENTRY OR EXIT POINT
- GEOTECHNICAL BOREHOLE
- POWERPOLE
- MLP — MAINLINE PIPE
- PIPELINE
- FOREIGN PIPELINE
- EDGE OF WATER
- PRIVATE ACCESS SHOO FLY ROAD
- COUNTY BOUNDARY
- WATER LEVEL
- USACOE CONSTRUCTION REFERENCE POINT
- WETLANDS
- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_14	11042 HDD XREF_14.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

REV No	DATE	DESCRIPTION
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)
1	03.19.09	ISSUED FOR TROW REVIEW
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
11042	UEI	UEI	BM	JW	JH	UEI
11042	UEI	UEI	DW	JW	JH	UEI
11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA #	CHAINAGE:	DISCIPLINE #
4378	M.P. 74.6	03

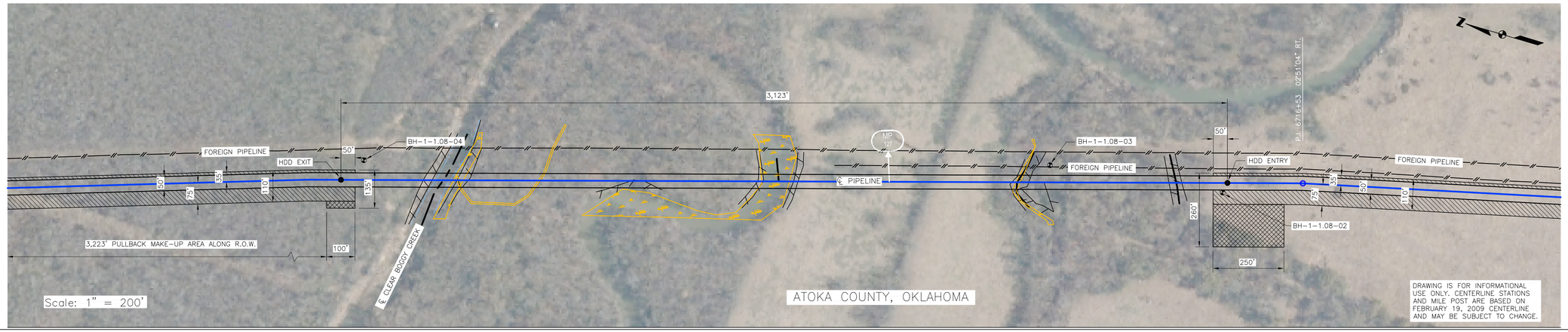
CANADIAN RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
HUGHES COUNTY, OKLAHOMA

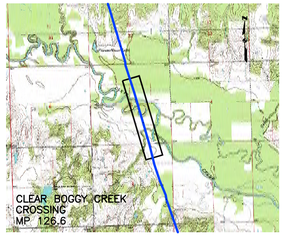
SCALE	DRAWING No	REV
AS SHOWN	4378-03-ML-03-002	2

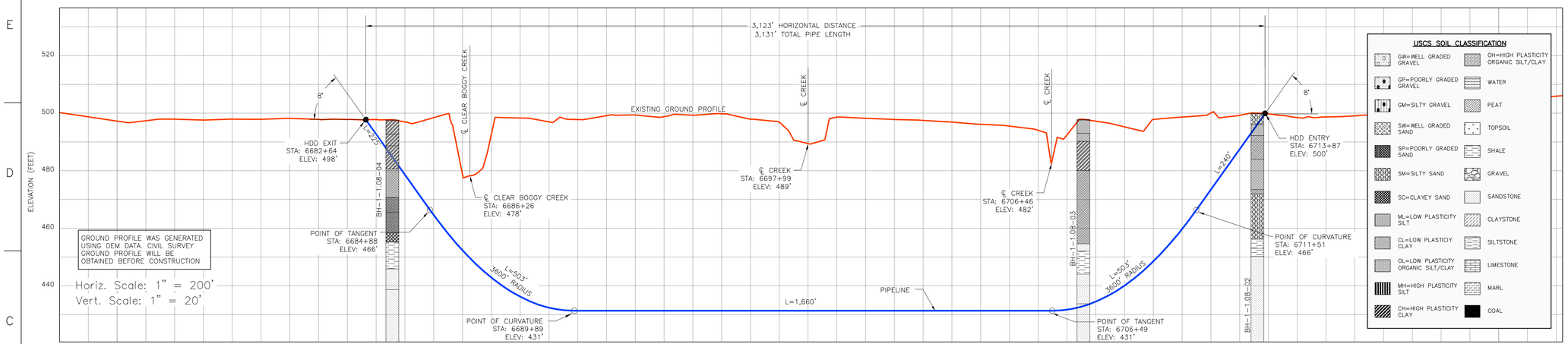
TC_UD_BR.DWG 22X34

PLOTTED SIZE: ANSI D (22x34)

TIME — DESIGNFILE





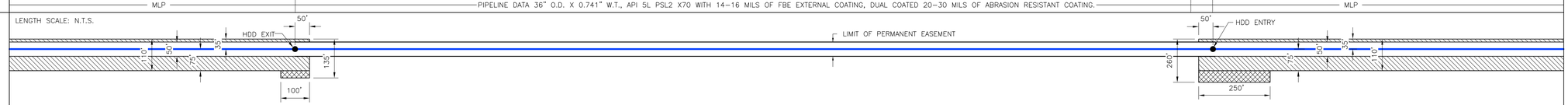


USCS SOIL CLASSIFICATION

GW=WELL GRADED GRAVEL	OH=HIGH PLASTICITY ORGANIC SILT/CLAY
GP=POORLY GRADED GRAVEL	WATER
GM=SILTY GRAVEL	PEAT
SW=WELL GRADED SAND	TOPSOIL
SP=POORLY GRADED SAND	SHALE
SM=SILTY SAND	GRAVEL
SC=CLAYEY SAND	SANDSTONE
ML=LOW PLASTICITY SILT	CLAYSTONE
CL=LOW PLASTICIY CLAY	SILTSTONE
OL=LOW PLASTICITY ORGANIC SILT/CLAY	LIMESTONE
MH=HIGH PLASTICITY SILT	MARL
CH=HIGH PLASTICITY CLAY	COAL

CROSSING INFORMATION (ESTIMATED STATIONING)	6682+64 HDD EXIT	6683+56 BH-1-1.08-04	6684+88 PT OF TANGENT	6686+26 ℄ CLEAR BOGGY CREEK	6689+90 PT OF CURVATURE	6697+99 ℄ CREEK	6706+46 ℄ CREEK	6706+49 PT OF TANGENT	6707+57 BH-1-1.08-03	6711+51 PT OF CURVATURE	6713+62 BH-1-1.08-02	6713+87 HDD ENTRY	6716+53 P.I. 02°51'04" RT

PIPELINE DATA	MLP	PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING.	MLP



ENVIRONMENTAL MITIGATION/RECLAMATION	
TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSRAINTS	
MILEPOST	
MONITORING	
RECLAMATION	
SPECIAL CONSIDERATIONS	

TO BE DETERMINED

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- EXTRA WORKSPACE

INSTALLATION NOTES

1) ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.
2) VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE ENVIRONMENTAL INSPECTOR.
3) WORK SPACE: WORK SPACE LIMITS ARE DEPICTED. CLEARING WILL BE RESTRICTED TO THE WORK SPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA ALONG THE RIGHT-OF-WAY. CLEARING BETWEEN THE ENTRY AND EXIT POINTS IS LIMITED TO THE MINIMUM AMOUNT NECESSARY TO STRING LOCATION WIRES AND INSTALL PUMPS AND PIPING TO OBTAIN WATER (WHERE APPROVED).
4) WATER SOURCE: DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. THE CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT THE ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH THE CONSTRUCTION MITIGATION AND RECLAMATION PLAN (CMRP) AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATER BODY.
5) HYDROSTATIC TEST: PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. THE CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PROJECT PERMITS. DISCHARGES WILL BE BACK TO THE WATER SOURCE UNLESS OTHERWISE DIRECTED BY THE ENVIRONMENTAL INSPECTOR. DISCHARGES SHALL NOT CAUSE EROSION OR SEDIMENTATION. TO REDUCE THE VELOCITY OF THE DISCHARGE, THE CONTRACTOR SHALL UTILIZE AN ENERGY-DISSIPATING DEVICE AS DESCRIBED IN THE CMRP.
6) SPILL-PREVENTION: ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATER BODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATER BODIES AND WETLANDS. EACH CONSTRUCTION CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.
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9) PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO KEYSTONE FOR APPROVAL.
10) INSTALLATION: THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK.
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REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_14	11042 HDD XREF_14.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

REV No	DATE	DESCRIPTION
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)
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APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
11042	UEI	UEI	BM	JW	JH	UEI
11042	UEI	UEI	DW	JW	JH	UEI
11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA #	CHAINAGE:	DISCIPLINE #
4379	M.P.126.6	03

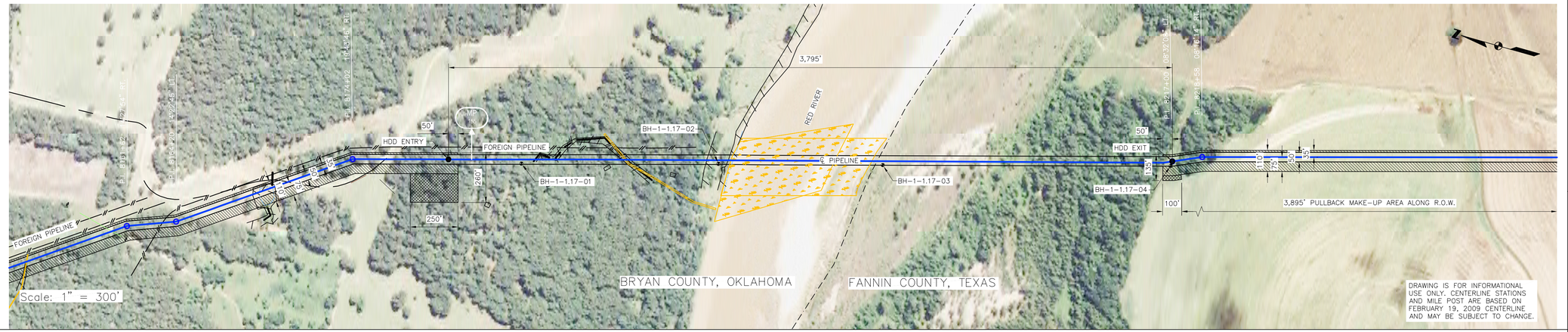
CLEAR BOGGY CREEK HDD INSTALLATION
KEYSTONE XL PROJECT
ATOKA COUNTY, OKLAHOMA

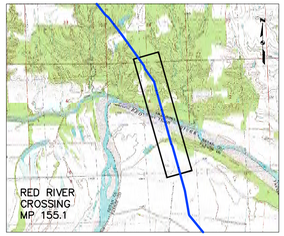
SCALE	DRAWING No	REV
AS SHOWN	4379-03-ML-03-001	2

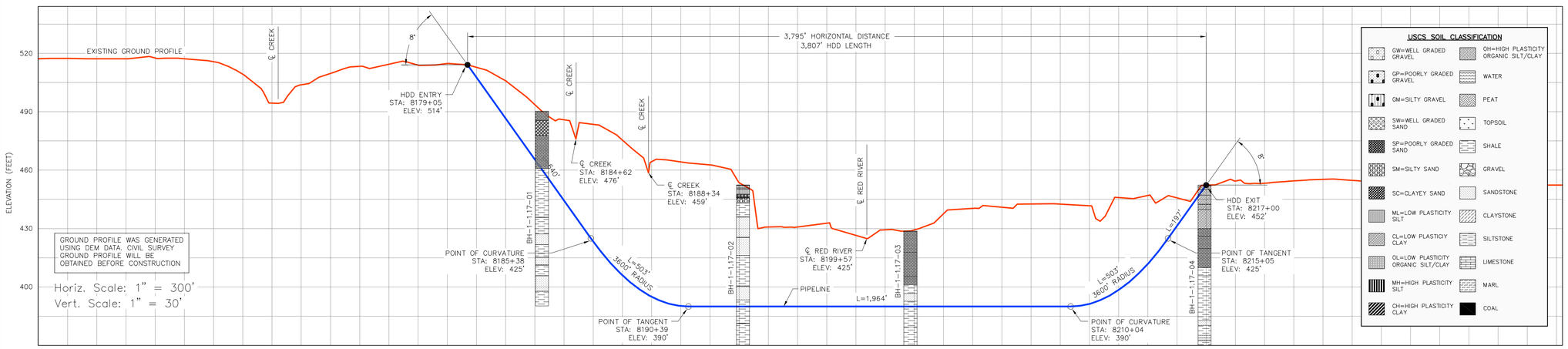
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)







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MH=HIGH PLASTICITY SILT	MARL
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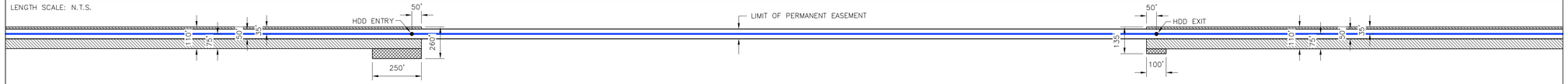
CROSSING INFORMATION (ESTIMATED STATIONING)

8161+62 P.I. 1427°54" RT.
8164+20 P.I. 1422°45" LT.
8169+32 ℄ CREEK
8174+02 P.I. 1943°46" RT.
8179+05 HDD ENTRY
8182+37 BH-1-1.17-01
8184+62 ℄ CREEK
8185+38 PT OF CURVATURE
8188+34 ℄ CREEK
8190+39 PT OF TANGENT
8193+20 BH-1-1.17-02
8199+57 ℄ RED RIVER
8179+89 BH-1-1.17-03
8210+04 PT OF CURVATURE
8215+05 PT OF TANGENT
8179+97 BH-1-1.17-04
8217+00 HDD EXIT
8217+00 P.I. 0852°08" LT.
8218+58 P.I. 0816°14" RT.

PIPELINE DATA: MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP



ENVIRONMENTAL MITIGATION/RECLAMATION

- TOPSOIL SALVAGE METHOD
- STREAMS
- WETLANDS
- TIMING CONSRAINTS
- MILEPOST
- MONITORING
- RECLAMATION
- SPECIAL CONSIDERATIONS

TO BE DETERMINED

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- WATER LEVEL
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- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_14	11042 HDD XREF_14.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

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2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)
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APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
11042	UEI	UEI	BM	JW	JH	UEI
11042	UEI	UEI	DW	JW	JH	UEI
11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL — DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA # 4380 | CHAINAGE: M.P. 155.1 | DISCIPLINE # 03

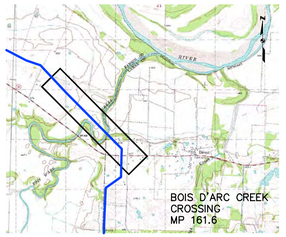
RED RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
BRYAN COUNTY, OK & FANNIN COUNTY, TEXAS

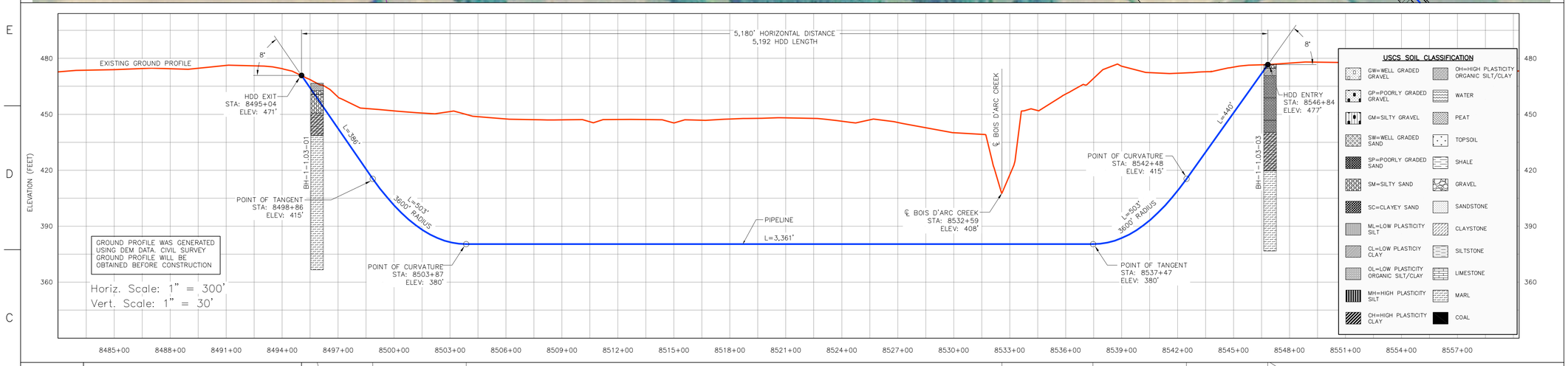
SCALE AS SHOWN | DRAWING No 4380-03-ML-03-001 | REV 2

PLOTTED SIZE: ANSI D (22x34)

ID: TC_UD_BR.DWG 22X34

TIME — DESIGNFILE





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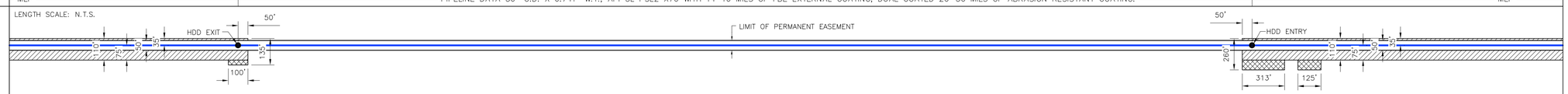
CROSSING INFORMATION (ESTIMATED STATIONING)	8495+04 HDD EXIT	8495+04 BH-1-1.03-01	8498+86 PT OF TANGENT	8503+87 PT OF CURVATURE	8532+59 ℄ BOIS D'ARC CREEK	8537+47 PT OF TANGENT	8542+48 PT OF CURVATURE	8546+84 HDD ENTRY P.I. 46°16'38" RT.	8542+46 BH-1-1.03-03

PIPELINE DATA: MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP



ENVIRONMENTAL MITIGATION/RECLAMATION	
TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSRAINTS	
MILEPOST	
MONITORING	
RECLAMATION	
SPECIAL CONSIDERATIONS	

TO BE DETERMINED

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- WETLANDS
- PERMANENT EASEMENT
- TEMPORARY EASEMENT
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REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF_15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

REV No	DATE	DESCRIPTION
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)
1	03.19.09	ISSUED FOR TROW REVIEW
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
11042	UEI	UEI	BM	JW	JH	UEI
11042	UEI	UEI	DW	JW	JH	UEI
11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL — DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA #	CHAINAGE:	DISCIPLINE #
4380	M.P. 161.6	03

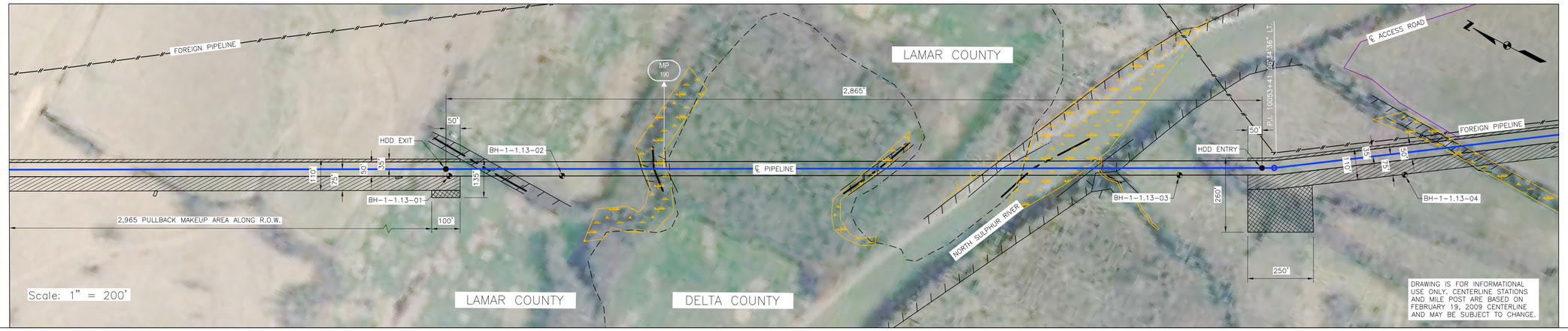
BOIS D'ARC CREEK HDD INSTALLATION
KEYSTONE XL PROJECT
FANNIN & LAMAR COUNTY, TEXAS

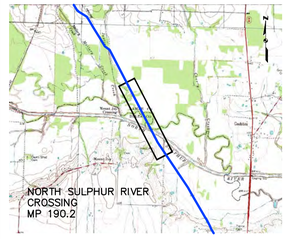
SCALE	DRAWING No	REV
AS SHOWN	4380-03-ML-03-002	2

TC_UD_BR.DWG 22X34

PLOTTED SIZE: ANSI D (22x34)

TIME — DESIGNFILE





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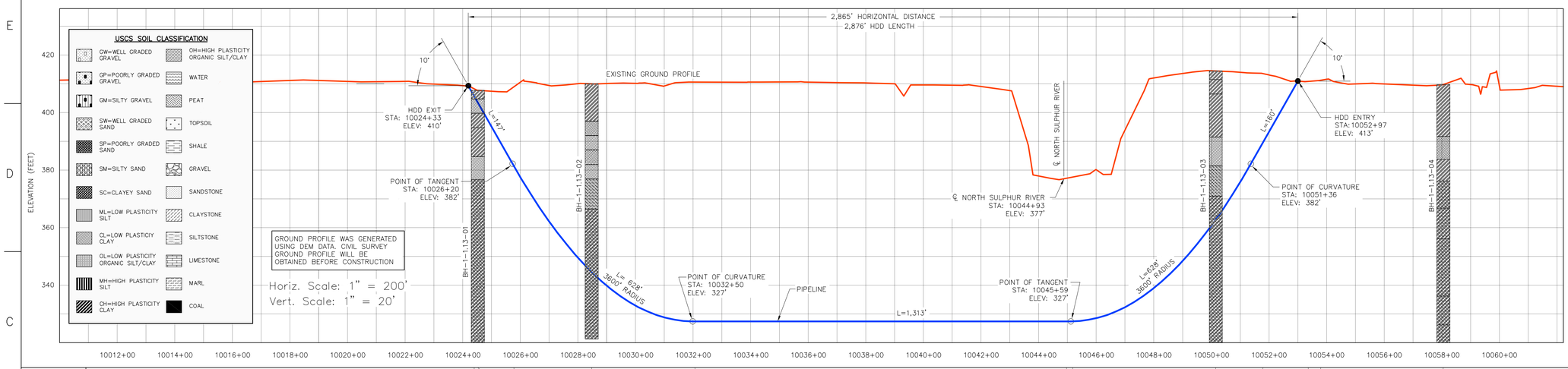

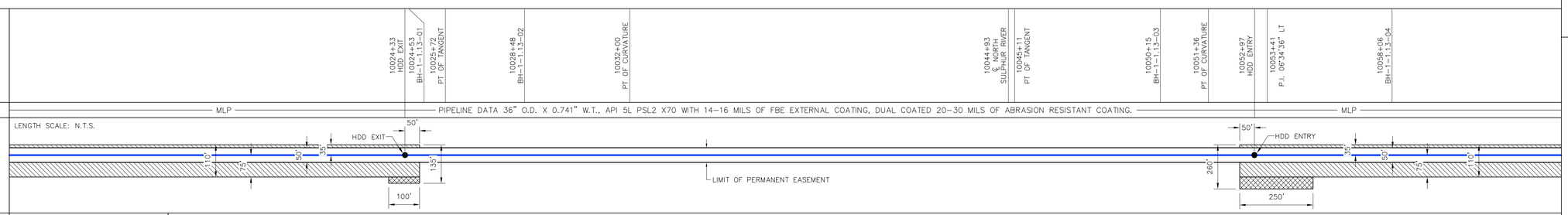

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REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF_15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	JW	JH	UEI
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0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)	11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA # 4380 | CHAINAGE: M.P. 190.2 | DISCIPLINE # 03

NORTH SULPHUR RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
LAMAR & DELTA COUNTIES, TEXAS

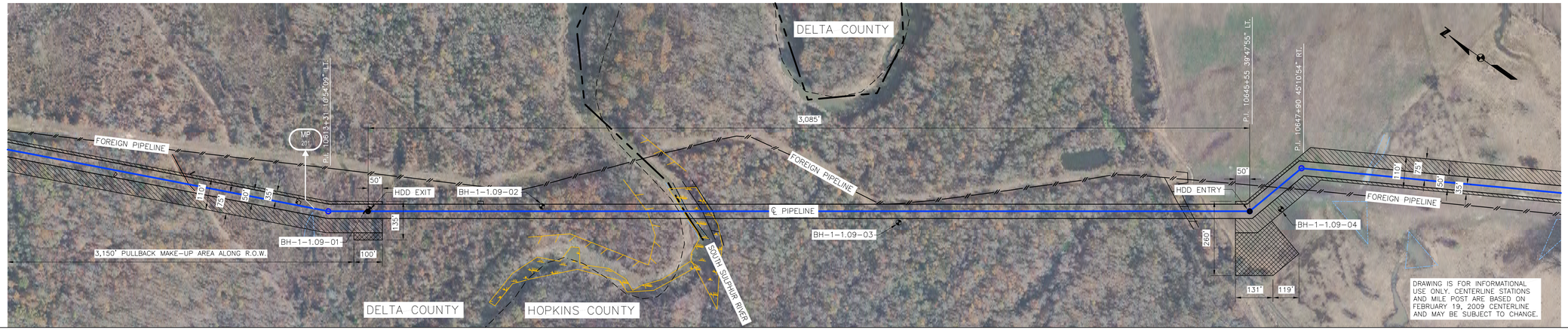
SCALE AS SHOWN | DRAWING No 4380-03-ML-03-004 | REV 2

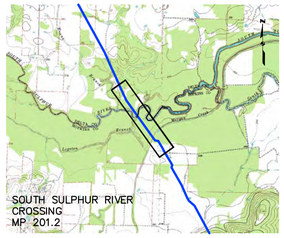
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)

TIME — DESIGNFILE





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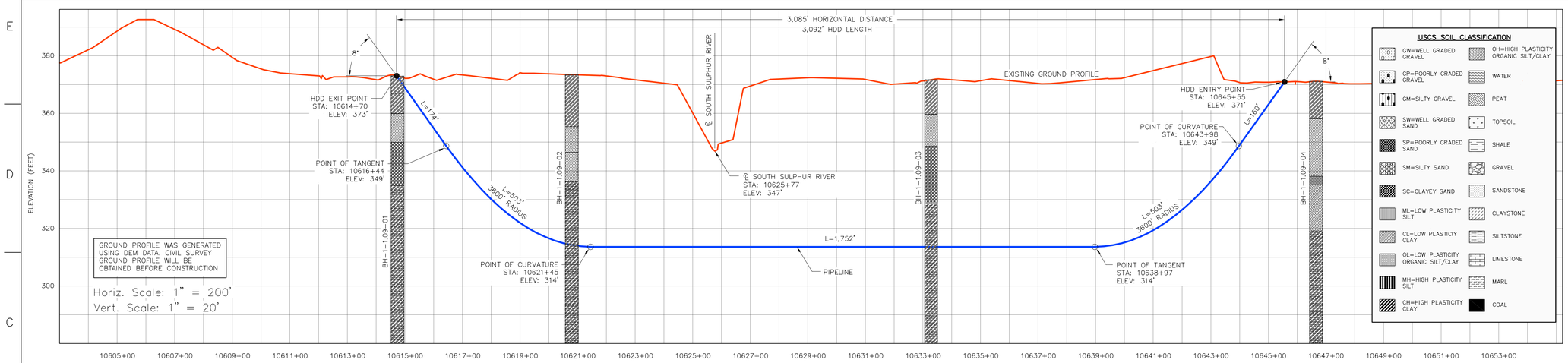
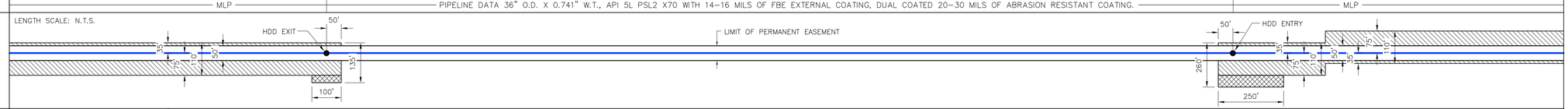


USCS SOIL CLASSIFICATION

- GW=WELL GRADED GRAVEL
- GP=POORLY GRADED GRAVEL
- GM=SILTY GRAVEL
- SW=WELL GRADED SAND
- SP=POORLY GRADED SAND
- SM=SILTY SAND
- SC=CLAYEY SAND
- ML=LOW PLASTICITY SILT
- CL=LOW PLASTICITY CLAY
- OL=LOW PLASTICITY ORGANIC SILT/CLAY
- MH=HIGH PLASTICITY SILT
- CH=HIGH PLASTICITY CLAY
- OH=HIGH PLASTICITY ORGANIC SILT/CLAY
- WATER
- PEAT
- TOPSOIL
- SHALE
- GRAVEL
- SANDSTONE
- CLAYSTONE
- SILTSTONE
- LIMESTONE
- MARL
- COAL

CROSSING INFORMATION (ESTIMATED STATIONING)	10613+31 P.I. 10°54'09" LT.; 10614+70 HDD EXIT; 10614+74 BH-1-1.09-01; 10616+44 PT OF TANGENT; 10620+80 BH-1-1.09-02; 10621+45 PT OF CURVATURE; 10625+77 ℄ SOUTH SULPHUR RIVER; 10633+28 BH-1-1.09-03; 10638+97 PT OF TANGENT; 10643+98 PT OF CURVATURE; 10645+55 HDD ENTRY P.I. 39°47'55" LT.; 10646+65 BH-1-1.09-04; 10647+90 P.I. 45°10'54" RT.
PIPELINE DATA	MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP



ENVIRONMENTAL MITIGATION/RECLAMATION	
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PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL

DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA # 4382 | CHAINAGE: M.P. 201.2 | DISCIPLINE # 03

SOUTH SULPHUR RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
DELTA & HOPKINS COUNTY, TEXAS

SCALE AS SHOWN | DRAWING No 4382-03-ML-03-001 | REV 2

TIME — DESIGNFILE

TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

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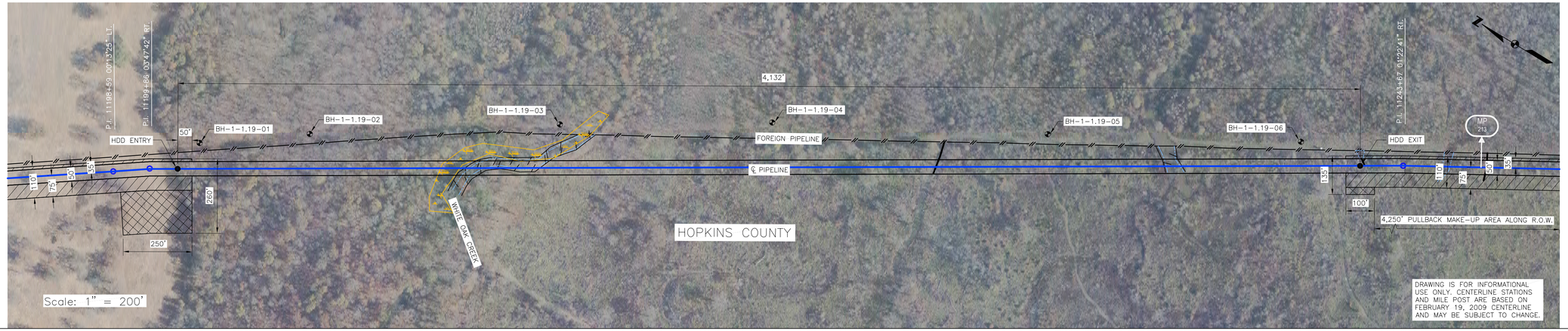

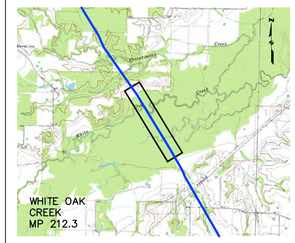

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4) WATER SOURCE: DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. THE CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT THE ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH THE CONSTRUCTION MITIGATION AND RECLAMATION PLAN (CMRP) AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATER BODY.

5) HYDROSTATIC TEST: PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. THE CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PROJECT PERMITS. DISCHARGES WILL BE BACK TO THE WATER SOURCE UNLESS OTHERWISE DIRECTED BY THE ENVIRONMENTAL INSPECTOR. DISCHARGES SHALL NOT CAUSE EROSION OR SEDIMENTATION. TO REDUCE THE VELOCITY OF THE DISCHARGE, THE CONTRACTOR SHALL UTILIZE AN ENERGY-DISSIPATING DEVICE AS DESCRIBED IN THE CMRP.

6) SPILL-PREVENTION: ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATER BODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATER BODIES AND WETLANDS. EACH CONSTRUCTION CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.

7) EROSION AND SEDIMENT CONTROL: CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH CONTRACT DOCUMENTS. CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.

8) TOPSOIL SHALL BE STRIPPED AS REQUIRED BY PROJECT SPECIFICATIONS.

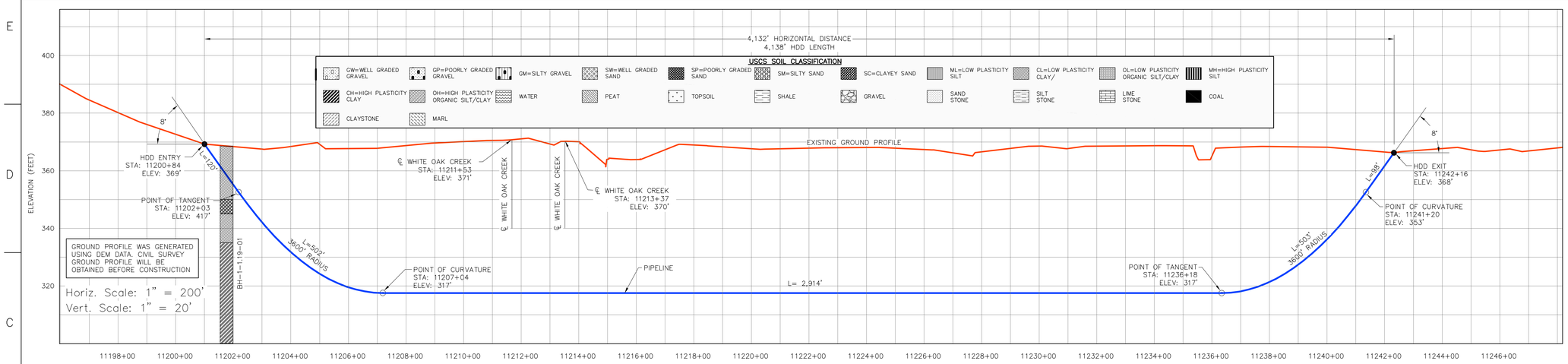
9) PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO KEYSTONE FOR APPROVAL.

10) INSTALLATION: THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK.

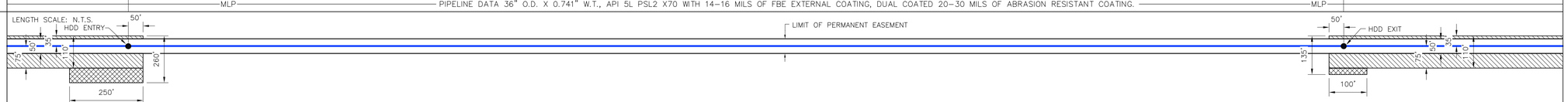
11) MUD DISPOSAL: CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISPOSED OF IN WATER BODIES OR WETLANDS. ANY DRILLING MUD WHICH INADVERTENTLY EXITS AT POINTS OTHER THAN THE ENTRY AND EXIT POINTS SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PRACTICAL AND DISPOSED OF AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS.

12) CLEANUP/STABILIZATION/RESTORATION: ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED IN PROJECT DOCUMENTS.

13) NOMINAL WORKING SPACE DIMENSIONS ARE SHOWN. LARGER AREAS MAY BE REQUIRED IN IRREGULAR TERRAIN. UPDATED DIMENSIONS MAY BE PROVIDED AFTER LOCAL TOPOGRAPHICAL SURVEYS ARE PERFORMED.



CROSSING INTERSECTION (ESTIMATED STATIONING)	11198+59 P.I. 00°13'25" LT.	11199+86 P.I. 03°47'42" LT.	11200+84 HDD ENTRY	11201+77 BH-1-1.19-01	11202+03 PT OF TANGENT	11205+62 BH-1-1.19-02	11207+04 PT OF CURVATURE	11211+53 ℄ WHITE OAK CREEK	11213+37 ℄ WHITE OAK CREEK	11214+36 BH-1-1.19-03	11221+78 BH-1-1.19-04	11231+40 BH-1-1.19-05	11236+18 PT OF TANGENT	11240+25 BH-1-1.19-06	11241+20 PT OF CURVATURE	11242+16 HDD EXIT
PIPELINE DATA	MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP															



ENVIRONMENTAL MITIGATION/RECLAMATION	
TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSRAINTS	
MILEPOST	
MONITORING	
RECLAMATION	
SPECIAL CONSIDERATIONS	

TO BE DETERMINED

LEGEND

- POINT OF INTERSECTION (P.I.)
- ENTRY OR EXIT POINT
- GEOTECHNICAL BOREHOLE
- POWERPOLE
- MLP — MAINLINE PIPE
- PIPELINE
- FOREIGN PIPELINE
- EDGE OF WATER
- PRIVATE ACCESS SHOO FLY ROAD
- COUNTY BOUNDARY
- WATER LEVEL
- USACOE CONSTRUCTION REFERENCE POINT
- WETLANDS
- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF_15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

REV No	DATE	DESCRIPTION
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)
1	03.19.09	ISSUED FOR TROW REVIEW
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
11042	UEI	UEI	BM	JW	JH	UEI
11042	UEI	UEI	DW	JW	JH	UEI
11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL — DATE

PRELIMINARY

REV. NO.	DATE	PERMIT NUMBER:

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA #	CHAINAGE:	DISCIPLINE #
4382	212.3	03

WHITE OAK CREEK HDD INSTALLATION
KEYSTONE XL PROJECT
HOPKINS COUNTY, TEXAS

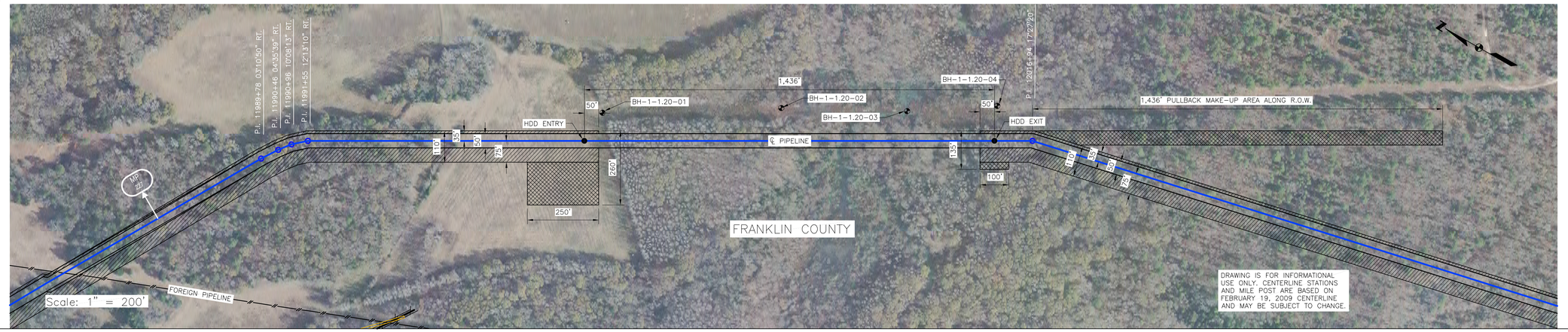
SCALE	DRAWING No	REV
AS SHOWN	4382-03-ML-03-002	2

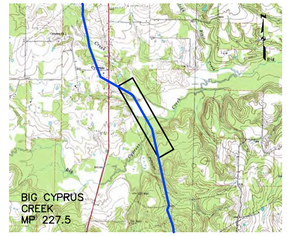
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)

ID — TIME — DESIGNFILE





INSTALLATION NOTES

1) ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.

2) VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE ENVIRONMENTAL INSPECTOR.

3) WORK SPACE: WORK SPACE LIMITS ARE DEPICTED. CLEARING WILL BE RESTRICTED TO THE WORK SPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA ALONG THE RIGHT-OF-WAY. CLEARING BETWEEN THE ENTRY AND EXIT POINTS IS LIMITED TO THE MINIMUM AMOUNT NECESSARY TO STRING LOCATION WIRES AND INSTALL PUMPS AND PIPING TO OBTAIN WATER (WHERE APPROVED).

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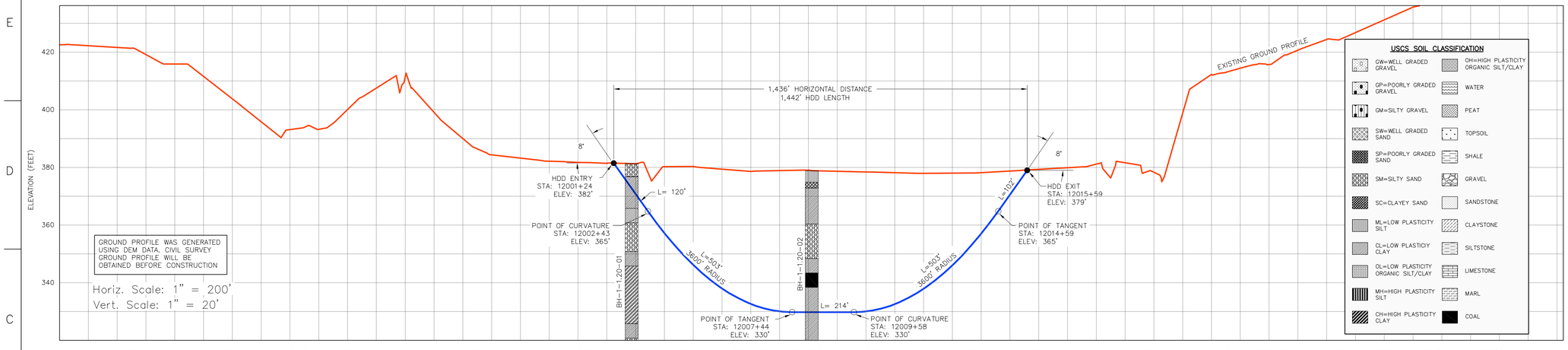


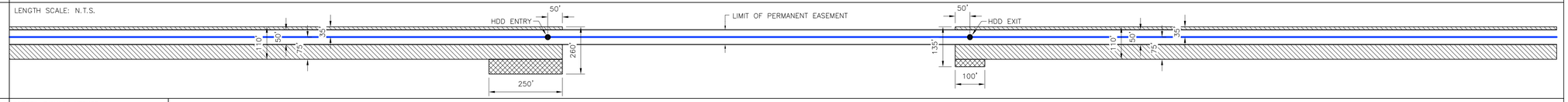
CROSSING INFORMATION (ESTIMATED STATIONING)

11989+78 P.I. 03°10'50" RT.	11990+46 P.I. 04°35'36" RT.	11990+96 P.I. 10°08'13" RT.	11991+55 P.I. 12°13'10" RT.	12001+24 HDD ENTRY	12001+86 BH-1-1.20-01	12002+43 PT OF CURVATURE	12007+44 PT OF TANGENT	12008+13 BH-1-1.20-02	12009+58 PT OF CURVATURE	12012+54 BH-1-1.20-03	12014+59 PT OF TANGENT	12015+59 HDD EXIT	12015+70 BH-1-1.20-04	12016+94 P.I. 17°27'20" RT.

PIPELINE DATA

MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION

TOPSOIL SALVAGE METHOD
STREAMS
WETLANDS
TIMING CONSRAINTS
MILEPOST
MONITORING
RECLAMATION
SPECIAL CONSIDERATIONS

TO BE DETERMINED

LEGEND

- POINT OF INTERSECTION (P.I.)
- ENTRY OR EXIT POINT
- GEOTECHNICAL BOREHOLE
- POWERPOLE
- MLP — MAINLINE PIPE
- PIPELINE
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- WETLANDS
- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF_15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	JW	JH	UEI
1	03.19.09	ISSUED FOR TROW REVIEW	11042	UEI	UEI	DW	JW	JH	UEI
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)	11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL — DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada — In business to deliver

FIA # 4382	CHAINAGE: 227.5	DISCIPLINE # 03

BIG CYPRUS CREEK HDD INSTALLATION
KEYSTONE XL PROJECT
FRANKLIN COUNTY, TEXAS

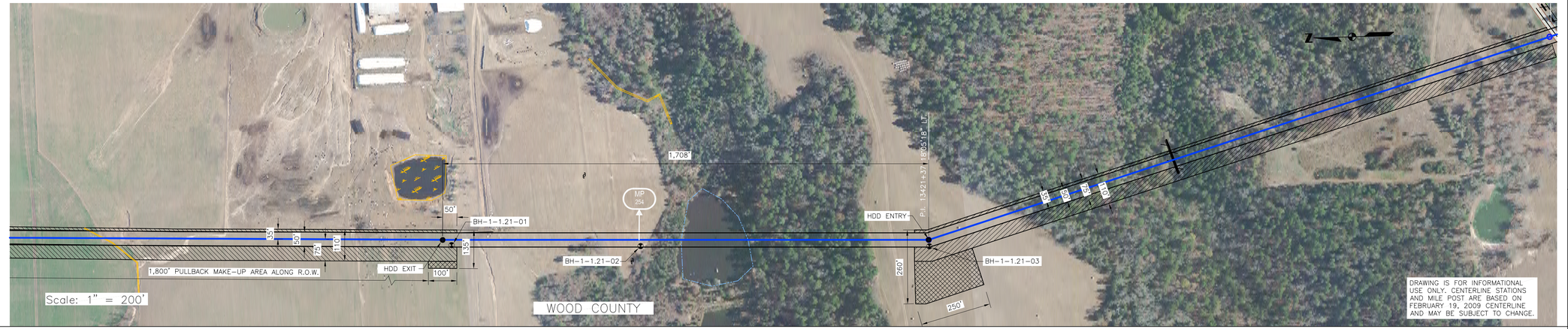
SCALE AS SHOWN	DRAWING No 4382-03-ML-03-003	REV 2

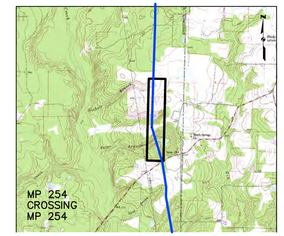
TC_UD_BR.DWG 22X34

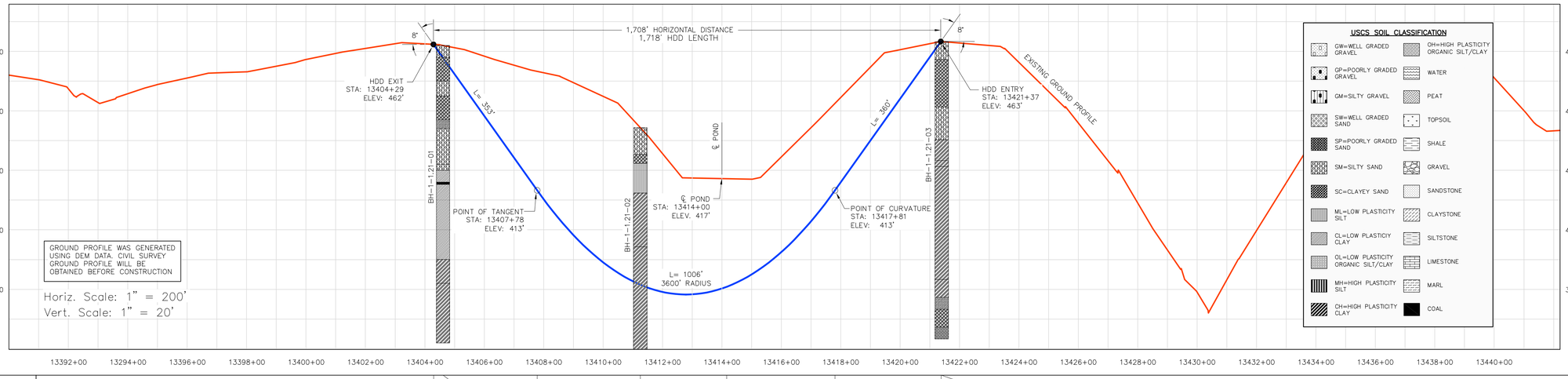
CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)

TIME — DESIGNFILE







USCS SOIL CLASSIFICATION

GW=WELL GRADED GRAVEL	OH=HIGH PLASTICITY ORGANIC SILT/CLAY
GP=POORLY GRADED GRAVEL	WATER
GM=SILTY GRAVEL	PEAT
SW=WELL GRADED SAND	TOPSOIL
SP=POORLY GRADED SAND	SHALE
SM=SILTY SAND	GRAVEL
SC=CLAYEY SAND	SANDSTONE
ML=LOW PLASTICITY SILT	CLAYSTONE
CL=LOW PLASTICIY CLAY	SILTSTONE
OL=LOW PLASTICITY ORGANIC SILT/CLAY	LIMESTONE
MH=HIGH PLASTICITY SILT	MARL
CH=HIGH PLASTICITY CLAY	COAL

INSTALLATION NOTES

1) ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.
2) VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE ENVIRONMENTAL INSPECTOR.
3) WORK SPACE: WORK SPACE LIMITS ARE DEPICTED. CLEARING WILL BE RESTRICTED TO THE WORK SPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA ALONG THE RIGHT-OF-WAY. CLEARING BETWEEN THE ENTRY AND EXIT POINTS IS LIMITED TO THE MINIMUM AMOUNT NECESSARY TO STRING LOCATION WIRES AND INSTALL PUMPS AND PIPING TO OBTAIN WATER (WHERE APPROVED).
4) WATER SOURCE: DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. THE CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT THE ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH THE CONSTRUCTION MITIGATION AND RECLAMATION PLAN (CMRP) AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATER BODY.
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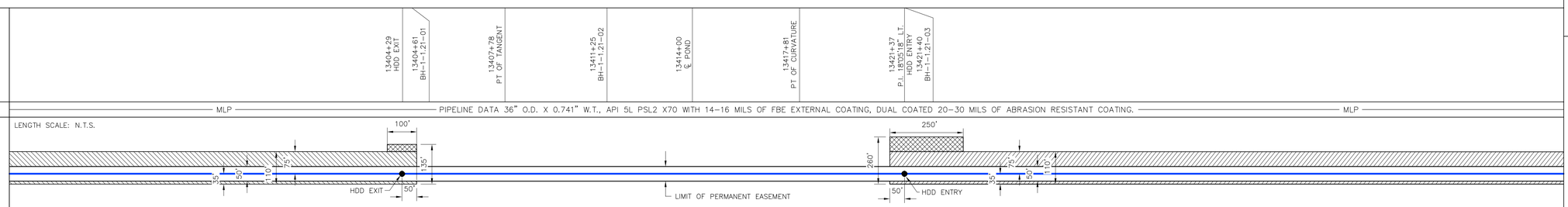
CROSSING INFORMATION (ESTIMATED STATIONING)	13404+29 HDD EXIT; 13404+61 BH-1-1.21-01; 13407+78 PT OF TANGENT; 13411+25 BH-1-1.21-02; 13414+00 ℄ POND; 13417+81 PT OF CURVATURE; 13421+37 P.I. 18°05'18" LT. HDD ENTRY; 13421+40 BH-1-1.21-03
PIPELINE DATA	MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP
CONSTRUCTION WORKSPACE	LENGTH SCALE: N.T.S.
ENVIRONMENTAL MITIGATION/RECLAMATION	TOPSOIL SALVAGE METHOD
	STREAMS
	WETLANDS
	TIMING CONSRAINTS
	MILEPOST
	MONITORING
	RECLAMATION
	SPECIAL CONSIDERATIONS



TO BE DETERMINED

LEGEND

○	POINT OF INTERSECTION (P.I.)
●	ENTRY OR EXIT POINT
	GEOTECHNICAL BOREHOLE
	POWERPOLE
MLP	MAINLINE PIPE
	PIPELINE
	FOREIGN PIPELINE
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	COUNTY BOUNDARY
	WATER LEVEL
	USACOE CONSTRUCTION REFERENCE POINT
	WETLANDS
	PERMANENT EASEMENT
	TEMPORARY EASEMENT
	EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF-15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	JW	JH	UEI
1	03.19.09	ISSUED FOR TROW REVIEW	11042	UEI	UEI	DW	JW	JH	UEI
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)	11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA # 4383	CHAINAGE: M.P. 254	DISCIPLINE # 03

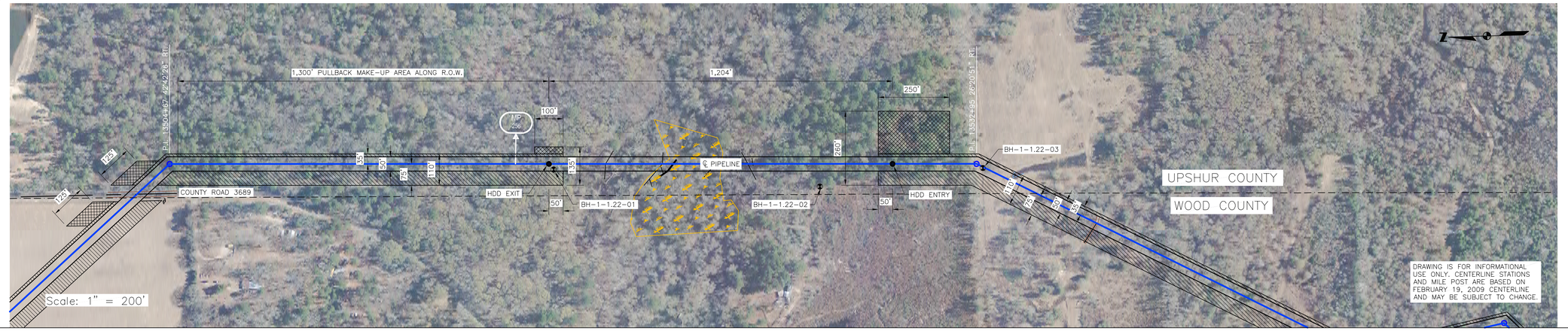
MP254 HDD INSTALLATION
KEYSTONE XL PROJECT
WOOD COUNTY, TEXAS

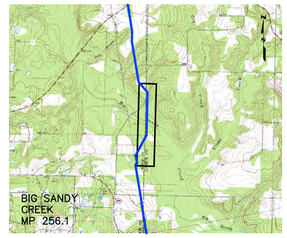
SCALE AS SHOWN	DRAWING No 4383-03-ML-03-001	REV 2

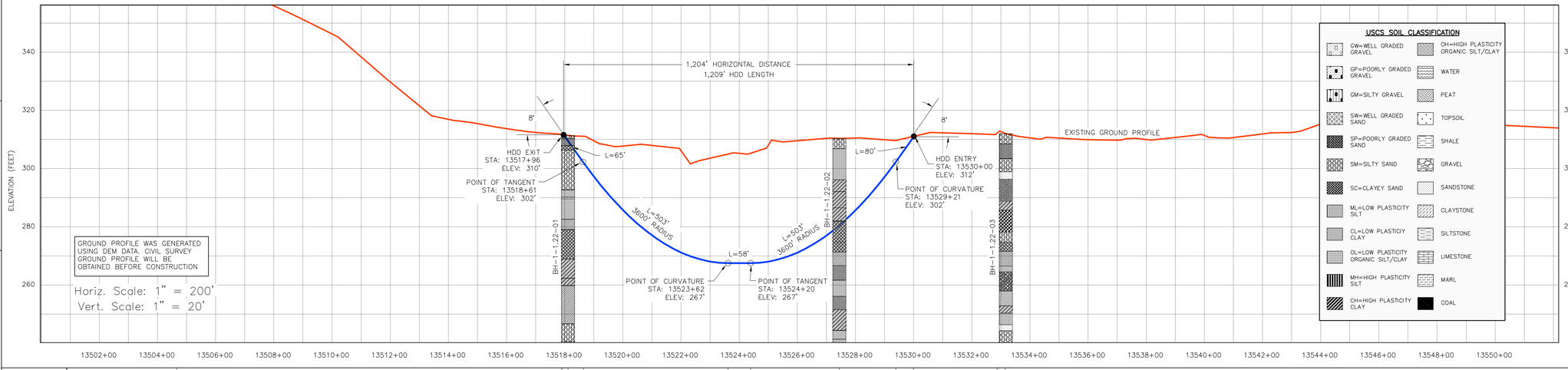
TIME — DESIGNFILE

TC_UD_BR.DWG 22X34

PLOTTED SIZE: ANSI D (22x34)







USCS SOIL CLASSIFICATION

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SC=CLAYEY SAND	SANDSTONE
ML=LOW PLASTICITY SILT	CLAYSTONE
CL=LOW PLASTICIY CLAY	SILTSTONE
OL=LOW PLASTICITY ORGANIC SILT/CLAY	LIMESTONE
MH=HIGH PLASTICITY SILT	MARL
CH=HIGH PLASTICITY CLAY	COAL

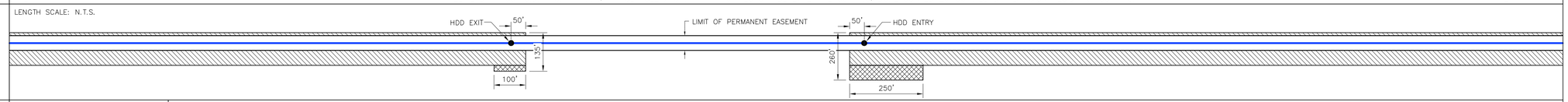
CROSSING INFORMATION (ESTIMATED STATIONING)

13504+67 P.I. 42°42'26" RT.	13517+96 HDD EXIT	13518+12 BH-1-1.22-01	13518+61 PT OF TANGENT	13523+62 PT OF CURVATURE	13524+20 PT OF TANGENT	13527+45 BH-1-1.22-02	13529+21 PT OF CURVATURE	13530+00 HDD ENTRY	13532+95 P.I. 26°20'51" RT.	13533+15 BH-1-1.22-03

PIPELINE DATA

MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION

TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSRAINTS	
MILEPOST	
MONITORING	
RECLAMATION	
SPECIAL CONSIDERATIONS	

TO BE DETERMINED

INSTALLATION NOTES

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5) HYDROSTATIC TEST: PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. THE CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PROJECT PERMITS. DISCHARGES WILL BE BACK TO THE WATER SOURCE UNLESS OTHERWISE DIRECTED BY THE ENVIRONMENTAL INSPECTOR. DISCHARGES SHALL NOT CAUSE EROSION OR SEDIMENTATION. TO REDUCE THE VELOCITY OF THE DISCHARGE, THE CONTRACTOR SHALL UTILIZE AN ENERGY-DISSIPATING DEVICE AS DESCRIBED IN THE CMRP.
6) SPILL-PREVENTION: ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATER BODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATER BODIES AND WETLANDS. EACH CONSTRUCTION CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.
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9) PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO KEYSTONE FOR APPROVAL.
10) INSTALLATION: THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK.
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13) NOMINAL WORKING SPACE DIMENSIONS ARE SHOWN. LARGER AREAS MAY BE REQUIRED IN IRREGULAR TERRAIN. UPDATED DIMENSIONS MAY BE PROVIDED AFTER LOCAL TOPOGRAPHICAL SURVEYS ARE PERFORMED.

LEGEND

	POINT OF INTERSECTION (P.I.)
	ENTRY OR EXIT POINT
	GEOTECHNICAL BOREHOLE
	POWERPOLE
MLP	MAINLINE PIPE
	PIPELINE
	FOREIGN PIPELINE
	EDGE OF WATER
	PRIVATE ACCESS SHOO FLY ROAD
	COUNTY BOUNDARY
	WATER LEVEL
	USACOE CONSTRUCTION REFERENCE POINT
	WETLANDS
	PERMANENT EASEMENT
	TEMPORARY EASEMENT
	EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF_15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	JW	JH	UEI
1	03.19.09	ISSUED FOR TROW REVIEW	11042	UEI	UEI	DW	JW	JH	UEI
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)	11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA #	4383	CHAINAGE:	256.1	DISCIPLINE #	03

BIG SANDY CREEK HDD INSTALLATION
KEYSTONE XL PROJECT
UPSHUR COUNTY, TEXAS

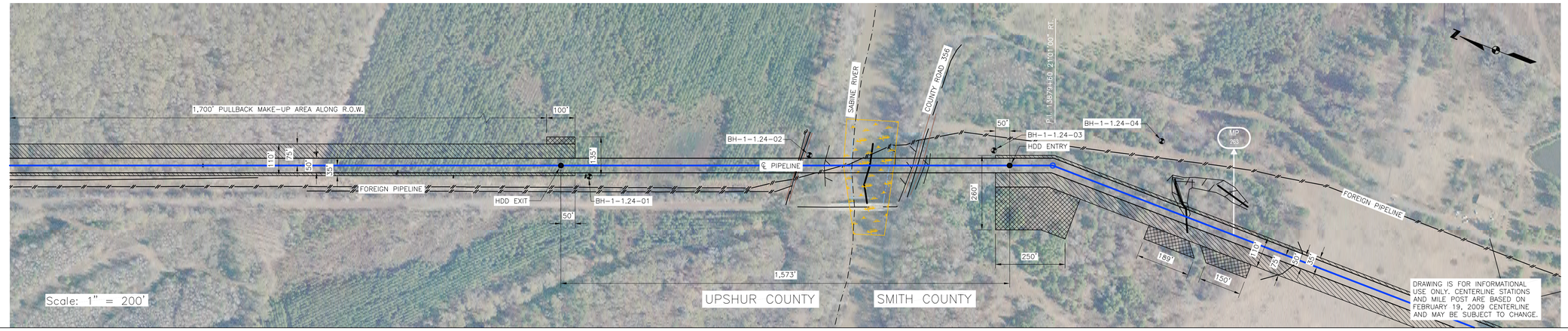
SCALE	AS SHOWN	DRAWING No	4383-03-ML-03-002	REV	2

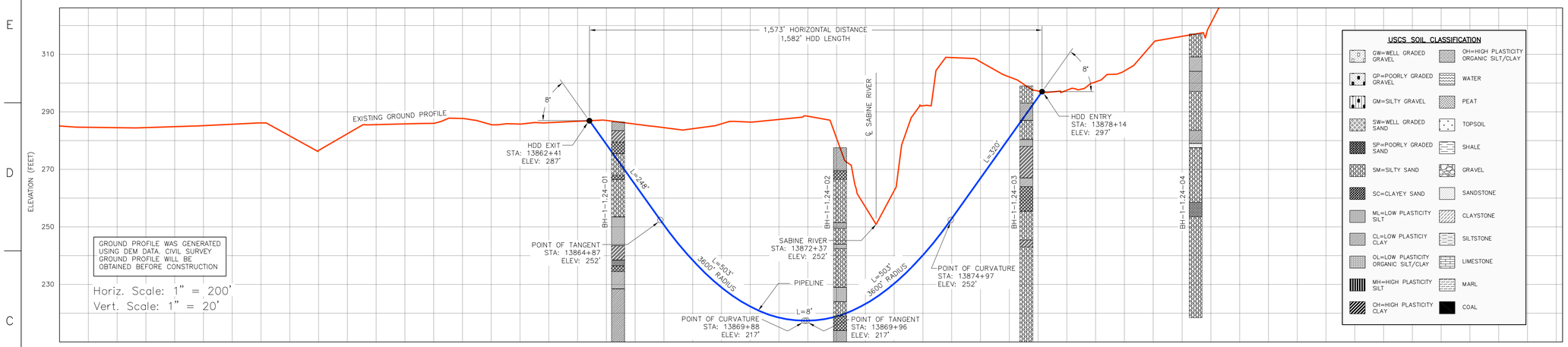
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)

TIME — DESIGNFILE





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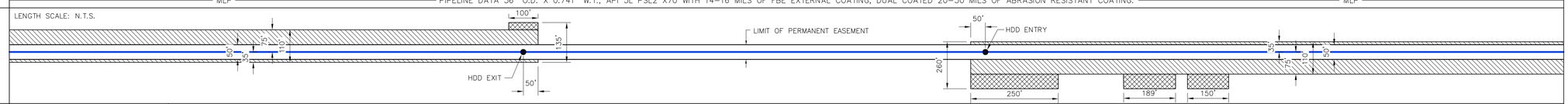
CROSSING INFORMATION (ESTIMATED STATIONING)	13862+41 HDD EXIT; 13863+41 BH-1-1.24-01; 13864+87 PT OF TANGENT; 13869+88 PT OF CURVATURE; 13869+96 PT OF TANGENT; 13871+12 BH-1-1.24-02; 13872+37 ℄ SABINE RIVER; 13874+97 PT OF CURVATURE; 13879+59 BH-1-1.24-03; 13878+14 HDD ENTRY; 13879+60 P.I. 210°00' RT.; 13883+47 BH-1-1.24-04
PIPELINE DATA	MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP



ENVIRONMENTAL MITIGATION/RECLAMATION	
	TOPSOIL SALVAGE METHOD
	STREAMS
	WETLANDS
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MLP	MAINLINE PIPE
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	PERMANENT EASEMENT
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REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF-15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

REV No	DATE	DESCRIPTION
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APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
11042	UEI	UEI	BM	JW	JH	UEI
11042	UEI	UEI	DW	JW	JH	UEI
11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL

DATE

PRELIMINARY

REV. NO.	DATE	PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA #	CHAINAGE:	DISCIPLINE #
4383	M.P. 262.7	03

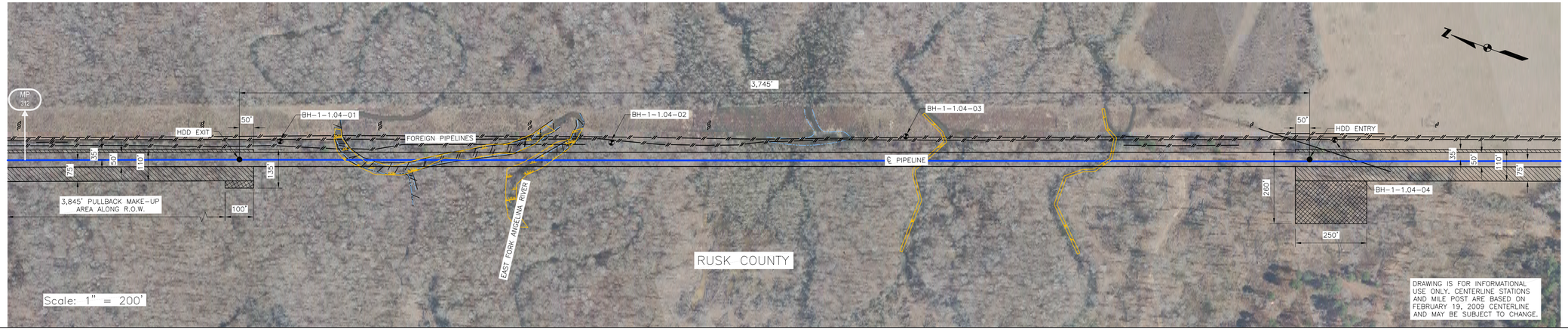
SABINE RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
UPSHUR & SMITH COUNTIES, TEXAS

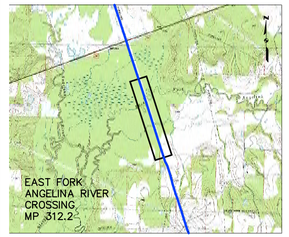
SCALE	DRAWING No	REV
AS SHOWN	4383-03-ML-03-003	2

TC_UD_BR.DWG 22X34

PLOTTED SIZE: ANSI D (22x34)

ID — TIME — DESIGNFILE





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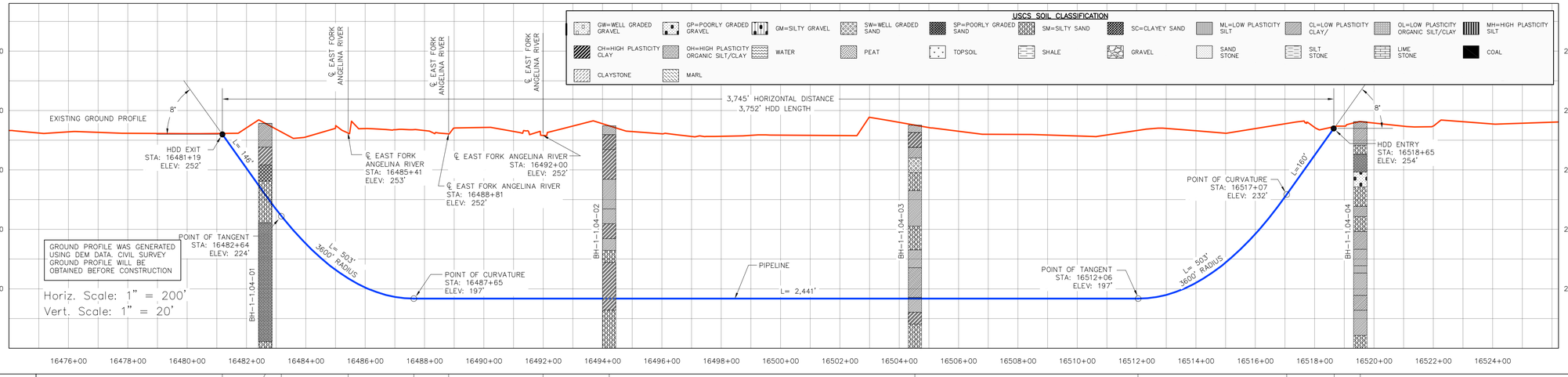
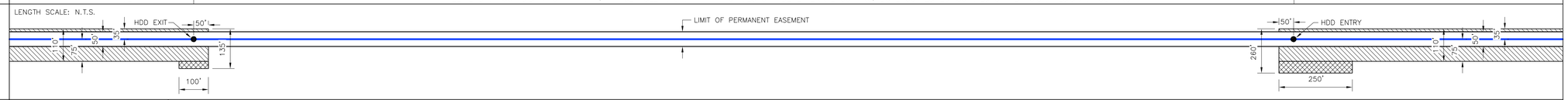


CROSSING INFORMATION (ESTIMATED STATIONING)	16481+19 HDD EXIT	16482+64 BH-1-1.04-01	16483+64 PT OF TANGENT	16485+41 ℄ EAST FORK ANGELINA RIVER	16487+65 PT OF CURVATURE	16488+81 ℄ EAST FORK ANGELINA RIVER	16492+00 ℄ EAST FORK ANGELINA RIVER	16494+23 BH-1-1.04-02	16504+53 BH-1-1.04-03	16512+06 PT OF TANGENT	16517+07 PT OF CURVATURE	16518+65 HDD ENTRY	16519+55 BH-1-1.04-04

PIPELINE DATA	MLP	PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING.	MLP



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REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	JW	JH	UEI
1	03.19.09	ISSUED FOR TROW REVIEW	11042	UEI	UEI	DW	JW	JH	UEI
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)	11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA #	4384	CHAINAGE:	M.P. 312.2	DISCIPLINE #	03

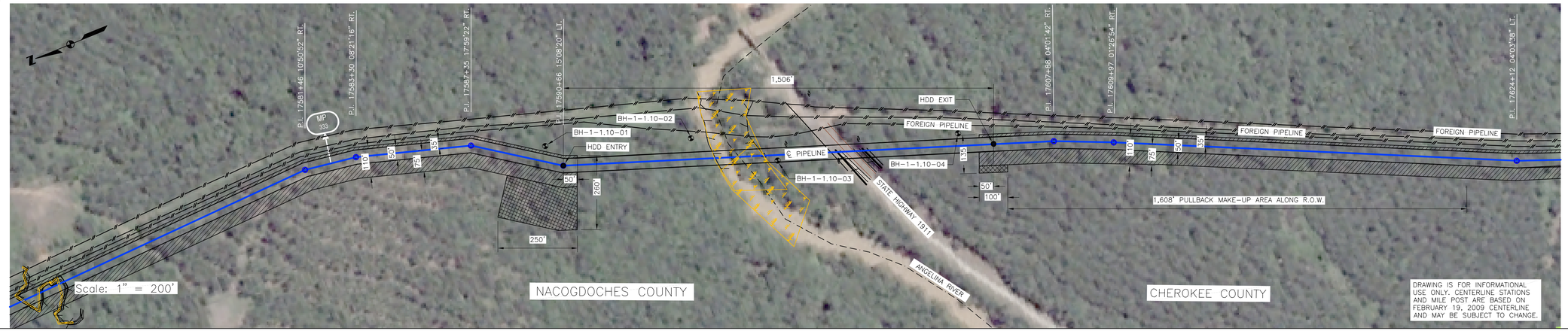
EAST FORK ANGELINA RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
RUSK COUNTY, TEXAS

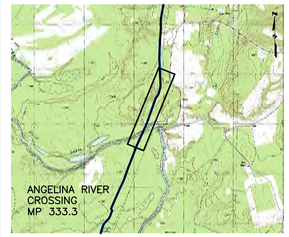
SCALE	AS SHOWN	DRAWING No	4384-03-ML-03-001	REV	2

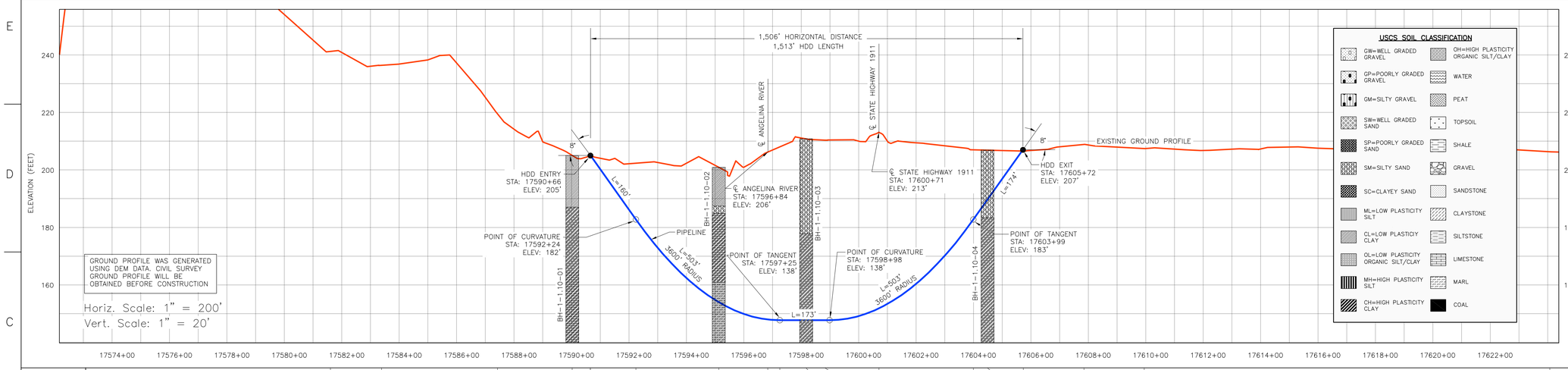
PLOTTED SIZE: ANSI D (22x34)

TC_UD_BR.DWG 22X34

TIME — DESIGNFILE







USCS SOIL CLASSIFICATION

GW=WELL GRADED GRAVEL	OH=HIGH PLASTICITY ORGANIC SILT/CLAY
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GM=SILTY GRAVEL	PEAT
SW=WELL GRADED SAND	TOPSOIL
SP=POORLY GRADED SAND	SHALE
SM=SILTY SAND	GRAVEL
SC=CLAYEY SAND	SANDSTONE
ML=LOW PLASTICITY SILT	CLAYSTONE
CL=LOW PLASTICITY CLAY	SILTSTONE
OL=LOW PLASTICITY ORGANIC SILT/CLAY	LIMESTONE
MH=HIGH PLASTICITY SILT	MARL
CH=HIGH PLASTICITY CLAY	COAL

CROSSING INFORMATION (ESTIMATED STATIONING)	17581+46 P.I. 10°50'52" RT. · 17853+30 P.I. 08°21'16" RT. · 17587+35 P.I. 17°59'22" RT. · 17590+03 BH-1-1.10-01 · 17590+66 P.I. 15°08'20" LT. · 17590+66 HDD ENTRY · 17592+24 PT OF CURVATURE · 17595+13 BH-1-1.10-02 · 17596+84 ℄ ANGELINA RIVER · 17597+25 PT OF TANGENT · 17598+17 BH-1-1.10-03 · 17598+98 PT OF CURVATURE · 17600+71 ℄ STATE HIGHWAY 1911 · 17603+99 PT OF TANGENT · 17604+49 BH-1-1.10-04 · 17605+72 HDD EXIT · 17607+88 P.I. 04°01'42" RT. · 17609+97 P.I. 01°26'54" RT. · 17624+12 P.I. 04°03'38" LT.
PIPELINE DATA	MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP
CONSTRUCTION WORKSPACE	LENGTH SCALE: N.T.S. — HDD ENTRY · LIMIT OF PERMANENT EASEMENT · HDD EXIT — 110' · 50' · 35' · 75' · 260' · 250' · 50' · 135' · 50' · 100'
ENVIRONMENTAL MITIGATION/RECLAMATION	TOPSOIL SALVAGE METHOD · STREAMS · WETLANDS · TIMING CONSRAINTS · MILEPOST · MONITORING · RECLAMATION · SPECIAL CONSIDERATIONS

TO BE DETERMINED

INSTALLATION NOTES

1) ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.
2) VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE ENVIRONMENTAL INSPECTOR.
3) WORK SPACE: WORK SPACE LIMITS ARE DEPICTED. CLEARING WILL BE RESTRICTED TO THE WORK SPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA ALONG THE RIGHT-OF-WAY. CLEARING BETWEEN THE ENTRY AND EXIT POINTS IS LIMITED TO THE MINIMUM AMOUNT NECESSARY TO STRING LOCATION WIRES AND INSTALL PUMPS AND PIPING TO OBTAIN WATER (WHERE APPROVED).
4) WATER SOURCE: DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. THE CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT THE ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH THE CONSTRUCTION MITIGATION AND RECLAMATION PLAN (CMRP) AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATER BODY.
5) HYDROSTATIC TEST: PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. THE CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PROJECT PERMITS. DISCHARGES WILL BE BACK TO THE WATER SOURCE UNLESS OTHERWISE DIRECTED BY THE ENVIRONMENTAL INSPECTOR. DISCHARGES SHALL NOT CAUSE EROSION OR SEDIMENTATION. TO REDUCE THE VELOCITY OF THE DISCHARGE, THE CONTRACTOR SHALL UTILIZE AN ENERGY-DISSIPATING DEVICE AS DESCRIBED IN THE CMRP.
6) SPILL-PREVENTION: ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATER BODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATER BODIES AND WETLANDS. EACH CONSTRUCTION CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.
7) EROSION AND SEDIMENT CONTROL: CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH CONTRACT DOCUMENTS. CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
8) TOPSOIL SHALL BE STRIPPED AS REQUIRED BY PROJECT SPECIFICATIONS.
9) PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO KEYSTONE FOR APPROVAL.
10) INSTALLATION: THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK.
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13) NOMINAL WORKING SPACE DIMENSIONS ARE SHOWN. LARGER AREAS MAY BE REQUIRED IN IRREGULAR TERRAIN. UPDATED DIMENSIONS MAY BE PROVIDED AFTER LOCAL TOPOGRAPHICAL SURVEYS ARE PERFORMED.

LEGEND

O	POINT OF INTERSECTION (P.I.)
●	ENTRY OR EXIT POINT
	GEOTECHNICAL BOREHOLE
	POWERPOLE
MLP	MAINLINE PIPE
	PIPELINE
	FOREIGN PIPELINE
	EDGE OF WATER
	PRIVATE ACCESS SHOO FLY ROAD
	COUNTY BOUNDARY
	WATER LEVEL
	USACOE CONSTRUCTION REFERENCE POINT
	WETLANDS
	PERMANENT EASEMENT
	TEMPORARY EASEMENT
	EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF-15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE (2.19.09 CL)	11042	UEI	UEI	BM	JW	JH	UEI
1	03.19.09	ISSUED FOR TROW REVIEW	11042	UEI	UEI	DW	JW	JH	UEI
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)	11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL — DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

UNIVERSAL ENSCO, INC. · ConocoPhillips · TransCanada *In business to deliver*

FIA #	CHAINAGE:	DISCIPLINE #
4384	M.P. 333.3	03

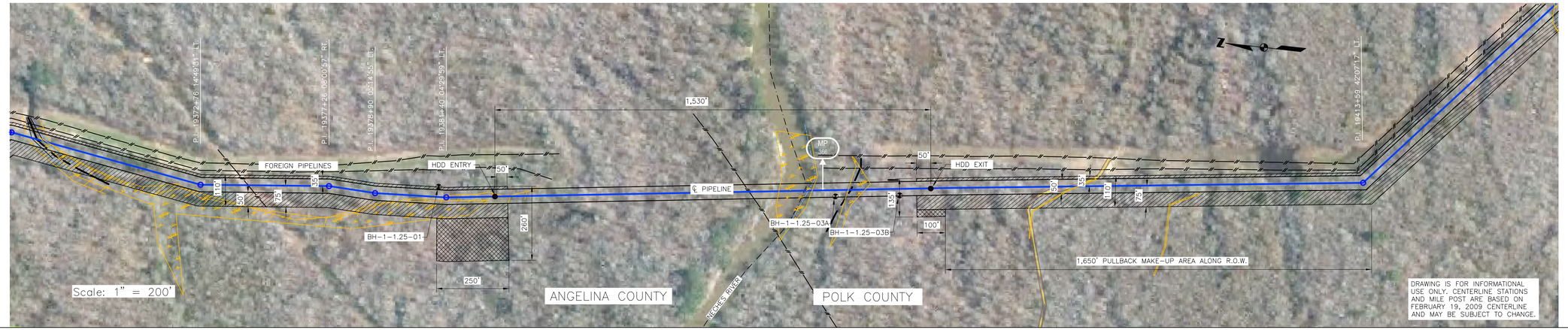
ANGELINA RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
NACOGDOCHES & CHEROKEE COUNTIES, TEXAS

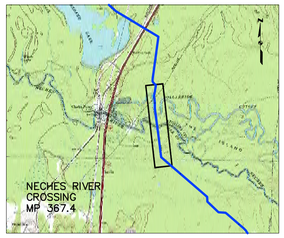
SCALE	DRAWING No	REV
AS SHOWN	4384-03-ML-03-003	2

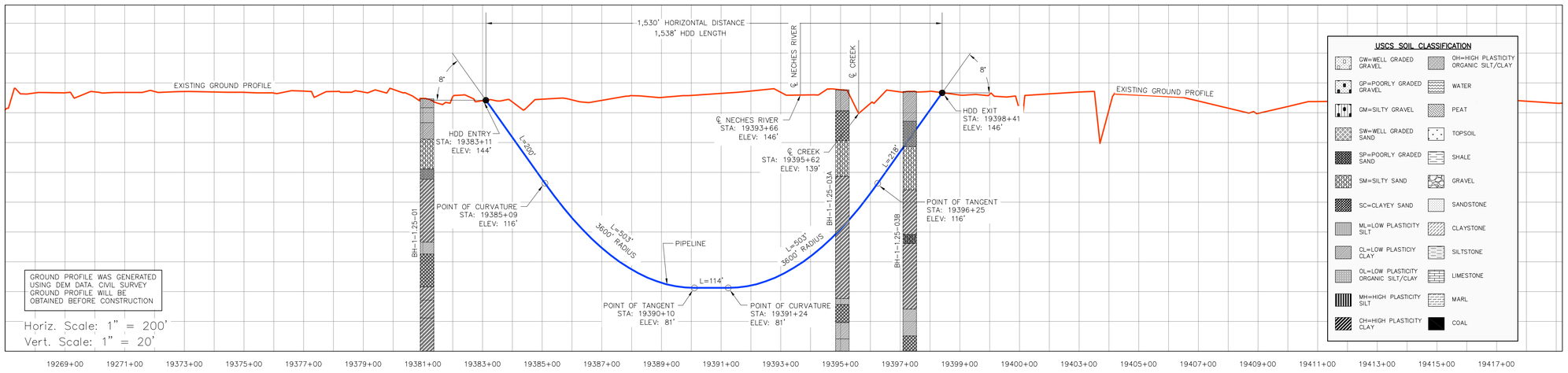
PLOTTED SIZE: ANSI D (22x34)

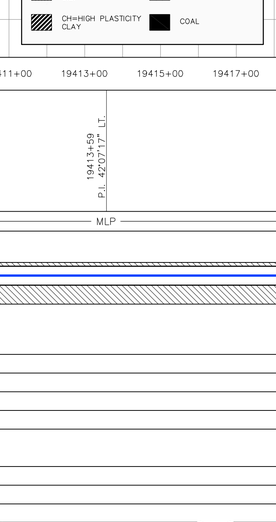
TC_UD_BR.DWG 22X34

TIME — DESIGNFILE









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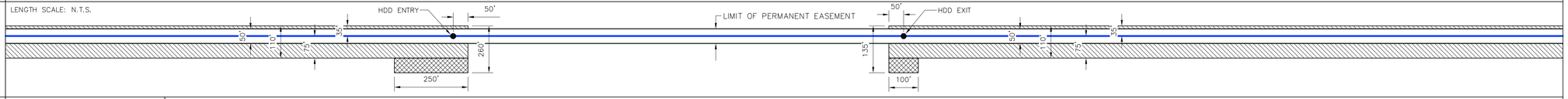
CROSSING INFORMATION (ESTIMATED STATIONING)

19372+76 P.I. 14°49'31" LT.	19377+26 P.I. 08°00'57" RT.	19378+90 P.I. 05°14'55" LT.	19381+14 BH-1-1.25-01	19381+40 P.I. 04°29'59" LT.	19383+11 HDD ENTRY	19385+09 PT OF CURVATURE	19390+10 PT OF TANGENT	19391+24 PT OF CURVATURE	19393+66 ℄ NECHES RIVER	19395+06 BH-1-1.25-03A	19395+62 ℄ CREEK	19396+25 PT OF TANGENT	19397+32 BH-1-1.25-03B	19398+41 HDD EXIT	19413+59 P.I. 42°07'17" LT.

PIPELINE DATA: MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION

TOPSOIL SALVAGE METHOD
STREAMS
WETLANDS
TIMING CONSRAINTS
MILEPOST
MONITORING
RECLAMATION
SPECIAL CONSIDERATIONS

TO BE DETERMINED

LEGEND

- POINT OF INTERSECTION (P.I.)
- ENTRY OR EXIT POINT
- GEOTECHNICAL BOREHOLE
- POWERPOLE
- MLP — MAINLINE PIPE
- PIPELINE
- FOREIGN PIPELINE
- EDGE OF WATER
- PRIVATE ACCESS SHOO FLY ROAD
- COUNTY BOUNDARY
- WATER LEVEL
- USACOE CONSTRUCTION REFERENCE POINT
- WETLANDS
- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF_15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

REV No	DATE	DESCRIPTION
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)
1	03.19.09	ISSUED FOR TROW REVIEW
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
11042	UEI	UEI	BM	JW	JH	UEI
11042	UEI	UEI	DW	JW	JH	UEI
11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL — DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada — In business to deliver

FIA # 4385 | CHAINAGE: M.P. 367.4 | DISCIPLINE # 03

NECHES RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
ANGELINA & POLK COUNTIES, TEXAS

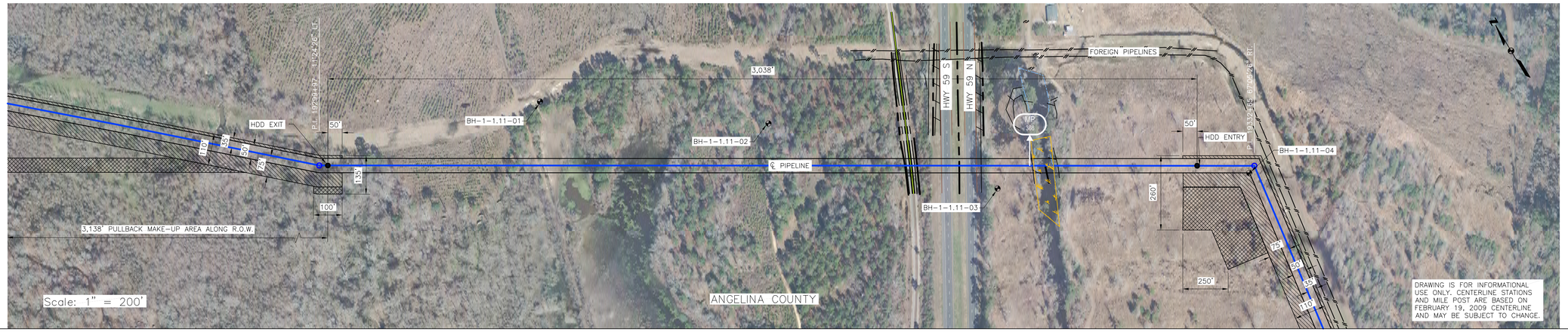
SCALE AS SHOWN | DRAWING No 4385-03-ML-03-001 | REV 2

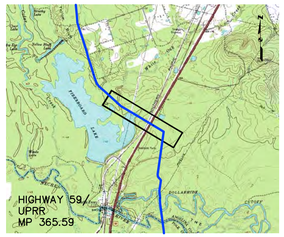
TIME — DESIGNFILE

TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)





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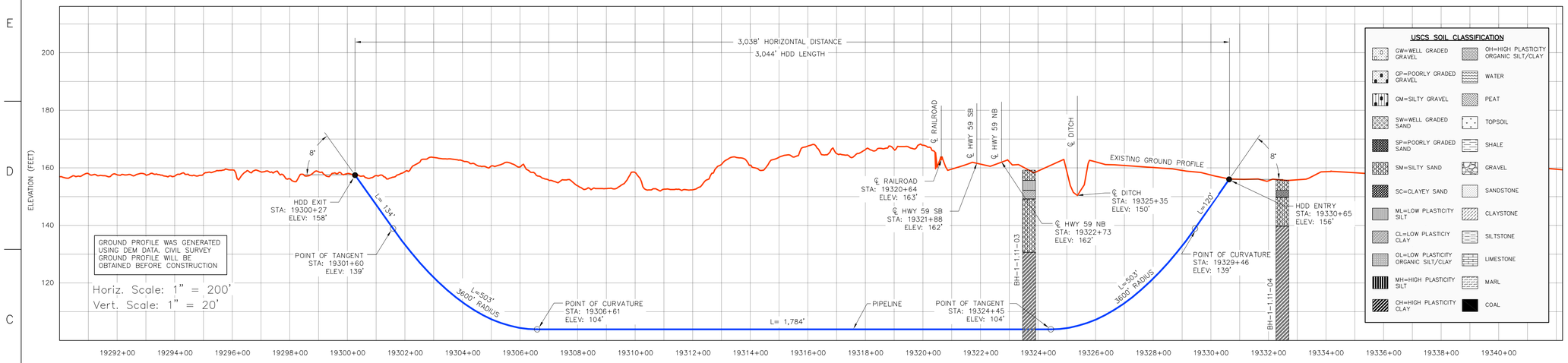

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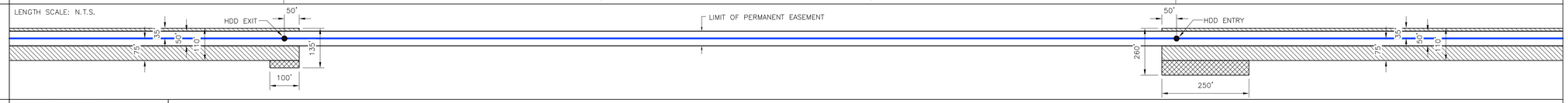
MH=HIGH PLASTICITY SILT	MARL
CH=HIGH PLASTICITY CLAY	COAL

CROSSING INFORMATION (ESTIMATED STATIONING)	19299+97 P.I. 11°24'26" LT.; 19300+27 HDD EXIT; 19301+60 PT OF TANGENT; 19306+61 PT OF CURVATURE; 19307+71 BH-1-1.11-01; 19315+70 BH-1-1.11-02; 19320+64 RAILROAD; 19321+88 HWY 59 SB; 19322+73 HWY 59 NB; 19323+70 BH-1-1.11-03; 19324+45 PT OF TANGENT; 19325+35 ℄ DITCH; 19329+46 PT OF CURVATURE; 19330+65 HDD ENTRY; 19332+50 BH-1-1.11-04; 19332+65 P.I. 67°05'26" RT
PIPELINE DATA	MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP



ENVIRONMENTAL MITIGATION/RECLAMATION	
TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSRAINTS	
MILEPOST	
MONITORING	
RECLAMATION	
SPECIAL CONSIDERATIONS	

TO BE DETERMINED

LEGEND

	POINT OF INTERSECTION (P.I.)
	ENTRY OR EXIT POINT
	GEOTECHNICAL BOREHOLE
	POWERPOLE
MLP	MAINLINE PIPE
	PIPELINE
	FOREIGN PIPELINE
	EDGE OF WATER
	PRIVATE ACCESS SHOO FLY ROAD
	COUNTY BOUNDARY
	WATER LEVEL
	USACOE CONSTRUCTION REFERENCE POINT
	WETLANDS
	PERMANENT EASEMENT
	TEMPORARY EASEMENT
	EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF_15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

REV No	DATE	DESCRIPTION
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)
1	03.19.09	ISSUED FOR TROW REVIEW
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
11042	UEI	UEI	BM	JW	JH	UEI
11042	UEI	UEI	DW	JW	JH	UEI
11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PRELIMINARY

REV. NO.	DATE	PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA #	CHAINAGE:	DISCIPLINE #
4385	365.59	03

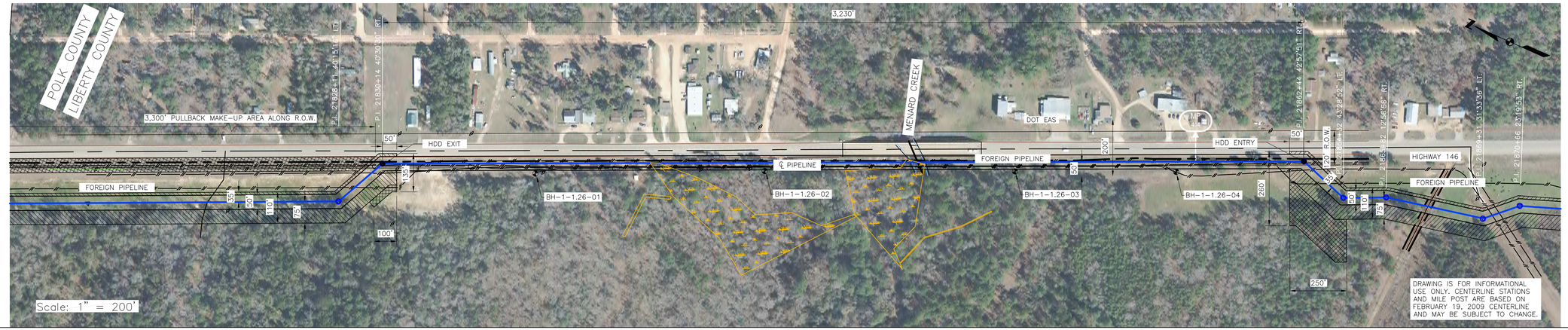
HIGHWAY 59/ UPRR HDD INSTALLATION
KEYSTONE XL PROJECT
ANGELINA COUNTY, TEXAS

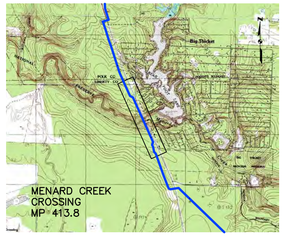
SCALE	DRAWING No	REV
AS SHOWN	4385-03-ML-03-202	2

PLOTTED SIZE: ANSI D (22x34)

TC_UD_BR.DWG 22X34

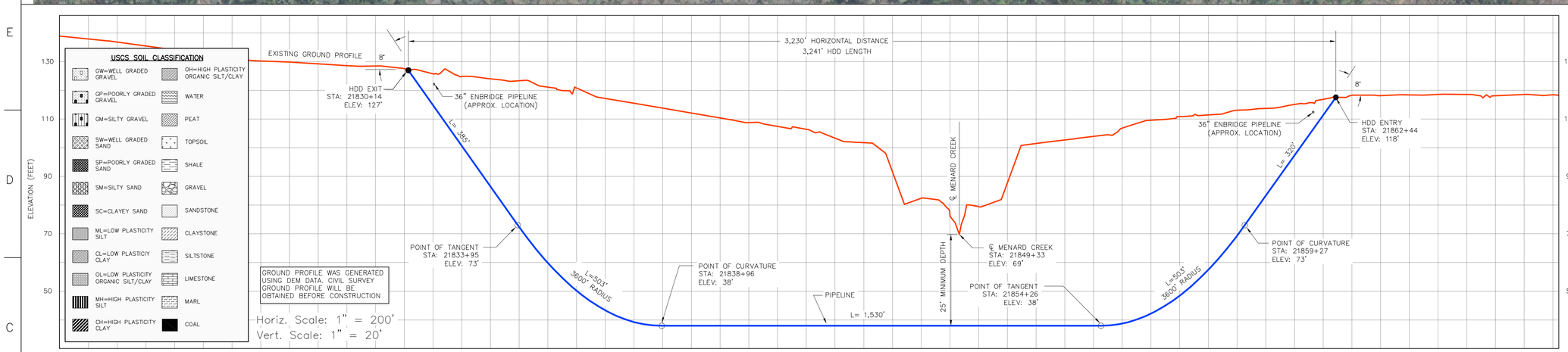
TIME-DESIGNFILE





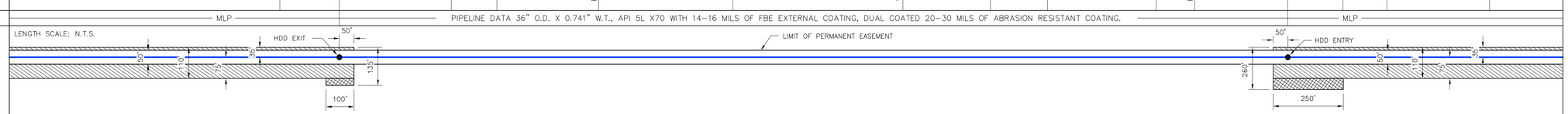
INSTALLATION NOTES

1) ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.
2) VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE ENVIRONMENTAL INSPECTOR.
3) WORK SPACE: WORK SPACE LIMITS ARE DEPICTED. CLEARING WILL BE RESTRICTED TO THE WORK SPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA ALONG THE RIGHT-OF-WAY. CLEARING BETWEEN THE ENTRY AND EXIT POINTS IS LIMITED TO THE MINIMUM AMOUNT NECESSARY TO STRING LOCATION WIRES AND INSTALL PUMPS AND PIPING TO OBTAIN WATER (WHERE APPROVED).
4) WATER SOURCE: DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. THE CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT THE ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH THE CONSTRUCTION MITIGATION AND RECLAMATION PLAN (CMRP) AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATER BODY.
5) HYDROSTATIC TEST: PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. THE CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PROJECT PERMITS. DISCHARGES WILL BE BACK TO THE WATER SOURCE UNLESS OTHERWISE DIRECTED BY THE ENVIRONMENTAL INSPECTOR. DISCHARGES SHALL NOT CAUSE EROSION OR SEDIMENTATION. TO REDUCE THE VELOCITY OF THE DISCHARGE, THE CONTRACTOR SHALL UTILIZE AN ENERGY-DISSIPATING DEVICE AS DESCRIBED IN THE CMRP.
6) SPILL-PREVENTION: ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATER BODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATER BODIES AND WETLANDS. EACH CONSTRUCTION CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.
7) EROSION AND SEDIMENT CONTROL: CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH CONTRACT DOCUMENTS. CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
8) TOPSOIL SHALL BE STRIPPED AS REQUIRED BY PROJECT SPECIFICATIONS.
9) PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO KEYSTONE FOR APPROVAL.
10) INSTALLATION: THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK.
11) MUD DISPOSAL: CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISPOSED OF IN WATER BODIES OR WETLANDS. ANY DRILLING MUD WHICH INADVERTENTLY EXITS AT POINTS OTHER THAN THE ENTRY AND EXIT POINTS SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PRACTICAL AND DISPOSED OF AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS.
12) CLEANUP/STABILIZATION/RESTORATION: ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED IN PROJECT DOCUMENTS.
13) NOMINAL WORKING SPACE DIMENSIONS ARE SHOWN. LARGER AREAS MAY BE REQUIRED IN IRREGULAR TERRAIN. UPDATED DIMENSIONS MAY BE PROVIDED AFTER LOCAL TOPOGRAPHICAL SURVEYS ARE PERFORMED.



CROSSING INFORMATION (ESTIMATED STATIONING)	21828+11 P.I. 40°15'16" LT.	21830+14 HDD EXIT P.I. 40°30'30" RT.	21833+95 PT OF TANGENT	21835+50 BH-1-1.26-01	21838+96 PT OF CURVATURE	21843+54 BH-1-1.26-02	21849+33 ℄ MENARD CREEK	21852+31 BH-1-1.26-03	21854+26 PT OF TANGENT	21857+96 BH-1-1.26-04	21859+27 PT OF CURVATURE	21862+44 HDD ENTRY P.I. 42°57'51" RT.	21864+32 P.I. 43°28'52" LT.	21865+82 P.I. 12°56'56" RT.	21869+31 P.I. 31°33'36" LT.

PIPELINE DATA: MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP



ENVIRONMENTAL MITIGATION/RECLAMATION

TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSRAINTS	
MILEPOST	
MONITORING	
RECLAMATION	
SPECIAL CONSIDERATIONS	

TO BE DETERMINED

LEGEND

- POINT OF INTERSECTION (P.I.)
- ENTRY OR EXIT POINT
- GEOTECHNICAL BOREHOLE
- POWERPOLE
- MLP — MAINLINE PIPE
- PIPELINE
- FOREIGN PIPELINE
- EDGE OF WATER
- PRIVATE ACCESS SHOO FLY ROAD
- COUNTY BOUNDARY
- WATER LEVEL
- USACOE CONSTRUCTION REFERENCE POINT
- WETLANDS
- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF_15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

REV No	DATE	DESCRIPTION
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)
1	03.19.09	ISSUED FOR TROW REVIEW
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
11042	UEI	UEI	BM	JW	JH	UEI
11042	UEI	UEI	DW	JW	JH	UEI
11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT — PERMIT/ ENG. APPROVAL — DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA # 4386 | CHAINAGE: M.P. 413.8 | DISCIPLINE # 03

MENARD CREEK HDD INSTALLATION
KEYSTONE XL PROJECT
LIBERTY COUNTY, TEXAS

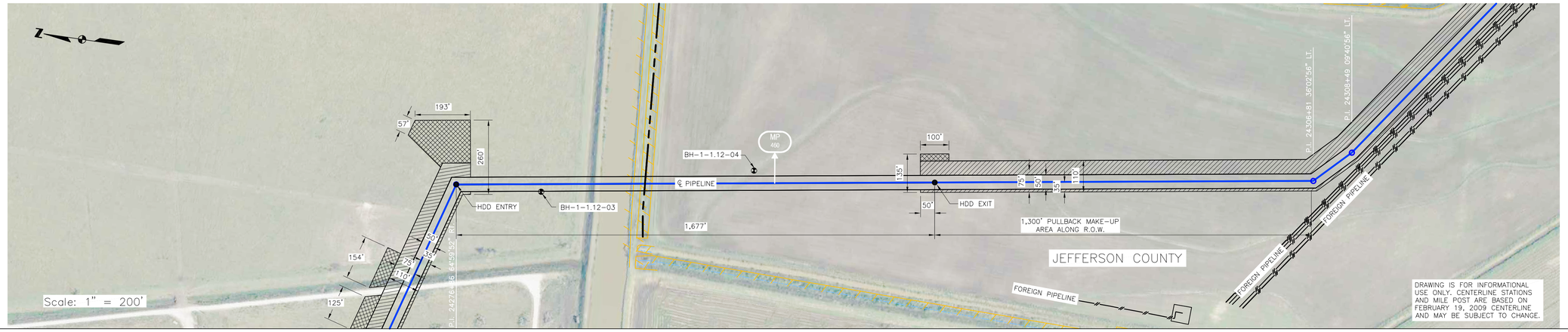
SCALE AS SHOWN | DRAWING No 4386-03-ML-03-001 | REV 2

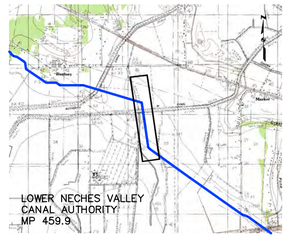
TC_UD_BR.DWG 22X34

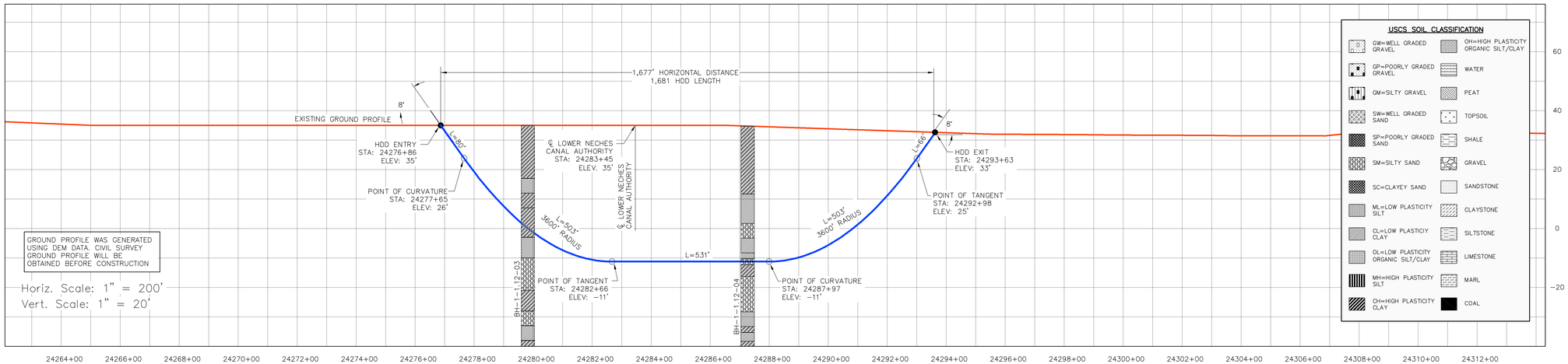
CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)

ID — TIME — DESIGNFILE



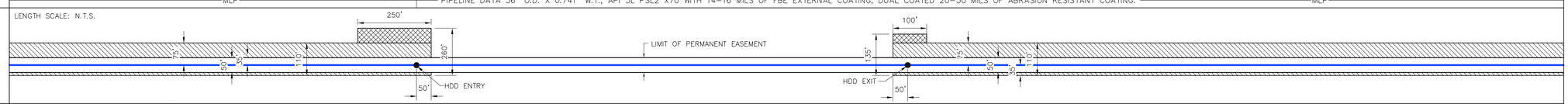




USCS SOIL CLASSIFICATION

GW=WELL GRADED GRAVEL	OH=HIGH PLASTICITY ORGANIC SILT/CLAY
GP=POORLY GRADED GRAVEL	WATER
GM=SILTY GRAVEL	PEAT
SW=WELL GRADED SAND	TOPSOIL
SP=POORLY GRADED SAND	SHALE
SM=SILTY SAND	GRAVEL
SC=CLAYEY SAND	SANDSTONE
ML=LOW PLASTICITY SILT	CLAYSTONE
CL=LOW PLASTICITY CLAY	SILTSTONE
OL=LOW PLASTICITY ORGANIC SILT/CLAY	LIMESTONE
MH=HIGH PLASTICITY SILT	MARL
CH=HIGH PLASTICITY CLAY	COAL

CROSSING INFORMATION (ESTIMATED STATIONING)	24276+86 HDD ENTRY P.I. 64°59'52" RT. · 24277+65 PT OF CURVATURE · 24279+82 BH-1-1.12-03 · 24282+66 PT OF TANGENT · 24283+45 ℄ LOWER NECHES CANAL AUTHORITY · 24287+26 BH-1-1.12-04 · 24287+97 PT OF CURVATURE · 24292+98 PT OF TANGENT · 24293+63 HDD EXIT · 24306+81 P.I. 36°02'56" LT. · 24308+49 P.I. 09°40'56" LT.
PIPELINE DATA	MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP



ENVIRONMENTAL MITIGATION/RECLAMATION	
TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSRAINTS	
MILEPOST	
MONITORING	
RECLAMATION	
SPECIAL CONSIDERATIONS	

TO BE DETERMINED

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LEGEND

○	POINT OF INTERSECTION (P.I.)
●	ENTRY OR EXIT POINT
	GEOTECHNICAL BOREHOLE
	POWERPOLE
MLP	MAINLINE PIPE
	PIPELINE
	FOREIGN PIPELINE
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	COUNTY BOUNDARY
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	USACOE CONSTRUCTION REFERENCE POINT
	WETLANDS
	PERMANENT EASEMENT
	TEMPORARY EASEMENT
	EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF_15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

REV No	DATE	DESCRIPTION
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1	03.19.09	ISSUED FOR TROW REVIEW
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
11042	UEI	UEI	BM	JW	JH	UEI
11042	UEI	UEI	DW	JW	JH	UEI
11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL

DATE

PRELIMINARY

REV. NO.	DATE	PERMIT NUMBER:

UNIVERSAL ENSCO, INC. · ConocoPhillips · TransCanada In business to deliver

FIA # 4387 | CHAINAGE: 459.9 | DISCIPLINE # 03

LOWER NECHES VALLEY CANAL ANTHORITY HDD INSTALLATION
KEYSTONE XL PROJECT
JEFFERSON COUNTY, TEXAS

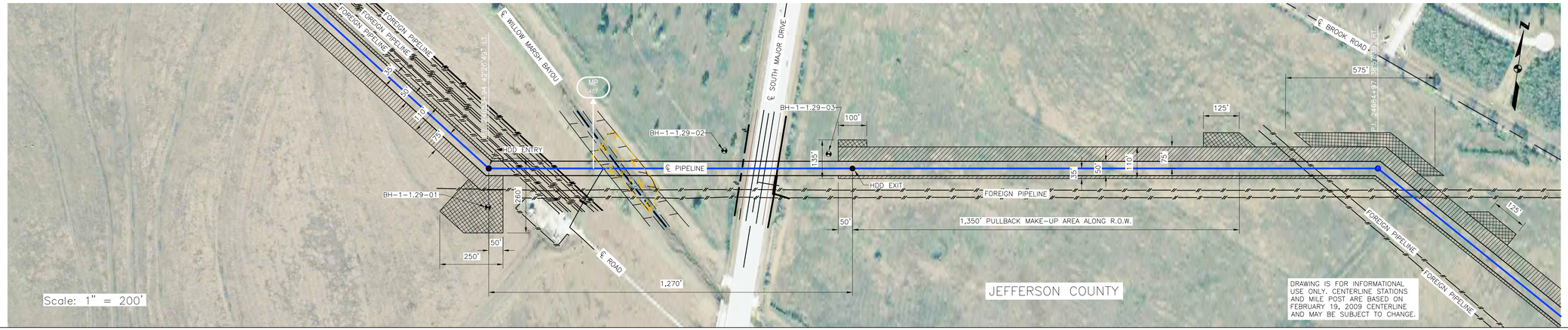
SCALE AS SHOWN | DRAWING No 4387-03-ML-03-004 | REV 2

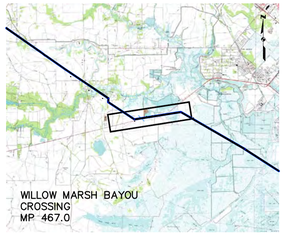
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)

TIME — DESIGNFILE





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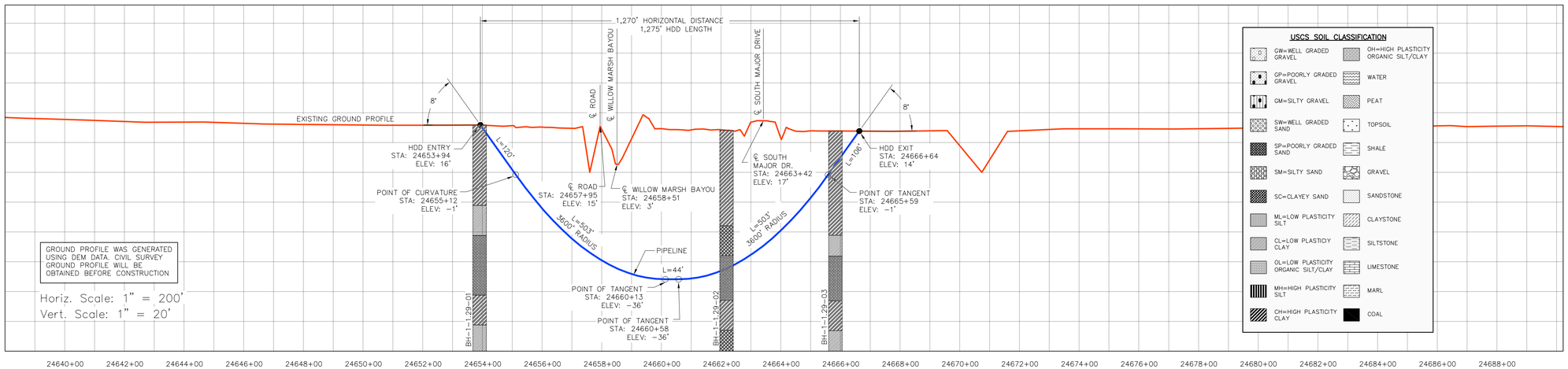
9) PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO KEYSTONE FOR APPROVAL.
10) INSTALLATION: THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK.
11) MUD DISPOSAL: CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISPOSED OF IN WATER BODIES OR WETLANDS. ANY DRILLING MUD WHICH INADVERTENTLY EXITS AT POINTS OTHER THAN THE ENTRY AND EXIT POINTS SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PRACTICAL AND DISPOSED OF AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS.
12) CLEANUP/STABILIZATION/RESTORATION: ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED IN PROJECT DOCUMENTS.
13) NOMINAL WORKING SPACE DIMENSIONS ARE SHOWN. LARGER AREAS MAY BE REQUIRED IN IRREGULAR TERRAIN. UPDATED DIMENSIONS MAY BE PROVIDED AFTER LOCAL TOPOGRAPHICAL SURVEYS ARE PERFORMED.



USCS SOIL CLASSIFICATION

GW=WELL GRADED GRAVEL	OH=HIGH PLASTICITY ORGANIC SILT/CLAY
GP=POORLY GRADED GRAVEL	WATER
GM=SILTY GRAVEL	PEAT
SW=WELL GRADED SAND	TOPSOIL
SP=POORLY GRADED SAND	SHALE
SM=SILTY SAND	GRAVEL
SC=CLAYEY SAND	SANDSTONE
ML=LOW PLASTICITY SILT	CLAYSTONE
CL=LOW PLASTICITY CLAY	SILTSTONE
OL=LOW PLASTICITY ORGANIC SILT/CLAY	LIMESTONE
MH=HIGH PLASTICITY SILT	MARL
CH=HIGH PLASTICITY CLAY	COAL

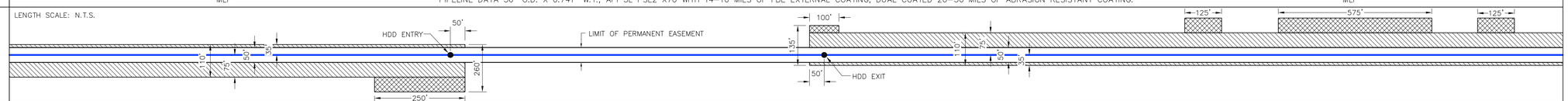
CROSSING INFORMATION (ESTIMATED STATIONING)

24653+94 HDD ENTRY P.I. 24°56'49" LT. BH-1-1.29-01	24655+12 PT. OF CURVATURE	24657+95 ℄ ROAD	24658+51 ℄ WILLOW MARSH BAYOU	24660+13 PT. OF TANGENT	24660+58 PT. OF CURVATURE	24662+18 BH-1-1.29-02	24663+42 ℄ SOUTH MAJOR DRIVE	24665+59 PT. OF TANGENT 24665+88 BH-1-1.29-03	24666+64 HDD EXIT	24684+97 P.I. 38°57'39" RT.

PIPELINE DATA

MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION

TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSRAINTS	
MILEPOST	
MONITORING	
RECLAMATION	
SPECIAL CONSIDERATIONS	

TO BE DETERMINED

LEGEND

	POINT OF INTERSECTION (P.I.)
	ENTRY OR EXIT POINT
	GEOTECHNICAL BOREHOLE
	POWERPOLE
MLP	MAINLINE PIPE
	PIPELINE
	FOREIGN PIPELINE
	EDGE OF WATER
	PRIVATE ACCESS SHOO FLY ROAD
	COUNTY BOUNDARY
	WATER LEVEL
	USACOE CONSTRUCTION REFERENCE POINT
	WETLANDS
	PERMANENT EASEMENT
	TEMPORARY EASEMENT
	EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF-15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	JW	JH	UEI
1	03.19.09	ISSUED FOR TROW REVIEW	11042	UEI	UEI	DW	JW	JH	UEI
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)	11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA # 4387 | CHAINAGE: M.P. 467.0 | DISCIPLINE # 03

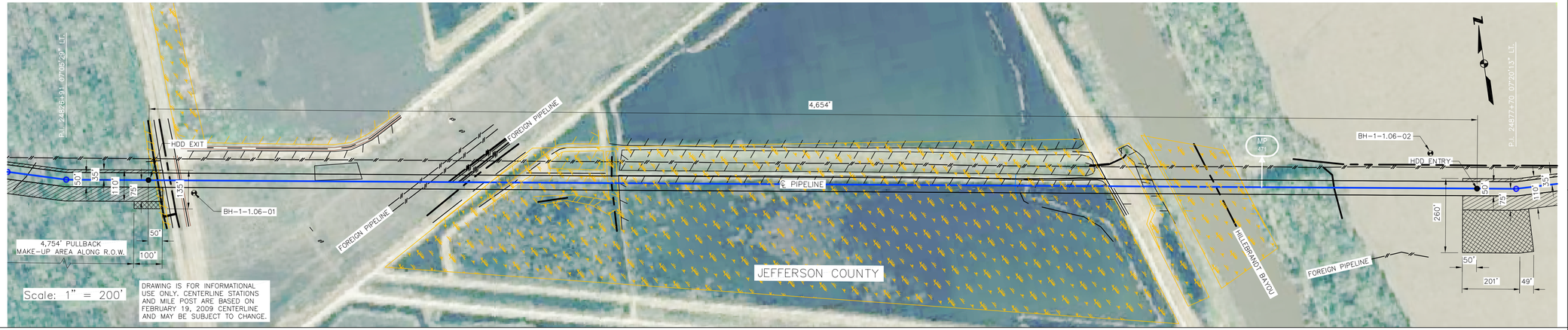
WILLOW MARSH BAYOU HDD INSTALLATION
KEYSTONE XL PROJECT
JEFFERSON COUNTY, TEXAS

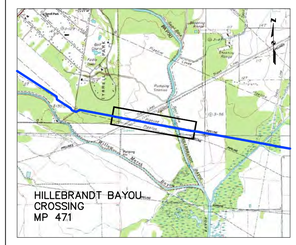
SCALE AS SHOWN | DRAWING No 4387-03-ML-03-005 | REV 2

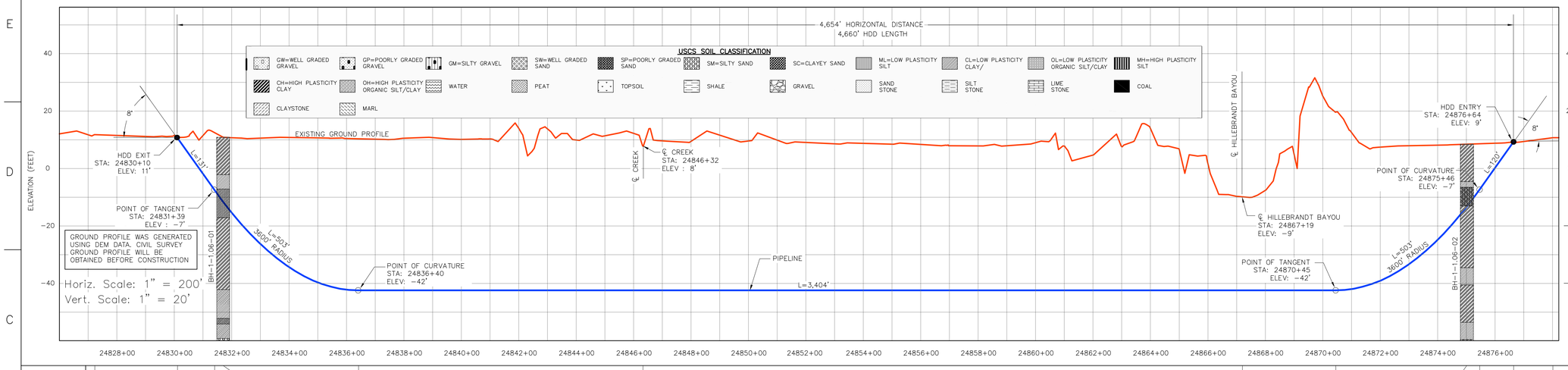
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

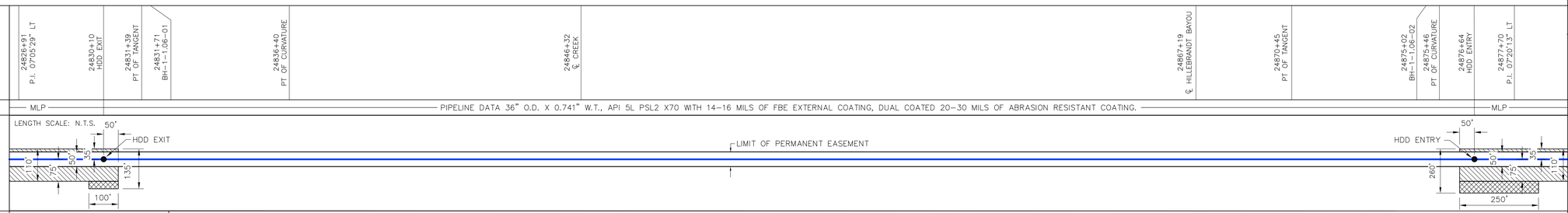
PLOTTED SIZE: ANSI D (22x34)







CROSSING INFORMATION (ESTIMATED STATIONING)	24826+91 P.I. 07°05'29" LT	24830+10 HDD EXIT	24831+39 PT OF TANGENT	24831+71 BH-1-1.06-01	24836+40 PT OF CURVATURE	24846+32 ℄ CREEK	24867+19 ℄ HILLEBRANDT BAYOU	24870+45 PT OF TANGENT	24875+02 BH-1-1.06-02	24875+46 PT OF CURVATURE	24876+64 HDD ENTRY	24877+70 P.I. 07°20'13" LT
PIPELINE DATA	MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP											



ENVIRONMENTAL MITIGATION/RECLAMATION	
TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSRAINTS	
MILEPOST	
MONITORING	
RECLAMATION	
SPECIAL CONSIDERATIONS	

TO BE DETERMINED

INSTALLATION NOTES

1) ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.
2) VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE ENVIRONMENTAL INSPECTOR.
3) WORK SPACE: WORK SPACE LIMITS ARE DEPICTED. CLEARING WILL BE RESTRICTED TO THE WORK SPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA ALONG THE RIGHT-OF-WAY. CLEARING BETWEEN THE ENTRY AND EXIT POINTS IS LIMITED TO THE MINIMUM AMOUNT NECESSARY TO STRING LOCATION WIRES AND INSTALL PUMPS AND PIPING TO OBTAIN WATER (WHERE APPROVED).
4) WATER SOURCE: DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. THE CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT THE ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH THE CONSTRUCTION MITIGATION AND RECLAMATION PLAN (CMRP) AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATER BODY.
5) HYDROSTATIC TEST: PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. THE CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PROJECT PERMITS. DISCHARGES WILL BE BACK TO THE WATER SOURCE UNLESS OTHERWISE DIRECTED BY THE ENVIRONMENTAL INSPECTOR. DISCHARGES SHALL NOT CAUSE EROSION OR SEDIMENTATION. TO REDUCE THE VELOCITY OF THE DISCHARGE, THE CONTRACTOR SHALL UTILIZE AN ENERGY-DISSIPATING DEVICE AS DESCRIBED IN THE CMRP.
6) SPILL-PREVENTION: ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATER BODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATER BODIES AND WETLANDS. EACH CONSTRUCTION CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.
7) EROSION AND SEDIMENT CONTROL: CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH CONTRACT DOCUMENTS. CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
8) TOPSOIL SHALL BE STRIPPED AS REQUIRED BY PROJECT SPECIFICATIONS.
9) PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO KEYSTONE FOR APPROVAL.
10) INSTALLATION: THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK.
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LEGEND

- POINT OF INTERSECTION (P.I.)
- ENTRY OR EXIT POINT
- GEOTECHNICAL BOREHOLE
- POWERPOLE
- MLP — MAINLINE PIPE
- PIPELINE
- FOREIGN PIPELINE
- EDGE OF WATER
- PRIVATE ACCESS SHOO FLY ROAD
- COUNTY BOUNDARY
- WATER LEVEL
- USACOE CONSTRUCTION REFERENCE POINT
- WETLANDS
- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF_15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

REV No	DATE	DESCRIPTION
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)
1	03.19.09	ISSUED FOR TROW REVIEW
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
11042	UEI	UEI	BM	JW	JH	UEI
11042	UEI	UEI	DW	JW	JH	UEI
11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PRELIMINARY

REV. NO.	DATE	PERMIT NUMBER:

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA #	CHAINAGE:	DISCIPLINE #
4387	M.P. 471	03

HILLEBRANDT BAYOU HDD INSTALLATION
KEYSTONE XL PROJECT
JEFFERSON COUNTY, TEXAS

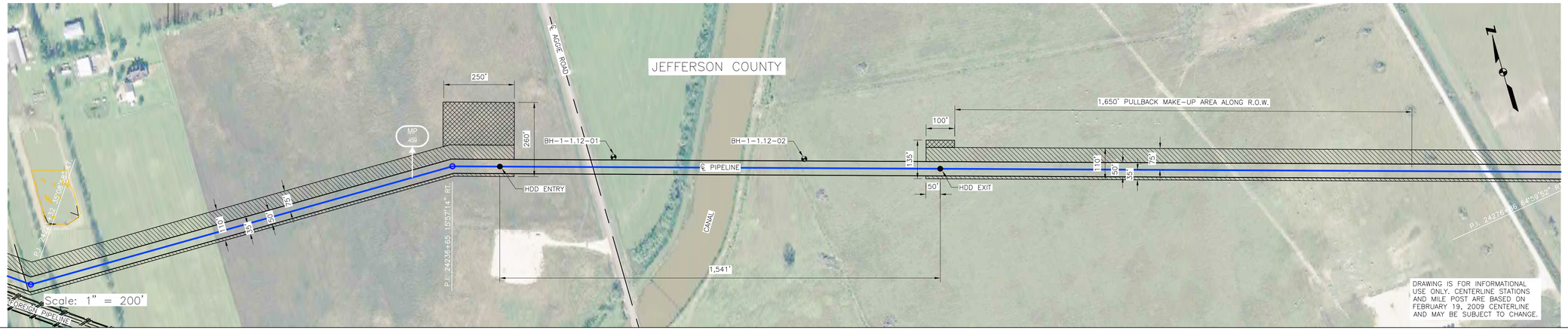
SCALE	DRAWING No	REV
AS SHOWN	4387-03-ML-03-006	2

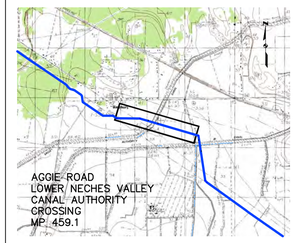
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)

TIME — DESIGNFILE





INSTALLATION NOTES

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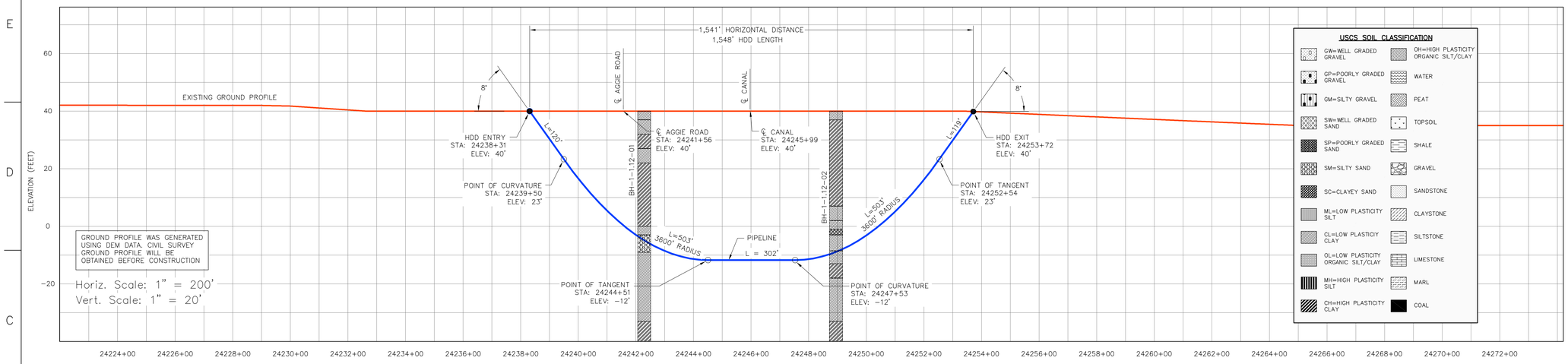

USCS SOIL CLASSIFICATION

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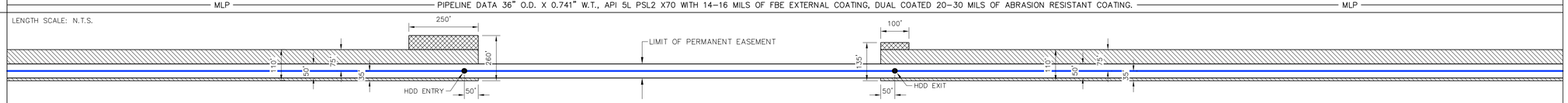
- CL=LOW PLASTICITY CLAY
- OL=LOW PLASTICITY ORGANIC SILT/CLAY
- MH=HIGH PLASTICITY SILT
- CH=HIGH PLASTICITY CLAY
- OH=HIGH PLASTICITY ORGANIC SILT/CLAY
- WATER
- PEAT
- TOPSOIL
- SHALE
- GRAVEL
- SANDSTONE
- CLAYSTONE
- SILTSTONE
- LIMESTONE
- MARL
- COAL

CROSSING INFORMATION (ESTIMATED STATIONING)	24236+65 P.I. 155°7'14" RT.	24238+31 HDD ENTRY	24239+50 PT OF CURVATURE	24241+56 ℄ AGGIE ROAD	24242+29 BH-1-1.12-01	24244+51 PT OF TANGENT	24245+99 ℄ CANAL	24247+53 PT OF CURVATURE	24248+96 BH-1-1.12-02	24252+54 PT OF TANGENT	24253+72 HDD EXIT

PIPELINE DATA	MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP



ENVIRONMENTAL MITIGATION/RECLAMATION	
TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSRAINTS	
MILEPOST	
MONITORING	
RECLAMATION	
SPECIAL CONSIDERATIONS	

TO BE DETERMINED

LEGEND

- POINT OF INTERSECTION (P.I.)
- ENTRY OR EXIT POINT
- GEOTECHNICAL BOREHOLE
- POWERPOLE
- MLP — MAINLINE PIPE
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- WETLANDS
- PERMANENT EASEMENT
- TEMPORARY EASEMENT
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REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF_15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	JW	JH	UEI
1	03.19.09	ISSUED FOR TROW REVIEW	11042	UEI	UEI	DW	JW	JH	UEI
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)	11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT	PERMIT/ ENG. APPROVAL
	DATE

PRELIMINARY

REV. NO.	DATE	PERMIT NUMBER:

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA # 4387	CHAINAGE: M.P. 459.1	DISCIPLINE # 03

AGGIE ROAD LOWER NECHES VALLEY CANAL AUTHORITY HDD INSTALLATION
KEYSTONE XL PROJECT
JEFFERSON COUNTY, TEXAS

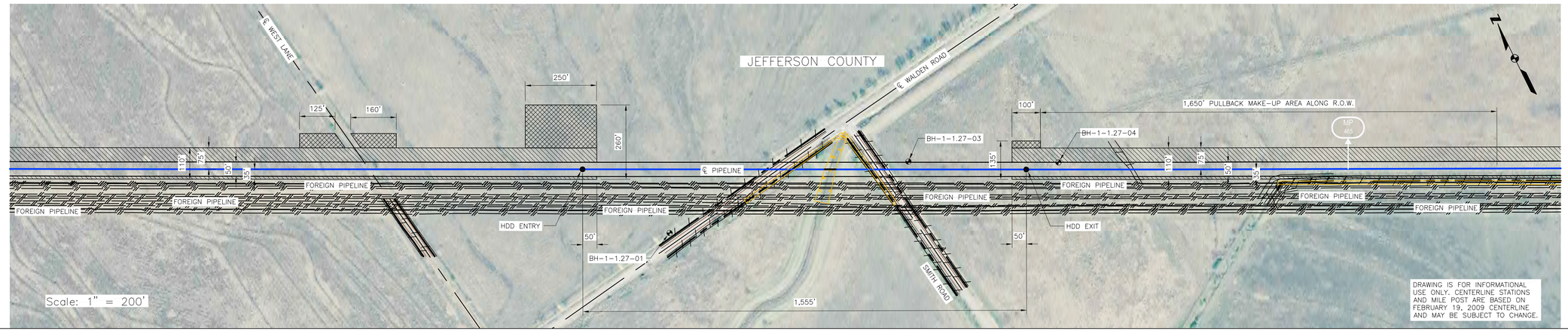
SCALE AS SHOWN	DRAWING No 4387-03-ML-03-103	REV 2

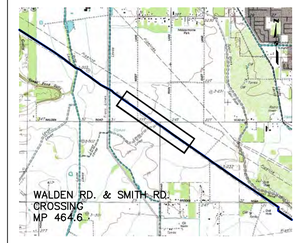
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)

TIME — DESIGNFILE





INSTALLATION NOTES

1) ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.

2) VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE ENVIRONMENTAL INSPECTOR.

3) WORK SPACE: WORK SPACE LIMITS ARE DEPICTED. CLEARING WILL BE RESTRICTED TO THE WORK SPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA ALONG THE RIGHT-OF-WAY. CLEARING BETWEEN THE ENTRY AND EXIT POINTS IS LIMITED TO THE MINIMUM AMOUNT NECESSARY TO STRING LOCATION WIRES AND INSTALL PUMPS AND PIPING TO OBTAIN WATER (WHERE APPROVED).

4) WATER SOURCE: DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. THE CONTRACTOR SHALL SCREEN THE INTAKE HOSE TO PREVENT THE ENTRAINMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH THE CONSTRUCTION MITIGATION AND RECLAMATION PLAN (CMRP) AND PROJECT REQUIREMENTS. THE HOSE SHALL BE KEPT OFF THE BOTTOM OF THE WATER BODY.

5) HYDROSTATIC TEST: PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. THE CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PROJECT PERMITS. DISCHARGES WILL BE BACK TO THE WATER SOURCE UNLESS OTHERWISE DIRECTED BY THE ENVIRONMENTAL INSPECTOR. DISCHARGES SHALL NOT CAUSE EROSION OR SEDIMENTATION. TO REDUCE THE VELOCITY OF THE DISCHARGE, THE CONTRACTOR SHALL UTILIZE AN ENERGY-DISSIPATING DEVICE AS DESCRIBED IN THE CMRP.

6) SPILL-PREVENTION: ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCC). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATER BODY OR WETLAND SHALL BE OPERATED AND REFUELED IN ACCORDANCE WITH THE SPCC PLAN. EQUIPMENT REFUELING AND STORAGE OF HAZARDOUS MATERIALS, FUELS, ETC. SHALL BE CONDUCTED AT LEAST 100 FEET FROM WATER BODIES AND WETLANDS. EACH CONSTRUCTION CREW SHALL HAVE ON HAND SUFFICIENT TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ABSORBENT AND BARRIER MATERIALS TO ALLOW RAPID CONTAINMENT AND RECOVERY OF SPILLED MATERIALS.

7) EROSION AND SEDIMENT CONTROL: CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES IN ACCORDANCE WITH CONTRACT DOCUMENTS. CONTRACTOR SHALL INSTALL ADDITIONAL EROSION CONTROL STRUCTURES AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.

8) TOPSOIL SHALL BE STRIPPED AS REQUIRED BY PROJECT SPECIFICATIONS.

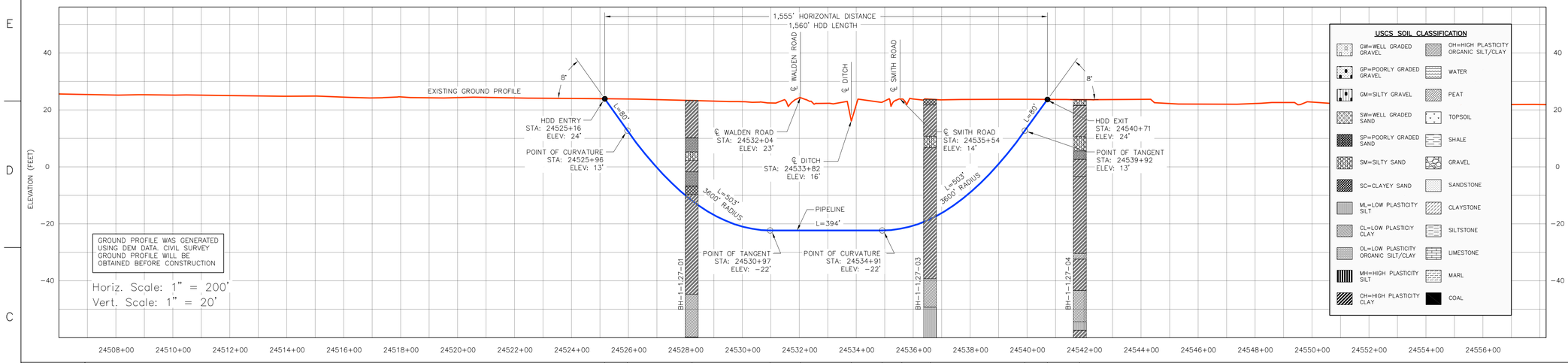
9) PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO KEYSTONE FOR APPROVAL.

10) INSTALLATION: THE PIPE SECTION FOR THE DRILLED CROSSING SHALL BE MADE UP WITHIN THE RIGHT-OF-WAY AT THE DRILL EXIT POINT AS SHOWN. CONTRACTOR SHALL ASSESS THE NEED FOR AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK.

11) MUD DISPOSAL: CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. UNDER NO CIRCUMSTANCES SHALL DRILLING FLUID BE DISPOSED OF IN WATER BODIES OR WETLANDS. ANY DRILLING MUD WHICH INADVERTENTLY EXITS AT POINTS OTHER THAN THE ENTRY AND EXIT POINTS SHALL BE CONTAINED AND COLLECTED TO THE EXTENT PRACTICAL AND DISPOSED OF AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS.

12) CLEANUP/STABILIZATION/RESTORATION: ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOURS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED IN PROJECT DOCUMENTS.

13) NOMINAL WORKING SPACE DIMENSIONS ARE SHOWN. LARGER AREAS MAY BE REQUIRED IN IRREGULAR TERRAIN. UPDATED DIMENSIONS MAY BE PROVIDED AFTER LOCAL TOPOGRAPHICAL SURVEYS ARE PERFORMED.



USCS SOIL CLASSIFICATION

- GW=WELL GRADED GRAVEL
- GP=POORLY GRADED GRAVEL
- GM=SILTY GRAVEL
- SW=WELL GRADED SAND
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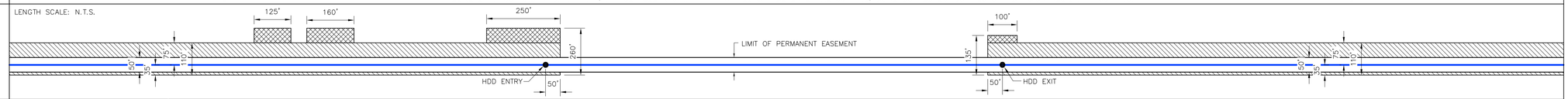
- SM=SILTY SAND
- SC=CLAYEY SAND
- ML=LOW PLASTICITY SILT
- CL=LOW PLASTICIY CLAY
- OL=LOW PLASTICITY ORGANIC SILT/CLAY
- MH=HIGH PLASTICITY SILT
- CH=HIGH PLASTICITY CLAY
- OH=HIGH PLASTICITY ORGANIC SILT/CLAY
- WATER
- PEAT
- TOPSOIL
- SHALE
- GRAVEL
- SANDSTONE
- CLAYSTONE
- SILTSTONE
- LIMESTONE
- MARL
- COAL

CROSSING INFORMATION (ESTIMATED STATIONING)

24525+16 HDD ENTRY
24525+96 PT OF CURVATURE
24528+22 BH-1-1.27-01
24530+97 PT OF TANGENT
24532+04 ℄ WALDEN ROAD
24533+82 ℄ DITCH
24534+91 PT OF CURVATURE
24535+54 ℄ SMITH ROAD
24536+59 BH-1-1.27-03
24539+92 PT OF TANGENT
24540+71 HDD EXIT
24541+85 BH-1-1.27-04

PIPELINE DATA: MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION

TOPSOIL SALVAGE METHOD
STREAMS
WETLANDS
TIMING CONSRAINTS
MILEPOST
MONITORING
RECLAMATION
SPECIAL CONSIDERATIONS

TO BE DETERMINED

LEGEND

- POINT OF INTERSECTION (P.I.)
- ENTRY OR EXIT POINT
- GEOTECHNICAL BOREHOLE
- POWERPOLE
- MLP — MAINLINE PIPE
- PIPELINE
- FOREIGN PIPELINE
- EDGE OF WATER
- PRIVATE ACCESS SHOO FLY ROAD
- COUNTY BOUNDARY
- WATER LEVEL
- USACOE CONSTRUCTION REFERENCE POINT
- WETLANDS
- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF-15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	JW	JH	UEI
1	03.19.09	ISSUED FOR TROW REVIEW	11042	UEI	UEI	DW	JW	JH	UEI
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)	11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL — DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA # 4387	CHAINAGE: M.P. 464.6	DISCIPLINE # 03

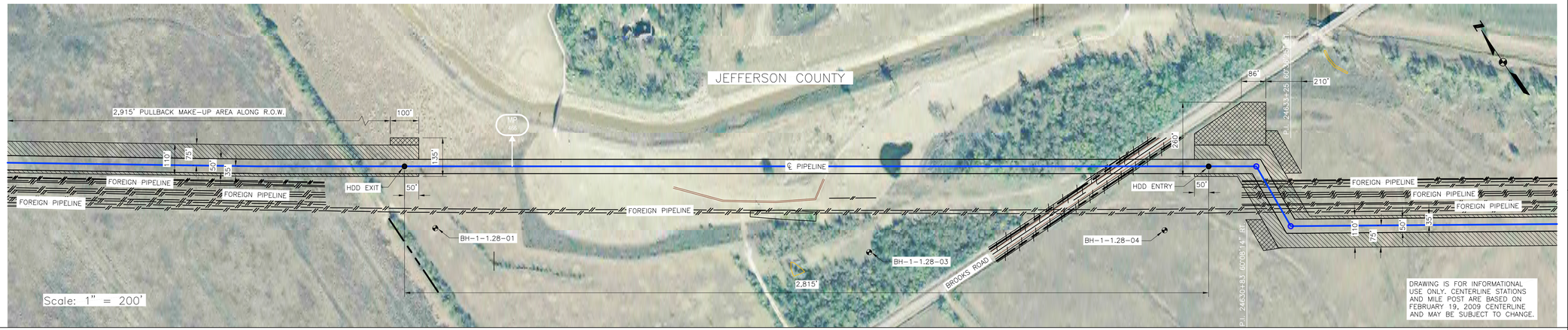
WALDEN ROAD & SMITH ROAD HDD INSTALLATION
KEYSTONE XL PROJECT
JEFFERSON COUNY, TEXAS

SCALE AS SHOWN	DRAWING No 4387-03-ML-03-104	REV 2

PLOTTED SIZE: ANSI D (22x34)

TC_UD_BR.DWG 22X34

ID — TIME — DESIGNFILE



INSTALLATION NOTES

1) ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.
2) VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE ENVIRONMENTAL INSPECTOR.
3) WORK SPACE: WORK SPACE LIMITS ARE DEPICTED. CLEARING WILL BE RESTRICTED TO THE WORK SPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA ALONG THE RIGHT-OF-WAY. CLEARING BETWEEN THE ENTRY AND EXIT POINTS IS LIMITED TO THE MINIMUM AMOUNT NECESSARY TO STRING LOCATION WIRES AND INSTALL PUMPS AND PIPING TO OBTAIN WATER (WHERE APPROVED).
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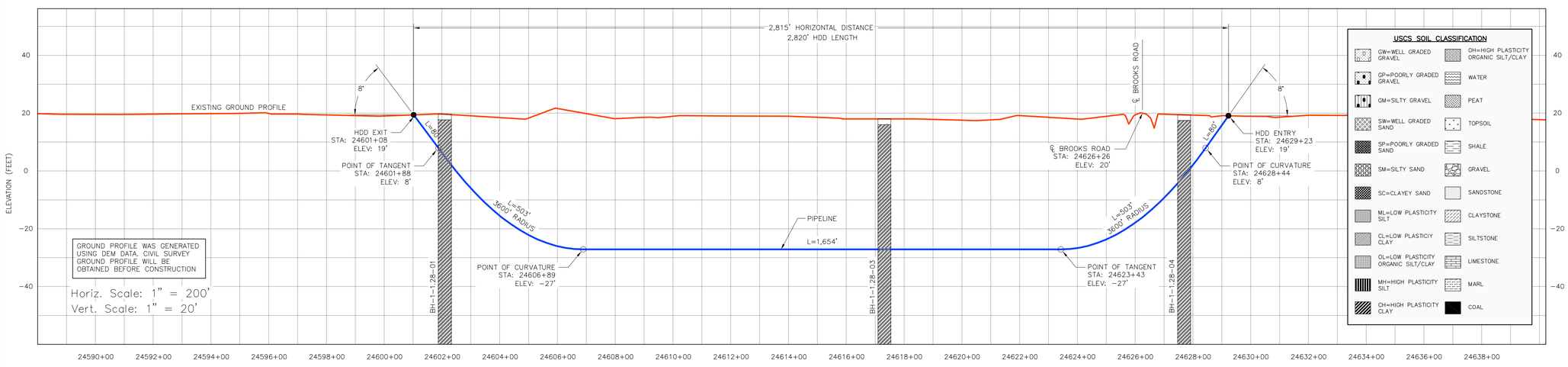

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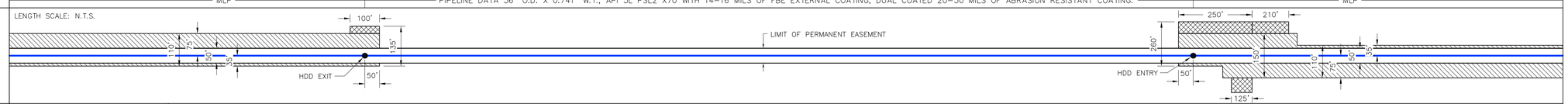
ML=LOW PLASTICITY SILT	CLAYSTONE
CL=LOW PLASTICIY CLAY	SILTSTONE
OL=LOW PLASTICITY ORGANIC SILT/CLAY	LIMESTONE
MH=HIGH PLASTICITY SILT	MARL
CH=HIGH PLASTICITY CLAY	COAL

CROSSING INFORMATION (ESTIMATED STATIONING)	24601+08 HDD EXIT; 24601+88 PT OF TANGENT; 24602+10 BH-1-1.28-01; 24606+89 PT OF CURVATURE; 24617+32 BH-1-1.28-03; 24623+43 PT OF TANGENT; 24626+26 ℄ BROOKS ROAD; 24627+69 BH-1-1.28-04; 24628+44 PT OF CURVATURE; 24629+23 HDD ENTRY; 24630+83 P.I. 60°08'14" RT.; 24633+25 P.I. 60°36'25" LT.
PIPELINE DATA	MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION	
	TOPSOIL SALVAGE METHOD
	STREAMS
	WETLANDS
	TIMING CONSRAINTS
	MILEPOST
	MONITORING
	RECLAMATION
	SPECIAL CONSIDERATIONS

TO BE DETERMINED

LEGEND

- POINT OF INTERSECTION (P.I.)
- ENTRY OR EXIT POINT
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- EXTRA WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF-15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	JW	JH	UEI
1	03.19.09	ISSUED FOR TROW REVIEW	11042	UEI	UEI	DW	JW	JH	UEI
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)	11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL — DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA # 4387 | CHAINAGE: M.P. 466.4 | DISCIPLINE # 03

GOLF GREEN & BROOKS RD. HDD INSTALLATION
KEYSTONE XL PROJECT
JEFFERSON COUNTY, TEXAS

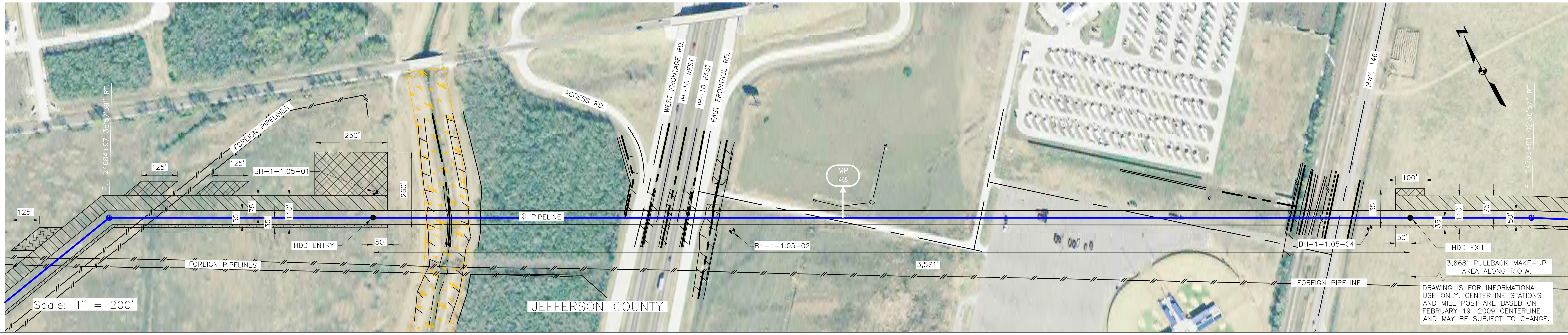
SCALE AS SHOWN | DRAWING No 4387-03-ML-03-105 | REV 2

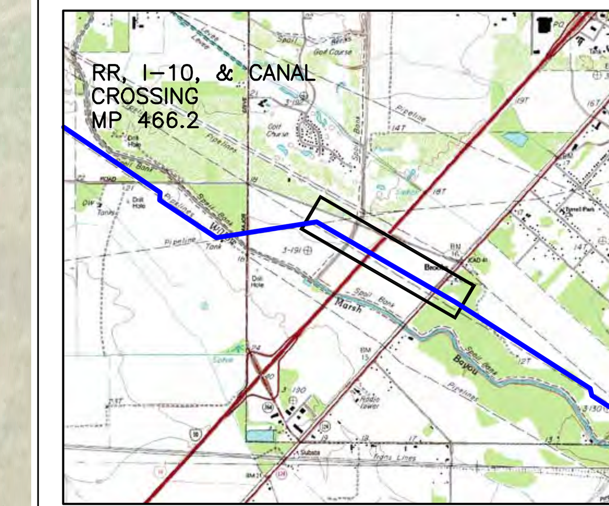
ID — TC_UD_BR.DWG 22X34

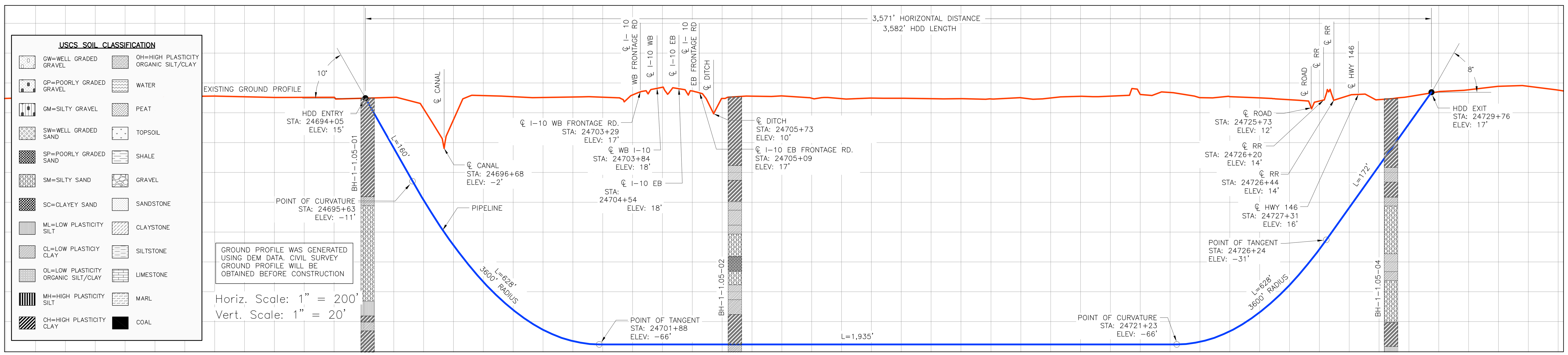
TIME — DESIGNFILE

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)







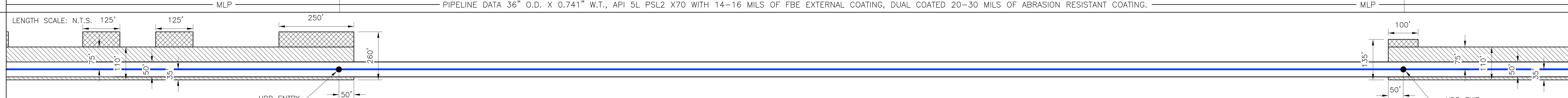
CROSSING INFORMATION (ESTIMATED STATIONING)

- 24684+97 P.I. 38°57'39" RT.
- 24694+05 HDD ENTRY
- 24694+12 BH-1-1.05-01
- 24695+63 PT OF CURVATURE
- 24696+68 ℄ CANAL
- 24701+88 PT OF TANGENT
- 24703+29 ℄ WB FRONTAGE RD.
- 24703+84 ℄ I-10 WB
- 24704+54 ℄ I-10 EB
- 24705+09 ℄ EB FRONTAGE RD.
- 24705+73 ℄ DITCH
- 24706+43 BH-1-1.05-02
- 24721+23 PT OF CURVATURE
- 24725+73 ℄ ROAD
- 24726+20 ℄ RAILROAD
- 24726+24 PT OF TANGENT
- 24726+44 ℄ RAILROAD
- 24727+31 ℄ HWY 146
- 24728+40 BH-1-1.05-04
- 24729+76 HDD EXIT
- 24733+91 P.I. 02°36'57" RT.

PIPELINE DATA

MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION

TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSRAINTS	
MILEPOST	
MONITORING	
RECLAMATION	
SPECIAL CONSIDERATIONS	

TO BE DETERMINED

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REFERENCE DRAWINGS

DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF_15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	JW	JH	UEI
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PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA # 4387	CHAINAGE: M.P. 467.8	DISCIPLINE # 03

RR, I-10, & CANAL HDD INSTALLATION
KEYSTONE XL PROJECT
JEFFERSON COUNTY, TEXAS

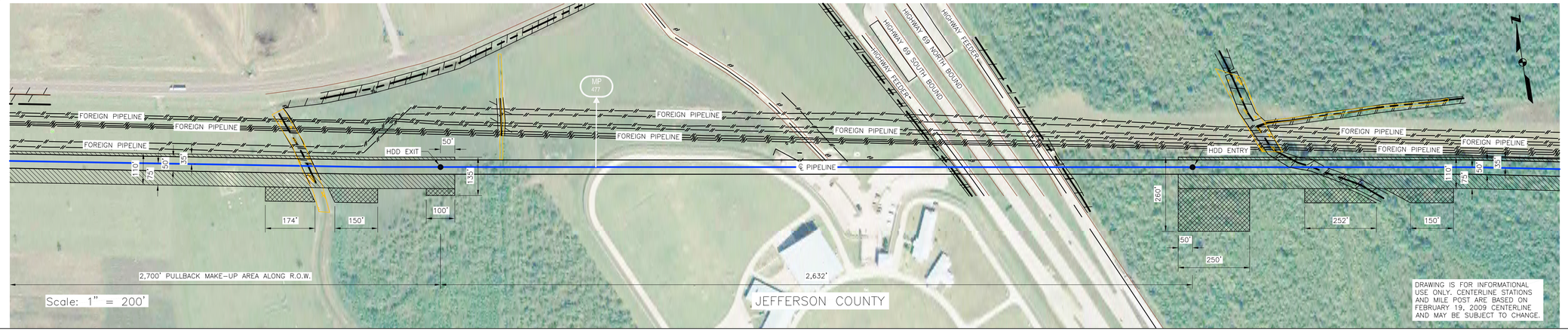
SCALE AS SHOWN	DRAWING No 4387-03-ML-03-106	REV 2

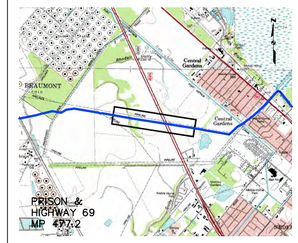
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)

TIME——DESIGNFILE——ID





INSTALLATION NOTES

1) ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.

2) VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE ENVIRONMENTAL INSPECTOR.

3) WORK SPACE: WORK SPACE LIMITS ARE DEPICTED. CLEARING WILL BE RESTRICTED TO THE WORK SPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA ALONG THE RIGHT-OF-WAY. CLEARING BETWEEN THE ENTRY AND EXIT POINTS IS LIMITED TO THE MINIMUM AMOUNT NECESSARY TO STRING LOCATION WIRES AND INSTALL PUMPS AND PIPING TO OBTAIN WATER (WHERE APPROVED).

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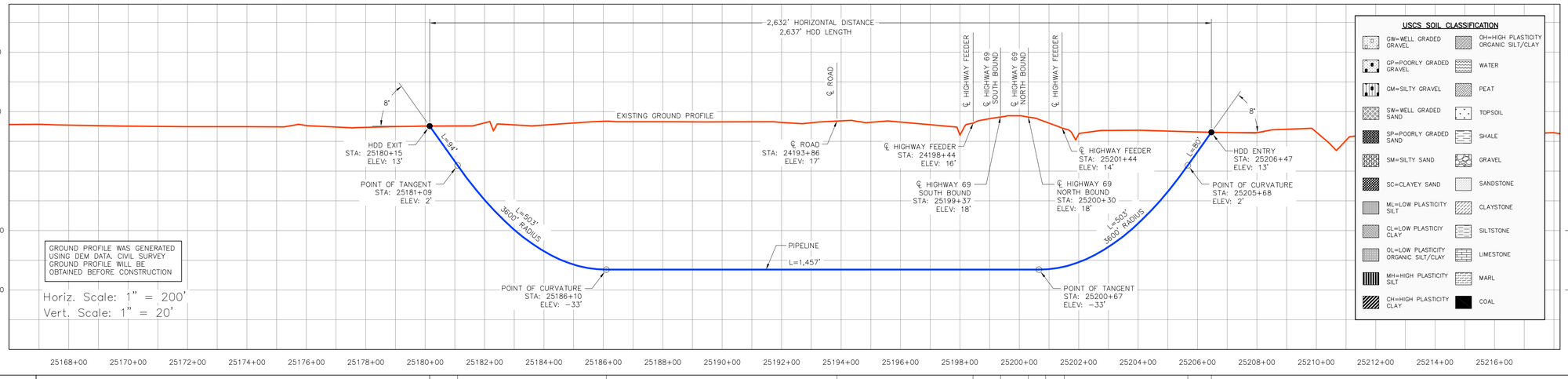

USCS SOIL CLASSIFICATION

GW=WELL GRADED GRAVEL	OH=HIGH PLASTICITY ORGANIC SILT/CLAY
GP=POORLY GRADED GRAVEL	WATER
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SW=WELL GRADED SAND	TOPSOIL
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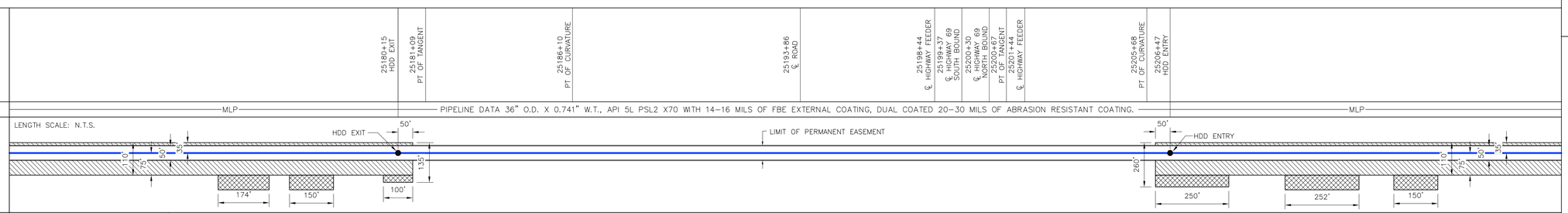
SM=SILTY SAND	GRAVEL
SC=CLAYEY SAND	SANDSTONE
ML=LOW PLASTICITY SILT	CLAYSTONE
CL=LOW PLASTICIY CLAY	SILTSTONE
OL=LOW PLASTICITY ORGANIC SILT/CLAY	LIMESTONE
MH=HIGH PLASTICITY SILT	MARL
CH=HIGH PLASTICITY CLAY	COAL

CROSSING INFORMATION (ESTIMATED STATIONING)	25180+15 HDD EXIT; 25181+09 PT OF TANGENT; 25186+10 PT OF CURVATURE; 25193+86 ℄ ROAD; 25198+44 ℄ HIGHWAY FEEDER; 25199+37 ℄ HIGHWAY 69 SOUTH BOUND; 25200+30 ℄ HIGHWAY 69 NORTH BOUND; 25200+67 PT OF TANGENT; 25201+44 ℄ HIGHWAY FEEDER; 25205+68 PT OF CURVATURE; 25206+47 HDD ENTRY
PIPELINE DATA	MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP
CONSTRUCTION WORKSPACE	LENGTH SCALE: N.T.S.
ENVIRONMENTAL MITIGATION/RECLAMATION	TOPSOIL SALVAGE METHOD
	STREAMS
	WETLANDS
	TIMING CONSRAINTS
	MILEPOST
	MONITORING
	RECLAMATION
	SPECIAL CONSIDERATIONS



TO BE DETERMINED

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- GEOTECHNICAL BOREHOLE
- POWERPOLE
- MLP — MAINLINE PIPE
- PIPELINE
- FOREIGN PIPELINE
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- COUNTY BOUNDARY
- WATER LEVEL
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DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF_15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

REV No	DATE	DESCRIPTION
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)
1	03.19.09	ISSUED FOR TROW REVIEW
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)

APPROVAL

PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
11042	UEI	UEI	BM	JW	JH	UEI
11042	UEI	UEI	DW	JW	JH	UEI
11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL | DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA # 4387	CHAINAGE: 477.2	DISCIPLINE # 03

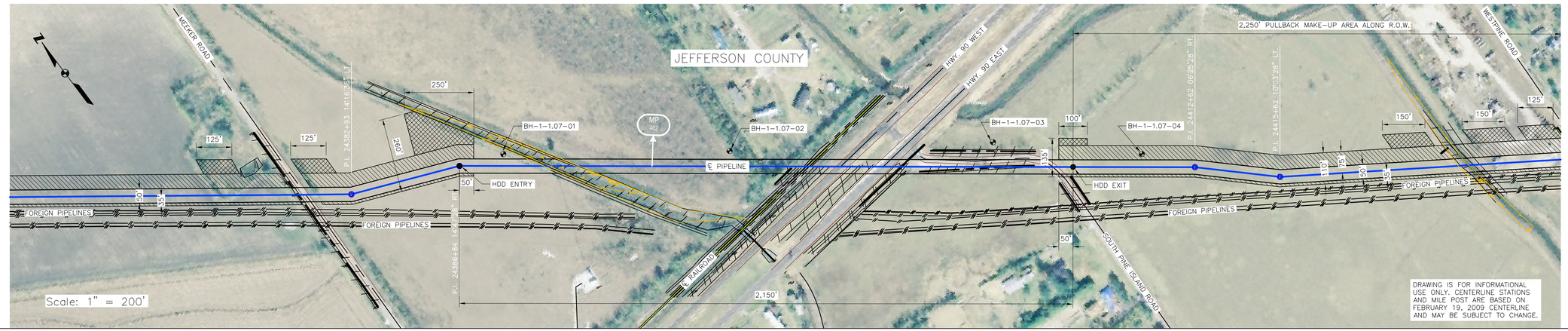
PRISON & HIGHWAY 69 HDD INSTALLATION
KEYSTONE XL PROJECT
JEFFERSON COUNTY, TEXAS

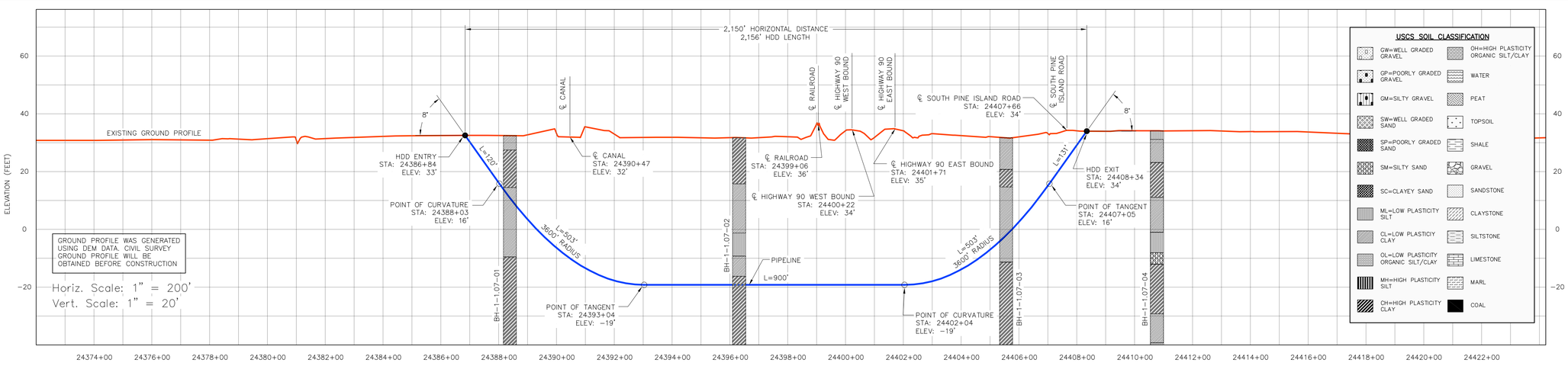
SCALE AS SHOWN	DRAWING No 4387-03-ML-03-109	REV 2

TIME — DESIGNFILE

TC_UD_BR.DWG 22X34

PLOTTED SIZE: ANSI D (22x34)





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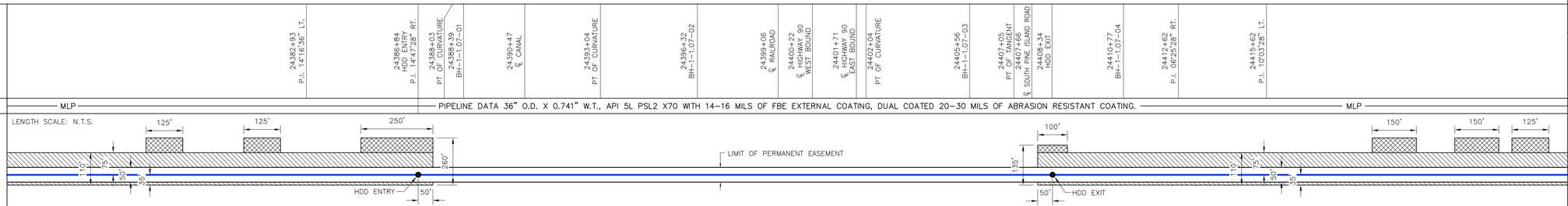

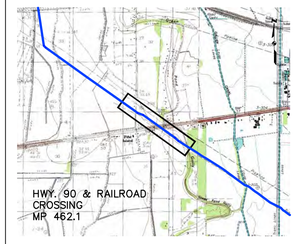

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DRAWING No	TITLE
11042 HDD XREF_15	11042 HDD XREF_15.dwg
TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

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PROFESSIONAL ENGINEER/RPT

PERMIT/ ENG. APPROVAL

DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada In business to deliver

FIA # 4387 | CHAINAGE: M.P. 462.1 | DISCIPLINE # 03

HWY. 90 & RAILROAD HDD INSTALLATION
KEYSTONE XL PROJECT
JEFFERSON COUNTY, TEXAS

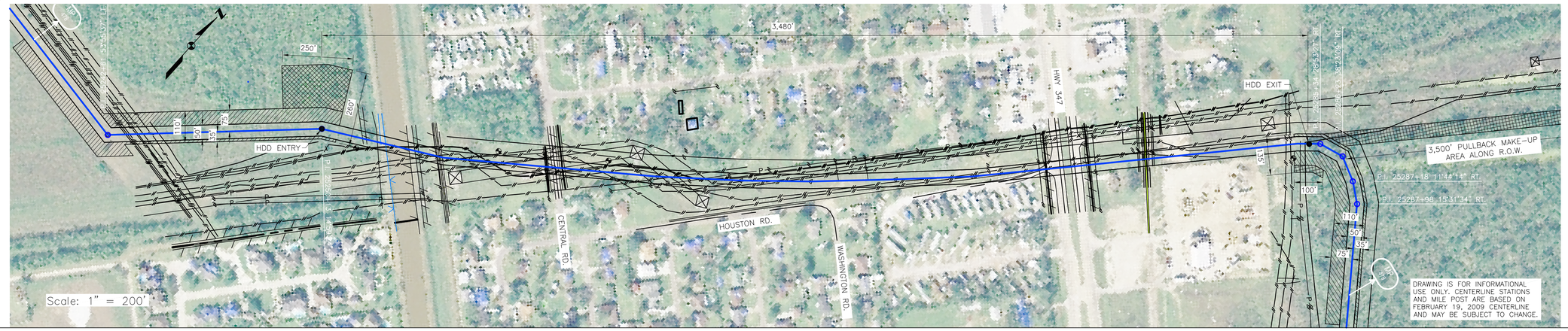
SCALE AS SHOWN | DRAWING No 4387-03-ML-03-202 | REV 2

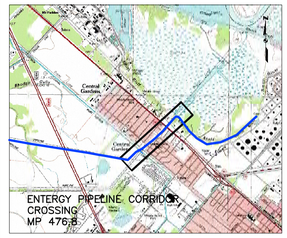
ID — TIME — DESIGNFILE

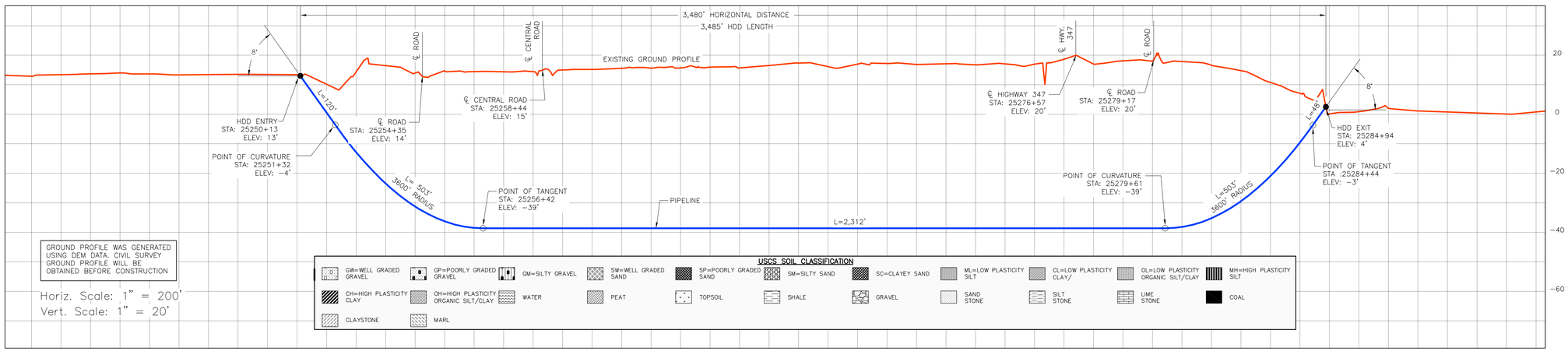
TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)







GROUND PROFILE WAS GENERATED USING DEM DATA. CIVIL SURVEY GROUND PROFILE WILL BE OBTAINED BEFORE CONSTRUCTION

Horiz. Scale: 1" = 200'
Vert. Scale: 1" = 20'

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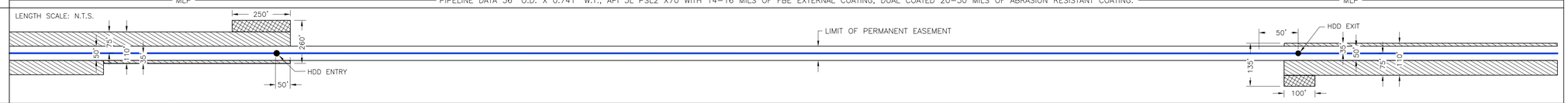
CROSSING INFORMATION (ESTIMATED STATIONING)	25242+61 P.I. 5°55'37" LT.	25250+13 HDD ENTRY	25251+32 PT OF CURVATURE	25254+35 ℄ ROAD	25256+42 PT OF TANGENT	25258+44 ℄ CENTRAL ROAD	25276+57 ℄ HWY 347	25279+17 ℄ ROAD	25279+61 PT OF CURVATURE	25284+44 PT OF TANGENT	25284+94 HDD EXIT	25285+34 P.I. 28°53'27" RT.	25286+23 P.I. 38°23'09" RT.	25287+18 P.I. 11°44'14" RT.	25287+98 P.I. 15°31'34" RT.

PIPELINE DATA: MLP — PIPELINE DATA 36" O.D. X 0.741" W.T., API 5L PSL2 X70 WITH 14-16 MILS OF FBE EXTERNAL COATING, DUAL COATED 20-30 MILS OF ABRASION RESISTANT COATING. — MLP

CONSTRUCTION WORKSPACE



ENVIRONMENTAL MITIGATION/RECLAMATION

TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSRAINTS	
MILEPOST	
MONITORING	
RECLAMATION	
SPECIAL CONSIDERATIONS	

TO BE DETERMINED

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TC_UD_BR_UEI	TC_UD_BR_UEI.dwg
NOTES-LEGEND	NOTES-LEGEND.dwg

REVISION

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
2	07.06.09	ISSUED FOR SUPPLEMENTAL U.S. DEPT. OF STATE FILING (2.19.09 CL)	11042	UEI	UEI	BM	JW	JH	UEI
1	03.19.09	ISSUED FOR TROW REVIEW	11042	UEI	UEI	DW	JW	JH	UEI
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (7.31.08 CL)	11042	UEI	UEI	RB	JW	JH	UEI

PROFESSIONAL ENGINEER/RPT | PERMIT/ ENG. APPROVAL — DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

UNIVERSAL ENSCO, INC. | ConocoPhillips | TransCanada — In business to deliver

FIA #	CHAINAGE:	DISCIPLINE #
4387	M.P. 476.8	03

ENTERGY PIPELINE CORRIDOR HDD INSTALLATION
KEYSTONE XL PROJECT
JEFFERSON COUNTY, TEXAS

SCALE	DRAWING No	REV
AS SHOWN	4387-03-ML-03-601	2

PLOTTED SIZE: ANSI D (22x34)

TC_UD_BR.DWG 22X34

ID — TIME — DESIGNFILE