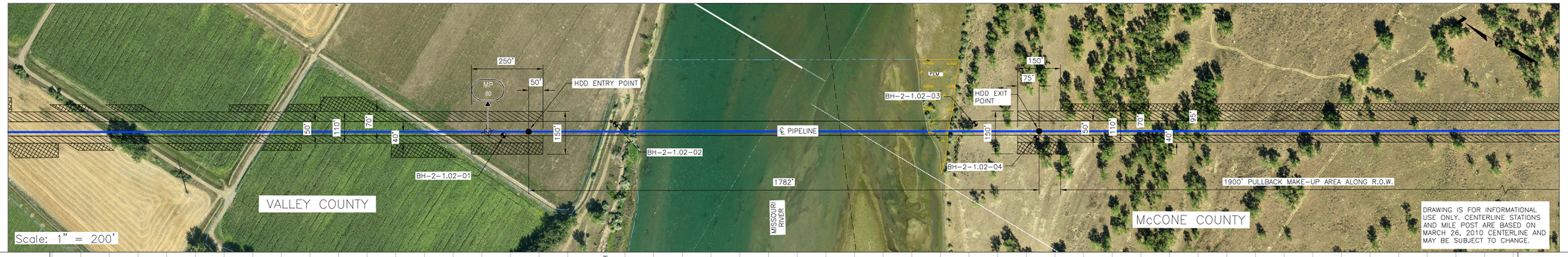
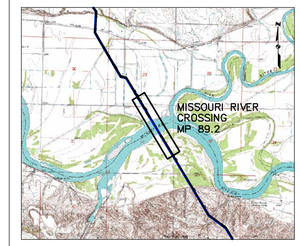
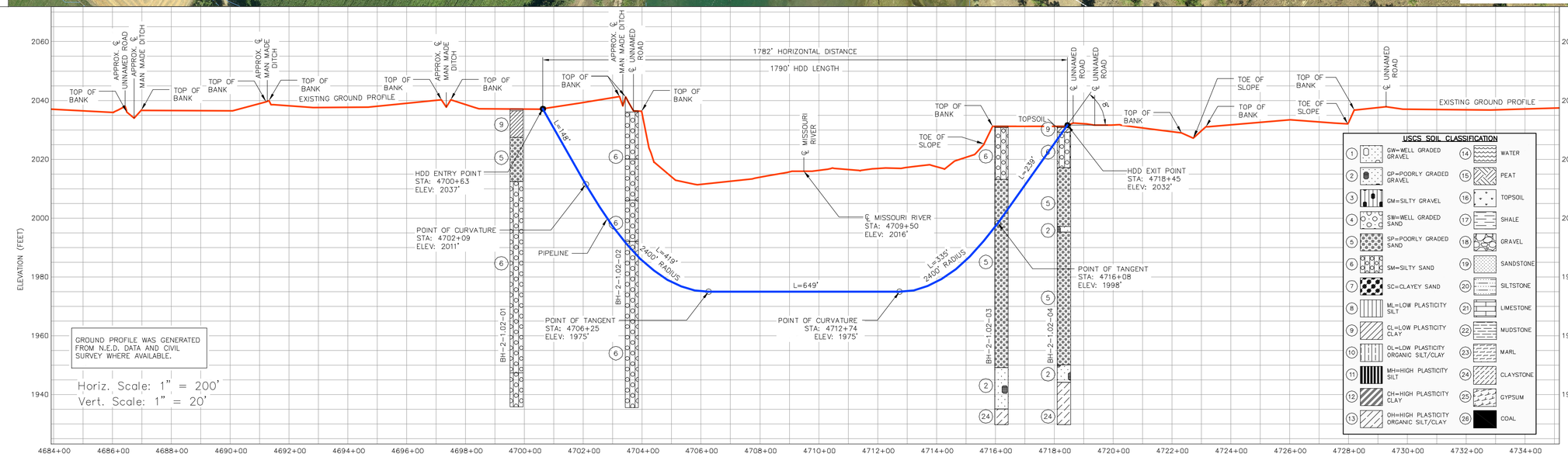






USCS SOIL CLASSIFICATION

1	GW=WELL GRADED GRAVEL	14	WATER
2	GP=POORLY GRADED GRAVEL	15	PEAT
3	GM=SILTY GRAVEL	16	TOPSOIL
4	SW=WELL GRADED SAND	17	SHALE
5	SP=POORLY GRADED SAND	18	GRAVEL
6	SM=SILTY SAND	19	SANDSTONE
7	SC=CLAYEY SAND	20	SILTSTONE
8	ML=LOW PLASTICITY SILT	21	LIMESTONE
9	CL=LOW PLASTICITY CLAY	22	MUDSTONE
10	OL=LOW PLASTICITY ORGANIC SILT/CLAY	23	MARL
11	MH=HIGH PLASTICITY SILT	24	CLAYSTONE
12	CH=HIGH PLASTICITY CLAY	25	GYPSUM
13	OH=HIGH PLASTICITY ORGANIC SILT/CLAY	26	COAL

INSTALLATION NOTES

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

2) VEHICLE AND EQUIPMENT ACCESS CROSSING MAY BE INSTALLED IF APPROVED BY THE 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 (FROM PIPELINE STATIONING)

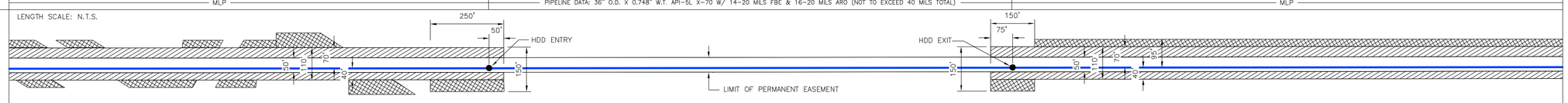
Station	Feature
4686+44	APPROX. ℄ UNNAMED ROAD
4686+49	APPROX. ℄ TOP OF BANK
4686+73	APPROX. ℄ MAN MADE DITCH
4686+98	TOP OF BANK
4691+22	TOP OF BANK
4691+26	APPROX. ℄ MAN MADE DITCH
4691+33	TOP OF BANK
4697+18	TOP OF BANK
4697+34	APPROX. ℄ MAN MADE DITCH
4697+49	TOP OF BANK
4699+73	BH-2-1.02-01
4700+63	HDD ENTRY POINT
4702+09	PT OF CURVATURE
4703+23	TOP OF BANK
4703+34	APPROX. ℄ MAN MADE DITCH
4703+44	TOP OF BANK
4703+55	BH-2-1.02-02
4703+69	℄ UNNAMED ROAD
4703+98	TOP OF BANK
4706+25	PT OF TANGENT
4709+50	℄ MISSOURI RIVER
4712+74	PT OF CURVATURE
4715+61	TOE OF SLOPE
4715+90	TOP OF BANK
4716+08	PT OF TANGENT
4716+20	BH-2-1.02-03
4718+33	BH-2-1.02-04
4718+45	HDD EXIT POINT
4718+64	℄ UNNAMED ROAD
4719+38	℄ UNNAMED ROAD
4722+32	TOP OF BANK
4722+73	TOE OF SLOPE
4723+15	TOP OF BANK
4727+97	TOE OF SLOPE
4728+20	TOP OF BANK
4729+27	APPROX. ℄ UNNAMED ROAD

PIPELINE DATA

MLP — PIPELINE DATA: 36" O.D. X 0.748" W.T. API-5L X-70 W/ 14-20 MILS FBE & 16-20 MILS ARO (NOT TO EXCEED 40 MILS TOTAL) — MLP

CONSTRUCTION WORKSPACE

LENGTH SCALE: N.T.S.



ENVIRONMENTAL MITIGATION/RECLAMATION

TOPSOIL SALVAGE METHOD	
STREAMS	
WETLANDS	
TIMING CONSTRAINTS	
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
- ADDITIONAL TEMPORARY WORKSPACE

REFERENCE DRAWINGS

DRAWING No	TITLE

REVISION / APPROVAL

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
3	04.21.10	ISSUED FOR DEIS FILING (03.26.10 CL)	2095406	BM	AH	FP	FP	RG	TROW
2	04.21.09	ISSUED FOR REVIEW (02.15.09 CL)	2095406	AH	AH	FP	FP	RG	TROW
1	12.08.08	ISSUED FOR REVIEW (12.01.08 CL)	2095406	JB	AH	HF	RB	RG	TROW
0	11.19.08	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (07.31.08 CL)	2095406	JB	JP	FP	RB	RG	TROW

PROFESSIONAL ENGINEER/RPT: RAYMOND E. WALLACE, JR. PE MT – 19435

PERMIT/ ENG. APPROVAL — DATE

PRELIMINARY

REV. NO. | DATE | PERMIT NUMBER:

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

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VALLEY SECTION

FIA # 4360	CHAINAGE: MP 89.2	DISCIPLINE # 03

MISSOURI RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
VALLEY & McCONE COUNTY, MONTANA

SCALE AS SHOWN | DRAWING No 4360-03-ML-03-002 | REV 3

TC_UD_BR.DWG 22X34

CADD DRAWING: DO NOT MAKE MANUAL REVISIONS

PLOTTED SIZE: ANSI D (22x34)