

STATUTORY DECLARATION

I, *COREY GOULET*, of *CALGARY*, in the Province of Alberta, Canada, do solemnly declare as follows:

THAT THE CERTIFICATION CONTAINED HEREIN IS TRUE.

And I make this solemn declaration conscientiously believing it to be true and knowing that it is of the same force and effect as is made under oath.

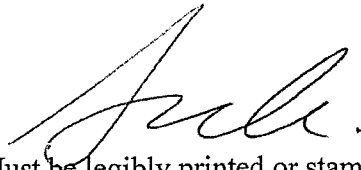
DECLARED before me at the *CITY*)
of *CALGARY* in the)
Province of Alberta, this *12th* day)
of *SEPTEMBER*, A.D. 20 *14*.)



COREY GOULET

A Commissioner for Oaths/Notary Public

(PRINT OF STAMP NAME HERE)



(Must be legibly printed or stamped in legible printing if appointed under section 1 of the act)

MY APPOINTMENT EXPIRES

SHANNON R. ONOOK
A Notary Public in and for the
Province of Alberta. My Commission
expires at the pleasure of the
Lieutenant Governor-in-Council

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

0-0

IN THE MATTER OF THE APPLICATION :
BY TRANSCANADA KEYSTONE : DOCKET NUMBER HP _____
PIPELINE, LP FOR A PERMIT UNDER :
THE SOUTH DAKOTA ENERGY :
CONVERSION AND TRANSMISSION : PETITION FOR ORDER
FACILITIES ACT TO CONSTRUCT THE : ACCEPTING CERTIFICATION
KEYSTONE XL PROJECT : UNDER SDCL § 49-41B-27
:

0-0

Petitioner TransCanada Keystone Pipeline, LP (Keystone) sought and obtained a permit from the South Dakota Public Utilities Commission (Commission) in 2010 to construct and operate the Keystone XL hydrocarbon pipeline project (Project) through western South Dakota. The Commission granted a final permit in Docket No. HP09-001 on June 29, 2010. More than four years have passed since that time. State law provides that permits are perpetual but if construction has not commenced within four years of issuance, the applicant must certify to the Commission, prior to commencing construction, that the Project continues to meet the conditions upon which the permit was issued (SDCL 49-41B-27). By this filing, Keystone makes the required certification and requests that the Commission issue an order accepting Keystone’s certification and finding that the Project continues to meet the conditions upon which the permit was issued.

I. BACKGROUND

On March 12, 2009, Keystone filed an application in Docket HP 09-001 seeking a permit to construct and operate the Project in South Dakota. A hearing was held before the Commission from November 2-4, 2009. Keystone, Commission staff, and Dakota Rural Action were parties to the proceeding and participated in the hearing. The Commission issued a Final Decision and Order dated March 12, 2010. The Commission issued an Amended Final Decision and Order dated June 29, 2010, to which 50 conditions are attached.

As stated in the Amended Final Decision and Order, the Project originally was proposed to be developed in three segments: the Steele City Segment from Hardisty, Alberta, to Steele City, Nebraska; the Gulf Coast Segment from Cushing, Oklahoma, to Liberty County, Texas; and the Houston Lateral Segment from Liberty County, Texas to refinery markets near Houston, Texas. The Project was conceived to transport incremental crude oil production from the Western Canadian Sedimentary Basin to refineries and markets in the United States. Construction of the Project was proposed to begin in May 2011 and to be completed in 2012.

The Project, as proposed, has been delayed. A Presidential Permit required by Executive Order 11423 of August 16, 1968, and Executive Order 13337 of April 30, 2004, allowing the pipeline to cross the border between Canada and the United States, is still under review before the United States Department of State (DOS). Keystone submitted a Presidential Permit application to the DOS on September 19, 2008. After that application was denied without prejudice due to the Administration's inability to complete its review by a Congressionally imposed deadline, Keystone submitted a revised application on May 4, 2012. Drawing upon an

extensive public record and multiple draft and final Environmental Impact Statements, DOS

issued a Final Supplemental Environmental Impact Statement (Final SEIS) on January 31, 2014.¹

In the Final SEIS, the DOS concluded, among other things, that:

- Keystone has long-term commitments to ship both Canadian and Bakken oil to Gulf Coast refineries, production of Canadian and Bakken oil is projected to increase, and there is existing demand by Gulf Coast area refiners for stable sources of crude oil. (Final SEIS §§ 1.3.1, 1.4.)
- The analyses of potential impacts associated with construction and normal operation of the pipeline “suggest that significant impacts to most resources are not expected along the proposed Project route” assuming that the Project complies with applicable laws, regulations, and permit conditions. (Final SEIS § 4.16.)
- Due to market developments, the transportation of Canadian crude by rail is already occurring in substantial volumes (an estimated 180,000 bpd), with a greater risk of leaks and spills, as well as injuries and fatalities, than if the oil were transported by pipeline. (Final EIS, §§ E.S. 3.1, E.S.5.4.3.)

On April 18, 2014, the Administration announced an indefinite delay in the current Presidential Permit review process, referencing on-going litigation related to the approval of a revised pipeline route in Nebraska.²

During the pendency of the current Presidential Permit application, Keystone proceeded with the Gulf Coast Segment as a stand-alone project based on its independent utility.

Construction is complete and that pipeline from Cushing, OK to Liberty County, Texas was placed in service on January 22, 2014. Construction of the Houston Lateral segment is currently

¹ <http://keystonepipeline-xl.state.gov/finalseis/index.htm>.

² In 2012, the Nebraska Legislature approved legislation giving the Governor authority to approve a revised route for the pipeline in that State. After an extensive public review process led by the Department of Environmental Quality, the Governor approved Keystone’s proposed re-route in Nebraska. In February 2014, a Nebraska lower court declared the legislation unconstitutional. That case is currently on appeal to the Nebraska Supreme Court and the effect of the lower court’s decision is stayed pending the outcome of that appeal.

{01717811.1}

under way. The currently pending Presidential Permit application involves consideration of the former Steele City segment only (see Appendix A; map of the current proposed Project).

Since the Amended Final Decision and Order, the Bakken Marketlink Project has been made part of the Project. Bakken Marketlink includes a five-mile pipeline, pumps, meters, and storage tanks near Baker, Montana, to deliver light sweet crude oil from the Bakken formation in Montana and North Dakota for transportation through the Project. Bakken Marketlink became commercial after the Amended Final Decision and Order in this case, as the result of a successful open season that closed on November 19, 2010. Bakken Marketlink will deliver up to 100,000 bpd of domestically-produced crude oil into the Keystone XL Pipeline. Approximately 700,000 bpd of Bakken formation production is currently being shipped by rail. Bakken Marketlink may relieve the need for some of that rail transportation while providing improved ratatability and lower transportation costs for American producers.

The material aspects of the proposed construction and operation of the Project in South Dakota remain essentially unchanged since the Commission granted its approval in 2010. The Project will extend 315 miles, use 36-inch nominal diameter pipe made of high-strength steel, and be protected by an external fusion bonded epoxy coating and cathodic protection by impressed current. The route corridor through South Dakota is largely unchanged from the route analyzed by the Commission as part of the permitting process.³ The pipeline will have batching capabilities and will be able to transport products ranging from light crude oil to heavy crude oil.

³ Keystone has implemented minor route variations designed to accommodate landowner concerns and improve constructability. As required by Condition No. 6 of the Amended Final Decision and Order, any material route changes will be provided to the Commission for review prior to construction.
{01717811.1}

Since the Amended Final Decision and Order, Keystone has filed seventeen quarterly reports with the Commission as required by Condition No. 8 of the Amended Final Decision and Order. Each report is submitted by Keystone's public liaison officer and addresses the status of land acquisition, construction, permitting, and other items. The most recent quarterly report was submitted on July 29, 2014, and a copy of this report is attached hereto as Appendix B.

**II.
THE PROJECT CONTINUES TO MEET THE CONDITIONS UPON WHICH THE
PERMIT WAS ISSUED**

Accompanying this petition is a Certification, signed by the President of the Keystone Pipeline business unit, attesting that: (i) the conditions upon which the Commission issued the facility permit in this docket continue to be satisfied; (ii) Keystone is in compliance with the conditions attached to the June 29, 2010 order, to the extent that those conditions have applicability in the current pre-construction phase of the Project; and (iii) Keystone will meet and comply with all of the applicable permit conditions during construction, operation, and maintenance of the Project. Compliance with those conditions is further reflected in Keystone's July 29, 2014 Quarterly Report (Appendix B). Thus, Keystone has satisfied the statutory requirement to certify that the Project continues to meet the conditions upon which the Commission's approval was issued.

In addition, Keystone submits that the circumstances and factual underpinnings of the Project that led the Commission to issue the facility permit remain valid. The factual findings underlying the Commission's decision are set forth in the June 29, 2010 Amended Final Decision and Order. In support of this petition, Appendix C hereto presents those findings of fact from the

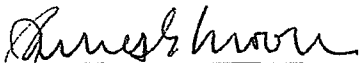
Commission's Amended Final Decision and Order that have changed since 2010 and describes the nature of those changes. As Appendix C makes clear, to the extent that there have been changes in the underlying facts, those changes are either neutral or positive to the Commission's concerns. In sum, the need, impacts, efficacy, and safety of the Project have not changed since the Amended Final Decision and Order.

III. CONCLUSION

The attached Certification, together with this petition and the supporting appendices, provides the necessary basis for the Commission to find that the Project continues to meet the conditions upon which the June 2010 permit was issued. Accordingly, Keystone respectfully requests that the Commission accept its certification under SDCL § 49-41B-27.

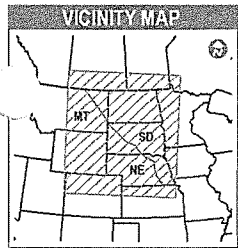
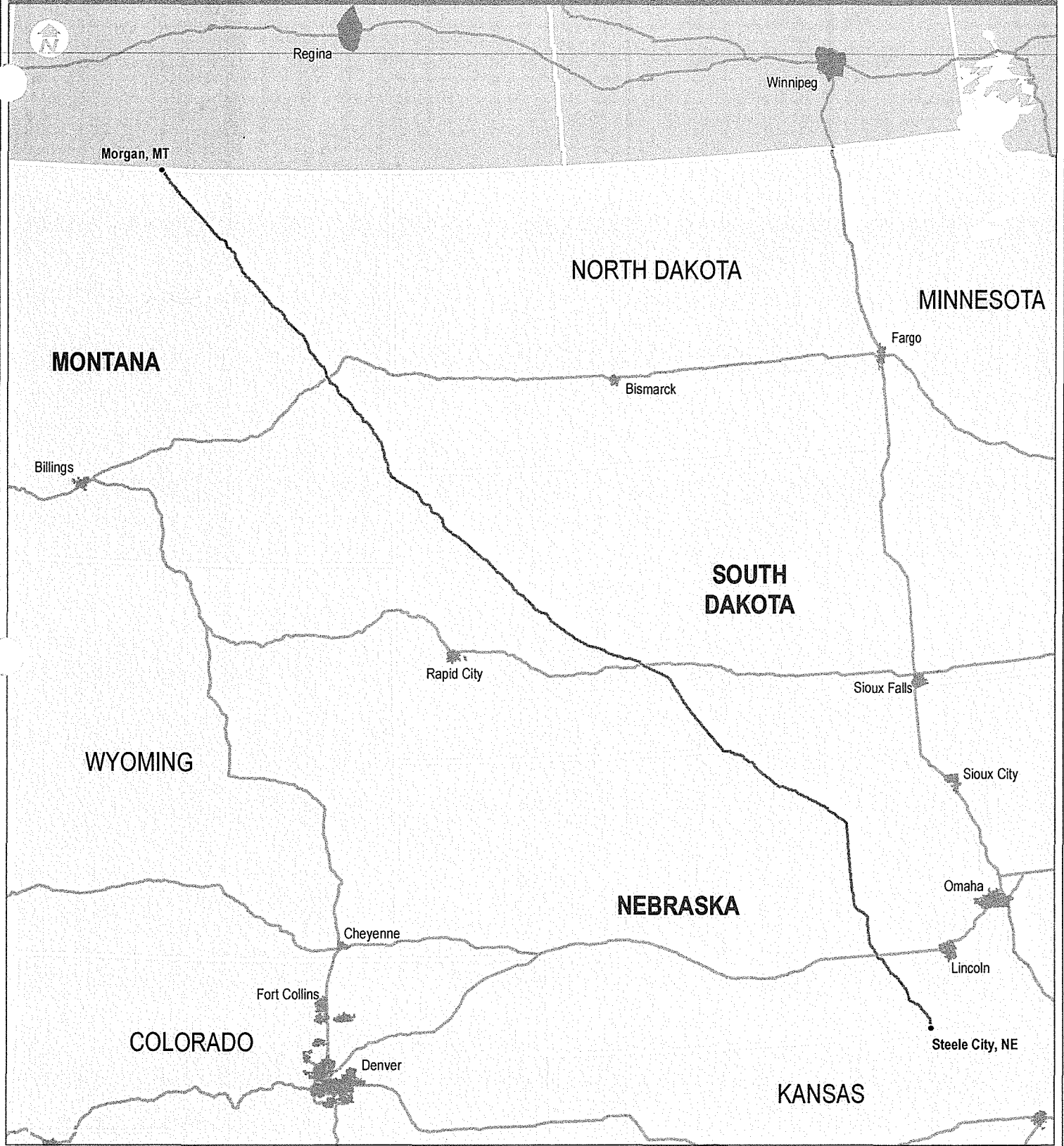
Dated this 15th day of September, 2014.

WOODS, FULLER, SHULTZ & SMITH P.C.

By 

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KXL PIPELINE PROJECT - OVERVIEW MAP



LEGEND	
	KXL CENTERLINE ROUTE
	FREEWAY SYSTEM
	URBAN AREA
	USA Major Lakes
	PROVINCE BOUNDARY
	STATE BOUNDARY

DRAWING INFORMATION			
DRAWN BY:	DH	COUNTY:	-
CHECKED BY:	PD	STATE:	MT, SD & NE
DATE:	2014-09-09	SHEET:	1 OF 1
DWG #:	XL-P-9339-A	SCALE:	1:6,000,000
REVISIONS			
DATE	REVISION	REV.	
2014-09-09	ISSUED FOR REVIEW	A	

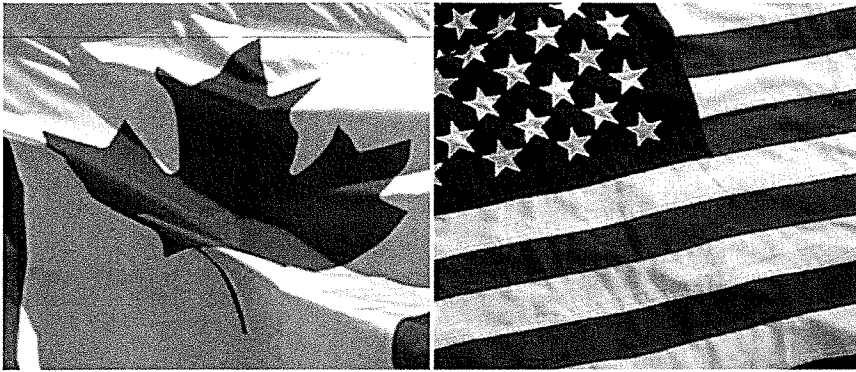
PREPARED BY

exp Energy Services Inc.

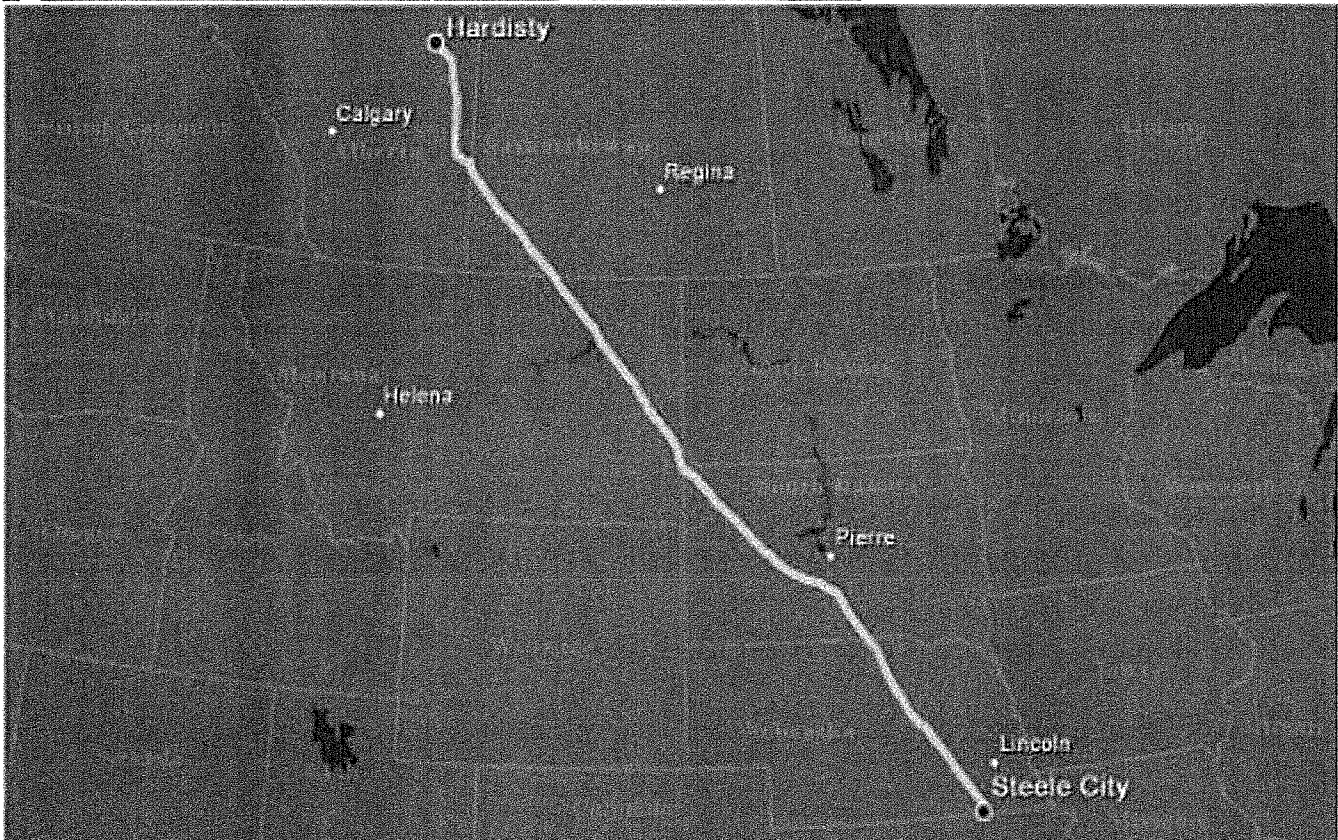
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KXL PIPELINE PROJECT

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KEYSTONE XL PIPELINE PROJECT

SOUTH DAKOTA PUBLIC UTILITIES COMMISSION QUARTERLY REPORT

For the Quarter Ending: **June 30, 2014**

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1.0 EXECUTIVE SUMMARY

TransCanada filed a new a Presidential Permit application with the Department of State on May 4, 2012 and on January 31, 2014 the Department of State issued a Final Supplemental Environmental Impact Statement (FSEIS). The project is currently in the National Interest Determination period of the Presidential Permit process. Construction activities have not taken place, or will take place, in South Dakota until the required permits and regulatory approvals are obtained for any proposed construction site. Project personnel are continuing to review the proposed pipeline route to identify any potential construction issues before construction. The construction plan for the portion of the Keystone XL Pipeline Project through South Dakota is dependent on the timing of final regulatory approvals and may include three or four spreads.

Keystone will implement the conditions of federal and state permits at the times specified by those permits. (See Appendix A for a table of the Summary of Consultations with the South Dakota Department of Environmental and Natural Resources.)

2.0 PROJECT DESCRIPTION

The project will include approximately 1,204 miles of 36 inch diameter pipeline from Hardisty, Alberta to Steel City, Nebraska, including approximately 313 miles in South Dakota.

3.0 LAND ACQUISITION STATUS (South Dakota)

3.1 Pipeline Right-of-Way Acquisition

The pipeline centerline crosses property owned by 301 landowners. Keystone has acquired easements from over 99% of the landowners. Easements have been acquired from the vast majority of all private landowners. Acquisition of tracts owned by the State of South Dakota is in process.

3.2 Pump Stations

The pump stations will be located in Harding, Meade, Haakon, Jones, and Tripp County, South Dakota. Keystone has purchased all seven pump station sites. The size of each pump station site is approximately 10 acres.

3.3 Pipe and Contractor Yards

Keystone has leased 11 pipe yards and six contractor yards in South Dakota. The leases were originally for 36 months, commencing on October 10, 2010. The leases have been extended an additional 24 months, expiring on October 1, 2015. The yards are in Harding, Butte, Meade, Haakon, Jones, Lyman and Tripp Counties. Each yard is approximately 30 acres in size.

3.4 Contractor Housing Camps

As outlined in the Keystone XL FSEIS, in Section 2.1.5.4 - Construction Camps, some remote areas in South Dakota do not have sufficient temporary housing near the proposed route to house all construction personnel working on spreads in those areas. In those remote areas, temporary work camps would be constructed to meet the housing needs of the construction workforce. Details of the construction camp configuration will depend on the final construction spread configuration and construction schedule, which is dependent on receipt of the final federal approval.

4.0 Non-Environmental Permitting Status (South Dakota)

4.1 County Roads

102 crossing permit applications have been filed for the pipeline to cross under all county road rights-of-way. Of the 102 applications filed, 101 have been acquired as of September 30, 2013.

4.2 State Roads

Thirteen (13) crossing permits and twenty-four (24) temporary approach permit applications have been filed with the state of South Dakota Department of Transportation (SD DOT) for the pipeline to cross under the state road rights-of-way. All crossing and temporary approach permits have been received from the SD DOT.

4.3 Railroads

Two crossing easement permits are being negotiated for the pipeline to cross under existing railroad rights-of-way. The South Dakota State Railroad application was received November 23, 2012. Canadian Pacific Railway was sold to the Genesee & Wyoming Railway; All permitting was transferred and is pending a signed license agreement.

4.4 Pump Stations

The special use permits required for the two Harding County pump stations were approved on September 28, 2010. Of the remaining five pump stations, four do not require a special use permit, leaving only one special use permit needed for the pump station in Jones County.

4.5 Contractor Camps

All construction camps will be permitted, constructed and operated consistent with applicable county, state, and federal regulations. (See Table 2.1-11 of the FSEIS for relevant regulations and permits required for the construction.)

5.0 ENVIRONMENTAL PERMITTING STATUS (South Dakota)

Keystone is awaiting or will be preparing and submitting all remaining applications for required federal and state environmental permits for work in South Dakota and will obtain the required permits in advance of pipeline construction activities.

6.0 FEDERAL PERMITS

TransCanada filed a Presidential Permit application with the U.S. Department of State on May 4, 2012 to authorize the international border crossing for the Keystone XL Project. On January 31, 2014 the US Department of State issued a Final Supplemental Environmental Impact Statement addressing Keystone's May 2012 Presidential Permit application. The project is currently in the National Interest Determination phase. The route through South Dakota is largely unchanged from the route analyzed for the SDPUC permit.

The former "Gulf Coast Segment" of the Keystone XL Project (a pipeline from Cushing Oklahoma to the Gulf Coast in Texas) was determined to have independent utility and was constructed as the stand-alone Gulf Coast pipeline separate from the Keystone XL Project.

Keystone XL pipeline will also file permit applications with the US Army Corps of Engineers for the necessary authorizations under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act.

6.1 Permit Compliance

Keystone will implement the conditions of federal and state permits at the times specified by those permits. (See Appendix A for a table of the Summary of Consultations with the South Dakota Department of Environmental and Natural Resources.)

7.0 CONSTRUCTION STATUS

No construction activities have taken place, or will take place, in South Dakota until the required permits and regulatory approvals are obtained for any proposed construction site. Project personnel are continuing to review the proposed pipeline route to identify any potential construction issues before construction.

8.0 ENVIRONMENTAL CONTROL ACTIVITIES

Environmental control activities, as required by applicable permit conditions, will be implemented when construction activities start in South Dakota.

9.0 STATUS OF EMERGENCY RESPONSE AND INTEGRITY MANAGEMENT PLANS

9.1 Emergency Response Plan

Development of the Keystone Pipeline Project operational Emergency Response Plan for the U.S. is ongoing and will be submitted to Pipeline and Hazardous Materials Safety Administration (PHMSA) six months before pipeline in-service. New TransCanada-owned emergency response equipment trailers are planned for storage in South Dakota.

Through its public awareness program, TransCanada continues to provide various types of information related to Keystone emergency response and pipeline safety awareness.

9.2 Integrity Management Plan for High Consequence Areas

Development of the Integrity Management Plan for the high consequence areas is ongoing. Progress in identifying high consequence areas and creating their subsequent tactical plans is about 70% complete. These tactical plans will be included in the Emergency Response Plan. After further discussions and coordination with PHMSA, the Integrity Management Plan will be formally submitted to PHMSA.

10.0 OTHER COMPLIANCE MEASURES

See Appendix B for the status of implementation of South Dakota Public Utilities Commission (PUC) conditions.

APPENDIX A

**Table 1: Recent Consultations with South Dakota
 Department of Environment and Natural Resources**

Date of Contact	Agency / Individual	Purpose of Consultation	Results of Consultation	Follow-up Required
8-3-10	SD DENR Kelli Buscher, John Miller, Albert Spangler, Brian Walsh, Mike DeFea SDGFP Leslie Murphy, John Lott SD DAG Raymond Sowers, Bill Smith	Discuss both state and federal permitting for the Keystone XL Pipeline project in South Dakota as well as to review the current project status and schedule in South Dakota.	Laid out a blue print for State permitting.	Determine if a construction stormwater discharge permit is required for the camps as it is not required for pipeline related construction
10-23-12	SDGFP Silka Kempana, Travis Runia	Coordination with FWS, DOS, SD GFP regarding Keystone Sage Grouse Protection Plan and mitigation plans	Keystone will modify Sage Grouse Protection Plan to account for SD GFP additional input, conduct ambient noise studies and additional modeling, and revise mitigation plans for SD GFP review.	Updating Sage Grouse Protection Plan, mitigation plans and noise modeling
10-25-12	SD DENR AI Spangler	Verification of permit application process	Discussed water withdrawal and discharge permit application and format required	Keystone will prepare permit applications
12-3-12	SD DENR Ashley Brakke	Followed up with SD DENR with the submitted air permit applications for the contractor camps [for emergency generators].	DENR needs a notarized statement from the applicant saying these were the generators that would be used for emergency electric power. Ms. Brakke was about ½ way through with the applications and none yet required the permit.	Prepare statement for SD Camp Contractor(s) to sign, notarize and send to the DENR Air Quality representative when they are on board.
12-5-12	SD DENR Ashley Brakke	Followed up with SD DENR with the submitted air permit applications for the contractor camps [for emergency generators].	DENR stated that they were OK with the notarized letter not being submitted until the camp contractor had been identified and on board.	Prepare statement for SD Camp Contractor(s) to sign, notarize and send to the DENR Air Quality representative when they are on board.

Date of Contact	Agency / Individual	Purpose of Consultation	Results of Consultation	Follow-up Required
4-10-13	SD DENR Al Spangler	Confirm/discuss whether there would be any issues associated with hydrotest water obtained in SD being used to test pipe in Nebraska as long as the water was pushed back and released in SD near the location where the water was withdrawn.	Al Spangler confirmed that he did not see any issue with this approach. He would double-check with the water people and confirm.	Keystone will follow up with SD DENR on the feasibility of using SD test water in NE.
4-15-13	SD GFP Paul Coughlin	Discuss the potential for water withdrawal from Lake Gardner, which is a SD Game Protection Area.	SD GFP was receptive to the potential water withdrawal from Lake Gardner. SD GFP requested a formal written request.	Keystone will prepare a formal written request for the withdrawal of water from Lake Gardner
5-7-13	SD DENR Genny McMat, Marc Rush SDGFP Leslie Murphy, Gene Galinat, John Lott	Discuss the feasibility of the Keystone utilizing Lake Gardner as a source for hydrostatic test water and dust control water	SDGFP conditionally approved of the water withdrawal from Lake Gardner as long as there was adequate water present. SD GFP also stated that they would have to determine if there would be any other conditions that would need to be met to allow for the water withdrawal.	Follow-up with SDGFP on their progress developing a list of conditions that would permit the use of water from Lake Gardner for the proposed use [no further conditions were proposed] Work with SD GFP to fund restoration or conservation project in exchange for water use.
5-9-13	SDGFP Leslie Murphy	Emailed a pdf map of the proposed water withdrawal location for Lake Gardner	Provided the map following May 7, 2013 meeting	None
11-14-13	SD DENR William Marcouiller	Discuss the renewal process for the temporary discharge permit that had been issued to Keystone in April 2013.	SD DENR confirmed that the permit was good through December 31, 2015.	Keystone would need to renew the permit if discharge activities would occur after December 2015.
04-03-14	SD Natural Heritage Program Casey Heimerl	Request for most recent observation records for northern long-eared bat	Being processed	No
04-16-14	SD Natural Heritage Program Casey Heimerl	Request for most recent observation records for northern long-eared bat	Received via email: tabular and GIS (shapefiles) of the observation records of the northern long-eared bat for the counties that the Project crosses.	No

Date of Contact	Agency / Individual	Purpose of Consultation	Results of Consultation	Follow-up Required
05-28-14	SD Natural Heritage Program Casey Heimerl SD Game, Fish and Parks Tom Kirschenmann	Voluntary Informal Conference with US Fish and Wildlife Service to discuss the potential impacts to northern long-eared bat and red knot resulting from the Project. Both species are proposed for listing under the Endangered Species Act.	Keystone to revise habitat assessment report for the northern long-eared bat and red knot based on the comments and guidance provided during the meeting.	Keystone will submit a revised report to USFWS

APPENDIX B

Table 2: Status of Implementation of South Dakota PUC Conditions

NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
1	<p>Keystone shall comply with all applicable laws and regulations in its construction and operation of the Project. These laws and regulations include, but are not necessarily limited to: the federal Hazardous Liquid Pipeline Safety Act of 1979 and Pipeline Safety Improvement Act of 2002, as amended by the Pipeline Inspection, Protection, Enforcement, and Safety Act of 2006, and the various other pipeline safety statutes currently codified at 49 U.S.C. § 60101 et seq. (collectively, the "PSA"); the regulations of the United States Department of Transportation implementing the PSA, particularly 49 C.F.R. Parts 194 and 195; temporary permits for use of public water for construction, testing or drilling purposes, SDCL 46-5-40.1 and ARSD 74:02:01 :32 through 74:02:01 :34.02 and temporary discharges to waters of the state, SDCL 34A-2-36 and ARSD Chapters 74:52:01 through 74:52:11, specifically, ARSD § 74:52:02:46 and the General Permit issued thereunder covering temporary discharges of water from construction dewatering and hydrostatic testing.</p>	<p>Construction of the project has not been initiated. Keystone will comply with all applicable laws and regulations during construction and operation of the Project.</p>
2	<p>Keystone shall obtain and shall thereafter comply with all applicable federal, state and local permits, including but not limited to: Presidential Permit from the United States Department of State, Executive Order 11423 of August 16, 1968 (33 Fed. Reg. 11741) and Executive Order 13337 of April 30, 2004 (69 Fed. Reg. 25229), for the construction, connection, operation, or maintenance, at the border of the United States, of facilities for the exportation or importation of petroleum, petroleum products, coal, or other fuels to or from a foreign country; Clean Water Act § 404 and Rivers and Harbors Act Section 10 Permits; Special Permit if issued by the Pipeline and Hazardous Materials Safety Administration; Temporary Water Use Permit, General Permit for Temporary Discharges and federal, state and local highway and road encroachment permits. Any of such permits not previously filed with the Commission shall be filed with the Commission upon their issuance. To the extent that any condition, requirement or standard of the Presidential Permit, including the Final EIS Recommendations, or any other law, regulation or permit applicable to the portion of the pipeline in this state differs from the requirements of these Conditions, the more stringent shall apply.</p>	<p>Construction of the project has not been initiated. Keystone is in the process of obtaining all applicable permits from Federal, State and Local entities. Upon commencement of construction Keystone will follow all applicable laws and conditions related to these permits.</p>

NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
3	<p>Keystone shall comply with and implement the Recommendations set forth in the Final Environmental Impact Statement when issued by the United States Department of State pursuant to its Amended Department of State Notice of Intent To Prepare an Environmental Impact Statement and To Conduct Scoping Meetings and Notice of Floodplain and Wetland Involvement and To Initiate Consultation Under Section 106 of the National Historic Preservation Act for the Proposed TransCanada Keystone XL Pipeline; Notice of Intent--Rescheduled Public Scoping Meetings in South Dakota and extension of comment period (FR vol. 74, no. 54, Mar. 23, 2009). The Amended Notice and other Department of State and Project Documents are available on-line at: http://www.keystonepipeline-xl.state.gov/clientsite/keystonexl.nsf?Open.</p>	<p>The Department of State re-initiated its NEPA review upon receipt of Keystone's May 4, 2012 application for a Presidential Permit. The Department is in the process of preparing a Supplement to the August 2011 Final Environmental Impact Statement for the project. Construction of the project has not been initiated. Keystone will comply with and implement the Recommendations set forth in the Final Environmental Impact Statement, and the Supplemental Environmental Impact Statement, as reflected in the Record of Decision, when issued by the Department of State.</p>
4	<p>The permit granted by this Order shall not be transferable without the approval of the Commission pursuant to SDCL 49-418-29.</p>	<p>N/A at this time.</p>
5	<p>Keystone shall undertake and complete all of the actions that it and its affiliated entities committed to undertake and complete in its Application as amended, in its testimony and exhibits received in evidence at the hearing, and in its responses to data requests received in evidence at the hearing.</p>	<p>Construction of the project has not been initiated. When construction is initiated, Keystone will undertake the actions committed to during the SDPUC hearings.</p>
6.a	<p>The most recent and accurate depiction of the Project route and facility locations is found on the maps in Exhibit TC-14. The Application indicates in Section 4.2.3 that Keystone will continue to develop route adjustments throughout the pre-construction design phase. These route adjustments will accommodate environmental features identified during surveys, property-specific issues, and civil survey information. The Application states that Keystone will file new aerial route maps that incorporate any such route adjustments prior to construction. Ex TC-1.4.2.3, p. 27.</p>	<p>Keystone will file new aerial route maps reflecting route adjustments prior to construction.</p>
6.b	<p>Keystone shall notify the Commission and all affected landowners, utilities and local governmental units as soon as practicable if material deviations are proposed to the route.</p>	<p>Keystone will continue to work with all landowners, utilities, local government and other affected parties as the final route is being developed and will notify the Commission and all affected parties of any material deviations to the proposed route.</p>
6.c	<p>Keystone shall notify affected landowners of any change in the route on their land.</p>	<p>This is a continuing occurrence during engineering review. Keystone will continue to notify landowners of route changes on their land as well as inform them of associated activities, such as civil and environmental surveys.</p>
6.d	<p>At such time as Keystone has finalized the pre-construction route, Keystone shall file maps with the Commission depicting the final preconstruction route</p>	<p>Construction of the project has not been initiated. Keystone will finalize the route and submit to the Commission new maps depicting the final preconstruction route prior to construction.</p>

NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
6.e	If material deviations are proposed from the route depicted on Exhibit TC-14 and accordingly approved by this Order, Keystone shall advise the Commission and all affected landowners, utilities and local governmental units prior to implementing such changes and afford the Commission the opportunity to review and approve such modifications.	Keystone has advised the Commission of all material route changes to date and has afforded the commission the opportunity to review and approve such modifications.
6.f	At the conclusion of construction, Keystone shall file detail maps with the Commission depicting the final as-built location of the Project facilities.	Keystone will submit final route maps to the Commission at the conclusion of construction.
7	Keystone shall provide a public liaison officer, approved by the Commission, to facilitate the exchange of information between Keystone, including its contractors, and landowners, local communities and residents and to promptly resolve complaints and problems that may develop for landowners, local communities and residents as a result of the Project. Keystone shall file with the Commission its proposed public liaison officer's credentials for approval by the Commission prior to the commencement of construction. After the public liaison officer has been approved by the Commission, the public liaison officer may not be removed by Keystone without the approval of the Commission. The public liaison officer shall be afforded immediate access to Keystone's on-site project manager, its executive project manager and to contractors' on-site managers and shall be available at all times to the Staff via mobile phone to respond to complaints and concerns communicated to the Staff by concerned landowners and others. Keystone shall also implement and keep an up-dated web site covering the planning and implementation of construction and commencement of operations in this state as an informational medium for the public. As soon as the Keystone's public liaison officer has been appointed and approved, Keystone shall provide contact information for him/her to all landowners crossed by the Project and to law enforcement agencies and local governments in the vicinity of the Project. The public liaison officer's contact information shall be provided to landowners in each subsequent written communication with them. If the Commission determines that the public liaison officer has not been adequately performing the duties set forth for the position in this Order, the Commission may, upon notice to Keystone and the public liaison officer, take action to remove the public liaison officer.	<p>The Commission has approved Sarah Metcalf as the public liaison officer for the Keystone XL project. The liaison can be reached at:</p> <p>Mailing Address:</p> <p>South Dakota Pipeline Liaison Officer PO Box 491 Aberdeen, South Dakota 57402 Phone: (888) 375-1370 Email: smetcalf12@gmail.com</p> <p>Contact information for the South Dakota liaison was sent out in December 2010 to landowners. Notification to law enforcement agencies and local governments in the vicinity of the Project was completed in 1st quarter 2011 in conjunction with notice required by other conditions for these groups. The liaison continues to contact affected counties, townships and other groups as the permit process takes place.</p> <p>The TransCanada Keystone Pipeline website at: http://www.transcanada.com/keystone.html provides general information about planning for construction of the project. When construction commences, more detailed construction information will be posted.</p>

NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
8	<p>Until construction of the Project, including reclamation, is completed, Keystone shall submit quarterly progress reports to the Commission that summarize the status of land acquisition and route finalization, the status of construction, the status of environmental control activities, including permitting status and Emergency Response Plan and Integrity Management Plan development, the implementation of the other measures required by these conditions, and the overall percent of physical completion of the project and design changes of a substantive nature. Each report shall include a summary of consultations with the South Dakota Department of Environment and Natural Resources and other agencies concerning the issuance of permits. The reports shall list dates, names, and the results of each contact and the company's progress in implementing prescribed construction, land restoration, environmental protection, emergency response and integrity management regulations, plans and standards. The first report shall be due for the period ending June 30, 2010. The reports shall be filed within 31 days after the end of each quarterly period and shall continue until the project is fully operational.</p>	<p>Keystone will continue to submit quarterly reports until the construction and reclamation of the Keystone XL pipeline is complete and the pipeline is operational.</p>
9	<p>Until one year following completion of construction of the Project, including reclamation, Keystone's public liaison officer shall report quarterly to the Commission on the status of the Project from his/her independent vantage point. The report shall detail problems encountered and complaints received. For the period of three years following completion of construction, Keystone's public liaison officer shall report to the Commission annually regarding post-construction landowner and other complaints, the status of road repair and reconstruction and land and crop restoration and any problems or issues occurring during the course of the year</p>	<p>The public liaison officer will comply with this condition and is currently available to affected landowners and parties in the State. Quarterly reporting will begin with active construction activities.</p>
10	<p>Not later than six months prior to commencement of construction, Keystone shall commence a program of contacts with state, county and municipal emergency response, law enforcement and highway, road and other infrastructure management agencies serving the Project area in order to educate such agencies concerning the planned construction schedule and the measures that such agencies should begin taking to prepare for construction impacts and the commencement of project operations.</p>	<p>Keystone has commenced and will continue a program of contacts to inform and coordinate with county and municipal emergency response, law enforcement and highway, road and other infrastructure management agencies regarding planned construction and eventual operation of the Keystone XL Pipeline.</p>
11	<p>Keystone shall conduct a preconstruction conference prior to the commencement of construction to ensure that Keystone fully understands the conditions set forth in this order. At a minimum, the conference shall include a Keystone representative, Keystone's construction supervisor and Staff.</p>	<p>Prior to the start of construction a Keystone representative, the Keystone construction supervisor, and staff will arrange a preconstruction conference with the Commission to ensure a full understanding of the conditions set forth in this order.</p>
12	<p>Once known, Keystone shall inform the Commission of the date construction will commence, report to the Commission on the date construction is started and keep the Commission updated on construction activities as provided in Condition 8.</p>	<p>Keystone will inform the Commission accordingly during the preconstruction conference.</p>
13	<p>Except as otherwise provided in the conditions of this Order and Permit, Keystone shall comply with all mitigation measures set forth in the Construction Mitigation and Reclamation Plan (CMR Plan)</p>	<p>Construction of the project has not been initiated. Keystone will comply with the requirements set forth in the CMR Plan during construction.</p>

NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
13.a	If modifications to the CMR Plan are made by Keystone as it refines its construction plans or are required by the Department of State in its Final EIS Record of Decision or the Presidential Permit, the CMR Plan as so modified shall be filed with the Commission and shall be complied with by Keystone.	Keystone will submit any modifications to the CMR Plan to the Commission and comply with any modifications to the CMR Plan.
14	Keystone shall incorporate environmental inspectors into its CMR Plan and obtain follow-up information reports from such inspections upon the completion of each construction spread to help ensure compliance with this Order and Permit and all other applicable permits, laws, and rules	Construction of the project has not been initiated. Keystone will utilize environmental inspectors and comply with this condition during the construction of the project.
15	Prior to construction, Keystone shall, in consultation with area NRCS staff, develop specific construction/reclamation units (Con/Rec Units) that are applicable to particular soil and subsoil classifications, land uses and environmental settings. The Con/Rec Units shall contain information of the sort described in response to Staff Data Request 3-25 found in Exhibit TC-16.	Keystone has completed the consultation with NRCS and has received the concurrence of the NRCS for Con/Rec Units to be utilized in South Dakota. Keystone will consult further with the NRCS should alterations to the Con/Rec Units be required.
15.a	In the development of the Con/Rec Units in areas where NRCS recommends, Keystone shall conduct analytical soil probing and/or soil boring and analysis in areas of particularly sensitive soils where reclamation potential is low. Records regarding this process shall be available to the Commission and to the specific land owner affected by such soils upon request	Keystone has completed analytical soil probing and/or soil boring and analysis in areas of particularly sensitive soils where reclamation potential is low. Records regarding the process are available to the Commission and to the specific land owner affected by such soil upon request.
15.b	Through development of the Con/Rec Units and consultation with NRCS, Keystone shall identify soils for which alternative handling methods are recommended.	Keystone has completed the analytical soil probing and/or boring in areas of sensitive soils following the NRCS recommendations.
15.b.1	Keystone shall thoroughly inform the landowner regarding the options applicable to their property, including their respective benefits and negatives, and implement whatever reasonable option for soil handling is selected by the landowner. Records regarding this process shall be available to the Commission upon request.	This is discussed with the landowners and itemized in the "Binding Agreement". These agreements are available to the Commission upon request.
15.c	Keystone shall, in consultation with NCRS, ensure that its construction planning and execution process, including Con/Rec Units, CMR Plan and its other construction documents and planning shall adequately identify and plan for areas susceptible to erosion, areas where sand dunes are present, areas with high concentrations of sodium bentonite, areas with sodic, saline and sodic-saline soils and any other areas with low reclamation potential	Keystone's construction planning and execution process consisted of consultation with the NRCS for identified areas susceptible to erosion, areas where sand dunes are present, areas with high concentration of sodium bentonite, areas with sodic, saline and sodic-saline soils and any other areas with low reclamation potential. The identified areas were addressed in the CON/REC Units, CMR Plan, and will be listed on construction alignment sheets.
15.d	The Con/Rec Units shall be available upon request to the Commission and affected landowners. Con/Rec Units may be evaluated by the Commission upon complaint or otherwise, regarding whether proper soil handling, damage mitigation or reclamation procedures are being followed.	Con/Rec Units will be available upon request to the Commission and affected landowners.

NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
15.e	Areas of specific concern or of low reclamation potential shall be recorded in a separate database. Action taken at such locations and the results thereof shall also be recorded and made available to the Commission and the affected property owner upon request.	Areas of specific concern or of low reclamation potential will be recorded in a separate database. Action taken at such locations and the results thereof will be recorded and made available to the Commission and the affected property owner upon request.
16	Keystone shall provide each landowner with an explanation regarding trenching and topsoil and subsoil/rock removal, segregation and restoration method options for his/her property consistent with the applicable Con/Rec Unit and shall follow the landowner's selected preference as documented on its written construction agreement with the landowner, as modified by any subsequent amendments, or by other written agreement(s).	This is discussed with the landowners and itemized in the "Binding Agreement".
16.a	Keystone shall separate and segregate topsoil from subsoil in agricultural areas, including grasslands and shelter belts, as provided in the CMR Plan and the applicable Con/Rec Unit.	Keystone will separate and segregate topsoil from subsoil in agricultural areas, including grasslands and shelter belts, as provided in the CMR Plan and the applicable Con/Rec Unit.
16.b	Keystone shall repair any damage to property that results from construction activities	Keystone will address this during or following construction activities.
16.c	Keystone shall restore all areas disturbed by construction to their preconstruction condition, including their original preconstruction topsoil, vegetation, elevation, and contour, or as close thereto as is feasible, except as is otherwise agreed to by the landowner.	Keystone will address this during or following construction activities and will restore disturbed areas as close as feasible to their preconstruction conditions or as otherwise agreed to by the landowner.
16.d	Except where practicably infeasible, final grading and topsoil replacement and installation of permanent erosion control structures shall be completed in non-residential areas within 20 days after backfilling the trench.	Keystone will address this during construction.
16.d.1	In the event that seasonal or other weather conditions, extenuating circumstances, or unforeseen developments beyond Keystone's control prevent compliance with this time frame, temporary erosion controls shall be maintained until conditions allow completion of cleanup and reclamation.	Keystone will address this during construction.
16.d.2	In the event Keystone cannot comply with the 20-day time frame as provided in this Condition, it shall give notice of such fact to all affected landowners, and such notice shall include an estimate of when such restoration is expected to be completed.	Keystone will address this during construction.
16.e	Keystone shall draft specific crop monitoring protocols for agricultural lands.	Keystone is in the process of developing specific crop monitoring protocols for agricultural lands. These protocols will be finalized prior to the start of construction and implemented following construction.

NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
16.e.1	If requested by the landowner, Keystone shall provide an independent crop monitor to conduct yield testing and/or such other measurements of productivity as he shall deem appropriate. The independent monitor shall be a qualified agronomist, rangeland specialist or otherwise qualified with respect to the species to be restored. The protocols shall be available to the Commission upon request and may be evaluated for adequacy in response to a complaint or otherwise.	If requested by the landowner, Keystone will provide an independent crop monitor and develop appropriate protocols, which will be available to the Commission upon request
16.f	Keystone shall work closely with landowners or land management agencies to determine a plan to control noxious weeds. Landowner permission shall be obtained before the application of herbicides.	Keystone has prepared a noxious weed control plan and provided a draft to the County Weed Boards for review and approval.
16.g	Keystone's adverse weather plan shall apply to improved hay land and pasture lands in addition to crop lands.	Keystone is in the process of developing an adverse weather plan and will include both improved hay lands and pasture lands in addition to crop lands.
16.h	The size, density and distribution of rock within the construction right-of-way following reclamation shall be similar to adjacent undisturbed areas.	Keystone will require the Contractor to remove excess rocks so that the size density and distribution of rock within the construction right-of-way is similar to the adjacent undisturbed areas.
16.h.1	Keystone shall treat rock that cannot be backfilled within or below the level of the natural rock profile as construction debris and remove it for disposal offsite except when the landowner agrees to the placement of the rock on his property. In such case, the rock shall be placed in accordance with the landowner's directions.	Keystone will require the Contractor to treat rock that cannot be backfilled within or below the level of the natural rock profile as construction debris and remove it for disposal offsite except when the landowner agrees to the placement of the rock on his property. In such case, the rock shall be placed in accordance with the landowner's directions and all Federal and State permits.
16.i	Keystone shall utilize the proposed trench line for its pipe stringing trucks where conditions allow and shall employ adequate measures to de-compact subsoil as provided in its CMR Plan. Topsoil shall be de-compacted if requested by the landowner.	Keystone will utilize the trench line for its pipe stringing trucks when site conditions allow and will employ adequate measures to de-compact subsoil as provided in its CMR Plan and in the specified CON/REC unit.
16.i.1	Topsoil shall be de-compacted if requested by the landowner.	Keystone will employ adequate measures to de-compact subsoil as provided in its CMR Plan and in the specified CON/REC unit, and will de-compact topsoil if requested by the landowner.
16.j	Keystone shall monitor and take appropriate mitigative actions as necessary to address salinity issues when dewatering the trench, and field conductivity and/or other appropriate constituent analyses shall be performed prior to disposal of trench water in areas where salinity may be expected.	Keystone will monitor and take appropriate actions as necessary to address salinity issues when dewatering the trench. Field conductivity and/or other appropriate constituent analyses will be performed prior to disposal of trench water in areas where salinity is expected.

NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
16.j.1	Keystone shall notify landowners prior to any discharge of saline water on their lands or of any spills of hazardous materials on their lands of one pint or more or of any lesser volume which is required by any federal, state, or local law or regulation or product license or label to be reported to a state or federal agency, manufacturer, or manufacturer's representative.	Keystone will notify landowners prior to any discharge of saline water on private lands or of any spills of hazardous materials on private lands of one pint or more or of any lesser volume which is required by any federal, state, or local law or regulation or product license or label to be reported.
16.k	Keystone shall install trench and slope breakers where necessary in accordance with the CMR Plan as augmented by Staff's recommendations in Post Hearing Commission Staff Brief, pp. 26-27	Keystone will install trench and slope breakers where necessary in accordance with the CMR Plan and SDPUC recommendations.
16.l	Keystone shall apply mulch when reasonably requested by landowners and also wherever necessary following seeding to stabilize the soil surface and to reduce wind and water erosion. Keystone shall follow the other recommendations regarding mulch application in Post Hearing Commission Staff Brief, p. 27.	Keystone will apply mulch in accordance with the CMR Plan and the specific CON/REC units to stabilize the soil surface and to reduce wind and water erosion. Keystone will apply mulch at the landowners request when the request is reasonable and in accordance with site reclamation requirements. Keystone will follow the other recommendations regarding mulch application in Post Hearing Commission Staff Brief, p. 27.
16.m	Keystone shall reseed all lands with comparable crops to be approved by landowner in landowner's reasonable discretion, or in pasture, hay or native species areas with comparable grass or forage crop seed or native species mix to be approved by landowner in landowner's reasonable discretion.	Keystone has developed seed mixtures in consultation with the NRCS.
16.m.1	Keystone shall actively monitor revegetation of all disturbed areas for at least two years.	Keystone will monitor revegetation on all disturbed areas for at least two years.
16.n	Keystone shall coordinate with landowners regarding his/her desires to properly protect cattle, shall implement such protective measures as are reasonably requested by the landowner and shall adequately compensate the landowner for any loss.	Keystone will coordinate with landowners and implement reasonably requested protective measures during construction and adequately compensate landowners for any loss.
16.o	Prior to commencing construction, Keystone shall file with the Commission a confidential list of property owners crossed by the pipeline and update this list if route changes during construction result in property owner changes	Prior to commencing construction, Keystone will submit to the Commission a confidential list of property owners crossed by the pipeline and will update this list if route changes result in property owner changes during construction.
16.p	Except in areas where fire suppression resources as provided in CMR Plan 2.16 are in close proximity, to minimize fire risk, Keystone shall, and shall cause its contractor to, equip each of its vehicles used in pre-construction or construction activities, including off-road vehicles, with a hand held fire extinguisher, portable compact shovel and communication device such as a cell phone, in areas with coverage, or a radio capable of achieving prompt communication with Keystone's fire suppression resources and emergency services.	Keystone will address compliance with this condition with Contractor prior to the commencement of construction on the right-of-way. Each vehicle that is subject to this condition will be equipped with fire extinguisher, portable compact shovel, and proper communications devices.

NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
17	Keystone shall cover open-bodied dump trucks carrying sand or soil while on paved roads and cover open-bodied dump trucks carrying gravel or other materials having the potential to be expelled onto other vehicles or persons while on all public roads.	Keystone will address this with the Contractor. Contractor vehicles carrying sand, soil, or gravel while traveling on paved public roads shall be covered to avoid the potential of expelling the material onto other vehicles or persons.
18	Keystone shall use its best efforts to not locate fuel storage facilities within 200 feet of private wells and 400 feet of municipal wells and shall minimize and exercise vigilance in refueling activities in areas within 200 feet of private wells and 400 feet of municipal wells.	Keystone will address this in the pre-construction planning. Fuel storage tanks and refueling activities shall follow the requirements set forth in the CMRP and Spill Prevention and Containment Plan.
19	If trees are to be removed that have commercial or other value to affected landowners, Keystone shall compensate the landowner for the fair market value of the trees to be cleared and/or allow the landowner the right to retain ownership of the felled trees.	Keystone will comply with this condition during the easement acquisition process.
19.a	Except as the landowner shall otherwise agree in writing, the width of the clear cuts through any windbreaks and shelterbelts shall be limited to 50 feet or less, and the width of clear cuts through extended lengths of wooded areas shall be limited to 85 feet or less. The environmental inspection in Condition 14 shall include forested lands.	Keystone will comply with this condition prior to or during construction.
20.	Keystone shall implement the following sediment control practices: a) Keystone shall use floating sediment curtains to maintain sediments within the construction right of way in open water bodies with no or low flow when the depth of non-flowing water exceeds the height of straw bales or silt fence installation. In such situations the floating sediment curtains shall be installed as a substitute for straw bales or silt fence along the edge or edges of each side of the construction right-of-way that is underwater at a depth greater than the top of a straw bale or silt fence as portrayed in Keystone's construction Detail #11 included in the CMR Plan. b) Keystone shall install sediment barriers in the vicinity of delineated wetlands and water bodies as outlined in the CMR Plan regardless of the presence of flowing or standing water at the time of construction. c) The Applicant should consult with South Dakota Game, Fish and Parks (SDGFP) to avoid construction near water bodies during fish spawning periods in which in-stream construction activities should be avoided to limit impacts on specific fisheries, if any, with commercial or recreational importance.	Keystone will comply with parts (a) and (b) of this condition during construction. Keystone will consult with SDGFP regarding spawning periods. The current construction schedule will avoid impacts to streams during the spawning season.
21	Keystone shall develop frac-out plans specific to areas in South Dakota where horizontal directional drilling will occur. The plan shall be followed in the event of a frac-out.	Keystone has developed a draft frac-out plan and HDD plan in South Dakota. The plan will be finalized with the input from the Contractor. The plan will be followed in the event of a frac-out.

NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
21.a	If a frac-out event occurs, Keystone shall promptly file a report of the incident with the Commission. Keystone shall also, after execution of the plan, provide a follow-up report to the Commission regarding the results of the occurrence and any lingering concerns.	Keystone will comply with this section in the event of a frac-out.
22.	<p>Keystone shall comply with the following conditions regarding construction across or near wetlands, water bodies and riparian areas:</p> <p>a) Unless a wetland is actively cultivated or rotated cropland or unless site specific conditions require utilization of Keystone's proposed 85 foot width and the landowner has agreed to such greater width, the width of the construction right-of-way shall be limited to 75 feet in non-cultivated wetlands unless a different width is approved or required by the United States Army Corps of Engineers.</p> <p>b) Unless a wetland is actively cultivated or rotated cropland, extra work areas shall be located at least 50 feet away from wetland boundaries except where site-specific conditions render a 50-foot setback infeasible. Extra work areas near water bodies shall be located at least 50 feet from the water's edge, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land or where site-specific conditions render a 50-foot setback infeasible. Clearing of vegetation between extra work space areas and the water's edge shall be limited to the construction right-of-way.</p> <p>c) Water body crossing spoil, including upland spoil from crossings of streams up to 30 feet in width, shall be stored in the construction right of way at least 10 feet from the water's edge or in additional extra work areas and only on a temporary basis.</p> <p>d) Temporary in-stream spoil storage in streams greater than 30 feet in width shall only be conducted in conformity with any required federal permit(s) and any applicable federal or state statutes, rules and standards.</p> <p>e) Wetland and water body boundaries and buffers shall be marked and maintained until ground disturbing activities are complete. Keystone shall maintain 15-foot buffers where practicable, which for stream crossings shall be maintained except during the period of trenching, pipe laying and backfilling the crossing point. Buffers shall not be required in the case of non-flowing streams.</p> <p>f) Best management practices shall be implemented to prevent heavily silt-laden trench water from reaching any wetland or water body directly or indirectly.</p> <p>g) Erosion control fabric shall be used on water body banks immediately following final stream bank restoration unless riprap or other bank stabilization methods are utilized in accordance with federal or state permits.</p> <p>h) The use of timber and slash to support equipment crossings of wetlands shall be avoided.</p>	Keystone will comply with all ROW widths, setbacks, and BMPS as detailed by the Commission. Keystone is identifying the appropriate locations for these conditions at or near wetlands, water bodies and riparian areas during the pre-construction process and will identify the ROW widths and setbacks on the construction drawings. BMPs will be installed as detailed in the CMRP.

NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
	<p>i) Subject to Conditions 37 and 38, vegetation restoration and maintenance adjacent to water bodies shall be conducted in such manner to allow a riparian strip at least 25 feet wide as measured from the water body's mean high water mark to permanently re-vegetate with native plant species across the entire construction right-of way.</p>	
<p>23.</p>	<p>Keystone shall comply with the following conditions regarding road protection and bonding:</p> <p>a. Keystone shall coordinate road closures with state and local governments and emergency responders and shall acquire all necessary permits authorizing crossing and construction use of county and township roads.</p> <p>b) Keystone shall implement a regular program of road maintenance and repair through the active construction period to keep paved and gravel roads in an acceptable condition for residents and the general public.</p> <p>c) Prior to their use for construction, Keystone shall videotape those portions of all roads which will be utilized by construction equipment or transport vehicles in order to document the pre-construction condition of such roads.</p> <p>d) After construction, Keystone shall repair and restore, or compensate governmental entities for the repair and restoration of, any deterioration caused by construction traffic, such that the roads are returned to at least their preconstruction condition.</p> <p>e) Keystone shall use appropriate preventative measures as needed to prevent damage to paved roads and to remove excess soil or mud from such roadways.</p> <p>f) Pursuant to SDCL 49-418-38, Keystone shall obtain and file for approval by the Commission prior to construction in such year a bond in the amount of \$15.6 million for the year in which construction is to commence and a second bond in the amount of \$15.6 million for the ensuing year, including any additional period until construction and repair has been completed, to ensure that any damage beyond normal wear to public roads, highways, bridges or other related facilities will be adequately restored or compensated. Such bonds shall be issued in favor of, and for the benefit of, all such townships, counties, and other governmental entities whose property is crossed by the Project. Each bond shall remain in effect until released by the Commission, which release shall not be unreasonably denied following completion of the construction and repair period. Either at the contact meetings required by Condition 10 or by mail, Keystone shall give notice of the existence and amount of these bonds to all counties, townships and other governmental entities whose property is crossed by the Project.</p>	<p>During the pre-construction planning period Keystone will develop and implement videotaping of road conditions prior to construction activities. Keystone, Contractor, and County Representatives will be present for evaluation and determination of road conditions.</p> <p>Keystone will notify state and local governments and emergency responders to coordinate and implement road closures. All necessary permits authorizing crossing and construction use of county and township roads will be obtained.</p> <p>Keystone will file the necessary bond prior to construction.</p>

NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
24	<p>Although no residential property is expected to be encountered in connection with the Project, in the event that such properties are affected and due to the nature of residential property, Keystone shall implement the following protections in addition to those set forth in its CMR Plan in areas where the Project passes within 500 feet of a residence:</p> <p>a) To the extent feasible, Keystone shall coordinate construction work schedules with affected residential landowners prior to the start of construction in the area of the residences.</p> <p>b) Keystone shall maintain access to all residences at all times, except for periods when it is infeasible to do so or except as otherwise agreed between Keystone and the occupant. Such periods shall be restricted to the minimum duration possible and shall be coordinated with affected residential landowners and occupants, to the extent possible.</p> <p>c) Keystone shall install temporary safety fencing, when reasonably requested by the landowner or occupant, to control access and minimize hazards associated with an open trench and heavy equipment in a residential area.</p> <p>d) Keystone shall notify affected residents in advance of any scheduled disruption of utilities and limit the duration of such disruption.</p> <p>e) Keystone shall repair any damage to property that results from construction activities.</p> <p>f) Keystone shall separate topsoil from subsoil and restore all areas disturbed by construction to at least their preconstruction condition.</p> <p>g) Except where practicably infeasible, final grading and topsoil replacement, installation of permanent erosion control structures and repair of fencing and other structures shall be completed in residential areas within 10 days after backfilling the trench. In the event that seasonal or other weather conditions, extenuating circumstances, or unforeseen developments beyond Keystone's control prevent compliance with this time frame, temporary erosion controls and appropriate mitigative measures shall be maintained until conditions allow completion of cleanup and reclamation.</p>	<p>In the event that Keystone constructs within 500 feet of a residence, it will implement these protective measures and those set forth in the CMR Plan.</p>
25	<p>Construction must be suspended when weather conditions are such that construction activities will cause irreparable damage, unless adequate protection measures approved by the Commission are taken. At least two months prior to the start of construction in South Dakota, Keystone shall file with the Commission an adverse weather land protection plan containing appropriate adverse weather land protection measures, the conditions in which such measures may be appropriately used, and conditions in which no construction is appropriate, for approval of or modification by the Commission prior to the start of construction. The Commission shall make such plan available to impacted landowners who may provide comment on such plan to the Commission</p>	<p>Keystone is preparing this adverse weather land protection plan and will submit it to the Commission after the plan has been completed but at least 2 months prior to start of construction in South Dakota.</p>

NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
26	Reclamation and clean-up along the right-of-way must be continuous and coordinated with ongoing construction.	Keystone will implement this requirement during construction of the project.
27	All pre-existing roads and lanes used during construction must be restored to at least their pre-construction condition that will accommodate their previous use, and areas used as temporary roads during construction must be restored to their original condition, except as otherwise requested or agreed to by the landowner or any governmental authority having jurisdiction over such roadway	Keystone is coordinating with county and state road authorities during the pre-construction planning phase. Pre-construction conditions will be documented and pre-existing roads will be restored to pre-construction condition following construction. Keystone will comply with the condition with respect to temporary roads after construction.
28	Keystone shall, prior to any construction, file with the Commission a list identifying private and new access roads that will be used or required during construction and file a description of methods used by Keystone to reclaim those access roads.	The list of private and new access roads that are being planned for use on the Project is being developed. This list of roads, including the reclamation methods that will be implemented will be provided to the Commission prior to construction.
29	Prior to construction, Keystone shall have in place a winterization plan and shall implement the plan if winter conditions prevent reclamation completion until spring. The plan shall be provided to affected landowners and, upon request, to the Commission.	Keystone will develop and submit to the Commission a winterization plan which addresses these factors.
30	Numerous Conditions of this Order, including but not limited to 16, 19, 24, 25, 26, 27 and 51 relate to construction and its effects upon affected landowners and their property. The Applicant may encounter physical conditions along the route during construction which makes compliance with certain of these Conditions infeasible. If, after providing a copy of this order, including the Conditions, to the landowner, the Applicant and landowner agree in writing to modifications of one or more requirements specified in these conditions, such as maximum clearances or right-of-way widths, Keystone may follow the alternative procedures and specifications agreed to between it and the landowner.	Keystone will comply with this condition and through negotiations with the landowner and any such modifications shall be agreed upon in writing. Note: Through the SDPUC liaison, Keystone has validated a typo in this condition with John Smith, the SDPUC General Counsel. The typo occurs in the first sentence and is a reference Condition 51, which does not exist. This should actually reference Condition 45.
31	Keystone shall construct and operate the pipeline in the manner described in the application and at the hearing, including in Keystone's exhibits, and in accordance with the conditions of this permit, the PHMSA Special Permit, if issued, and the conditions of this Order and the construction permit granted herein	Keystone will comply with this condition during construction and operation of the pipeline. Keystone XL has withdrawn its application to PHMSA for a Special Permit, subject to its right to apply for a Special Permit at a later time.
32	Keystone shall require compliance by its shippers with its crude oil specifications in order to minimize the potential for internal corrosion.	Keystone will require compliance by its shippers with its crude oil tariff specifications.

NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
33	Keystone's obligation for reclamation and maintenance of the right-of-way shall continue throughout the life of the pipeline.	Keystone will monitor the right-of-way conditions throughout the life of the pipeline.
33.a	In its surveillance and maintenance activities, Keystone shall, and shall cause its contractor to, equip each of its vehicles, including off-road vehicles, with a hand held fire extinguisher, portable compact shovel and communication device such as a cell phone, in areas with coverage, or a radio capable of achieving prompt communication with emergency services.	Keystone will require all Operators to maintain the required equipment in all vehicles on the right-of-way during surveillance and maintenance activities.
34	In accordance with 49 C.F.R. 195, Keystone shall continue to evaluate and perform assessment activities regarding high consequence areas.	Keystone will identify and assess high consequence areas in accordance with 49 C.F.R. 195.
34.a	Prior to Keystone commencing operation, all unusually sensitive areas as defined by 49 CFR 195.6 that may exist, whether currently marked on DOT's HCA maps or not, should be identified and added to the Emergency Response Plan and Integrity Management Plan	Keystone will identify HCA's as defined at 49 CFR 195.6 and add them to the Emergency Response Plan and Integrity Management Plan.
34.b	In its continuing assessment and evaluation of environmentally sensitive and high consequence areas, Keystone shall seek out and consider local knowledge, including the knowledge of the South Dakota Geological Survey, the Department of Game Fish and Parks and local landowners and governmental officials.	Keystone has conducted numerous consultations with South Dakota state agencies, local agencies and landowners and essentially concluded the assessment and evaluation of environmentally sensitive and high consequence areas and has concurrence from stakeholders related to construction and restoration plans within these areas. If new or different information on environmentally sensitive and high consequence areas becomes available, Keystone will assess that information.
35	The evidence in the record demonstrates that in some reaches of the Project in southern Tripp County, the High Plains Aquifer is present at or very near ground surface and is overlain by highly permeable sands permitting the uninhibited infiltration of contaminants. This aquifer serves as the water source for several domestic farm wells near the pipeline as well as public water supply system wells located at some distance and upgradient from the pipeline route. Keystone shall identify the High Plains Aquifer area in southern Tripp County as a hydrologically sensitive area in its Integrity Management and Emergency Response Plans. Keystone shall similarly treat any other similarly vulnerable and beneficially useful surficial aquifers of which it becomes aware during construction and continuing route evaluation	Keystone will identify the High Plains Aquifer area in southern Tripp County and any other similarly vulnerable and beneficially useful surficial aquifers as a hydrologically sensitive area in its Integrity Management and Emergency Response Plans.

NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
36	<p>Prior to putting the Keystone Pipeline into operation, Keystone shall prepare, file with PHMSA and implement an emergency response plan as required under 49 CFR 194 and a manual of written procedures for conducting normal operations and maintenance activities and handling abnormal operations and emergencies as required under 49 CFR 195.402. Keystone shall also prepare and implement a written integrity management program in the manner and at such time as required under 49 CFR 195.452. At such time as Keystone files its Emergency Response Plan and Integrity Management Plan with PHMSA or any other state or federal agency, it shall also file such documents with the Commission. The Commission's confidential filing rules found at ARSD 20:10:01:41 may be invoked by Keystone with respect to such filings to the same extent as with all other filings at the Commission. If information is filed as "confidential," any person desiring access to such materials or the Staff or the Commission may invoke the procedures of ARSD 20:10:01 :41 through 20: 10:01 :43 to determine whether such information is entitled to confidential treatment and what protective provisions are appropriate for limited release of information found to be entitled to confidential treatment.</p>	<p>Keystone will file its Emergency Response Plan and Integrity Management Plan with the Commission upon filing with PHMSA and will invoke the Commission's confidential filing rules.</p>
37	<p>To facilitate periodic pipeline leak surveys during operation of the facilities in wetland areas, a corridor centered on the pipeline and up to 15 feet wide shall be maintained in an herbaceous state. Trees within 15 feet of the pipeline greater than 15 feet in height may be selectively cut and removed from the permanent right-of-way.</p>	<p>Keystone will maintain a corridor centered on the pipeline and up to 15 feet wide in an herbaceous state to facilitate periodic pipeline leak surveys during operation of the facilities in wetland areas.</p>
38	<p>To facilitate periodic pipeline leak surveys in riparian areas, a corridor centered on the pipeline and up to 10 feet wide shall be maintained in an herbaceous state.</p>	<p>Keystone will maintain a corridor centered on the pipeline and up to 10 feet wide in an herbaceous state to facilitate periodic pipeline leak surveys during operation of the facilities in riparian areas.</p>
39	<p>Except to the extent waived by the owner or lessee in writing or to the extent the noise levels already exceed such standard, the noise levels associated with Keystone's pump stations and other noise-producing facilities will not exceed the L 1 0=55dbA standard at the nearest occupied, existing residence, office, hotel/motel or non-industrial business not owned by Keystone. The point of measurement will be within 100 feet of the residence or business in the direction of the pump station or facility. Post-construction operational noise assessments will be completed by an independent third-party noise consultant, approved by the Commission, to show compliance with the noise level at each pump station or other noise-producing facility. The noise assessments will be performed in accordance with applicable American National Standards Institute standards. The results of the assessments will be filed with the Commission. In the event that the noise level exceeds the limit set forth in this condition at any pump station or other noise producing facility, Keystone shall promptly implement noise mitigation measures to bring the facility into compliance with the limits set forth in this condition and shall report to the Commission concerning the measures taken and the results of post-mitigation assessments demonstrating that the noise limits have been met.</p>	<p>Keystone will design pump stations and other noise-producing facilities so that noise will not exceed the L 1 0 = 55dbA standard at the nearest occupied receptor (existing residence, office, hotel/motel or non-industrial business not owned by Keystone). Keystone will utilize a third-party noise consultant, approved by the Commission, to show post-construction compliance with the noise level at each pump station or other noise-producing facility and will file the assessments with the Commission.</p>

NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
40	At the request of any landowner or public water supply system that offers to provide the necessary access to Keystone over his/her property or easement(s) to perform the necessary work, Keystone shall replace at no cost to such landowner or public water supply system, any polyethylene water piping located within 500 feet of the Project with piping that is resistant to permeation by BTEX.	Keystone will replace polyethylene water piping located within 500 feet of the Project with piping that is resistant to permeation by BTEX when requested and provided access by the landowner or a public water supply system.
40.a	Keystone shall publish a notice in each newspaper of general circulation in each county through which the Project will be constructed advising landowners and public water supply systems of this condition.	Keystone will publish a notice in each newspaper of general circulation in each county through which the Project will be constructed advising landowners and public water supply systems of condition 40.
41	Keystone shall follow all protection and mitigation efforts as identified by the U.S. Fish and Wildlife Service ("USFWS") and SDGFP	Keystone is currently involved in consultation with the USFWS and SDGFP and will follow protection and mitigation efforts agreed to during consultation with the agencies.
41.a	Keystone shall identify all greater prairie chicken and greater sage and sharp-tailed grouse leks within the buffer distances from the construction right of way set forth for the species in the FEIS and Biological Assessment (BA) prepared by DOS and USFWS	Keystone is involved in consultations with SDGFP to identify greater prairie chicken and greater sage and sharp-tailed grouse leks and to develop construction mitigation plans for each species.
41.b	In accordance with commitments in the FEIS and BA, Keystone shall avoid or restrict construction activities as specified by USFWS within such buffer zones between March 1 and June 15 and for other species as specified by USFW and SDGFP.	Keystone will address this requirement during pre-construction planning efforts.
42	Keystone shall keep a record of drain tile system information throughout planning and construction, including pre-construction location of drain tiles. Location information shall be collected using a sub-meter accuracy global positioning system where available or, where not available by accurately documenting the pipeline station numbers of each exposed drain tile.	Records will be kept of drain tile system information.
42.a	Keystone shall maintain the drain tile location information and tile specifications and incorporate it into its Emergency Response and Integrity Management Plans where drains might be expected to serve as contaminant conduits in the event of a release.	Keystone will maintain the drain tile location information and tile specifications and incorporate it into its Emergency Response and Integrity Management Plans where drains might be expected to serve as contaminant conduits in the event of a release.
42.b	If drain tile relocation is necessary, the applicant shall work directly with landowner to determine proper location.	Keystone will work directly with landowner to determine proper location should drain tile relocation be necessary.

NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
42.c	The location of permanent drain tiles shall be noted on as-built maps. Qualified drain tile contractors shall be employed to repair drain tiles.	Keystone will identify the location of permanent drain tiles on as-built maps. Keystone will employ qualified drain tile contractors to repair drain tiles impacted by the project.
43	Keystone shall follow the "Unanticipated Discoveries Plan," as reviewed by the State Historical Preservation Office ("SHPO") and approved by the DOS and provide it to the Commission upon request. Ex TC-1.6.4, pp. 94-96; Ex S-3.	Keystone will comply with the "Unanticipated Discoveries Plan," as reviewed by the State Historical Preservation Office ("SHPO") and approved by the DOS and will provide the plan to the Commission upon request.
43.a	If during construction, Keystone or its agents discover what may be an archaeological resource, cultural resource, historical resource or gravesite, Keystone or its contractors or agents shall immediately cease work at that portion of the site and notify the DOS, the affected landowner(s) and the SHPO.	Keystone will comply with this condition during construction.
43.b	If the DOS and SHPO determine that a significant resource is present, Keystone shall develop a plan that is approved by the DOS and commenting/signatory parties to the Programmatic Agreement to salvage avoid or protect the archaeological resource.	Keystone will develop a treatment plan that is approved by the DOS and commenting/signatory parties to the Programmatic Agreement to salvage, avoid, or protect an archaeological resource that DOS and SHPO determine as significant.
43.c	If such a plan will require a materially different route than that approved by the Commission, Keystone shall obtain Commission and landowner approval for the new route before proceeding with any further construction.	Keystone will obtain approval from the Commission and affected landowner(s) for any materially different route that may be required as a result of unanticipated discoveries prior to further construction.
43.d	Keystone shall be responsible for any costs that the landowner is legally obligated to incur as a consequence of the disturbance of a protected cultural resource as a result of Keystone's construction or maintenance activities.	Keystone will be responsible for costs that the landowner is legally obligated to incur as a consequence of the disturbance of a protected cultural resource as a result of Keystone's construction or maintenance activities.
44.a	Prior to commencing construction, Keystone shall conduct a literature review and records search, and consult with the BLM and Museum of Geology at the S.D. School of Mines and Technology ("SDSMT") to identify known fossil sites along the pipeline route and identify locations of surface exposures of paleontologically sensitive rock formations using the BLM's Potential Fossil Yield Classification system.	Keystone is currently completing consultations with the BLM and Museum of Geology at the S.D. School of Mines and Technology ("SDSMT") to identify known fossil sites along the pipeline route and identify locations of surface exposures of paleontologically sensitive rock formations using the BLM's Potential Fossil Yield Classification system.
44.a.1	Any area where trenching will occur into the Hell Creek Formation shall be considered a high probability area.	Keystone has identified locations along the pipeline route where trenching will occur into the Hell Creek Formation and has identified these locations as areas of high probability to yield fossils.

NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
44.b	<p>Keystone shall at its expense conduct a pre-construction field survey of each area identified by such review and consultation as a known site or high probability area within the construction ROW. Following BLM guidelines as modified by the provisions of Condition 44, including the use of BLM permitted paleontologists, areas with exposures of high sensitivity (PFYC Class 4) and very high sensitivity (PFYC Class 5) rock formations shall be subject to a 100% pedestrian field survey, while areas with exposures of moderately sensitive rock formations (PFYC Class 3) shall be spot-checked for occurrences of scientifically or economically significant surface fossils and evidence of subsurface fossils. Scientifically or economically significant surface fossils shall be avoided by the Project or mitigated by collecting them if avoidance is not feasible. Following BLM guidelines for the assessment and mitigation of paleontological resources, scientifically significant paleontological resources are defined as rare vertebrate fossils that are identifiable to taxon and element, and common vertebrate fossils that are identifiable to taxon and element and that have scientific research value; and scientifically noteworthy occurrences of invertebrate, plant and trace fossils. Fossil localities are defined as the geographic and stratigraphic locations at which fossils are found</p>	<p>Keystone has conducting pre-construction field surveys of each area identified as high probability to yield fossils within the construction ROW. Keystone is conducting pedestrian field surveys of 100% of areas with exposures of high sensitivity (PFYC Class 4) and very high sensitivity (PFYC Class 5) rock formations utilizing the BLM guidelines as modified by the provisions of Condition 44, including the use of BLM permitted paleontologists. Additionally, Keystone is spot-checking areas of moderately sensitive rock formations (PFYC Class 3). Keystone will avoid scientifically or economically significant surface fossils or will mitigate by collecting them if avoidance is not feasible.</p>
44.c	<p>Following the completion of field surveys, Keystone shall prepare and file with the Commission a paleontological resource mitigation plan. The mitigation plan shall specify monitoring locations, and include BLM permitted monitors and proper employee and contractor training to identify any paleontological resources discovered during construction and the procedures to be followed following such discovery. Paleontological monitoring will take place in areas within the construction ROW that are underlain by rock formations with high sensitivity (PFYC Class 4) and very high sensitivity (PFYC Class 5), and in areas underlain by rock formations with moderate sensitivity (PFYC Class 3) where significant fossils were identified during field surveys.</p>	<p>Keystone will prepare and file with the Commission a paleontological resource mitigation plan upon completion of survey.</p>

Keystone XL Pipeline Project

Response to Condition 8 for the
South Dakota Public Utilities Commission



NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
44.d	<p>If during construction, Keystone or its agents discover what may be a paleontological resource of economic significance, or of scientific significance, as defined in subparagraph (b) above, Keystone or its contractors or agents shall immediately cease work at that portion of the site and, if on private land, notify the affected landowner(s). Upon such a discovery, Keystone's paleontological monitor will evaluate whether the discovery is of economic significance, or of scientific significance as defined in subparagraph (b) above. If an economically or scientifically significant paleontological resource is discovered on state land, Keystone will notify SDSMT and if on federal land, Keystone will notify the BLM or other federal agency. In no case shall Keystone return any excavated fossils to the trench. If a qualified and BLM-permitted paleontologist, in consultation with the landowner, BLM, or SDSMT determines that an economically or scientifically significant paleontological resource is present, Keystone shall develop a plan that is reasonably acceptable to the landowner(s), BLM, or SDSMT, as applicable, to accommodate the salvage or avoidance of the paleontological resource to protect or mitigate damage to the resource. The responsibility for conducting such measures and paying the costs associated with such measures, whether on private, state or federal land, shall be borne by Keystone to the same extent that such responsibility and costs would be required to borne by Keystone on BLM managed lands pursuant to BLM regulations and guidelines, including the BLM Guidelines for Assessment and Mitigation of Potential Impacts to Paleontological Resources, except to the extent factually inappropriate to the situation in the case of private land (e.g. museum curation costs would not be paid by Keystone in situations where possession of the recovered fossil(s) was turned over to the landowner as opposed to curation for the public). If such a plan will require a materially different route than that approved by the Commission, Keystone shall obtain Commission approval for the new route before proceeding with any further construction. Keystone shall, upon discovery and salvage of paleontological resources either during pre-construction surveys or construction and monitoring on private land, return any fossils in its possession to the landowner of record of the land on which the fossil is found. If on state land, the fossils and all associated data and documentation will be transferred to the SDSM; if on federal land, to the BLM.</p>	Keystone will comply with this condition during construction.
44.e	<p>To the extent that Keystone or its contractors or agents have control over access to such information, Keystone shall, and shall require its contractors and agents to, treat the locations of sensitive and valuable resources as confidential and limit public access to this information.</p>	<p>To the extent that Keystone or its contractors or agents have control over access to such information, Keystone will, and will require its contractors and agents to treat the locations of sensitive and valuable resources as confidential and limit public access to this information.</p>

NO.	CONDITION	STATUS OF OTHER MEASURES REQUIRED BY CONDITIONS
45	Keystone shall repair or replace all property removed or damaged during all phases of construction and operation of the proposed transmission facility, including but not limited to, all fences, gates and utility, water supply, irrigation or drainage systems.	Keystone will repair or replace all property removed or damaged during all phases of construction and operation of the proposed transmission facility.
45.a	Keystone shall compensate the owners for damages or losses that cannot be fully remedied by repair or replacement, such as lost productivity and crop and livestock losses or loss of value to a paleontological resource damaged by construction or other activities.	Keystone will compensate the owners for damages or losses that result from construction and operation of the proposed transmission facility and cannot be fully remedied by repair or replacement.
46	In the event that a person's well is contaminated as a result of construction or pipeline operation, Keystone shall pay all costs associated with finding and providing a permanent water supply that is at least of similar quality and quantity; and any other related damages, including but not limited to any consequences, medical or otherwise, related to water contamination.	Keystone will pay all costs associated with finding and providing a permanent water supply that is at least of similar quality and quantity and any other related damages related to water contamination in the event that a well is contaminated as a result of construction or pipeline operation.
47	Any damage that occurs as a result of soil disturbance on a persons' property shall be paid for by Keystone	Keystone will compensate for damage that occurs as a result of soil disturbance on a persons' property caused by construction and operation of the Project.
48	No person will be held responsible for a pipeline leak that occurs as a result of his/her normal farming practices over the top of or near the pipeline	Keystone will not hold any person responsible for a pipeline leak that occurs as a result of normal farming practices.
49	Keystone shall pay commercially reasonable costs and indemnify and hold the landowner harmless for any loss, damage, claim or action resulting from Keystone's use of the easement, including any resulting from any release of regulated substances or from abandonment of the facility, except to the extent such loss, damage claim or action results from the gross negligence or willful misconduct of the landowner or its agents.	Keystone will pay commercially reasonable costs and indemnify and hold the landowner harmless for any loss, damage, claim or action resulting from Keystone's use of the easement, including any resulting from any release of regulated substances or from abandonment of the facility, except to the extent such loss, damage claim or action results from the gross negligence or willful misconduct of the landowner or its agents.
50	The Commission's complaint process as set forth in ARSD 20:10:01 shall be available to landowners, other persons sustaining or threatened with damage or the consequences of Keystone's failure to abide by the conditions of this permit or otherwise having standing to obtain enforcement of the conditions of this Order and Permit.	The Commission's complaint process as set forth in ARSD 20:10:01 shall be available to landowners, other persons sustaining or threatened with damage or the consequences of Keystone's failure to abide by the conditions of this permit or otherwise having standing to obtain enforcement of the conditions of this Order and Permit.



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KEYSTONE XL PROJECT

CONSTRUCTION, MITIGATION, AND RECLAMATION PLAN

April 2012
November 2008
Rev. 41

CONSTRUCTION MITIGATION AND RECLAMATION PLAN

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CONSTRUCTION MITIGATION AND RECLAMATION PLAN

1.0 INTRODUCTION

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

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

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

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

2.0 GENERAL CONDITIONS

2.1 Training

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

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

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

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

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

2.2 Environmental Inspection

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

2.3 Advance Notice of Access to Property Prior to Construction

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

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

Keystone will coordinate with managers of public lands to reduce conflicts between construction activities and recreational uses. Keystone will consult with land managers on state and federal lands regarding any necessary construction and maintenance restrictions consistent with management and use of such

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lands. Damages from disruption of recreational uses of private lands will be the subject of compensation negotiations with individual landowners.

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

2.4 Other Notifications

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

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

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

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

2.5 Damages to Private Property

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

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

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

2.6 Appearance of Worksite

The construction right-of-way shall be maintained in a clean, neat condition at all times. At no time shall litter be allowed to accumulate at any location on the construction right-of-way. The Contractor shall provide a daily garbage detail

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with each major construction crew to keep the construction right-of-way clear of trash, pipe banding and spacers, waste from coating products, welding rods, timber skids, defective materials and all construction and other debris immediately behind construction operations unless otherwise approved by Keystone. Paper from wrapping or coating products or lightweight items shall not be permitted to be scattered by the wind.

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

2.7 Access

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

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

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

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

~~Keystone will develop a site-specific crossing plan for the Corps Fee Title Lands to address the primary concerns of limited access and conflicts with hunters during construction.~~

2.8 Aboveground Facilities

Locations for aboveground facilities shall be selected in a manner so as to be as unobtrusive as reasonably possible to ongoing agricultural or other landowner activities occurring on the lands adjacent to the facilities. If it is not feasible, to avoid interference, such activities shall be located so as to incur the least hindrance to the adjacent agricultural operations (i.e., located in field corners or areas where at least one side is not used for cropping purposes) provided the location is consistent with the design constraints of the pipeline. Aboveground facilities shall avoid floodplains and wetlands to the maximum extent possible. Additionally, they shall be located to avoid existing drain tile systems to the

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extent possible. To further reduce visual impacts from aboveground pipeline facilities and structures, Keystone will comply with standard industry painting practices with respect to aboveground facilities. Keystone will address any visual aesthetics issues with landowners in individual consultations.

2.9 Minimum Depth of Cover

The pipeline shall be installed so that the top of the pipe and coating is a minimum depth of 5 feet below the bottom of waterbodies including rivers, creeks, streams, ditches, and drains. This depth shall normally be maintained over a distance of 15 feet on each side of the waterbody measured from the top of the defined stream channel. If concrete weights or concrete coated pipe is utilized for negative buoyancy of the pipeline, the minimum depth of cover shall be measured from the top of the concrete to the original ground contour. The following table indicates standard depths that would apply to pipeline construction.

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

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

2.10 Non-Hazardous Waste Disposal

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

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

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

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

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

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

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

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

2.11 Hazardous Wastes

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

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

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

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

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

2.12 Noise Control

The Contractor shall minimize noise during non-daylight hours and within 1 mile of residences or other noise-sensitive areas such as hospitals, motels or

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

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

2.13 Weed Control

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

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

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

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

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

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

Keystone will implement Best Management Practices (BMPs) for conducting vegetation control where necessary before and after construction. Typical

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

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

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

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

2.14 Dust Control

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

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

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

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

2.15 Off Road Vehicle Control

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

- signs;
- fences with locking gates;
- slash and timber barriers, pipe barriers, or boulders lined across the construction right-of-way; and
- conifers or other appropriate trees or shrubs across the construction right-of-way.

2.16 Fire Prevention and Control

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

- A list of relevant fire authorities and their designated representative to contact shall be maintained on site by construction personnel.
- Adequate fire fighting equipment shall be available on site in accordance with the applicable regulatory requirements shall be available on site.
- The level of forest fire hazard shall be posted at the construction office (where visible for workers) and workers shall be made aware of the hazard level and related implications.
- The Contractor shall provide equipment to handle any possible fire emergency. This shall include, although not be limited to, water trucks; portable water pumps; chemical fire extinguishers; hand tools such as shovels, axes, and chain saws; and heavy equipment adequate for the construction of fire breaks when needed.
- Specifically, the Contractor shall supply and maintain in working order an adequate supply of fire extinguishers for each crew engaged in potentially combustible work such as welding, cutting, grinding, and burning of brush or vegetative debris.

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- In the event of a fire, the Contractor shall immediately use resources necessary to contain the fire. The Contractor shall then notify local emergency response personnel.
- All tree clearing activities are to be carried out in accordance with local rules and regulations for the prevention of forest fires.
- Burning shall be done in compliance with state, county, or local applicable regulations.
- Any burning will be done within the right-of-way. Only small piles shall be burned to avoid overheating or damage to trees or other structures along the right-of-way.
- Flammable wastes shall be removed from the construction site on a regular basis.
- Flammable materials kept on the construction site must be stored in approved containers away from ignition sources.
- Smoking shall be prohibited around flammable materials.
- Smoking shall be prohibited on the entire construction site when the fire hazard is high.

2.17 Road and Railroad Crossings

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

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

2.18 Adverse Weather

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

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

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

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

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

2.19 Cultural Resources

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

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

The preferred treatment of any historical property or culturally significant site is avoidance. Where ~~required~~ necessary, Keystone will monitor the construction spread using a cultural resource monitor working under the direction of a professional who meets the standards of the *Secretary of the Interior's Historic*

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Preservation Professional Qualification Standards (48 FR 44716, September 29, 1983).

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

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

3.0 SPILL PREVENTION AND CONTAINMENT

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

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

3.1 Spill Prevention

3.1.1 Staging Areas

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

- Contractor fuel trucks shall be loaded at existing bulk fuel dealerships or from bulk tanks set up for that purpose at the staging area. In the

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former case, the bulk dealer is responsible for preventing and controlling spills.

- The Environmental Inspector shall inspect the tank site for compliance with the 100-foot setback requirement and approve the tank site prior to installing bulk fuel or storage tanks on the construction yard.
- Fuels and lubricants shall be stored only at designated staging areas. Storage of fuel and lubricants in the staging area shall be at least 100 feet away from the water's edge. Refueling and lubrication of equipment shall be restricted to upland areas at least 100 feet away from perennial streams and wetlands.
- Contractors shall be required to perform all routine equipment maintenance at the staging area and recover and dispose of wastes in an appropriate manner.
- Fixed fuel dispensing locations will be provided with secondary containment to capture fuel from leaks, drips, and overfills.
- Temporary liners, berms, or dikes (secondary containment) shall be constructed around the aboveground bulk tanks, providing 110 percent containment volume of the largest storage tank or trailer within the containment structure, so that potential spill materials shall be contained and collected in specified areas. Tanks shall not be placed in areas subject to periodic flooding or washout.
- Drivers of tank trucks are responsible for safety and spill prevention during tank truck unloading. Procedures for loading and unloading tank trucks shall meet the minimum requirements established by the Department of Transportation.
- Drivers of tank trucks are responsible for setting brakes and chocking wheels prior to off loading. Warning signs requiring drivers to set brakes and chock wheels shall be displayed at all tanks. Proper grounding of equipment shall be undertaken during fuel transfer operations. Drivers shall observe and control the fueling operations at all times to prevent overfilling the temporary tank.
- Prior to departure of any tank truck, all vehicle outlets shall be examined closely by the driver for leakage, tightened, adjusted or replaced to prevent leakage while in transit.
- A supply of sorbent and barrier materials sufficient to allow the rapid containment and recovery of spills shall be maintained at each construction staging area. Sorbent and barrier materials shall also be utilized to contain runoff from contaminated areas.
- Shovels and drums shall be kept at each of the individual staging areas. In the event that small quantities of soil become contaminated, shovels shall be utilized to collect the soil and the material shall be stored in 55-gallon drums. Large quantities of contaminated soil may be bio-remediated on site or disposed in an approved landfill, subject to government approval, or collected utilizing heavy equipment, and

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stored in drums or other suitable containers prior to disposal. Should contamination occur adjacent to staging areas as a result of runoff, shovels or heavy equipment shall be utilized to collect the contaminated material. Contaminated soil shall be disposed of in accordance with state and federal regulations.

- Temporary aboveground tanks shall be subject to visual inspection on a monthly basis and when the tank is refilled. Inspection records shall be maintained. Operators shall routinely keep tanks under close surveillance and potential leaks or spills shall be quickly detected.
- Visible fuel leaks shall be reported to the Contractors' designated representative and corrected as soon as conditions warrant. Keystone's designated representative shall be informed.
- Drain valves on temporary tanks shall be locked to prevent accidental or unauthorized discharges from the tank.
- Oil and other hazardous materials stored in 350-gallon totes, 55-gallon drums, 5-gallon pails, smaller retail-size containers or other portable containers will be staged or stored in areas with a secondary temporary containment structure. Secondary containment structures may consist of temporary earthen berms with a chemical resistant liner, or a portable containment system constructed of steel, PVC, or other suitable material. The secondary containment structure will be capable of containing 110 percent of the volume of material stored in these areas.

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

3.1.2 Construction Right-of-Way

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

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

Each fuel truck that transports and dispenses fuel to construction equipment or Project vehicles along the construction ROW or within equipment staging and material areas shall carry an oil spill response kit

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and spill response equipment onboard at all times. In the event that response materials are depleted through use or their condition is deteriorated through age, the materials will be replenished prior to placing the fueling vehicle back into service.

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

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

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

3.2 Contingency Plans

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

3.3 Equipment

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

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

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

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

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

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

3.4 Emergency Notification

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

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

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

3.5 Spill Containment and Countermeasures

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

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

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

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

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

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

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

4.1 Interference with Irrigation Systems

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

- If it is feasible and mutually acceptable to Keystone and the landowner or landowner's designate, temporary measures shall be implemented to allow an irrigation system to continue to operate across land on which the pipeline is being constructed.
- If the pipeline or temporary work areas intersect an operational (or soon to be operational) pivot or other spray irrigation system, Keystone shall establish with the landowner or landowner's designate an acceptable amount of time the irrigation system may be out of service. If an irrigation system interruption results in crop damages, either on the pipeline construction right-of-way or off the construction right-of-way, the landowner shall be compensated reasonably for all such crop damages.
- If the pipeline or temporary work areas intersect an operational sheet flow irrigation system, Keystone shall establish with the landowner or landowner's designate an acceptable amount of time the irrigation system may be out of service. If an irrigation system interruption results in crop damages, either on the pipeline construction right-of-way or off the construction right-of-way, the landowner shall be compensated reasonably for all such crop damages.
- Irrigation ditches that are active at the time of construction shall not be stopped or obstructed except for the length of time to install the pipeline beneath the ditch (typically, one day or less) unless otherwise approved or directed by Keystone.

4.2 Clearing

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

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

4.3 Topsoil Removal and Storage

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

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

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

- Stripped topsoil is to be stockpiled in a windrow along the edge of the right-of-way. The Contractor shall perform work in a manner to minimize the potential for subsoil and topsoil to be mixed.
- Under no circumstances shall the Contractor use topsoil to fill a low area.
- If required due to excessively windy conditions, topsoil piles shall be tackified using either water or a suitable tackifier (liquid mulch binder).
- Gaps in the rows of topsoil will be left in order to allow drainage and prevent ponding of water adjacent to or on the right-of-way.

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- Topsoil shall not be utilized to construct ramps at road or waterbody crossings.
- In areas with defined saline or sodic soil concerns, a triple-ditch method will be used to segregate problem soils as indicated in Detail 67 and 67A.
- If frozen topsoil conditions are encountered during winter construction, specialized construction equipment (i.e. ripping, frozen topsoil cutter, road reclaimer, etc) may be required to adequately segregate and conserve topsoil resources.

4.4 Grading

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

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

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

- providing gaps in the rows of subsoil and topsoil in order to prevent any accumulation of water on the land;
- preventing obstructions in furrows, furrow drains, and ditches;
- installing flumes and ramps in furrows, furrow drains, and ditches to facilitate water flow across the construction right-of-way and allow for construction equipment traffic; and

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- installing flumes over the trench for any watercourse where flow is continuous during construction.

4.5 Temporary Erosion and Sediment Control

4.5.1 General

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

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

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

4.5.2 Sediment Barriers

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

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

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

- the base of slopes adjacent to road crossings;
- the edge of the construction right-of-way adjacent to and upgradient of a roadway, flowing stream, spring, wetland, or impoundment;

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

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

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

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

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

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

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4.5.3 Trench Plugs

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

4.5.4 Temporary Slope Breakers (Water Bars)

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

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

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

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

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

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

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

4.5.5 Drainage Channels or Ditches

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

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

4.5.6 Temporary Mulching and Cover Crops

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

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

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

4.5.7 Tackifier

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

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

4.6 Stringing

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

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

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

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- digging ditches to improve surface drainage;
- using timber riprap, matting, or geotextile fabric overlain with soil; and
- stopping construction for a period of time.

4.7 Trenching

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

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

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

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

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

4.7.1 Trench Dewatering/Well Points

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

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

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

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

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

4.8 Welding, Field Joint Coating, and Lowering In

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

- Shavings produced during beveling of the line pipe are to be removed immediately following this operation to ensure that livestock and wildlife do not ingest this material. When welding operations create a continuous line of pipe that may be left in the right-of-way for an extended period of time due to construction or weather constraints, a gap in the welded pipe shall be

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provided to allow for access at farm road crossings and for passage of livestock and wildlife.

- Prior to the application of epoxy powder, urethane epoxy, or other approved pipe coatings, a tarp shall be placed underneath the pipe in wetlands to collect any overspray of epoxy powder and liquid drippings. Excess powder, liquid, or other hazardous materials (e.g. brushes, rollers, gloves) shall be continuously collected and removed from the construction right-of-way and disposed of in a manner appropriate for these materials.

4.9 Padding and Backfilling

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

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

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- To reduce the potential for ditch line subsidence, spoil shall be replaced and compacted by backhoe bucket or by the wheels or tracks of equipment traversing down the trench.
- The lesser of 4 feet or the actual depth of topsoil cover, shall not be backfilled with soil containing rocks of any greater concentration or size than existed prior to pipeline construction in the pipeline trench, bore pits, or other excavations.

4.10 Cleanup

The objective of cleanup activities shall be to prepare the right-of-way and other disturbed areas to approximate pre-activity ground contours where appropriate and to replace spoil and stockpiled material in a manner which preserves soil capability and quality to a degree reasonably equivalent to the original or that of representative undisturbed land. The following mitigative measures shall be utilized during cleanup, unless otherwise approved or directed by Keystone based on specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- Cleanup shall occur immediately following backfilling operations when weather or seasonal conditions allow.
- All garbage and construction debris (e.g., lathing, ribbon, welding rods, pipe bevel shavings, pipe spacer ropes, end caps, pipe skids) shall be collected and disposed of at approved disposal sites.
- The right-of-way shall be re-contoured with spoil material to approximate pre-construction contours and as necessary to limit erosion and subsidence. Loading of slopes with unconsolidated spoil material shall be avoided during slope re-contouring. Topsoil shall be replaced after re-contouring of the grade with subsoil. The topsoil shall be replaced on the subsoil storage area and over the trench so that after settling occurs, the topsoil's approximate original depth and contour (with an allowance for settling) shall be achieved.
- Where topsoil has been segregated, subsoilSubsoil shall not be permanently placed on top of topsoil.
- Surface drainage shall be restored and re-contoured to conform to the adjacent land drainage system.
- Erosion control structures such as permanent slope breakers and cross ditches shall be installed on steep slopes where necessary to control erosion by diverting surface run-off from the right-of-way to stable and vegetated off right-of-way areas.
- During cleanup, temporary sediment barriers such as silt fence and hay bale diversions will be removed; accumulated sediment will re-contoured with the rest of the ROW; and permanent erosion controls will be installed as necessary.

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- After construction, all temporary access shall be returned to prior construction conditions unless specifically agreed with the landowner or otherwise specified by Keystone.
- Warning signs, aerial markers, and cathodic protection test leads shall be installed in locations in compliance with U.S. Federal code and in locations that shall not impair farming operations where practicable and are acceptable to the landowner.
- All bridges, fences and culverts existing prior to construction shall be restored to meet or exceed approximate pre-construction conditions. Caution shall be utilized when re-establishing culverts to ensure that drainage is not improved to a point that would be detrimental to existing waterbodies and wetlands.
- All temporary gates installed during construction shall be replaced with permanent fence unless otherwise requested by the landowner.

4.11 Reclamation and Revegetation

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

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

4.11.1 Relieving Compaction

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

- Compacted cropland compacted shall be ripped a minimum of 3 passes at least 18 inches deep and all pasture shall be ripped or chiseled a minimum of three passes at least 12 inches deep before replacing topsoil.
- Areas of the construction right-of-way that were stripped for topsoil salvage shall be ripped a minimum of 3 passes (in cross patterns, as practical) prior to topsoil replacement. The approximate depth of ripping shall be 18 inches (or a lesser depth if damage may occur to existing drain tile systems). After ripping, the subsoil surface shall be

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graded smooth and any subsoil clumps broken up (disc and harrow) in an effort to avoid topsoil mixing.

- The de-compacted construction right-of-way shall be tested by the Contractor at regular intervals for compaction in agricultural and residential areas. Tests shall be conducted on the same soil type under similar moisture conditions in undisturbed areas immediately adjacent to the right-of-way to approximate pre-construction conditions. Penetrometers or other appropriate devices shall be used to conduct tests
- Topsoil shall be replaced to pre-existing depths once ripping and discing of subsoil is complete up to a maximum of 12 inches. Topsoil compaction on cultivated fields shall be alleviated with ~~by~~ cultivation methods by the contractor.-
- If there is any dispute between the landowner and Keystone as to what areas need to be ripped or chiseled, the depth at which compacted areas should be ripped or chiseled, or the necessity or rates of lime and fertilizer application, the appropriate NRCS shall be consulted by Keystone and the landowner.

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

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

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

4.11.2 Rock Removal

- Rocks ~~On agricultural land,~~ rocks that are exposed on the surface due to construction activity shall be removed from the right-of-way prior to and after topsoil replacement. This effort will result in an equivalent quantity, size and distribution of rocks to that found on adjacent lands, as determined by the Environmental Inspectors.-

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- Clearing of rocks may be carried out with a mechanical rock picker or by manual means, provided that preservation of topsoil is assured. Rock removed from the right-of-way shall be hauled off the landowner's premises or disposed of on the landowner's premises at a location that is mutually acceptable to the landowner and to Keystone.

4.11.3 Soil Additives

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

4.11.4 Seeding

- The final seed mix shall be based on input from the local Natural Resource Conservation Service and the availability of seed at the time of reclamation. The landowner may request specific seeding requirements during easement negotiations.
- Certificates of seed analysis are required for all seed mixes to limit the introduction of noxious weeds.
- Seed not utilized within 12 months of seed testing shall be approved by Keystone prior to use. Seeding shall follow cleanup and topsoil replacement as closely as possible. Seed shall be applied to all disturbed surfaces (except cultivated fields unless requested by the landowner) as indicated on the construction drawings
- If mulch was applied prior to seeding for temporary erosion control, the Contractor shall remove and dispose of the excess mulch prior to seedbed preparation to ensure that seedbed preparation equipment and seed drills do not become plugged with excess mulch; and to support an adequate seedbed; and to ensure that seed incorporation or soil packing equipment can operate without becoming plugged with mulch.
- ~~The Contractor may evenly re-apply and anchor (straw crimp) the removed temporary mulch on the construction right-of-way following seeding.~~
- Identified seeding areas shall be seeded as specified by Keystone at a rate appropriate for the region and stability of the reclaimed surface. Seeding rates shall be based on pure live seed.
- Weather conditions, construction right-of-way constraints, site access, topography and soil type shall influence the seeding method to be

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used (i.e., drill seeding versus broadcast seeding). All areas seeded by the Contractor, except for temporary cover crops, shall be drill seeded unless the right-of-way is too steep to facilitate drill seeding. Temporary cover crop seed shall be broadcast.

- The Contractor shall delay seeding as directed by Keystone necessary until the soil is in the appropriate condition for drill seeding.
- The Contractor shall use a Truax brand or Keystone approved equivalent-type drill seeder equipped with a cultipacker designed and equipped to apply grass and grass-legume seed mixtures with mechanisms such as seed box agitators to allow even distribution of all species in each seed mix, with an adjustable metering mechanism to accurately deliver the specified seeding rate and with a mechanism such as depth bands to accurately place the seed at the specified depth.
- The Contractor shall operate drill seeders at an appropriate speed so the specified seeding rate and depth is maintained, as directed by Keystone.
- The Contractor shall calibrate drill seeders so that the specified seeding rate is planted. The row spacing on drill seeders shall not exceed 8 inches.
- The Contractor shall plant seed at depths consistent with the local or regional agricultural practices.
- Broadcast or hydro seeding, used in lieu of drilling, shall utilize NRCS- ~~double~~ the recommended seeding rates. Where seed is broadcast, the Contractor shall use a harrow, cultipacker, or other equipment immediately following broadcasting to incorporate the seed to the specified depth and to firm the seedbed.
- The Contractor shall delay broadcast seeding during high wind conditions if even distribution of seed is impeded.
- The Contractor shall hand rake all areas that are too steep or otherwise cannot be safely harrowed or cultipacked in order to incorporate the broadcast seed to the specified depth.
- Hydro seeding may be used, on a limited basis, where the slope is too steep or soil conditions do not warrant conventional seeding methods. Fertilizer, where specified, may be included in the seed, virgin wood fiber, tackifier, and water mixture. When hydro-seeding, virgin wood fiber shall be applied at the rate of approximately 3,000 pounds per acre on an air-dry weight basis as necessary to provide at least 75% ground cover. Tackifier shall consist of biodegradable, vegetable-based material and shall be applied at the rate recommended by the manufacturer. The seed, mulch, and tackifier slurry shall be applied so that it forms a uniform, mat-like covering of the ground.
- Keystone shall work with landowners to discourage intense livestock grazing of the construction right-of-way during the first growing

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season by utilization of temporary fencing or deferred grazing, or increased grazing rotation frequency.

4.11.5 Permanent Erosion and Sediment Control

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

4.11.5.1 Trench Breakers

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

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

4.11.5.2 Permanent Slope Breakers (Water Bars)

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

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

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

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

The Contractor shall construct slope breakers to divert surface flow to a stable, well-vegetated area. In the absence of a stable

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area, the Contractor shall construct appropriate energy-dissipating devices at the end of the slope breaker and beyond the area disturbed by construction.

4.11.5.3 Mulching

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

Mulch application includes straw mulch, ~~or hydro mulch and tackifier or other materials as approved.~~ ~~The Contractor shall not apply mulch in cultivated areas unless deemed necessary by Keystone.~~

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

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

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

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

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

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

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

4.11.5.4 Erosion Control Matting

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

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

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

4.11.5.5 Riprap and Stream Bank Stabilization

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

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

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

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

Stream bank riprap structures shall consist of a layer of stone underlain with approved filter fabric or a gravel filter blanket. Riprap shall extend from the stabilized streambed to the top of

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the stream bank. Native rock shall be utilized wherever practicable.

4.11.6 Fences

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

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

4.11.7 Farm Terraces

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

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

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

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

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

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Should the landowner desire the Contractor to restore the terraces, the pipeline contractor will compact the trench before the terrace berm is replaced. Following restoration of the terraces, final contours and grades will be re-surveyed and documented with survey notes. Photographs will be taken from a minimum of two or three perspectives to document that the cross-section profile matches the adjacent undisturbed grades. Keystone will perform post-construction monitoring and inspection with the landowner's concurrence. Should the terraces require further work, Keystone will either compensate the landowner to perform the work or arrange for a local contractor to perform the work.

4.11.8 Right-of-Way and Pipeline Markers

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

4.12 Pasture and Range Lands

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

- Access across the right-of-way during construction shall be provided at locations requested by landowners, if practicable.
- Shavings produced during pipe bevel operations are to be removed immediately to ensure that livestock and wildlife do not ingest this material.
- Litter and garbage shall be collected and removed from the construction site at the end of the day's activities.
- Temporary gates shall be installed at fence lines for access to the construction right-of-way. These gates shall remain closed at all times. Upon completion of construction, the temporary gates shall be removed and the permanent fence replaced.
- Feeding or harassment of livestock or wildlife is prohibited.
- Construction personnel shall not be permitted to have firearms or pets on the construction right-of-way.
- All food and wastes shall be stored and secured in vehicles or appropriate facilities.
- Areas of disturbance in native range shall be seeded with a native seed mix after topsoil replacement.

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- Improved pasture shall be seeded with a seed mix approved by individual landowners.

4.13 Forested Lands

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

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

- Prior to the start of clearing activity, right-of-way boundaries, including pre-approved temporary workspaces, shall be clearly staked to prevent disturbance of unauthorized areas.
- If trees are to be removed from the construction right-of-way, Keystone shall consult with the landowner or landowner's designate to see if there are trees of commercial or other value to the landowner. Timber shall be salvaged as per landowner request.
- If there are trees of commercial or other value to the landowner, Keystone shall allow the landowner the right to retain ownership of the trees with the disposition of the trees to be negotiated prior to the commencement of land clearing and included in the easement agreement.
- If not performed by the landowner, the construction right-of-way Contractor may salvage all marketable timber from designated areas.
- Tree stumps shall be grubbed to a maximum of 5 feet on either side of the trench line and where necessary for grading a level surface for pipeline construction equipment to operate safely.
- Keystone shall follow the landowner's or landowner designee's desires as stated in the easement agreement regarding the disposal of trees, brush, and stumps of no value to the landowner by burning, burial, etc., or complete removal from any affected property.
- Timber salvage operations shall use cut-off-type saw equipment. Felling shall be undertaken in a manner that minimizes butt shatter, breakage, and off ROW disturbance. Skidders or alternate equipment shall be used to transport salvaged logs to stacking sites.

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

4.14 Residential and Commercial/Industrial Areas

4.14.1 Residential and Commercial Areas

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

- notifying landowners prior to construction;
- posting warning signs as appropriate;

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

4.14.2 Site-Specific Plans

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

- a description of construction techniques to be used;

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

4.14.3 Landowner Complaint Resolution Procedure

Keystone shall implement a landowner complaint procedure as follows:

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

4.15 Sand Hills Fragile Soil Clean-up and Reclamation/Revegetation (Steele City Segment)

4.15.1 General

Fragile soil types are a result of the high percentage of sand content that exists within the surficial soil. These soil types exist within regions found in southern South Dakota and central Nebraska and are fragile due to their inherent high wind and water erosion potential, low water holding capacity and arid nature of the region, rolling to steep terrain and usually
The Sand Hills are an extensive and biologically significant eco-region encompassing many square miles in South Dakota and northern Nebraska. This arid eco-region is an important ecosystem that consists of predominantly native prairie landscapes and supports a variety of uses such as livestock grazing, wildlife habitat and recreational opportunities. The Sand Hills consist of a collection of diverse habitats that vary from highly erosive windswept ridges and blowouts, to wet meadows and alkali lakes in valley bottoms.

4.15.2 Right-of-way Construction

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- KXL will educate construction personnel regarding these areas the fragility of Sand Hills soils, and the necessity to strictly adhere to Project Best Management Practices (BMPs) designed to minimize impacts.
- Minor route re-alignments will be incorporated through these areas the Sand Hills region to avoid particularly erosion-prone locations, such as ridgetops and existing blowouts as much as practicable.
- KXL will avoid highly saturated areas, such as wetland, to the maximum extent possible.
- Construction soil handling procedures will strive to reduce the width of disturbance to the native prairie landscape by adopting "Trench-line or Blade-width stripping procedures where practicable.
- Topsoil conservation will be conducted on all areas where excavation occurs.
- Topsoil ~~topsoil~~ piles will be protected from erosion through matting, mulching, watering or tackifying as deemed practicable.
- Traffic management limitations will be employed on specific areas possessing high erosion potential or sensitive habitat.

4.15.3 Right-of-Way Reclamation

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

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rest a pasture until vegetation can become established. Management concerns such as livestock access to water or movement within a pasture would be incorporated as necessary.

4.15.4 Post-Construction

Keystone is committed to post-construction monitoring and repair and will monitor reclamation on the right-of-way for several years and repair erosion and reseed poorly revegetated areas as necessary. During monitoring, landowners are informed of our efforts and intentions.

A noxious weed management plan ~~specific to the Sand Hills region~~ will be established on these lands pending consultation with state and county experts

4.16 Operations and Maintenance

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

- Keystone shall monitor the pipeline right-of-way and all stream crossings for erosion or other potential problems that could affect the integrity of the pipeline. Any erosion identified shall be reclaimed as expeditiously as practicable by Keystone or by compensating to the landowner to reclaim the area.
- Trench depressions on ditch line that may interfere with natural drainage, vegetation establishment, or land use shall be repaired as expeditiously as practicable by Keystone or by compensating the landowner to repair the area.
- Post-construction monitoring inspections shall be conducted after the first growing season to determine the success of revegetation unless otherwise required by permit. Areas which have not been successfully re-established shall be revegetated by Keystone or by compensation of the landowner to reseed the area. If, after the first growing season, revegetation is successful, no additional monitoring shall be conducted unless otherwise required by permit.
- In non-agricultural areas, revegetation shall be considered successful if, upon visual survey, the density and cover of non-nuisance vegetation are similar in density and cover to adjacent undisturbed lands unless otherwise required by permit.

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- In agricultural areas, revegetation shall be considered successful if crop yields are similar to adjacent undisturbed portions of the same field.
- Restoration shall be considered successful if the surface condition is similar to adjacent undisturbed lands, construction debris is removed (unless requested otherwise by the landowner or land managing agency), revegetation is successful, and drainage has been restored.
- Weed control measures shall be implemented as required by any applicable plan and in conjunction with the landowner.
- Keystone shall be responsible for correcting tile line or irrigation system repairs that fail, provided those repairs were made by Keystone. Keystone shall not be responsible for tile line or irrigation system repairs which Keystone compensated the landowner to perform.
- When requested by owners in cultivated land, Keystone shall monitor the yield of land impacted by construction with the help of agricultural specialists. If yield deficiencies are indicated compared to yields on unaffected land, Keystone will compensate the landowner for reduced yields and shall implement procedures to return the land to equivalent capability.
- In residential areas, landowners may use the right-of-way provided they do not interfere with the rights granted to Keystone. Trees, bushes, structures, including houses, tool sheds, garages, poles, guy wires, catch basins, swimming pools, trailers, leaching fields, septic tanks, and any other objects not easily removable, shall not be permitted on the permanent construction right-of-way without the written permission of Keystone, because they could impair access for maintenance of the pipeline.
- Keystone shall maintain communication with the landowner and tenant throughout the operating life of the pipeline to allow expedient communication of issues and problems as they occur. Keystone shall provide the landowner with corporate contact information for these purposes. Keystone shall work with landowners to prevent excessive erosion on lands disturbed by construction. Reasonable methods shall be implemented to control erosion. These may not be implemented if the property across which the pipeline is constructed is bare cropland which the landowner intends to leave bare until the next crop is planted.
- If the landowner and Keystone cannot agree upon a reasonable method to control erosion on the landowner's property, the recommendations of the appropriate NRCS office shall be considered by Keystone and the landowner.

5.0 DRAIN TILE SYSTEMS

5.1 General

If underground drainage tile is damaged by the pipeline installation, it shall be repaired in a manner that ensures the tile line's proper operating condition at the point of repair. Keystone may elect to negotiate a fair settlement with the

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affected county or landowner for repair of the damaged drain tile. In the event the landowner chooses to have the damaged tile repaired by Keystone, the Contractor shall follow these guidelines and procedures to identify the location of drain tiles, to mitigate damages to drain tiles prior to and during construction, to repair drain tiles damaged during installation of the pipeline, to inspect the proper repair of drain tiles, and to provide post-construction monitoring to determine any impacts caused by repair of drain tiles. Since all public and private drain tile systems are unique, i.e., varying age, depth of cover, type of material, geometry on the land, etc., it is not possible to develop a standard procedure for resolving each county's or landowner's drain tile issues. These guidelines provide a basis on which to develop site specific methodology to mitigate damage and to repair drain tiles affected by construction of the Project. A typical right-of-way layout and typical orientation for crossing drain tiles is provided in Detail 25. Typical header and main crossovers are provided in Details 26 and 27. Actual measures will be developed based on site-specific information unique to specific installations. However, all work will be conducted in accordance with applicable permits.

5.2 Identification and Classification of Drain Tile Systems

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

5.2.1 Publicly Owned Drain Tiles

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

5.2.2 Privately Owned Drain Tiles

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

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5.3 Mitigation of Damage to Drain Tile Systems

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

5.3.1 Non-interference with Drain Tile

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

5.3.2 Non-disturbance of Drain Tile Mains

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

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

5.3.3 Relocation or Replacement of Existing Drain Tiles Prior to Construction

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

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

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5.3.4 Future Drain Tiles/Systems

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

5.3.5 Other Mitigation Measures

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

- not removing topsoil from the working side of the construction right-of-way to prevent crushing of drain tile by heavy equipment;
- spreading ditch and spoil side topsoil (not subsoil) over the working side to provide additional soil depth to protect existing drain tiles;
- restricting the work of the pipe lower in crew if ground conditions are too wet to adequately support the heavy equipment;
- limiting travel of heavy equipment the working lane of the construction right-of-way where possible;
- limiting travel of heavy equipment to one pass over the drain tile per work crew where possible; and
- removing and replacing topsoil during drain tile replacement should tile be crushed on the working side of the right-of-way.

5.4 Responsibility for Repair of Drain Tile Systems

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

5.4.1 Local Drain Tile Contractor Repair

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

5.4.2 Pipeline Contractor Repair

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

5.4.3 Landowner/Tenant Repair

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

5.5 Drain Tile Repairs

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

5.5.1 Temporary Repairs During Construction

Drain tiles damaged or cut during the excavation of the trench shall be marked with a lath and ribbon in the spoil bank. Care shall be taken to locate markers where the chance of disturbance shall be minimized and a written record maintained of each drain tile crossing. A work crew following the pipeline trench crew shall complete a temporary repair to allow continuing flow. Detail 28, Temporary Drain Tile Repair, depicts the materials and installation procedure to complete the temporary repair. If a drain tile line shall not be temporarily repaired, the open ends of the drain tile shall be screened to prevent entry of foreign materials and small animals.

5.5.2 Permanent Repairs

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

5.5.2.1 Ditch Line Only Repairs

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

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

5.5.2.2 Ditch Line and Temporary Work Space Repairs

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

5.6 Inspection/Acceptance of Drain Tile Repairs

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

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

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

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

6.0 WETLAND CROSSINGS

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6.1 General

~~Aboveground facilities shall not be located in a wetland, except where the location of such facilities outside of wetlands would preclude compliance with US Department of Transportation pipeline safety regulations.~~

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

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

~~A dry wetland is defined typically has groundwater level some depth below the surface. Trench excavations typically are stable and normal in Section 6.5.1. In these wetlands, equipment width. Equipment can traverse the wetland without the support of mats or timber riprap.~~

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

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

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

6.2 Easement and Workspace

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

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

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

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

6.3 Vehicle Access and Equipment Crossing

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

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

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

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

6.4 Temporary Erosion and Sediment Control

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

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

6.5 Wetland Crossing Procedures

The following general mitigative procedures shall be followed by the Contractor in all wetlands unless otherwise approved or directed by Keystone based on site-

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specific conditions. All work shall be conducted in accordance with applicable permits.

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

Specific procedures for each type of wetland crossing method are listed below and shall be designated on the construction drawings but may be modified

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depending on site conditions at the time of construction. All work shall be conducted in accordance with applicable permits.

6.5.1 Dry Wetland Crossing Method

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

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

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

6.5.2 Standard Wetland Crossing Method

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

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

Procedures unique to standard wetlands include:

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

6.5.3 Flooded Push/Pull Wetland Crossing Method

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

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

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

6.6 Restoration and Reclamation

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

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

~~In the absence of detailed revegetation plans or until the appropriate seeding season for permanent wetland vegetation in standard wetlands, the Contractor shall apply a temporary cover crop of annual ryegrass or oats on the construction right-of-way at a rate adequate for germination and ground cover unless standing water is present. The Contractor shall apply the temporary cover crop during final clean up. For farmed wetlands, the Contractor shall apply seeding requirements for agricultural lands or as required by the landowner.~~

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

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

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For FWS easement wetlands, topographic surveys will be conducted prior to construction through the wetland. Sediment barriers will be installed at FWS easement wetlands and to protect wetlands adjacent to the right-of-way where determined appropriate by the environmental inspector based on field conditions. During restoration of the FWS wetlands, final grades must be restored to within 0.1 foot of original elevations.

7.0 WATERBODIES AND RIPARIAN AREAS

7.1 General

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

Waterbody includes any areas delineated as jurisdictional natural or artificial stream, river, or drainage with perceptible flow at the time of crossing, and other permanent waterbodies such as ponds and lakes:

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

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

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

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

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overnight shall be at least 100 feet from a watercourse or wetland, if possible. Equipment shall not be washed in streams or wetlands.

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

Keystone may allow modification of the following specifications as necessary to accommodate specific situations or procedures. Any modifications must comply with all applicable regulations and permits. Keystone will complete site-specific crossing plans for certain waterbody crossings if required by the applicable regulatory agencies during federal or state permitting processes.

7.2 Easement and Work Space

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

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

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

7.3 Vehicle Access and Equipment Crossings

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

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

Equipment crossings shall be perpendicular to drainage bottoms wherever possible.

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

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

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

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

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

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

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

7.4 Waterbody Crossing Methods

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

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

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

7.4.1 Non-flowing Open Cut Crossing Method

The Contractor shall utilize the Non-flowing Open Cut Crossing Method (Detail 11) for all waterbody crossings (ditches, gullies, drains, swales, etc.) with no perceptible flow at the time of construction. Should site conditions change and the waterbody is flowing at the time of construction, the Contractor shall install the crossing utilizing the Flowing Open Cut Crossing Method (Detail 12) unless otherwise approved by Keystone.

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

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

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

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

7.4.3 Flowing Stream Crossing – Dry Flume Method

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

- Flume pipe shall be installed after blasting (if necessary), but before any trenching.
- Sand bag, sand bag and plastic sheeting diversion structure, or equivalent shall be used to develop an effective seal and to divert stream flow through the flume pipe (some modifications to the stream bottom may be required in order to achieve an effective seal).
- Flume pipe(s) shall be aligned to prevent bank erosion and streambed scour.

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- Flume pipe shall not be removed during trenching, pipe laying, or backfilling activities, or initial streambed restoration efforts.
- All flume pipes and dams that are not also part of the equipment bridge shall be removed as soon as final clean up of the stream bed and bank is complete.

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

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

- sufficient pumps to maintain 1.5 times the flow present in the stream at the time of construction;
- at least one back up pump available on site;
- dams constructed with materials that prevent sediment and other pollutants from entering the waterbody (e.g., sandbags or clean gravel with plastic liner);
- screen pump intakes installed;
- streambed scour prevented at pump discharge; and
- dam and pumps shall be monitored to ensure proper operation throughout the waterbody crossing.

7.4.5 Horizontal Directional Drill Crossings

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

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

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

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

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7.4.6 Horizontal Bore Crossings

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

7.5 Clearing

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

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

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

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

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

7.6 Grading

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

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

7.7 Temporary Erosion and Sediment Control

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

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

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

7.8 Trenching

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

All equipment and materials shall be on site before trenching in the active channel of all minor waterbodies containing state-designated fisheries, and in intermediate and major waterbodies. All activities shall proceed in an orderly manner without delays until the trench is backfilled and the stream banks stabilized. The Contractor shall not begin in-stream activity until the in-stream pipe section is complete and ready to be installed in the waterbody.

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

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

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

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

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

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7.9 Pipe Installation

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

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

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

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

The Contractor shall provide sufficient approved lifting equipment to perform the pipe installation in a safe and efficient manner. As the coated pipe is lowered in, it shall be prevented from swinging or rubbing against the sides of the trench. Only properly manufactured slings, belts, and cradles suitable for handling coated pipe shall be used. All pipes shall be inspected for coating flaws and/or damage as it is being lowered into the trench. Any damage to the pipe or coating shall be repaired.

7.10 Backfilling

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

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

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

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

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

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

7.11 Stabilization and Restoration of Stream Banks and Slopes

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

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

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

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

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

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

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

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

8.0 HYDROSTATIC TESTING

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8.1 Testing Equipment Location

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

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

8.2 Test Water Source and Discharge Locations

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

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

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

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

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

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

CONSTRUCTION MITIGATION AND RECLAMATION PLAN

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

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

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

Potential hydrostatic water sources for the Steele City, Gulf Coast segments, and Houston Lateral are as follows:

Table 1 – Steele City Segment Drainage Basins and Water Sources

Drainage Basins & Water Sources	Location Where Pipeline Crosses Water Source (Mile Post)
Frenchman Creek	25
Willow Creek	40
Milk River	82
Missouri River	88
Redwater River	146
Yellowstone River	195
Drainage Basins & Water Sources	Location Where Pipeline Crosses Water Source (Mile Post)
Cabin Creek	204
Sandstone Creek	244
Little Beaver Creek	262
Boxelder Creek	284
Little Missouri River	291
South Fork Grand River	347
Clarks Fork Creek	323
North Fork Moreau River	356
South Fork Moreau River	364

CONSTRUCTION MITIGATION AND RECLAMATION PLAN

Cheyenne River	425
Bad River	480
Dry Creek	493
White River	535
Cottonwood Creek	541
Buffalo Creek	594
Keya Paha River	598
Spring Creek	602
Niobrara River	613
North Branch Elkhorn River	627
Elkhorn River	628
South Fork Elkhorn River	658
Cedar River	695
Loup River	738
Prairie Creek	745
Platte River	754
Big Blue River	763
Beaver Creek	778
West Fork Big Blue River	787
Turkey Creek	807
South Fork Swan Creek	824

Table 2 – Gulf Coast Segment Drainage Basins and Water Sources

Drainage Basins & Water Sources	Location Where Pipeline Crosses Water Source (Mile Post)
North Canadian River	39
Canadian River	75
Red River	155
Bois D'Arc Creek	164
North Sulphur River	190
South Sulphur River	200
Sabine River	262
East Fork Angelina	312
Angelina	332

CONSTRUCTION MITIGATION AND RECLAMATION PLAN

Neches River	366
Menard-Creek	393
Hillebrandt-Bayou	469

Table 3 – Houston Lateral Segment Drainage Basins and Water Sources

Drainage Basins & Water Sources	Location Where Pipeline Crosses Water Source (Mile Post)
Trinity River	22
San Jacinto River	44

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

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

8.3 Filling the Pipeline

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

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

During water-filling of the pipeline, the Contractor shall employ fill pumps capable of injecting water into the pipeline at a maximum rate of approximately 0.7 to 1.0

CONSTRUCTION MITIGATION AND RECLAMATION PLAN

mile per hour, except as limited by permits or the maintenance of adequate flow rates in the waterbody, as follows:

<u>Nominal OD</u>	<u>Max GPM</u>
36"	3000

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

~~In waterbodies where sensitive species are located, Keystone will generally avoid withdrawal of hydrostatic test water until after August 1, unless specific approval is obtained in advance from the appropriate regulatory or resource agencies. In areas where zebra mussels are known to occur, all equipment used during the hydrostatic test withdrawal and discharge will be thoroughly cleaned before being used at subsequent hydrostatic test locations to prevent the transfer of zebra mussels or their larvae (veligers) to new locations.~~

8.4 Dewatering the Pipeline

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

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

The Contractor shall not discharge into state-designated exceptional value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate federal, state, and local permitting agencies grant written permission. To avoid impacts from introduced species, no inter-basin transfers (discharge) of hydrostatic test water will occur.

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

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

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

CONSTRUCTION MITIGATION AND RECLAMATION PLAN

Dewatering lines shall be of sufficient strength and be securely supported and tied down at the discharge end to prevent whipping during this operation.

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

8.4.1 Splash Pup

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

8.4.2 Splash Plate

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

8.4.3 Plastic Liner

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

8.4.4 Straw Bale Dewatering Structure

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

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Typical Drawing Index

Detail 1	Typical Silt Fence Barrier
Detail 2	Typical Straw or Hay Bail Barrier
Detail 3	Temporary/Permanent Slope Breaker Detail (Water Bars)
Detail 4	Erosion Control Matting Installation
Detail 5	Typical Dewatering Filter Bag
Detail 6	Typical Straw Bale Dewatering Structure
Detail 7	Typical Permanent Trench Breakers
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Detail 9	Standard Wetland Crossing Method
Detail 10	Push/Pull Wetland Crossing Method
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Detail 67	Topsoil Conservation Ditch & Spoil Stripping Triple Ditch
Detail 67A	Topsoil Conservation Ditch & Spoil Stripping Triple Ditch

Details 12A, 16A, 18A, 22, 67 & 67A are new additions

NOTE: The following typical drawings are included for ease of reference.
 • Details 1 through 31 can be found in the Construction Mitigation and Reclamation Plan

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



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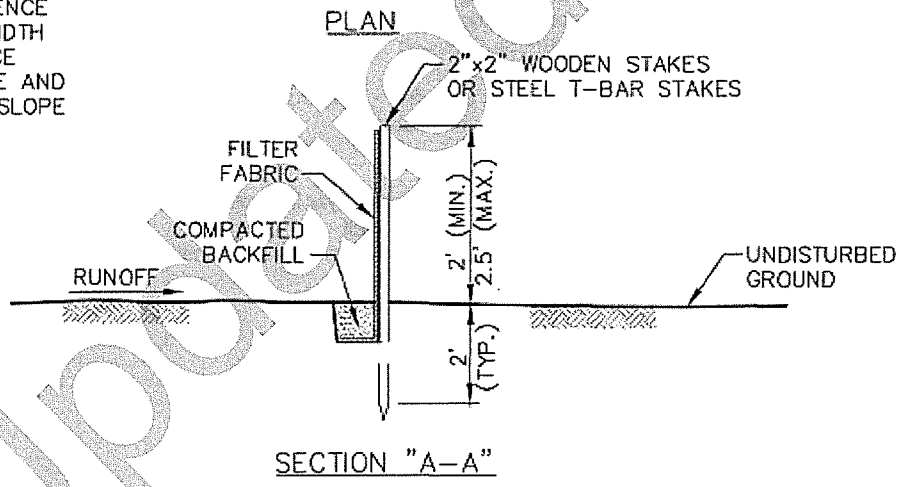
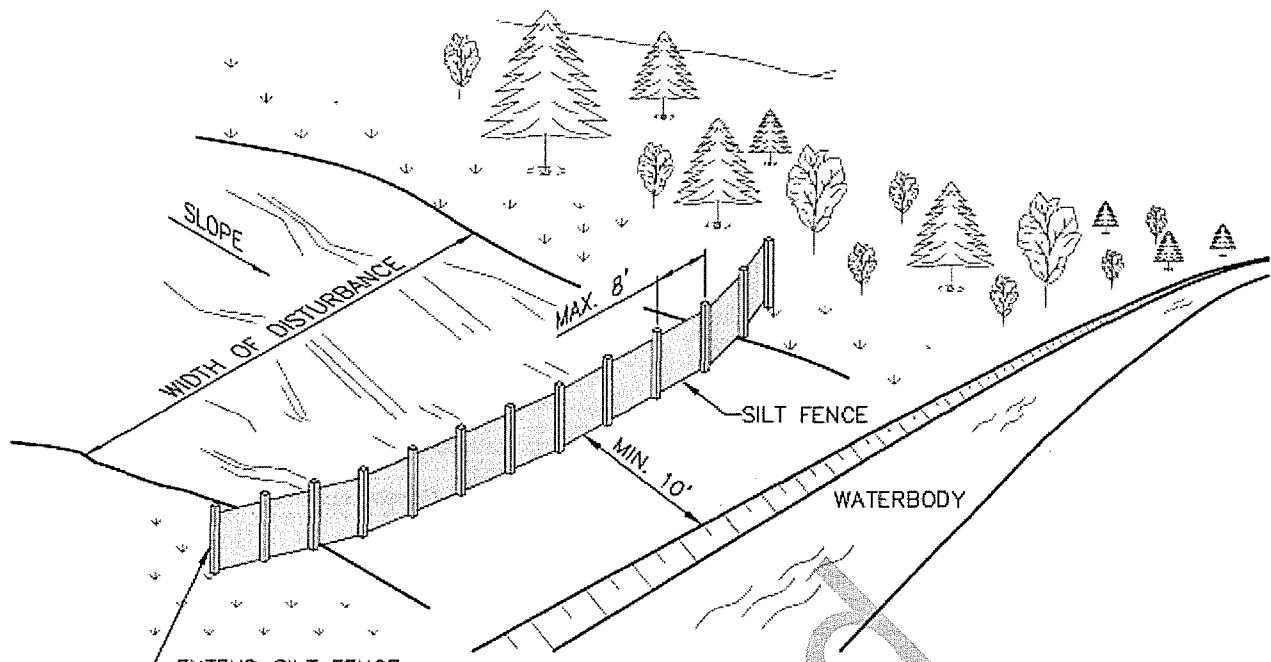
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FIA # 4359	CHAINAGE:	DISCIPLINE # 03	
TITLE DETAIL INDEX			
SCALE N.T.S.	DWG No 4359-03-ML-00-700	REV 03	

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



NOTES:

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

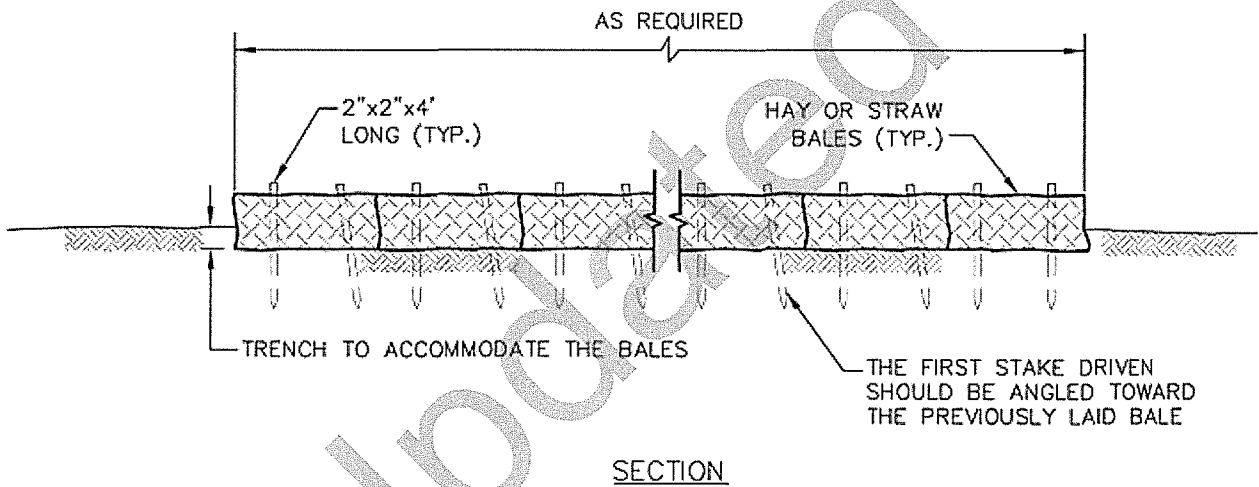
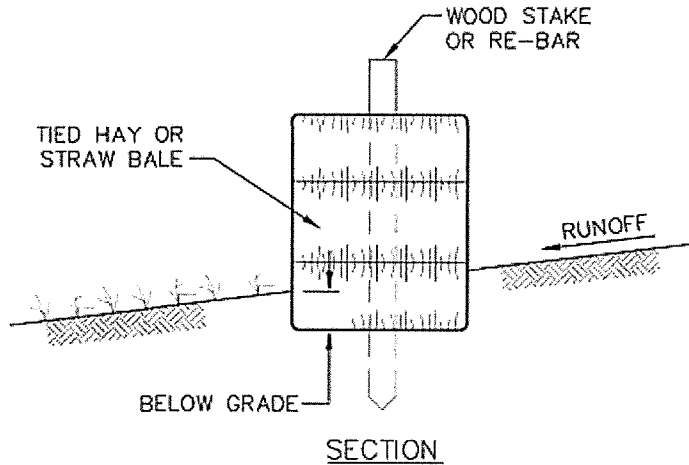

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JMP NAME		FIA # 4359	CHAINAGE:	DISCIPLINE # 03
2010-10-21 DATE		TITLE		
CHECKED BY: WSF		DETAIL 1 TYPICAL SILT FENCE BARRIER		
DESIGN CHECKER: RW		SCALE N.T.S.	DWG No 4359-03-ML-05-701	REV 03

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



NOTES:

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

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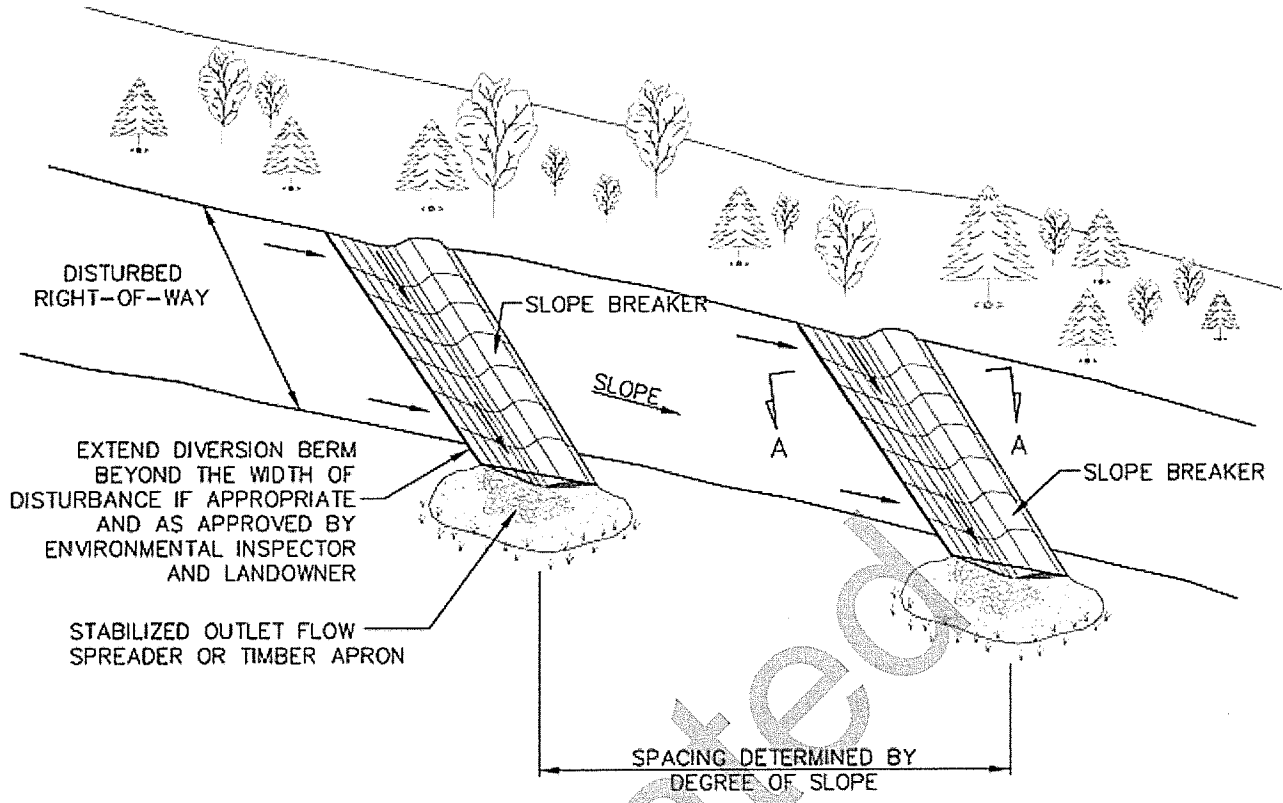
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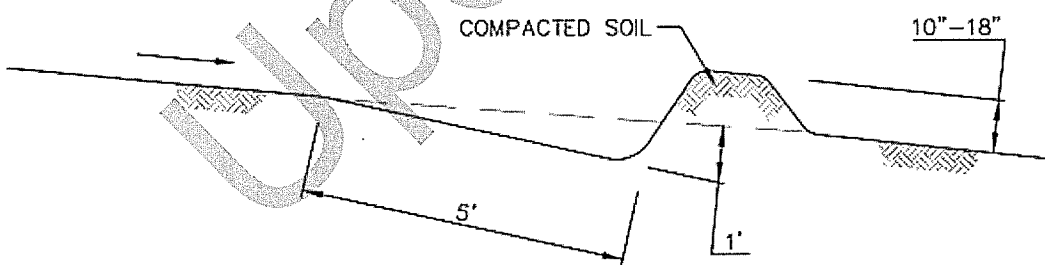
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FIA # 4359	CHAINAGE:	DISCIPLINE # 03	
TITLE			
DETAIL 2 TYPICAL STRAW OR HAY BALE BARRIER			
SCALE N.T.S.	DWG No 4359-03-ML-05-702	REV 03	

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



PLAN



NOTES:

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

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

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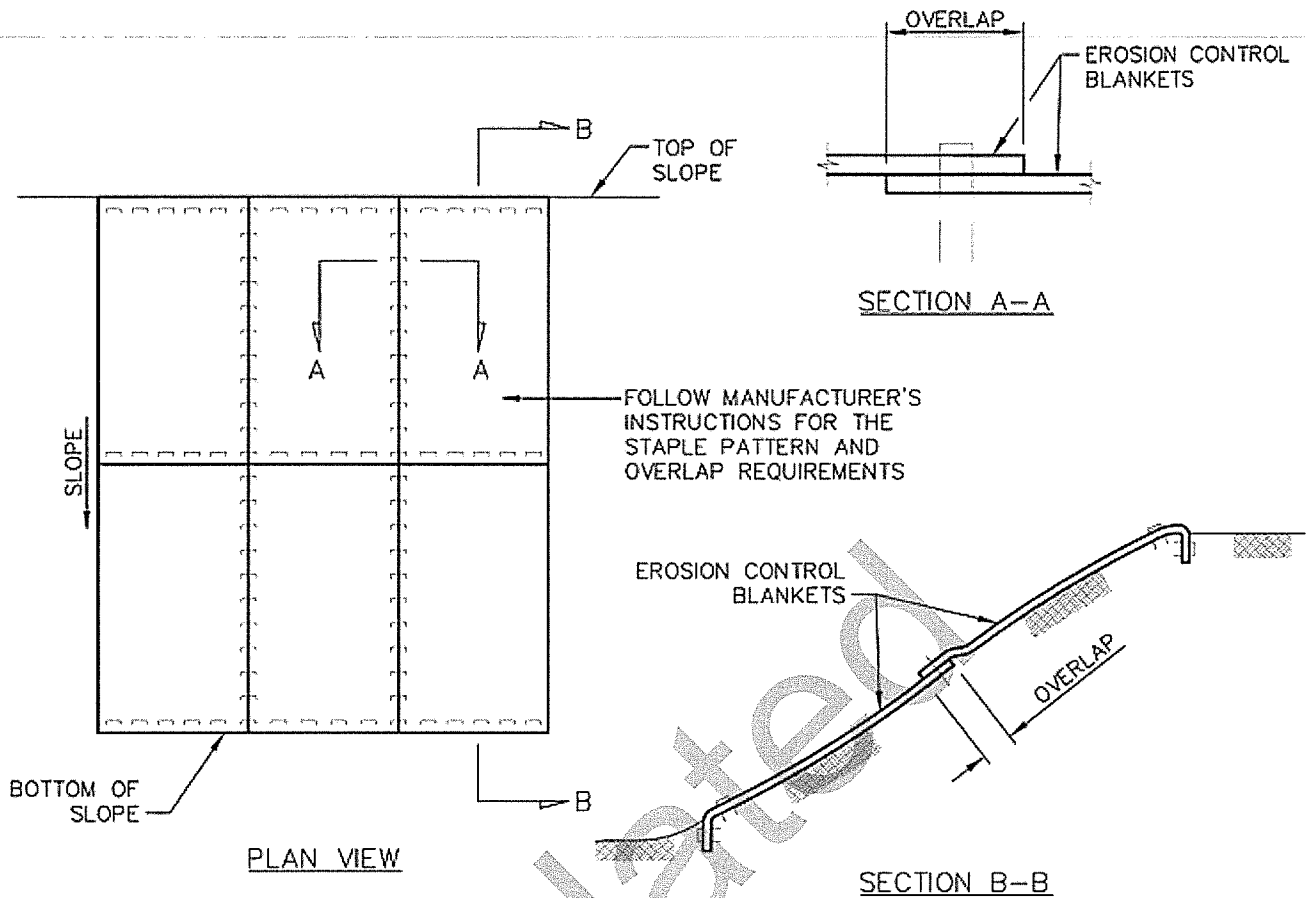
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FIA # 4359	CHAINAGE:	DISCIPLINE # 03
TITLE DETAIL 3 TEMPORARY/PERMANENT SLOPE BREAKER DETAIL (WATER BARS)		
SCALE N.T.S.	DWG No 4359-03-ML-05-703	REV 03

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NOTES:

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

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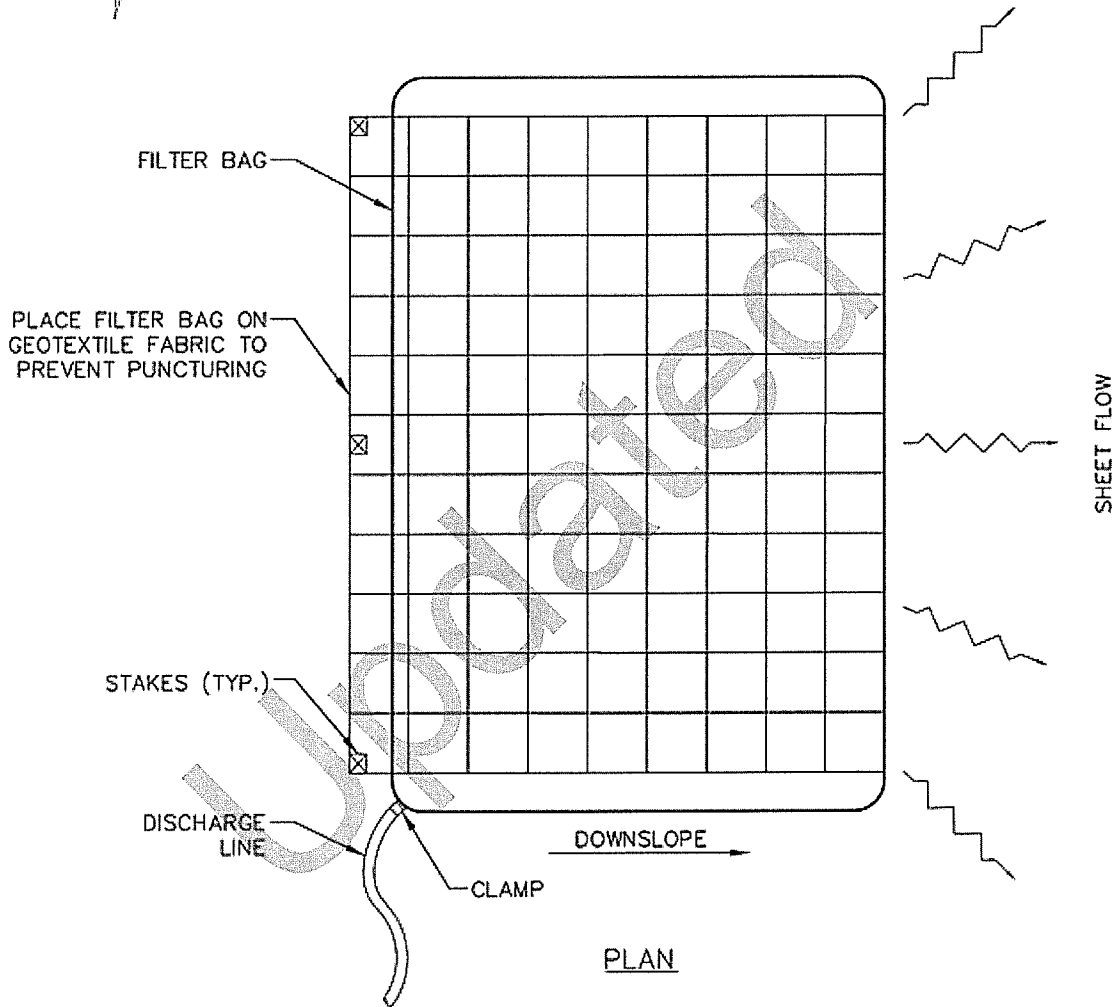
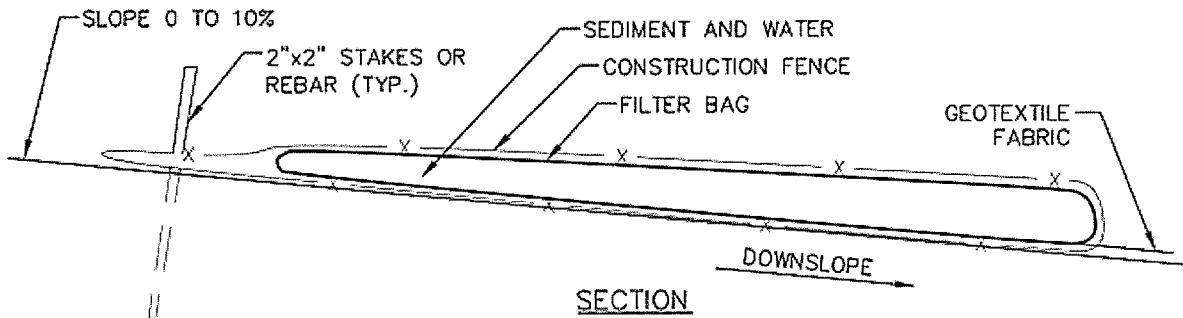

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TITLE			
DETAIL 4 EROSION CONTROL MATTING INSTALLATION			
SCALE	N.T.S.	DWG No	4359-03-ML-05-704
			REV 03

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NOTES:

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

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

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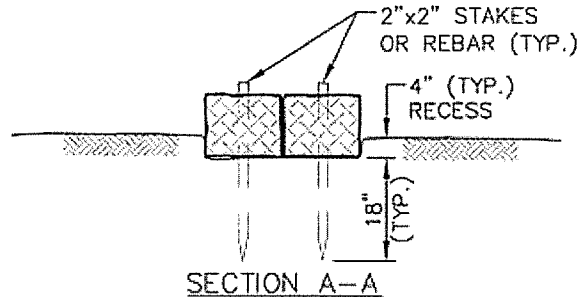
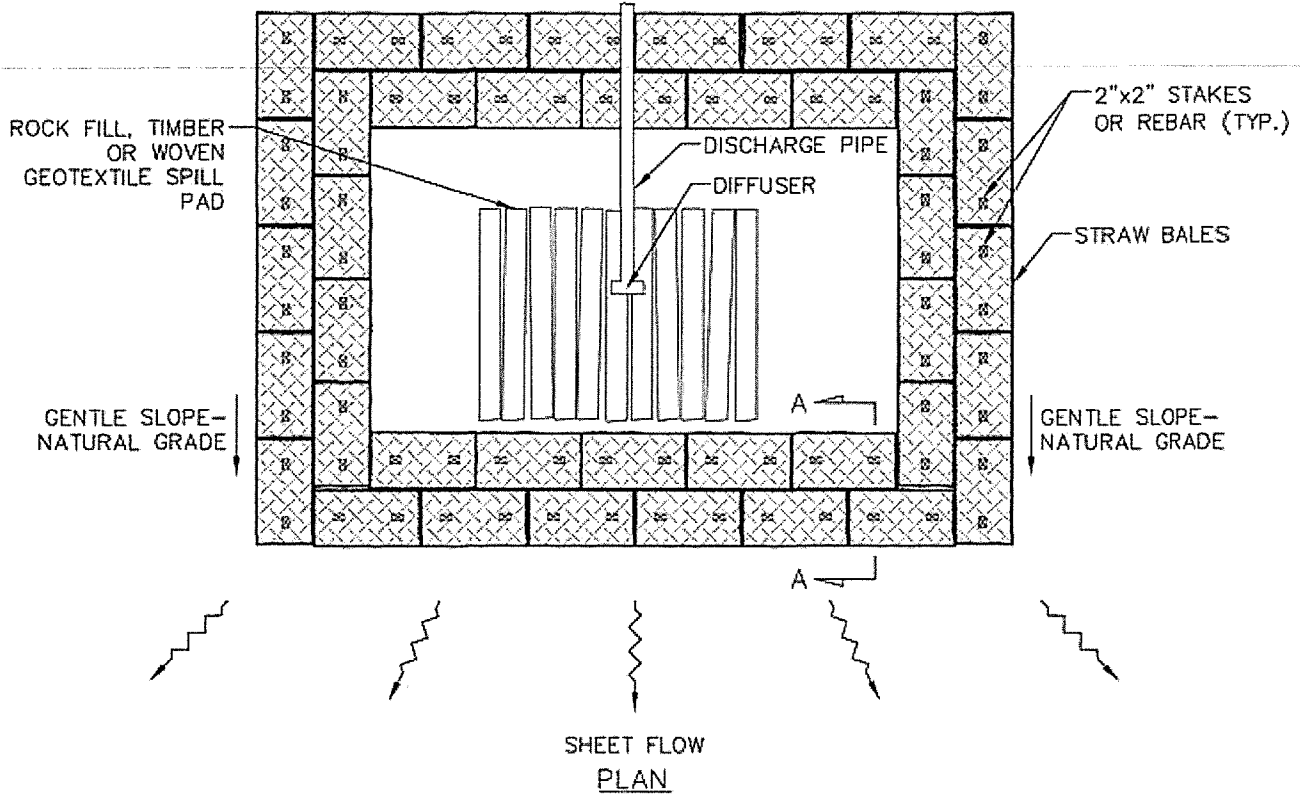
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KEYSTONE XL PROJECT

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TITLE DETAIL 5 TYPICAL DEWATERING FILTER BAG		
SCALE N.T.S.	DWG No 4359-03-ML-05-705	REV 02

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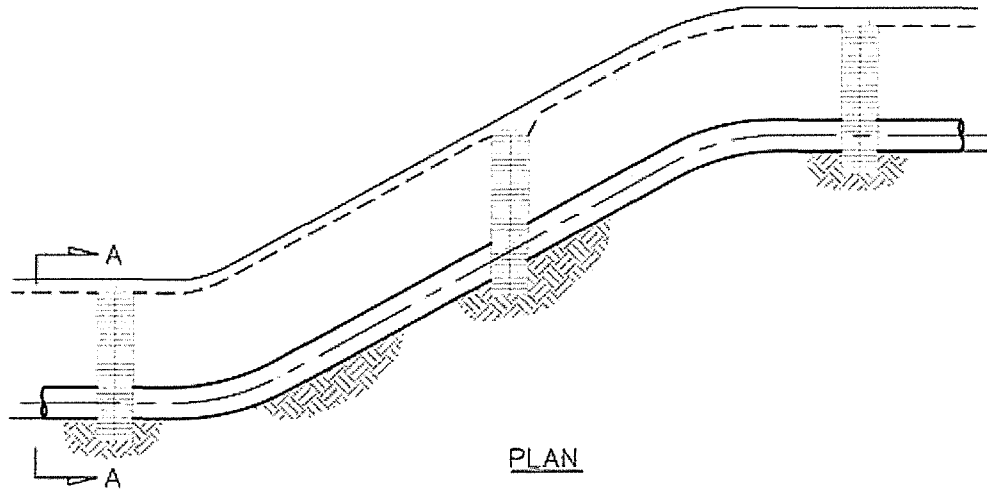
NOTES:

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

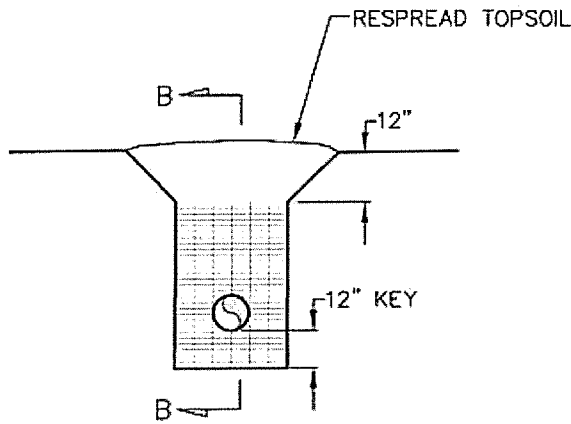
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			DETAIL 6 TYPICAL STRAW BALE DEWATERING STRUCTURE		
		SCALE N.T.S.	DWG No 4359-03-ML-05-706	REV 03	

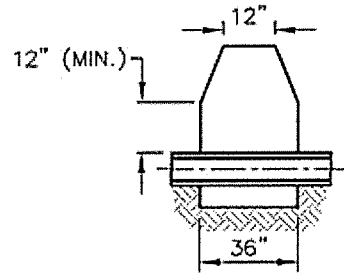
THESE ARE TYPICAL DRAWINGS; ACTUAL SITE CONDITIONS MAY VARY FROM THE SITE GRAPHICALLY REPRESENTED.



PLAN



SECTION A-A



SECTION B-B

NOTES:

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

REVISIONS [01] 2008-11-04 UPDATED DRAWING NOTES [02] 2010-10-11 UPDATED PLAN DETAIL

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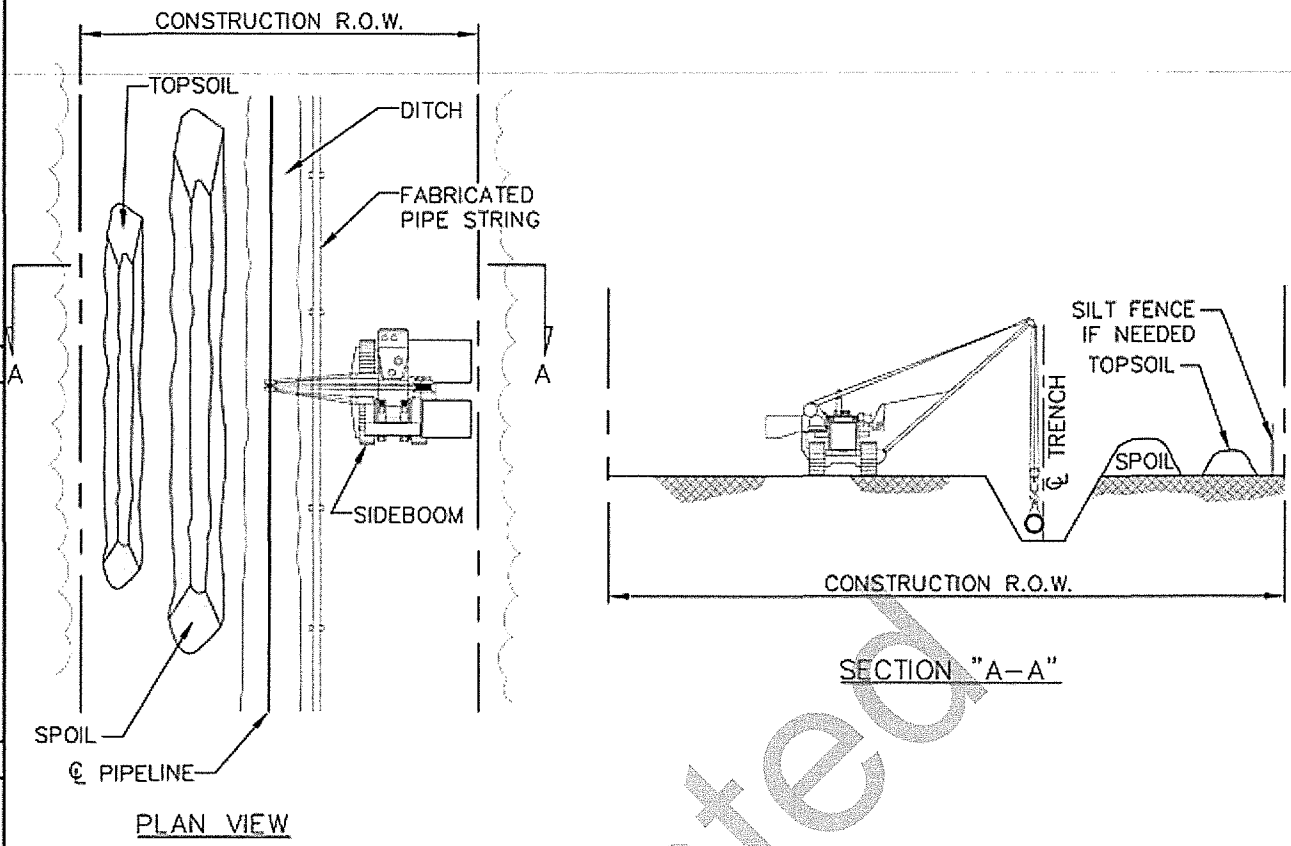
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DESIGNER:		KEYSTONE XL PROJECT	
JMP	2010-10-21	FIA # 4359	CHAINAGE:
NAME	DATE	DISCIPLINE # 03	
CHECKED BY:		TITLE	
WSF	RW	DETAIL 7	
DESIGN CHECKER:		TYPICAL PERMANENT TRENCH BREAKER	
SCALE N.T.S.		DWG No 4359-03-ML-05-707	REV 02

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



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

CONSTRUCTION PROCEDURES:

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

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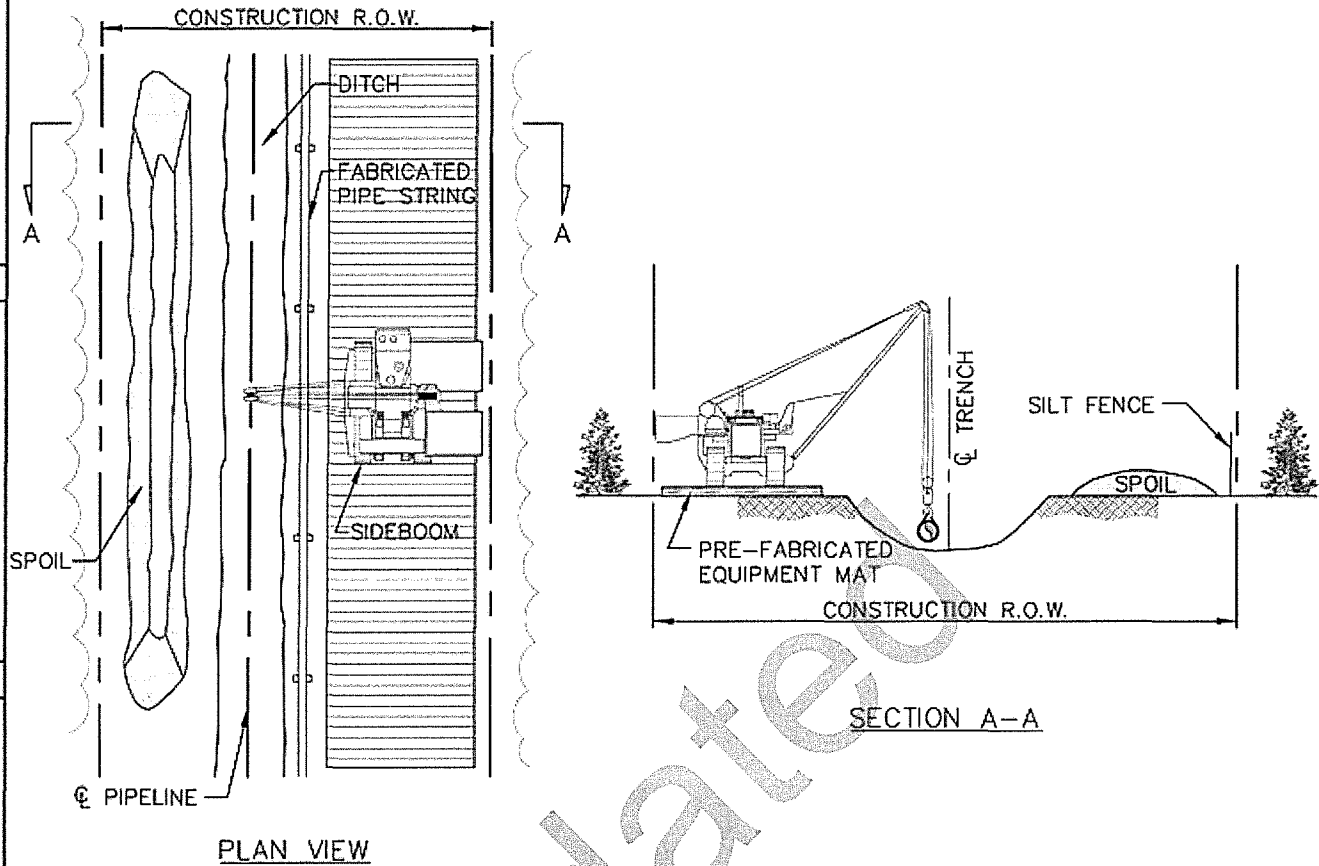
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JMP	2010-10-21
NAME	DATE
CHECKED BY:	DESIGN CHECKER:
WSF	RW P7100

KEYSTONE XL PROJECT		
FIA # 4359	CHAINAGE:	DISCIPLINE # 03
TITLE		
DETAIL 8 "DRY" WETLAND CROSSING METHOD		
SCALE N.T.S.	DWG No 4359-03-ML-03-701	REV 03

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



PLAN VIEW

SECTION A-A

CONSTRUCTION PROCEDURES:

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

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

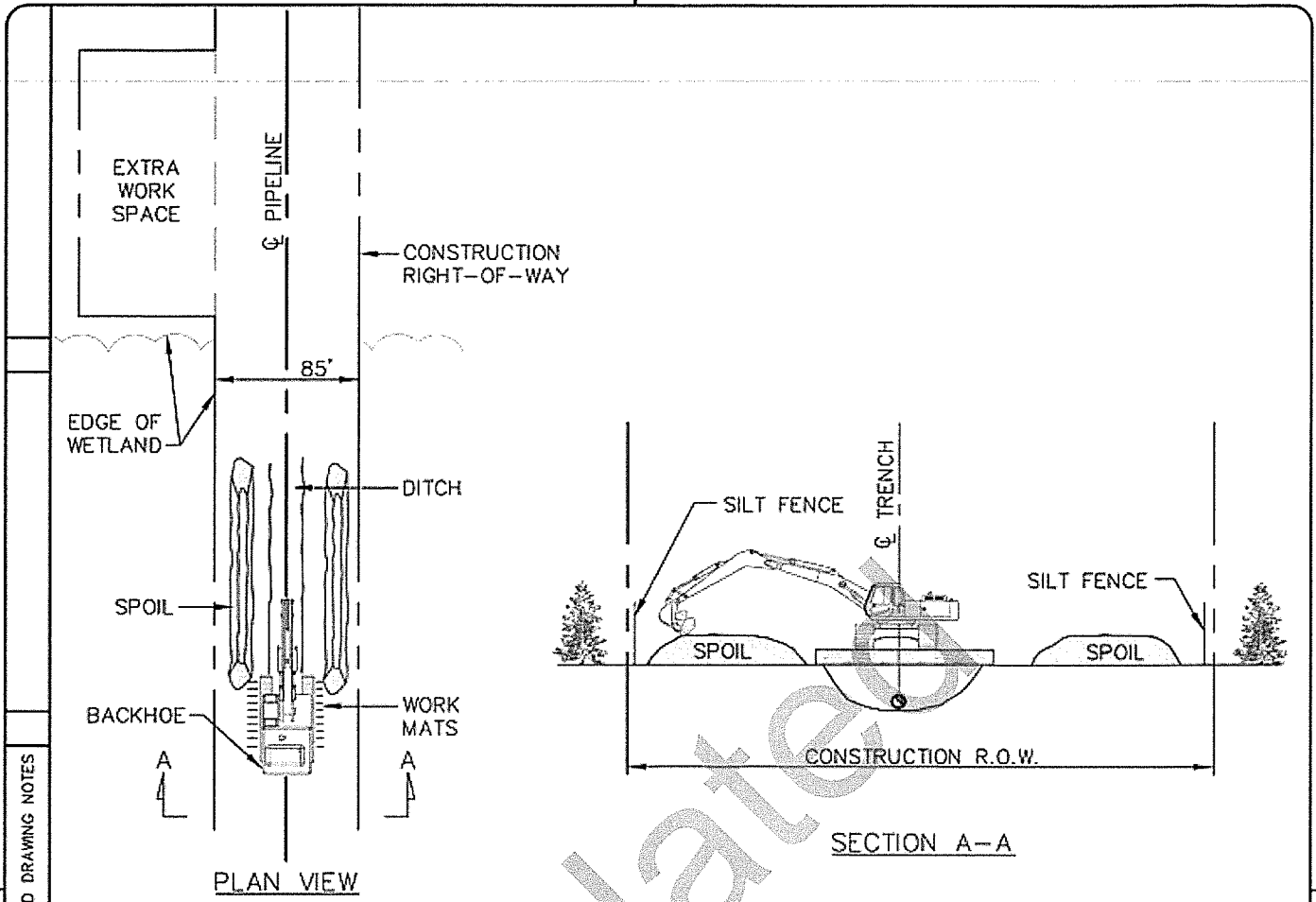

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	P2100

KEYSTONE XL PROJECT			
FIA # 4359	CHAINAGE:	DISCIPLINE # 03	
TITLE			
DETAIL 9 STANDARD WETLAND CROSSING METHOD			
SCALE N.T.S.	DWG No 4359-03-ML-03-702	REV 02	

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



CONSTRUCTION PROCEDURES:

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

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

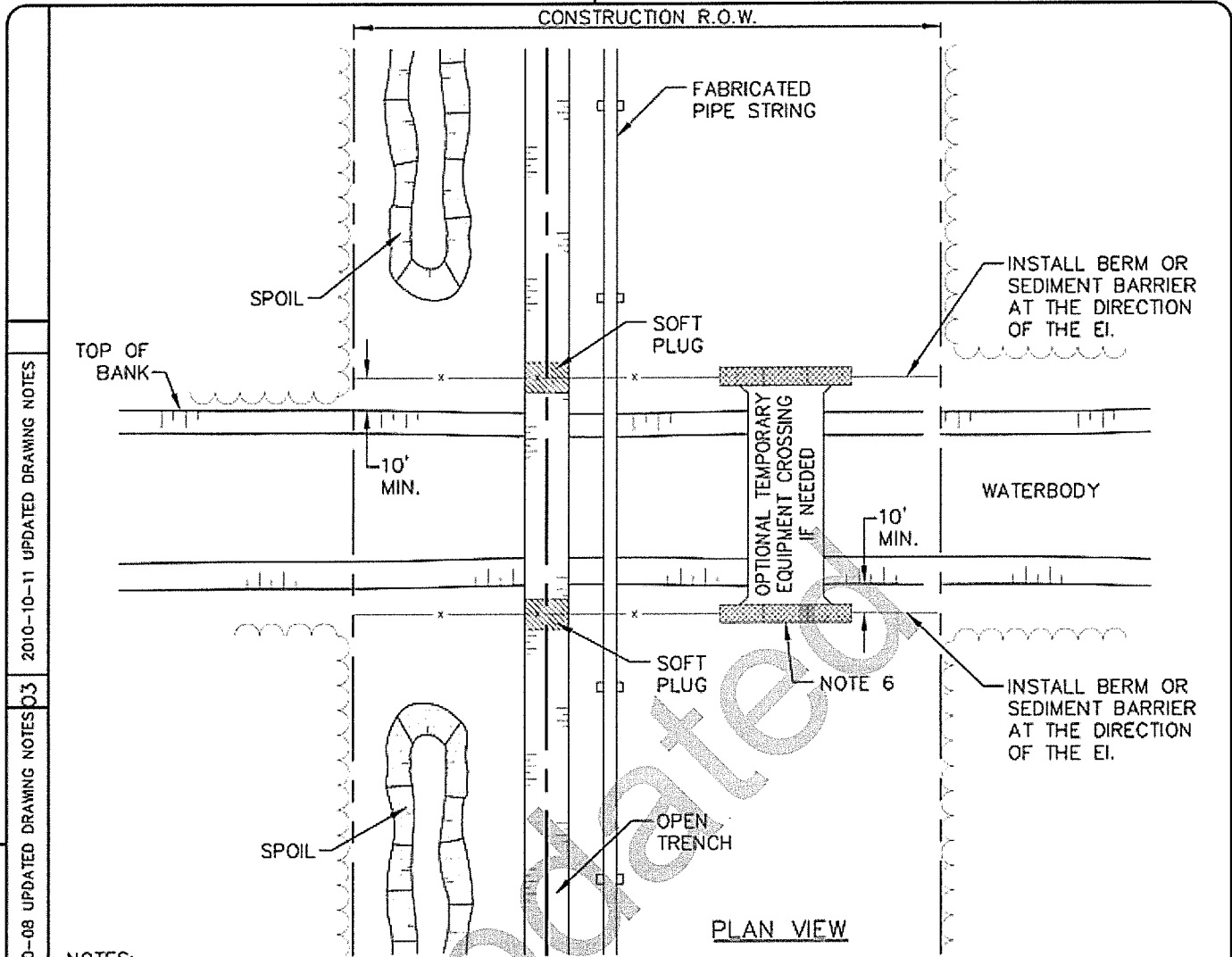

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KEYSTONE XL PROJECT		
FIA # 4359	CHAINAGE:	DISCIPLINE # 03
TITLE		
DETAIL 10 PUSH/PULL WETLAND CROSSING METHOD		
SCALE	DWG No	REV
N.T.S.	4359-03-ML-03-703	02

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



NOTES:

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

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

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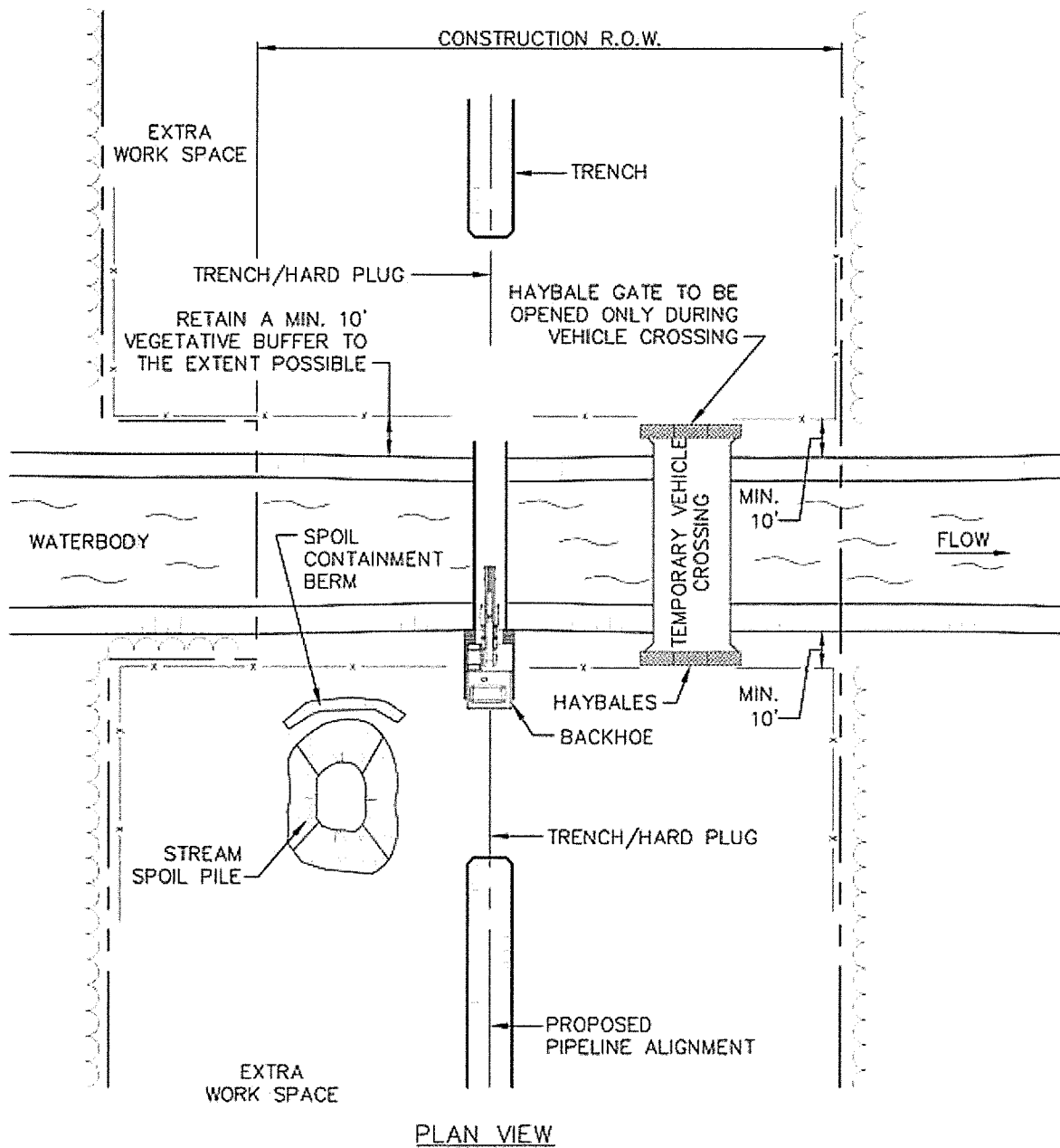
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KEYSTONE XL PROJECT		
FIA # 4359	CHAINAGE:	DISCIPLINE # 03
TITLE		
DETAIL 11 TYPICAL OPEN CUT WET CROSSING METHOD NON-FLOWING WATERBODY		
SCALE N.T.S.	DWG No 4359-03-ML-03-704	REV 03

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



02 2010-10-11 REMISED TITLE BLOCK

01 UPDATED DRAWING NOTES

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KEYSTONE XL PROJECT			
FIA # 4359	CHAINAGE:	DISCIPLINE # 03	
TITLE			
DETAIL 12 TYPICAL OPEN CUT WET CROSSING METHOD FLOWING WATERBODY			
SCALE	N.T.S.	DWG No	4359-03-ML-03-705
			REV 02


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

CONSTRUCTION PROCEDURES:

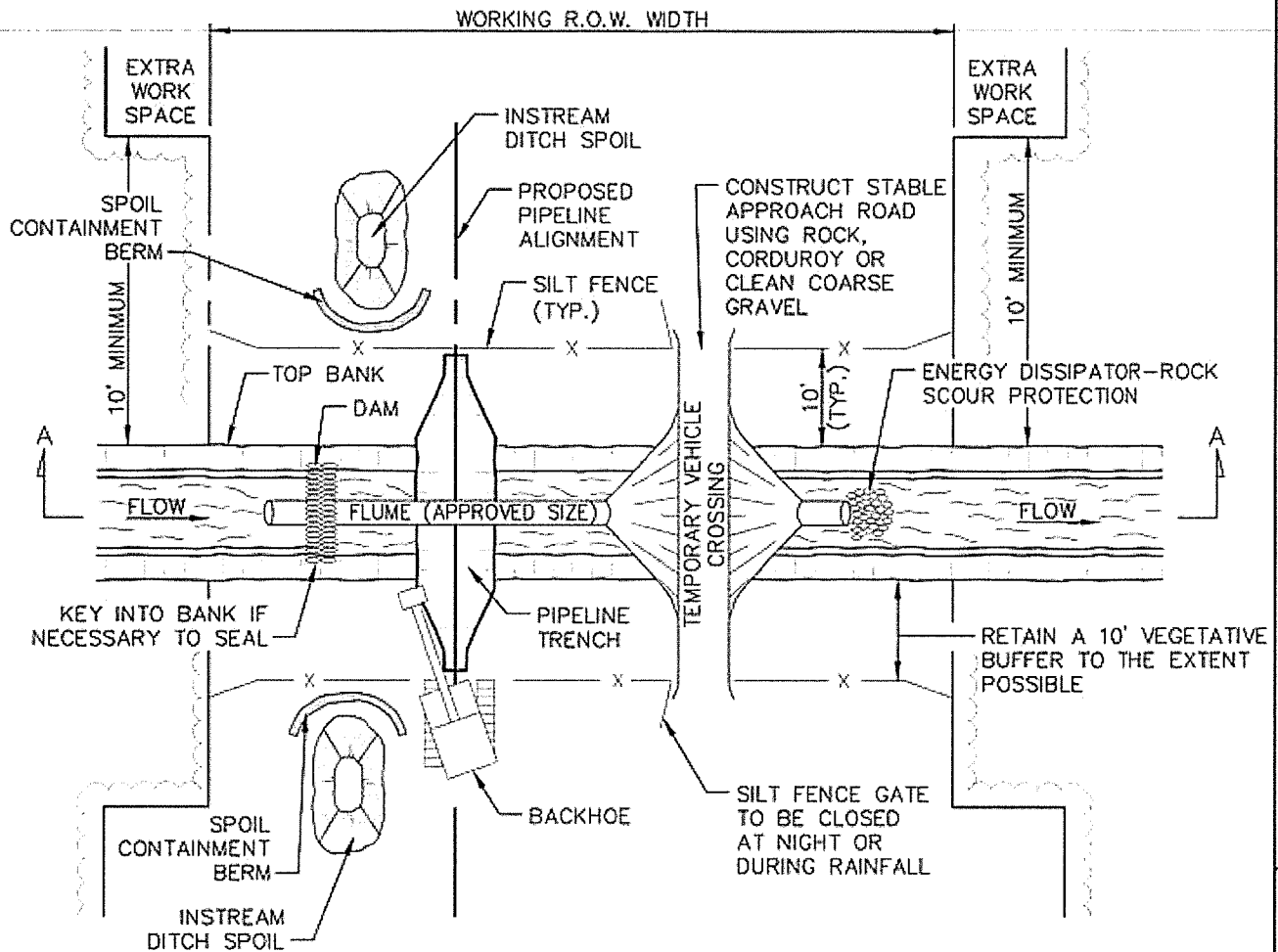
1. RIGHT-OF-WAY BOUNDARIES AND WORK SPACE LIMITS SHALL BE CLEARLY DELINEATED. STAGING FOR MAKEUP SHALL BE LOCATED A MINIMUM OF 10 FEET FROM WATERBODY.
2. CLEARING LIMITS WILL BE CLEARLY DELINEATED AND 10 FOOT VEGETATIVE BUFFER STRIP BETWEEN DISTURBED AREA AND THE WATERBODY SHALL BE MAINTAINED TO THE EXTENT POSSIBLE. ALL CLEARING SHALL BE MINIMIZED TO THE EXTENT POSSIBLE AND TO ONLY THAT NECESSARY FOR CONSTRUCTION. WOODY VEGETATION SHALL BE CUT AT GROUND LEVEL AND THE STUMPS/ROOTS LEFT IN PLACE TO THE EXTENT POSSIBLE.
3. TOPSOIL SHALL BE STRIPPED FROM THE DITCH LINE IN ALL WETLANDS RIPARIAN.
4. CONTRACTOR SHALL INSTALL SIGNS APPROXIMATELY 100 FEET MINIMUM FROM EACH WATERBODY AND WETLAND TO IDENTIFY THE HAZARDOUS MATERIALS EXCLUSION AREA.
5. EROSION AND SEDIMENT CONTROL
 - a. CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES, AS DEPICTED OR ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVILY SILT LADEN WATER ENTERS WATERBODY OR WETLAND.
 - b. NO HEAVILY SILT LADEN WATER SHALL BE DISCHARGED DIRECTLY OR INDIRECTLY INTO THE WATERBODY. ALL EROSION AND SEDIMENT CONTROL STRUCTURE LOCATIONS AS DEPICTED ARE APPROXIMATE AND MAY BE ADJUSTED AS DIRECTED BY THE COMPANY INSPECTOR TO SUIT ACTUAL SITE CONDITIONS. SILT FENCE OR STRAW BALE INSTALLATIONS SHALL INCLUDE REMOVABLE SECTIONS TO FACILITATE ACCESS DURING CONSTRUCTION.
 - c. SEDIMENT LADEN WATER FROM TRENCH DEWATERING SHALL BE DISCHARGED TO A WELL VEGETATED UPLAND AREA INTO A STRAW BALE DEWATERING STRUCTURE OR GEOTEXTILE FILTER BAG. SEDIMENT CONTROL STRUCTURES MUST BE IN PLACE AT ALL TIMES ACROSS THE DISTURBED CONSTRUCTION RIGHT-OF-WAY EXCEPT DURING EXCAVATION/INSTALLATION OF THE CROSSING PIPE.
 - d. SOFT DITCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE MAINLINE DITCH FROM THE WATERBODY CROSSING UNTIL THE WATER CROSSING IS INSTALLED AND BACKFILLED.
 - e. TRENCH BREAKERS ARE TO BE INSTALLED AT THE SAME SPACING AND IMMEDIATELY UPSLOPE OF PERMANENT SLOPE BREAKERS, OR AS DIRECTED BY THE COMPANY.
6. CONTRACTOR SHALL MAINTAIN HARD PLUGS IN THE DITCH AT THE WATERBODY UNTIL JUST PRIOR TO PIPE INSTALLATION. CONTRACTOR SHALL EXCAVATE TRENCH AND INSTALL PIPE AS EXPEDIENTLY AS PRACTICAL TO REDUCE THE DURATION OF WORK ACTIVITIES IN THE WATERBODY BED.
7. CONTRACTOR SHALL PLACE TRENCH SPOIL ONLY IN CERTIFICATED WORK SPACE AND A MINIMUM OF 10 FEET FROM THE WATERBODY BANKS TO PREVENT ENTRY OF SPOIL INTO THE WATERBODY. SPOIL SHALL BE CONTAINED AS NECESSARY USING EITHER A STRAW BALE BARRIER OR AN EARTH/ROCK BERM.
8. CONTRACTOR SHALL RESTORE THE WATERBODY AND BANKS TO APPROXIMATE PRE-CONSTRUCTION CONTOURS, UNLESS OTHERWISE APPROVED BY THE COMPANY. CONTRACTOR SHALL INSTALL PERMANENT EROSION AND SEDIMENT CONTROL STRUCTURES AS INDICATED. ANY MATERIALS PLACED IN THE WATERBODY TO FACILITATE CONSTRUCTION SHALL BE REMOVED DURING RESTORATION. BANKS SHALL BE STABILIZED AND TEMPORARY SEDIMENT BARRIERS INSTALLED AS SOON AS POSSIBLE AFTER CROSSING, BUT WITHIN 24 HOURS OF COMPLETING THE CROSSING. MAINTAIN A SILT FENCE OR STRAW BALE BARRIER ALONG THE WATERBODY AND WETLAND BOUNDARIES UNTIL VEGETATION IS ESTABLISHED IN ADJACENT DISTURBED AREAS.
9. VEHICLE CROSSING CAN BE CONSTRUCTED USING EITHER A FLUME CROSSING OR A TEMPORARY BRIDGE. VEHICLE CROSSING ONLY REQUIRED IF STREAM SUPPORTS A STATE DESIGNATED FISHERY.

2010-10-11 REVISED TITLE BLOCK

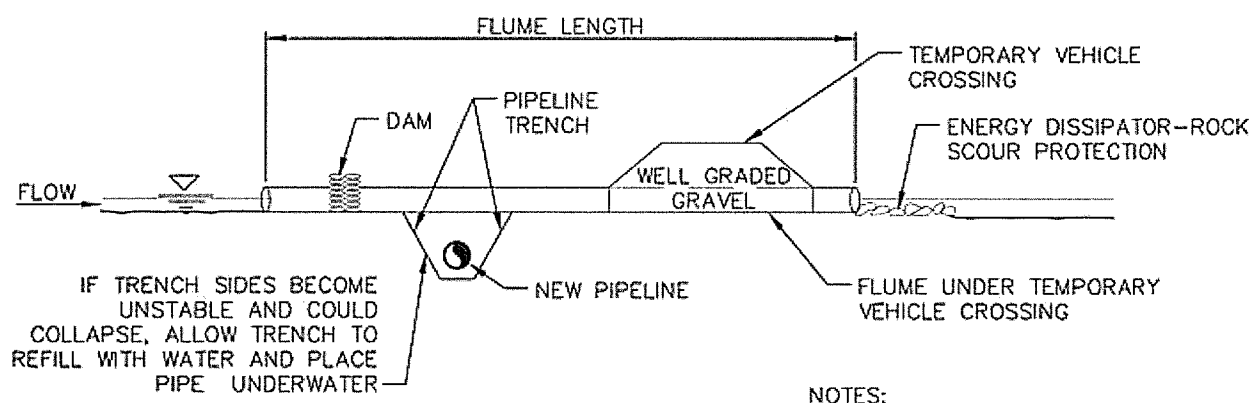
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	JMP <small>NAME</small>	2010-10-21 <small>DATE</small>	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE DETAIL 12A TYPICAL OPEN CUT WET CROSSING METHOD FLOWING WATERBODY - CONSTRUCTION PROCEDURES				
	CHECKED BY: WSF	DESIGN CHECKER: RW	SCALE N.T.S.	DWG No 4359-03-ML-03-706	REV 01

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



PLAN VIEW



SECTION A-A

NOTES:

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

REVISIONS 01 2010-10-11 REVISED TITLE BLOCK

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WSF	RW #7100

KEYSTONE XL PROJECT		
FIA # 4359	CHAINAGE:	DISCIPLINE # 03
TITLE		
DETAIL 13 TYPICAL DRY FLUME CROSSING METHOD		
SCALE	DWC No	REV
N.T.S.	4359-03-ML-03-707	01

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

CONSTRUCTION PROCEDURES:

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

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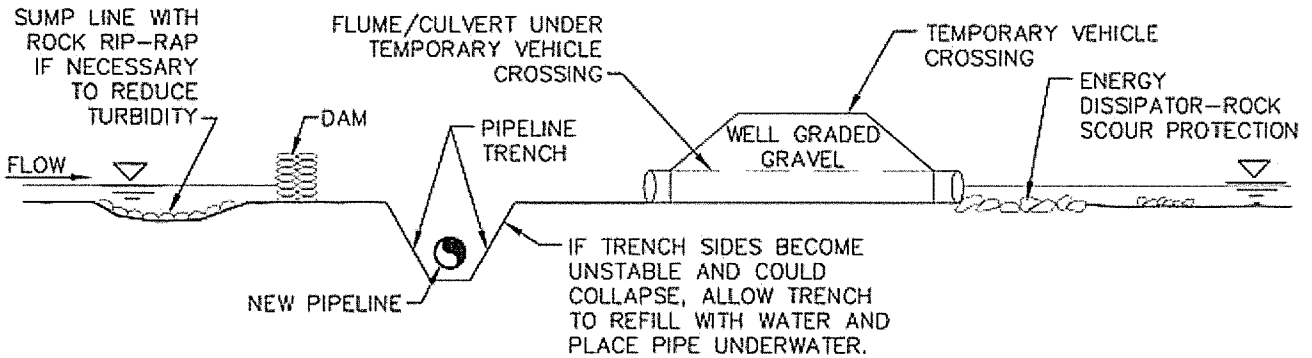
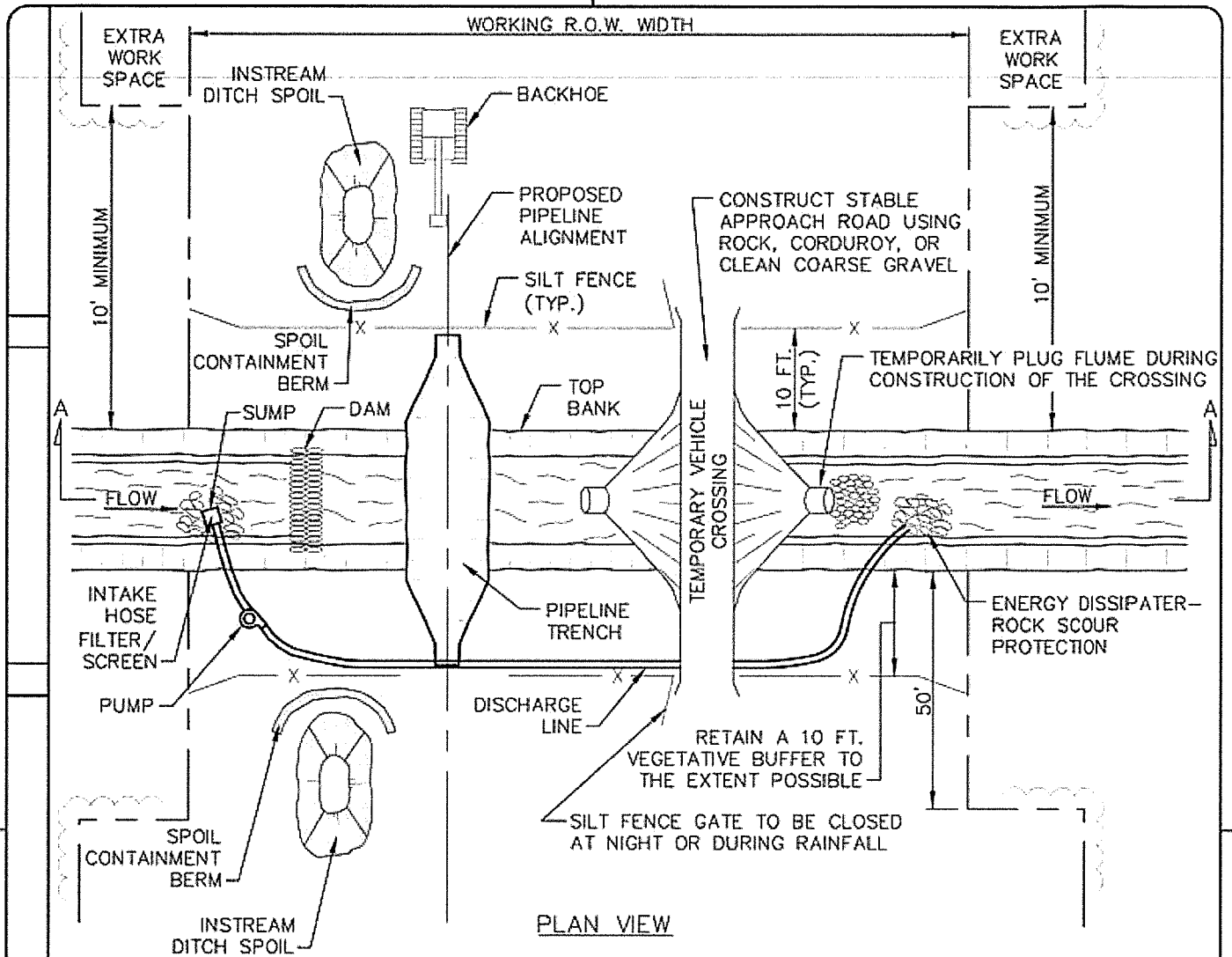


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KEYSTONE XL PROJECT			
FIA # 4359	CHAINAGE:	DISCIPLINE # 03	
TITLE			
DETAIL 13A TYPICAL DRY FLUME CROSSING METHOD - CONSTRUCTION PROCEDURES			
SCALE N.T.S.	DWG No 4359-03-ML-03-708	REV 02	

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



NOTES:

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

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	CHECKED BY: WSF	DESIGN CHECKER: RW P7100	FIA # 4359 CHAINAGE:	DISCIPLINE # 03
TITLE DETAIL 14 TYPICAL DAM AND PUMP CROSSING		SCALE N.T.S.	DWG No 4359-03-ML-03-709	REV 01

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

CONSTRUCTION PROCEDURES:

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

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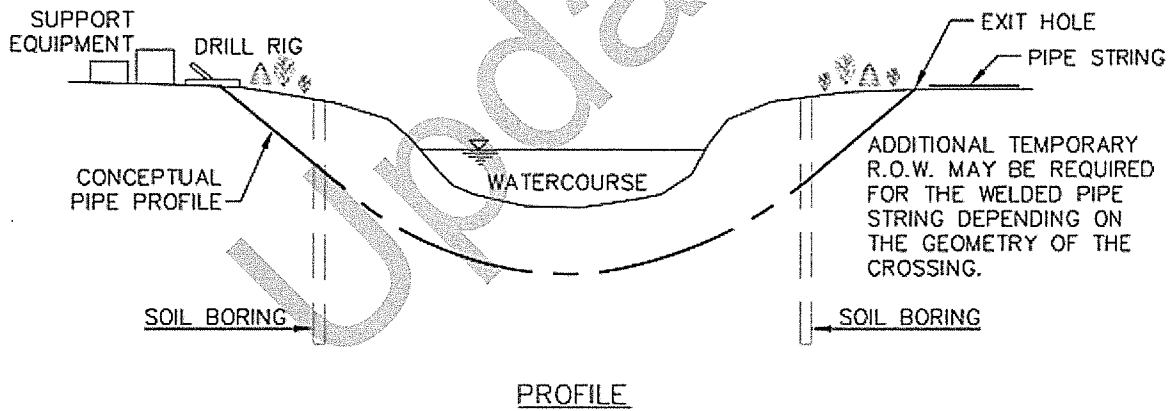
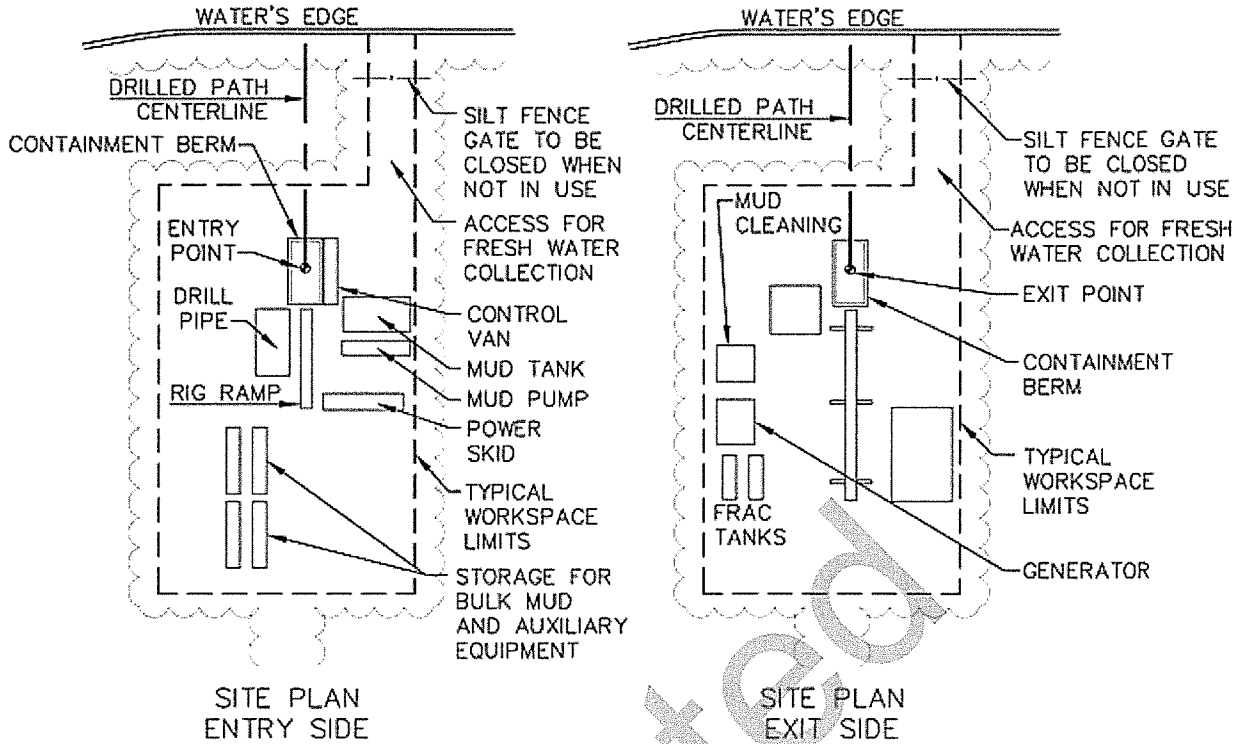


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KEYSTONE XL PROJECT			
FIA #	4359	CHAINAGE:	DISCIPLINE #
			03
TITLE			
DETAIL 14A			
TYPICAL DAM AND PUMP CROSSING -			
CONSTRUCTION PROCEDURES			
SCALE	N.T.S.	DWG No	4359-03-ML-03-710
			REV 02

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



NOTES:

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

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 01 UPDATED DRAWING NOTES
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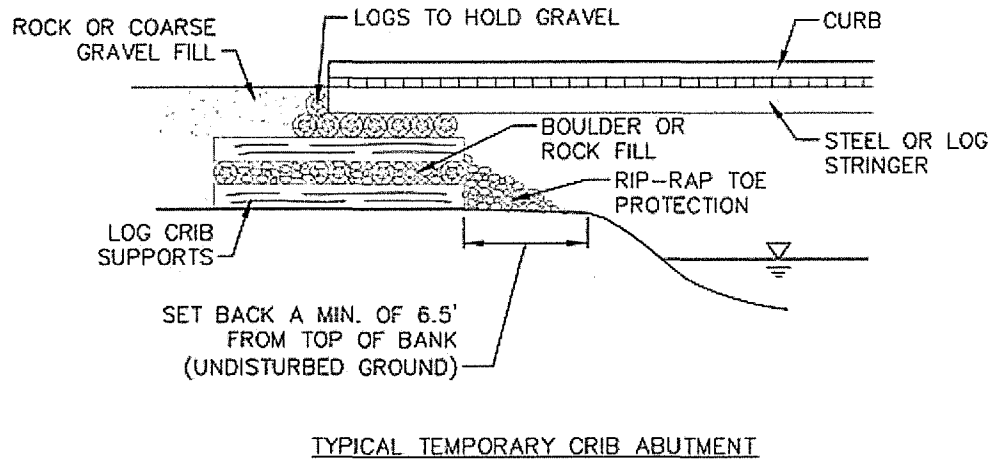
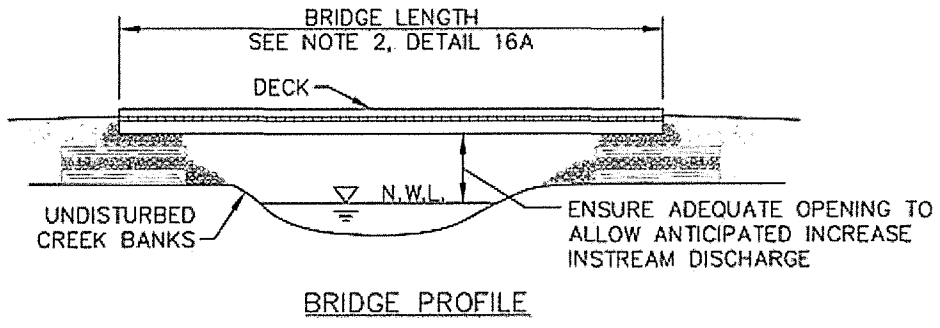
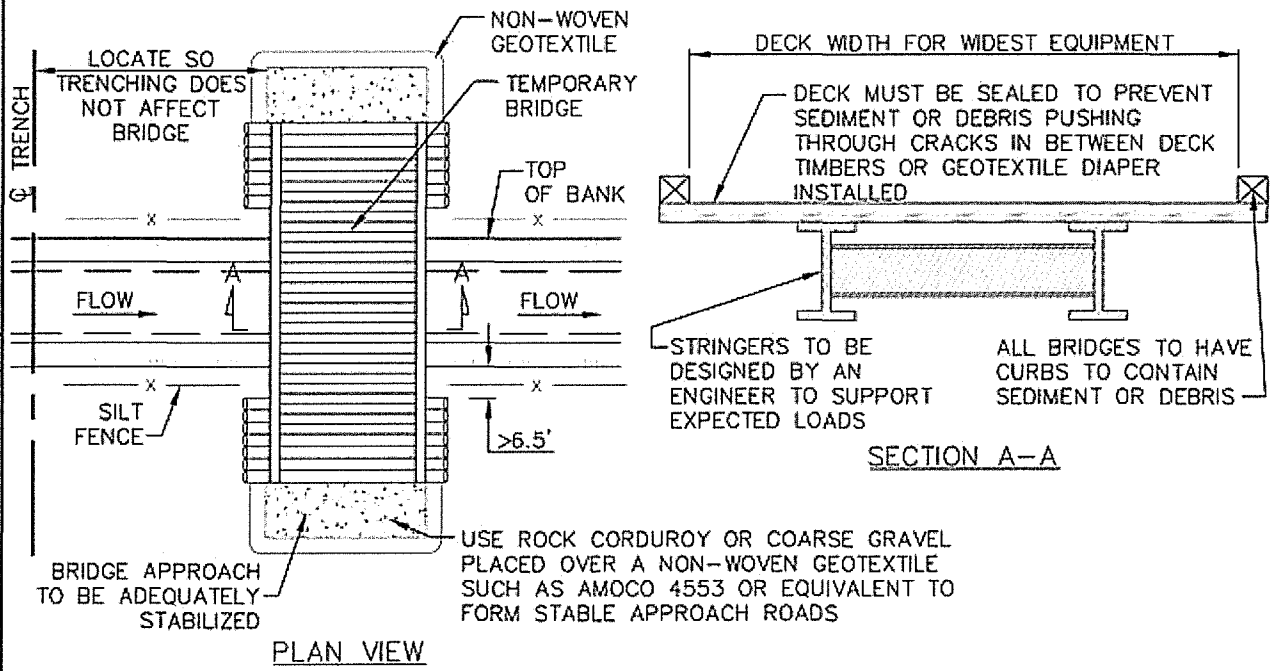
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KEYSTONE XL PROJECT		
FIA # 4359	CHAINAGE:	DISCIPLINE # 03
TITLE		
DETAIL 15		
TYPICAL HORIZONTAL DRILL (HDD) SITE PLAN & PROFILE		
SCALE	DWG No	REV
N.T.S.	4359-03-ML-03-711	02

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FIA # 4359	CHAINAGE:	DISCIPLINE # 03
TITLE DETAIL 16 TYPICAL TEMPORARY BRIDGE CROSSING		
SCALE N.T.S.	DWG No 4359-03-ML-03-712	REV 01

CONSTRUCTION PROCEDURES:

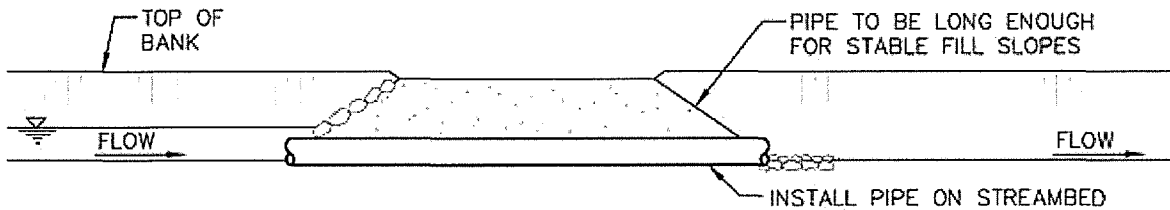
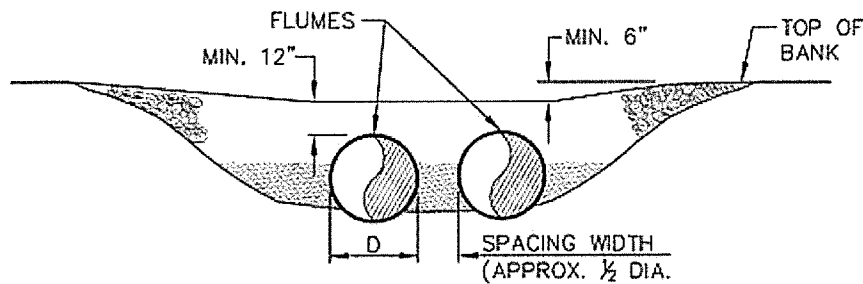
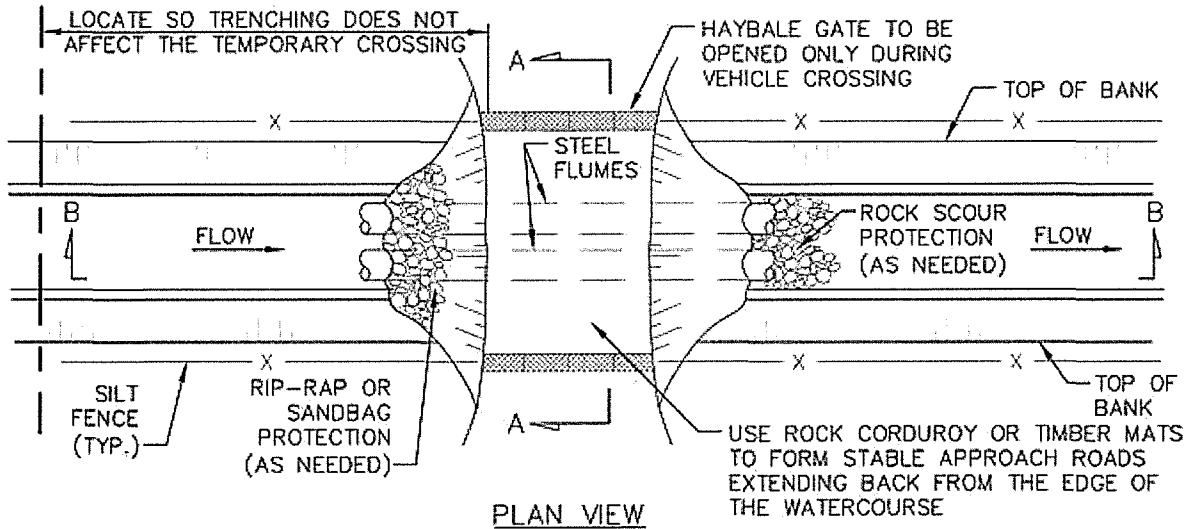
IN GENERAL TERMS, THE FOLLOWING IS A SEQUENCE OF CONSTRUCTION PROCEDURES THAT ARE RECOMMENDED TO BE FOLLOWED FOR TEMPORARY BRIDGE CROSSINGS:

1. A PORTABLE BRIDGE, FLEXI-FLOAT OR FLUMED VEHICLE CROSSING MAY BE SUBSTITUTED FOR THE TEMPORARY BRIDGE. IT IS IMPORTANT THAT THE SIZE OF THE TOTAL OPENING BE SELECTED SO THE STRUCTURE CAN SAFELY PASS FLOOD FLOWS THAT CAN REASONABLY BE EXPECTED TO OCCUR DURING THE LIFE OF THE CROSSING.
2. DETERMINE BRIDGE LENGTH REQUIRED AND FOLLOW EITHER METHOD A) OR B) FOR DETERMINING THE OPENING SIZE. IF A) IS FOLLOWED, A MINIMUM 6.5 FT. SETBACK FROM TOP OF BANK MUST BE PRESERVED AS A "NO DISTURBANCE AREA". IF ABUTMENTS OR PIERS IN THE STREAMBED ARE REQUIRED, METHOD B) IS TO BE FOLLOWED.
3. INSTALL THE BRIDGE IN A MANNER THAT WILL MINIMIZE SEDIMENT ENTERING THE WATER. STRINGERS MUST BE DESIGNED TO SUPPORT THE LOADS EXPECTED ON THE BRIDGE. CURBS MUST BE INSTALLED ALONG THE EDGE OF THE DECK TO CONTAIN SEDIMENT AND DEBRIS ON THE BRIDGE. FASTENERS CONNECTING COMPONENTS MUST BE STRONG ENOUGH TO HOLD THEM IN POSITION DURING THE LIFE OF THE BRIDGE. CRIBS ARE TO BE FILLED WITH ROCK OR COBBLE. RIP-RAP EROSION PROTECTION IS TO BE PLACED AROUND THE CRIBS AND ON ANY FILL SLOPES PROJECTING INTO THE WATERBODY.
4. ROAD APPROACHES LEADING TO THE BRIDGE MUST BE RAISED AND STABLE SO EQUIPMENT LOADS ARE SUPPORTED A SUFFICIENT DISTANCE BACK FROM THE WATER TO REDUCE SEDIMENT AND DEBRIS ENTERING THE WATERBODY FROM EQUIPMENT TRACKS. THIS MAY REQUIRE USING MATERIALS SUCH AS GRAVEL, ROCK OR CORDUROY. DO NOT USE SOIL TO CONSTRUCT OR STABILIZE EQUIPMENT BRIDGES. IF CUTS ARE NEEDED TO OBTAIN A SATISFACTORY GRADE, THEY ARE TO BE DUG WITH SIDE DITCHES AND STABLE SLOPES. EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE INSTALLED TO KEEP SEDIMENT ON LAND (E.G., SILT FENCING, FILTER CLOTH, RIP-RAP, SEED AND MULCH, ETC.)
5. MAINTAIN A SILT FENCE ON EACH SIDE OF THE WATERBODY EXTENDING A MINIMUM OF 10 FEET BEYOND THE WIDTH OF DISTURBANCE UNTIL VEGETATION HAS BEEN ESTABLISHED IN UPSLOPE AREAS.
6. PERIODICALLY CHECK BRIDGE INSTALLATION AND REMOVE ANY BUILD-UP OF SEDIMENT OR DEBRIS ON THE BRIDGE. DISPOSE OF THIS MATERIAL IN A LOW LYING AREA AT LEAST 100 FEET FROM THE WATERBODY.
7. REMOVE TEMPORARY CROSSINGS AS SOON AS POSSIBLE AFTER FINAL CLEAN-UP. MATERIALS PLACED ALONG THE WATERBODY SHOULD BE COMPLETELY REMOVED DURING FINAL CLEAN-UP. REMOVAL SHOULD NOT OCCUR OUTSIDE THE CONSTRUCTION WINDOWS. SURPLUS GRAVEL IS TO BE SPREAD ON THE RIGHT-OF-WAY AS GRAVEL SHEETING, IF GRADATION IS SUITABLE, OR MOVED AT LEAST 100 FEET FROM TOP OF BANK FOR DISPOSAL. BRIDGE MATERIALS ARE TO BE REMOVED FROM THE CROSSING AREA. THE WATERBODY BED AND BANKS ARE TO BE RESTORED TO A STABLE ANGLE AND PROTECTED WITH EROSION RESISTANT MATERIAL COMPATIBLE WITH THE EXPECTED FLOW CONDITIONS.

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

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SECTION B-B

CONSTRUCTION PROCEDURES:

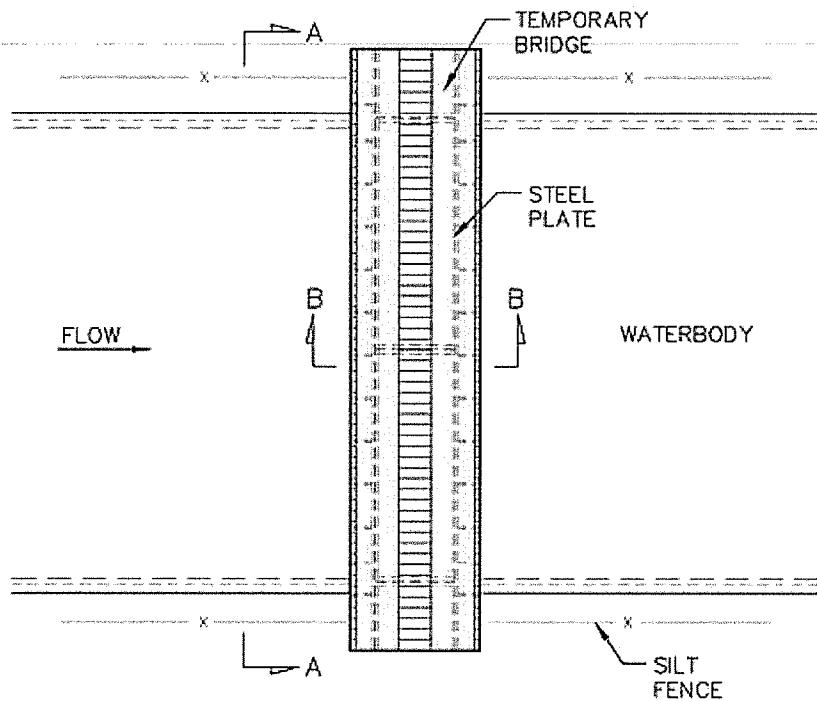
THE FOLLOWING IS A SEQUENCE OF CONSTRUCTION AND PROCEDURES MEASURES TO BE FOLLOWED AT ALL TEMPORARY FLUME VEHICLE CROSSINGS.

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

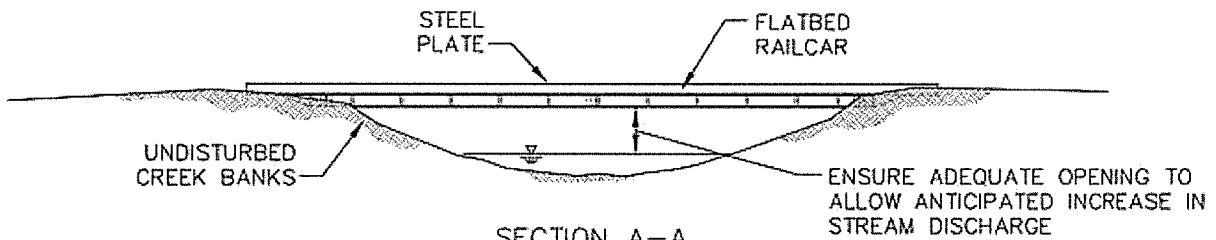
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	JMP	2010-10-21	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	NAME	DATE	TITLE		
	CHECKED BY: WSF		DESIGN CHECKER: RW	DETAIL 17 TYPICAL FLUME BRIDGE CROSSING	
SCALE N.T.S.		DWG No 4359-03-ML-03-714	REV 01		

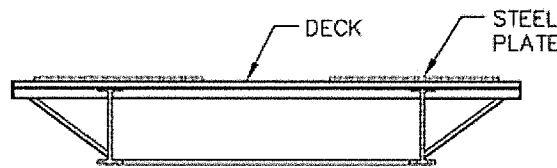
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PLAN VIEW



SECTION A-A



SECTION B-B

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KEYSTONE XL PROJECT		
FIA # 4359	CHAINAGE:	DISCIPLINE # 03
TITLE		
DETAIL 18 TYPICAL RAILCAR BRIDGE CROSSING		
SCALE N.T.S.	DWG No 4359-03-ML-03-715	REV 01

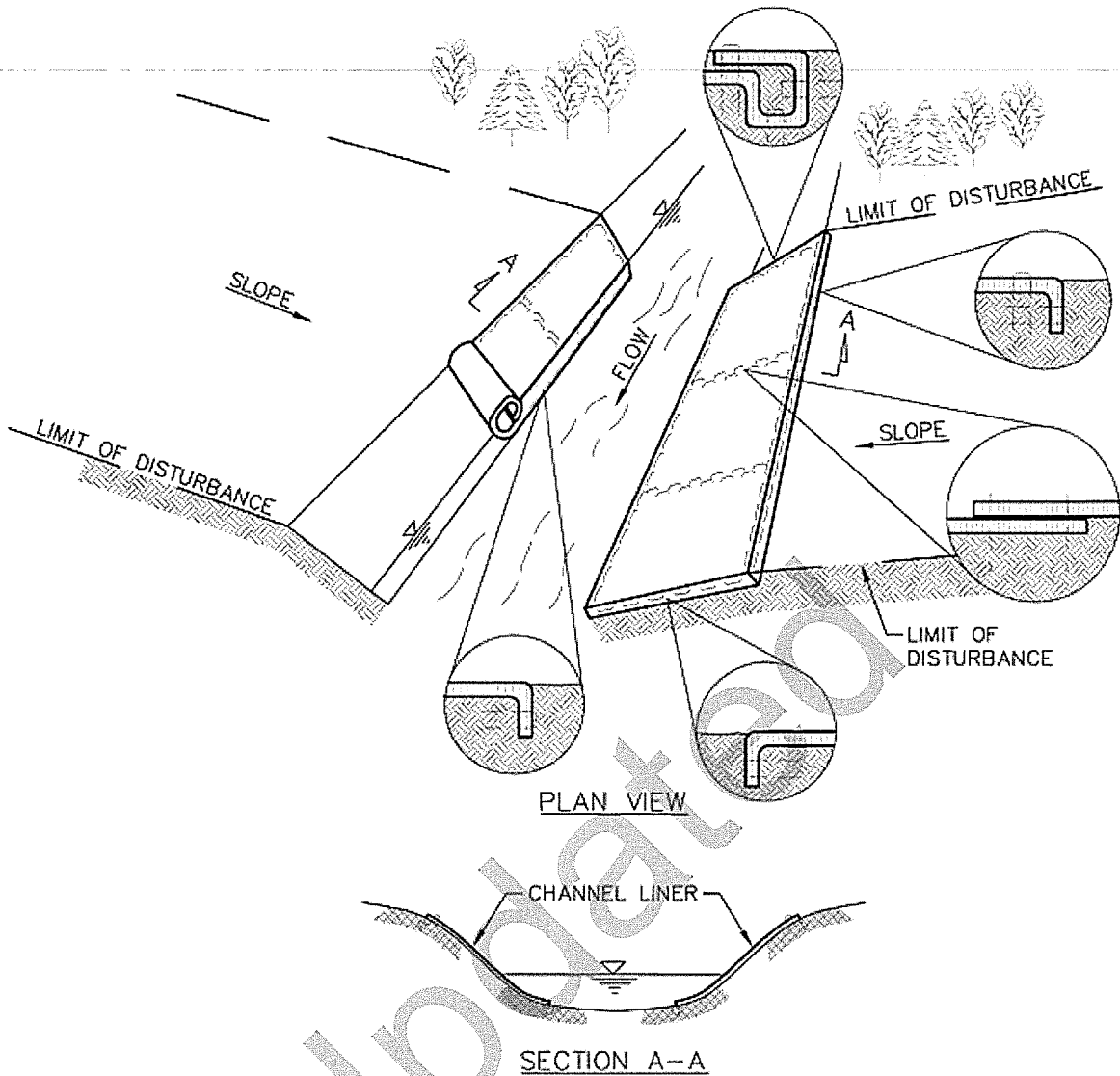
CONSTRUCTION PROCEDURES:

1. THIS TYPICAL DRAWING PROVIDES FOR A RAILCAR BRIDGE EQUIPMENT CROSSING.
2. BRIDGE SHOULD BE A MINIMUM OF 12 FEET LONGER THAN BANK TO BANK WIDTH.
3. BEST MANAGEMENT PRACTICES UTILIZING EROSION CONTROL DEVICES, SUCH AS HAY BALES AND SILT FENCE ARE REQUIRED TO PREVENT SEDIMENTATION OF THE STREAM. EROSION PROTECTION SHALL BE PLACED ON THE STREAM BANKS.
4. DURING FINAL CLEAN-UP, REMOVE TEMPORARY EQUIPMENT CROSSINGS AS SOON AS POSSIBLE. INSTALLED MATERIALS, SUCH AS HAY BALES AND SILT FENCE MUST BE REMOVED AND DISPOSED IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS AND REQUIREMENTS. THE STREAMBED, BANKS AND AREAS AFFECTED BY CONSTRUCTION OF THE TEMPORARY EQUIPMENT CROSSING SHOULD BE RESTORED TO A STABLE CONDITION. IF REQUIRED TO PREVENT TRANSPORT OF SEDIMENTATION TO THE STREAM, SILT FENCE SHOULD BE INSTALLED AT THE TOP OF THE BANKS.

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	JMP <small>NAME</small>	2010-10-21 <small>DATE</small>	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
			TITLE DETAIL 18A TYPICAL RAILCAR BRIDGE CROSSING - CONSTRUCTION PROCEDURES		
	CHECKED BY: WSF	DESIGN CHECKER: RW	SCALE N.T.S.	DWG No 4359-03-ML-03-716	REV 01

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



NOTES:

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

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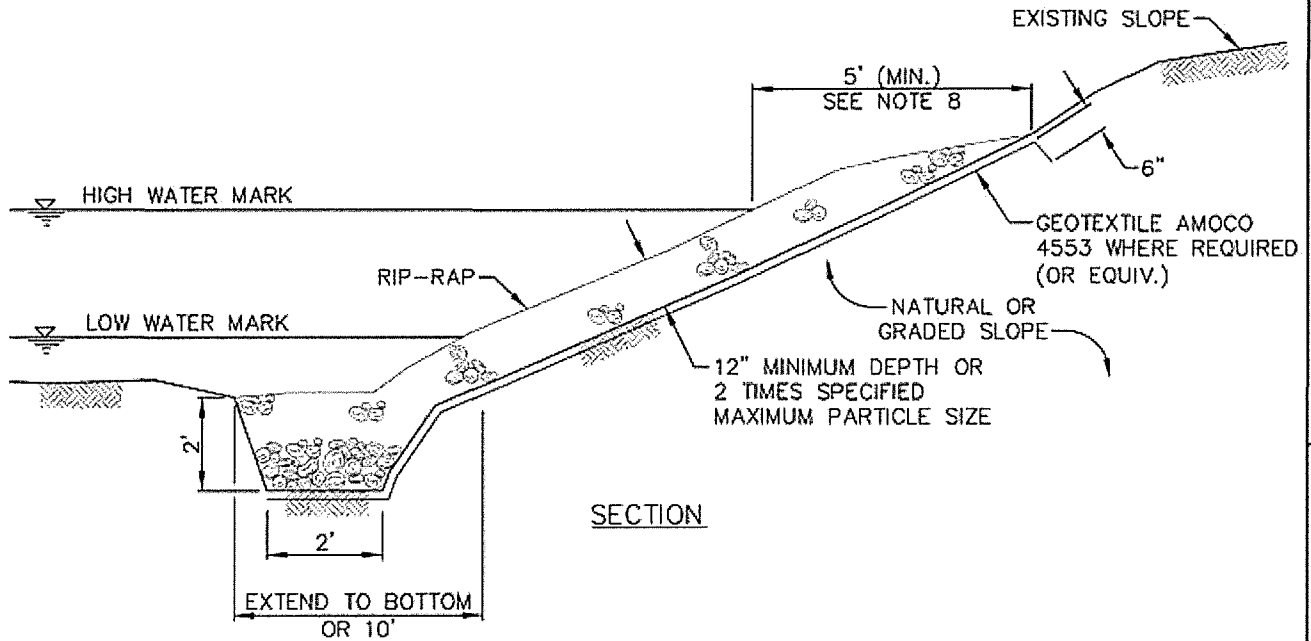
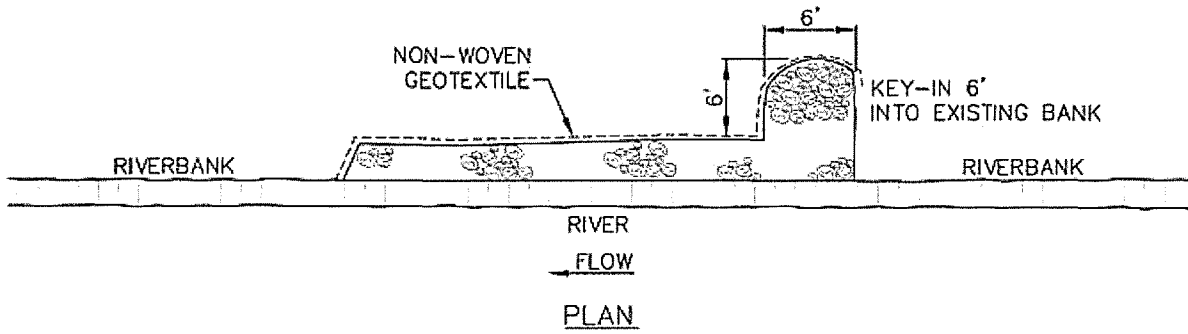
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KEYSTONE XL PROJECT		
FIA # 4359	CHAINAGE:	DISCIPLINE # 03
TITLE		
DETAIL 19 FLEXIBLE CHANNEL LINER INSTALLATION		
SCALE N.T.S.	DWG No 4359-03-ML-05-708	REV 02

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



NOTES:

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

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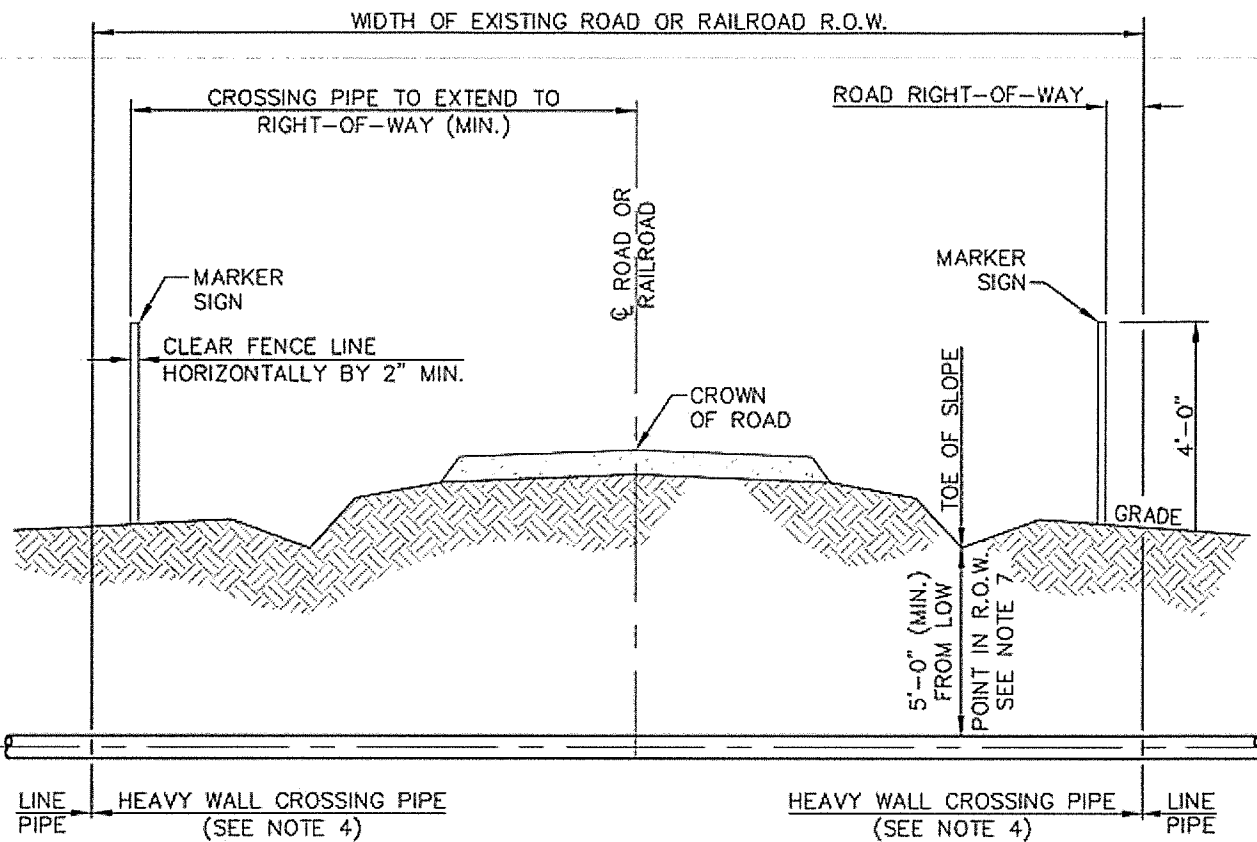
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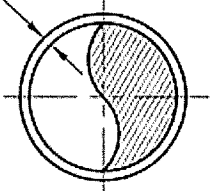
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KEYSTONE XL PROJECT		
FIA # 4359	CHAINAGE:	DISCIPLINE # 03
TITLE		
DETAIL 20 TYPICAL ROCK RIP-RAP		
SCALE N.T.S.	DWG No 4359-03-ML-05-709	REV 02

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



BORE ANNULUS TO BE NO LARGER THAN 1\"/>



NOTES:

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

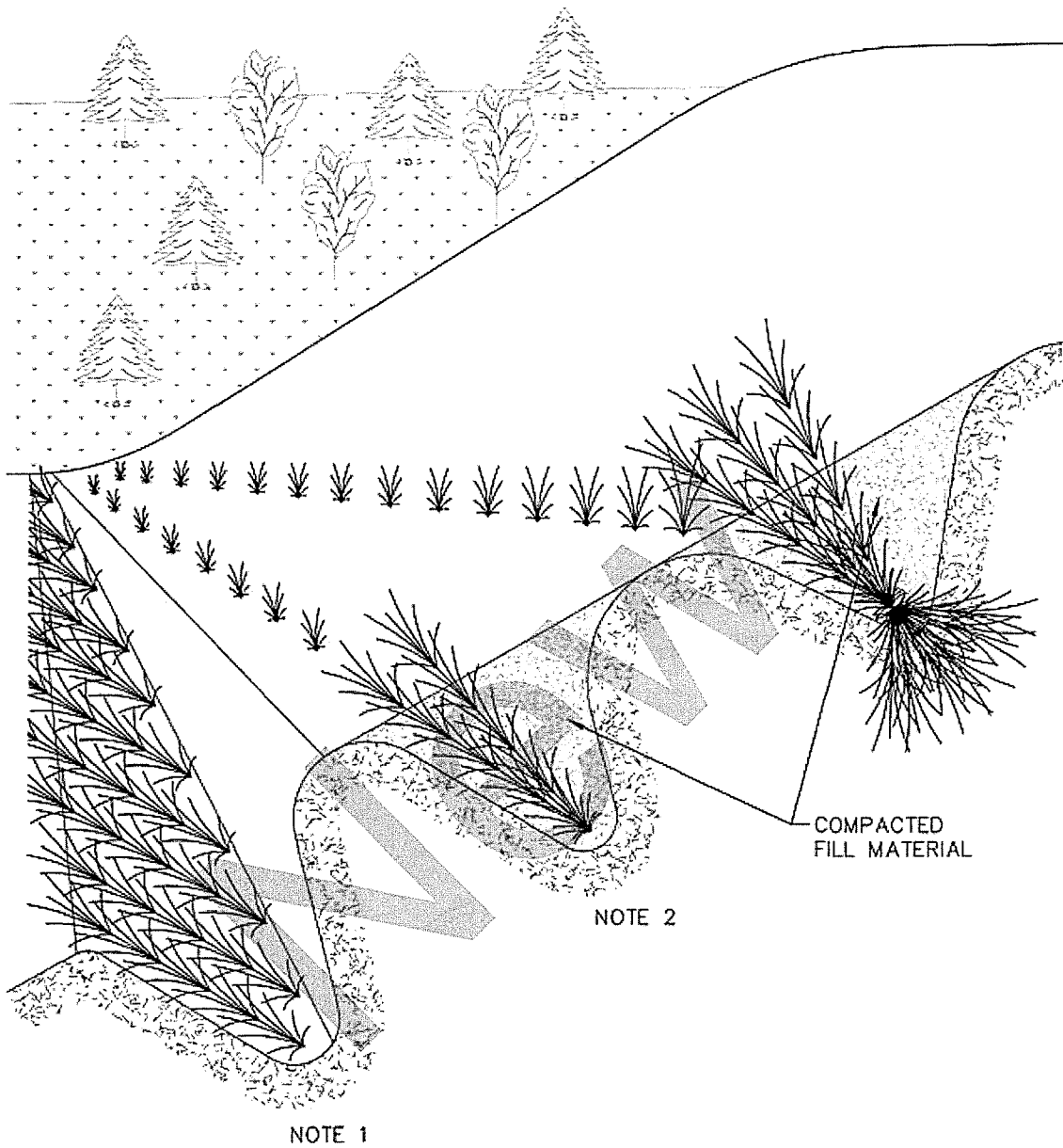
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KEYSTONE XL PROJECT		
FIA # 4359	CHAINAGE:	DISCIPLINE # 03
TITLE		
DETAIL 21		
TYPICAL UNCASSED ROAD/RAILROAD CROSSING BORE DETAIL		
SCALE N.T.S.	DWG No 4359-03-ML-03-717	REV 02

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



NOTES:

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

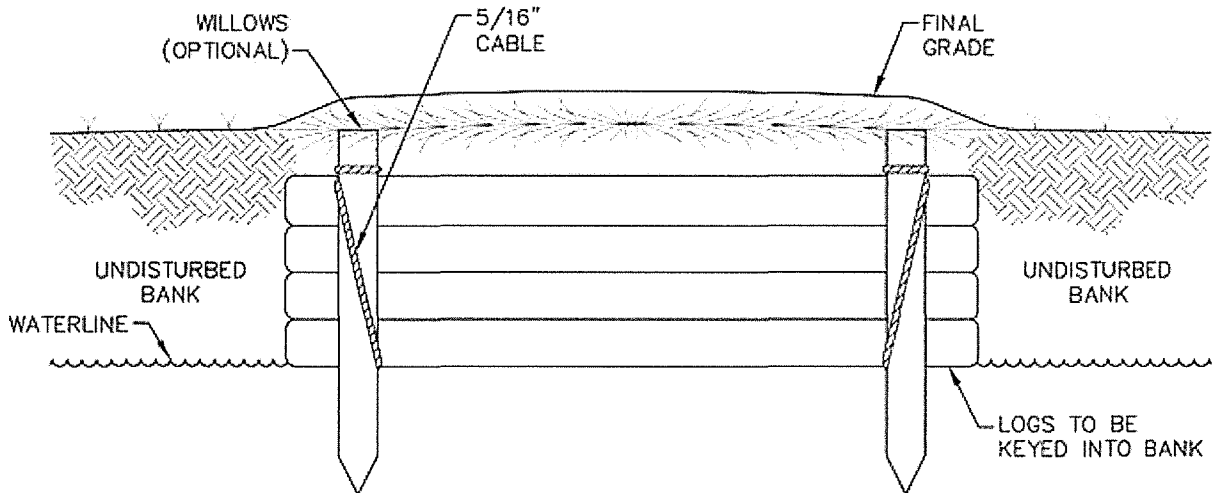
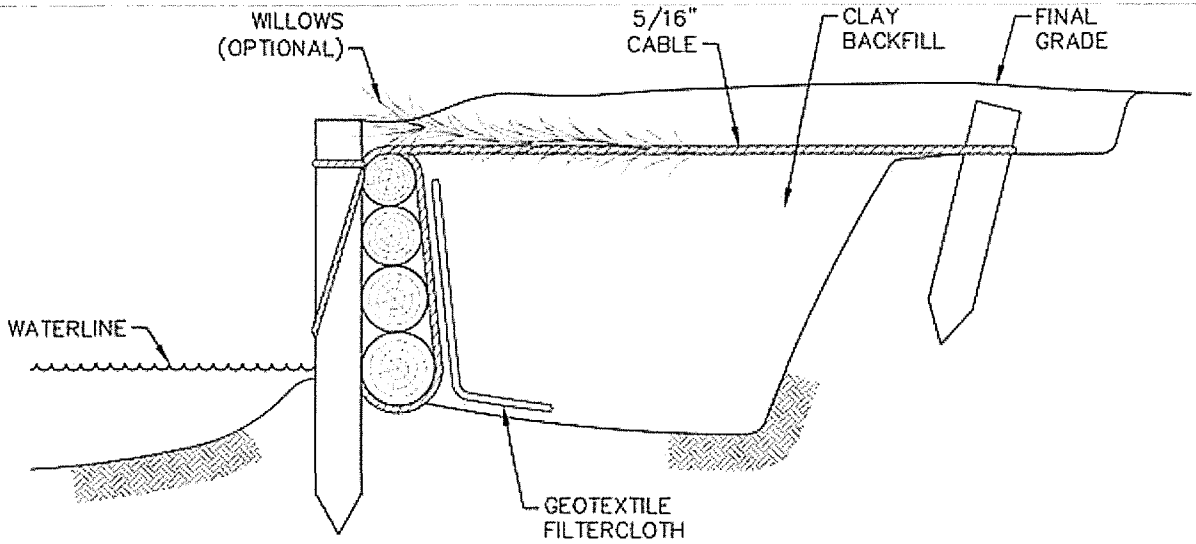
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KEYSTONE XL PROJECT		
FIA # 4359	CHAINAGE:	DISCIPLINE # 03
TITLE		
DETAIL 22 STREAMBANK RECLAMATION - BRUSH LAYER IN CROSS CUT SLOPE		
SCALE N.T.S.	DWG No 4359-03-ML-05-710	REV 02

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



NOTES:

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

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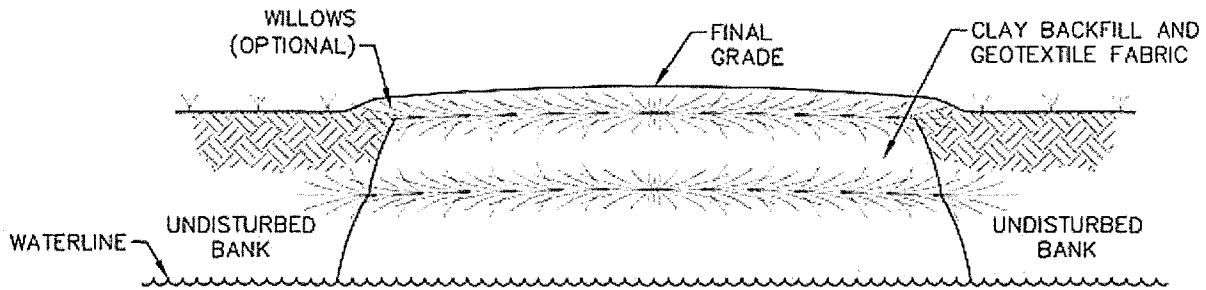
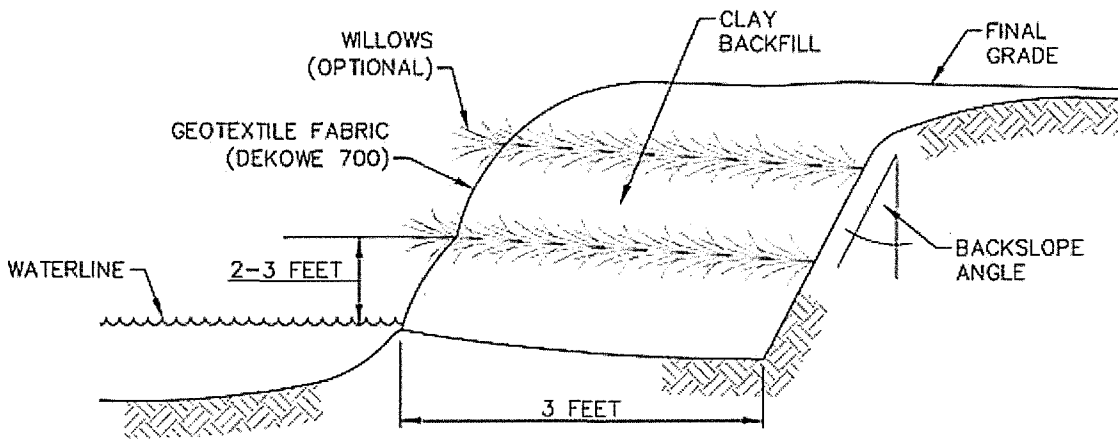

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KEYSTONE XL PROJECT		
FIA # 4359	CHAINAGE:	DISCIPLINE # 03
TITLE		
DETAIL 23 STREAMBANK RECLAMATION – LOGWALL		
SCALE N.T.S.	DWG No 4359-03-ML-05-711	REV 02

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



NOTES:

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

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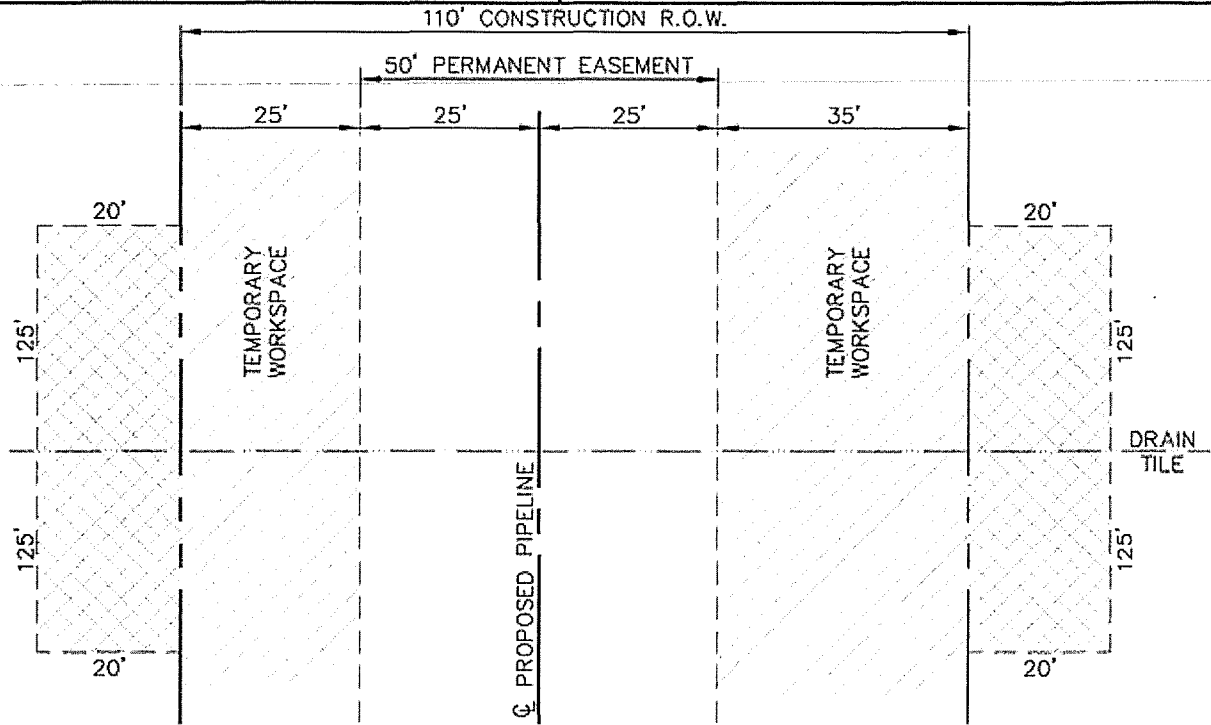
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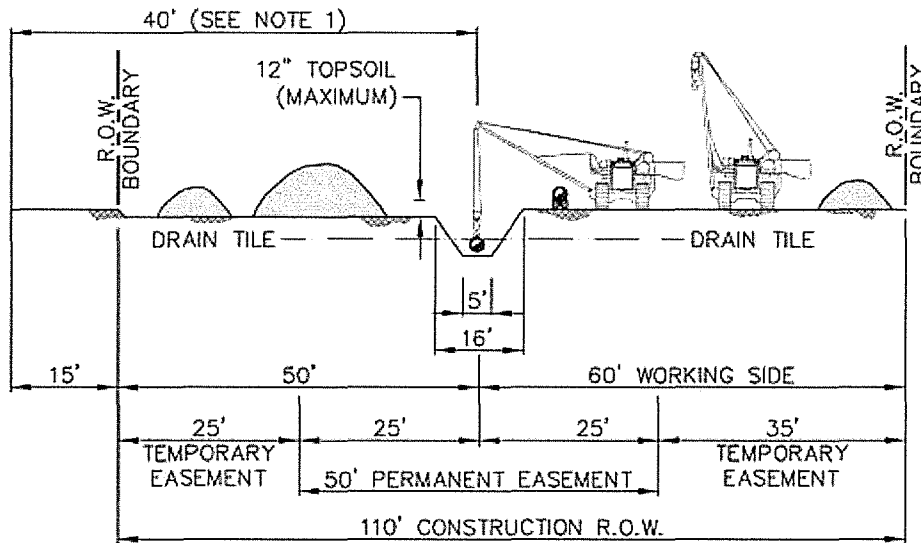
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KEYSTONE XL PROJECT			
FA # 4359	CHAINAGE:	DISCIPLINE # 03	
TITLE			
DETAIL 24 STREAMBANK RECLAMATION – VEGETATED GEOTEXTILE INSTALLATION			
SCALE N.T.S.	DWG No 4359-03-ML-05-712	REV 02	

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



PLAN VIEW



ELEVATION

NOTES:

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

REVISIONS 01 2010-10-11 REVISED TITLE BLOCK 02 DELETED DIMENSION 03 REVISED NOTE 3;

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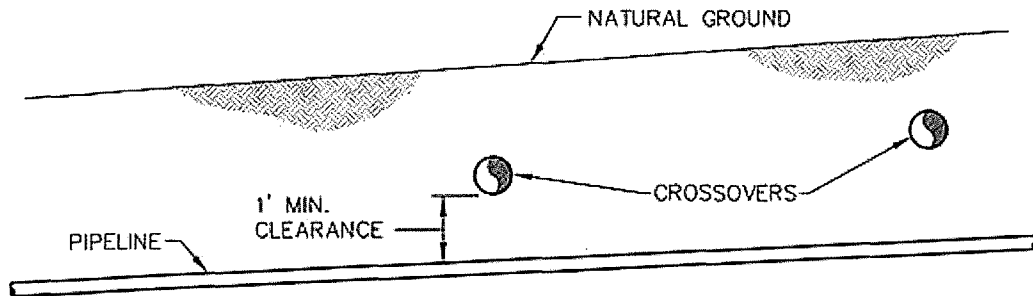
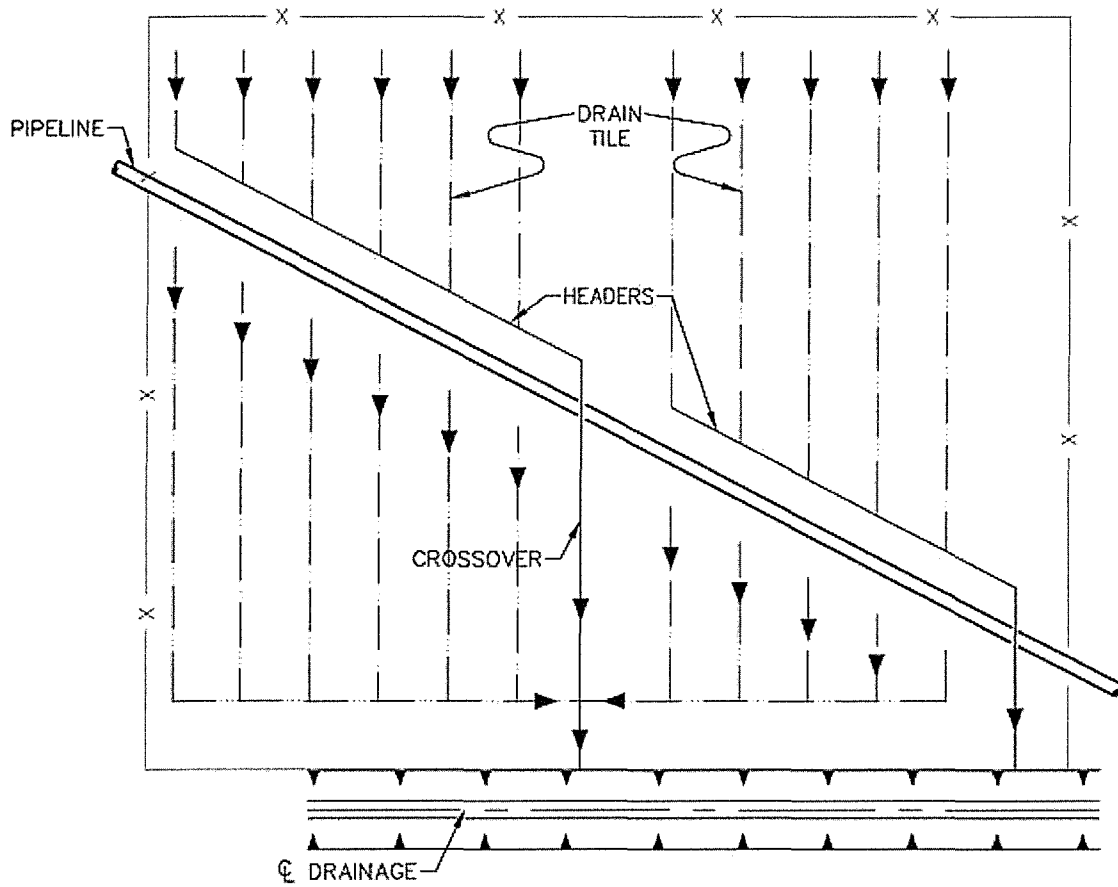
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FIA # 4359	CHAINAGE:	DISCIPLINE # 03
TITLE		
DETAIL 25		
TYPICAL R.O.W. LAYOUT/SOIL HANDLING		
110' CONSTRUCTION R.O.W. 50' EASEMENT		
DRAIN TILE CROSSING		
SCALE	DWG No	REV
N.T.S.	4359-03-ML-03-718	02

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PROFILE

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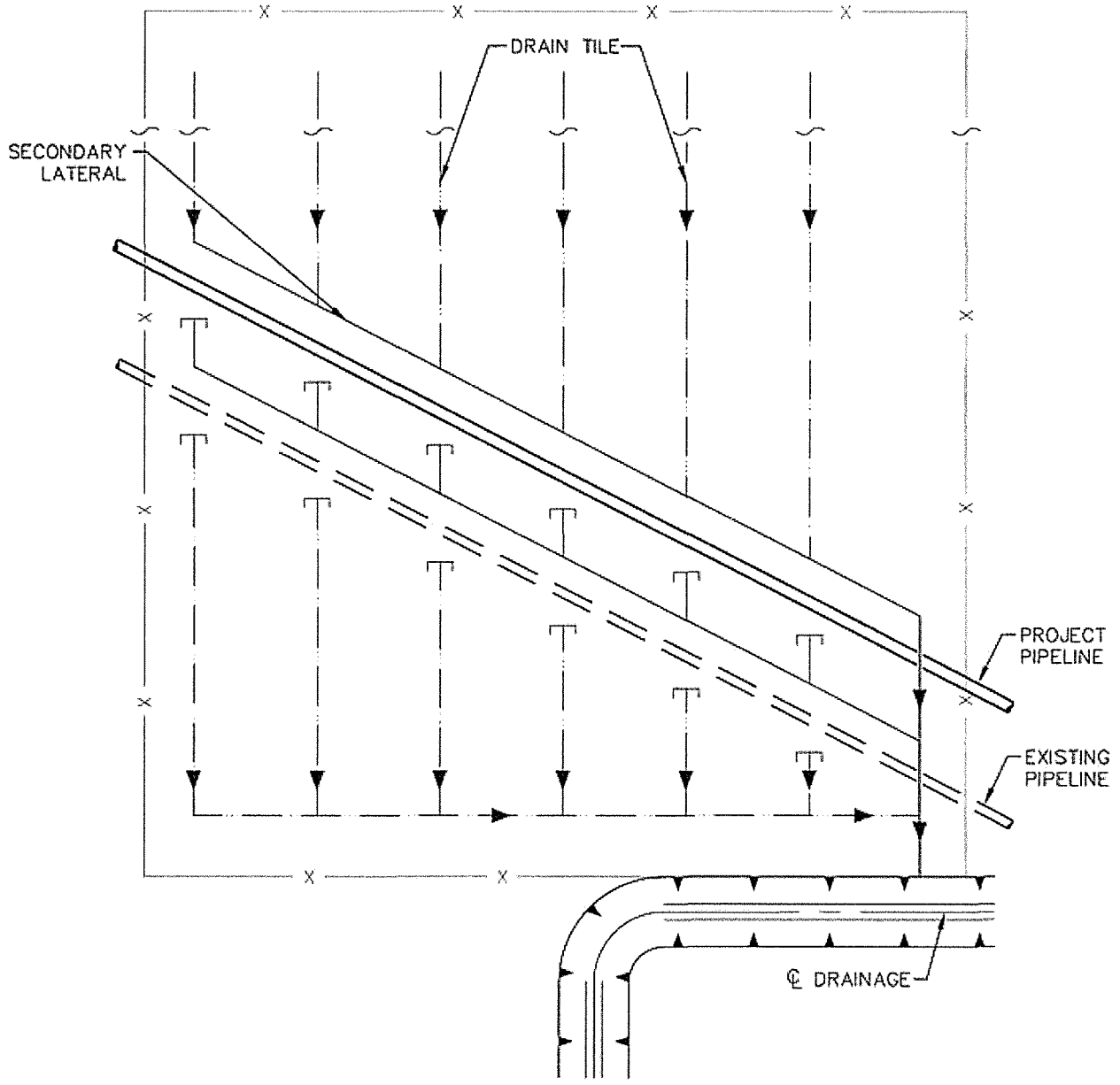
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KEYSTONE XL PROJECT		
FIA # 4359	CHAINAGE:	DISCIPLINE # 03
TITLE		
DETAIL 26 HEADER/MAIN CROSSOVERS OF PIPELINE		
SCALE N.T.S.	DWG No 4359-03-ML-03-719	REV 02

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RELOCATE/REPLACE DRAINAGE HEADER/MAIN



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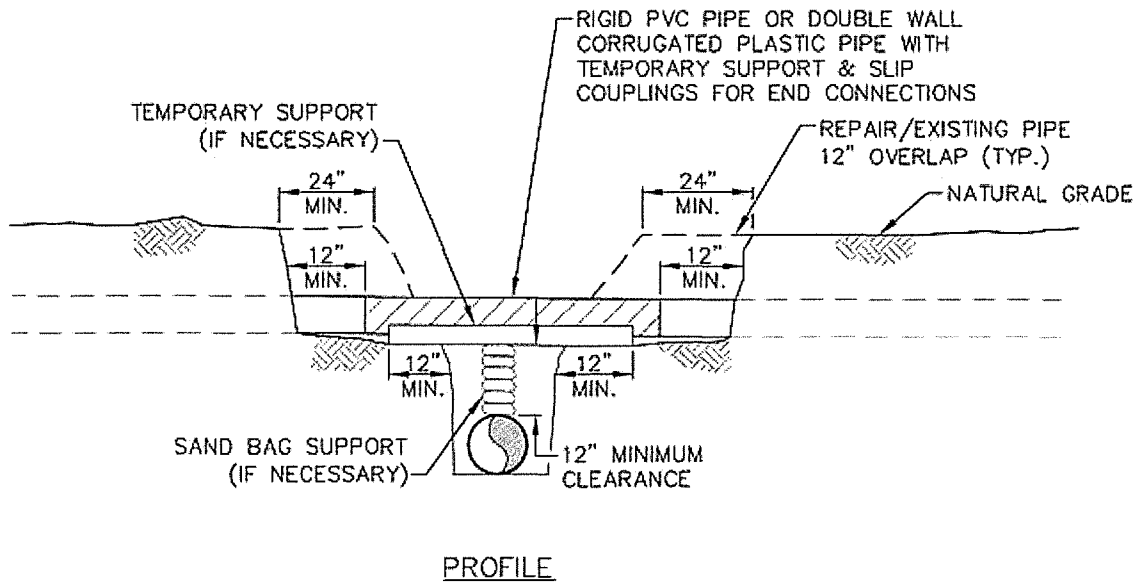
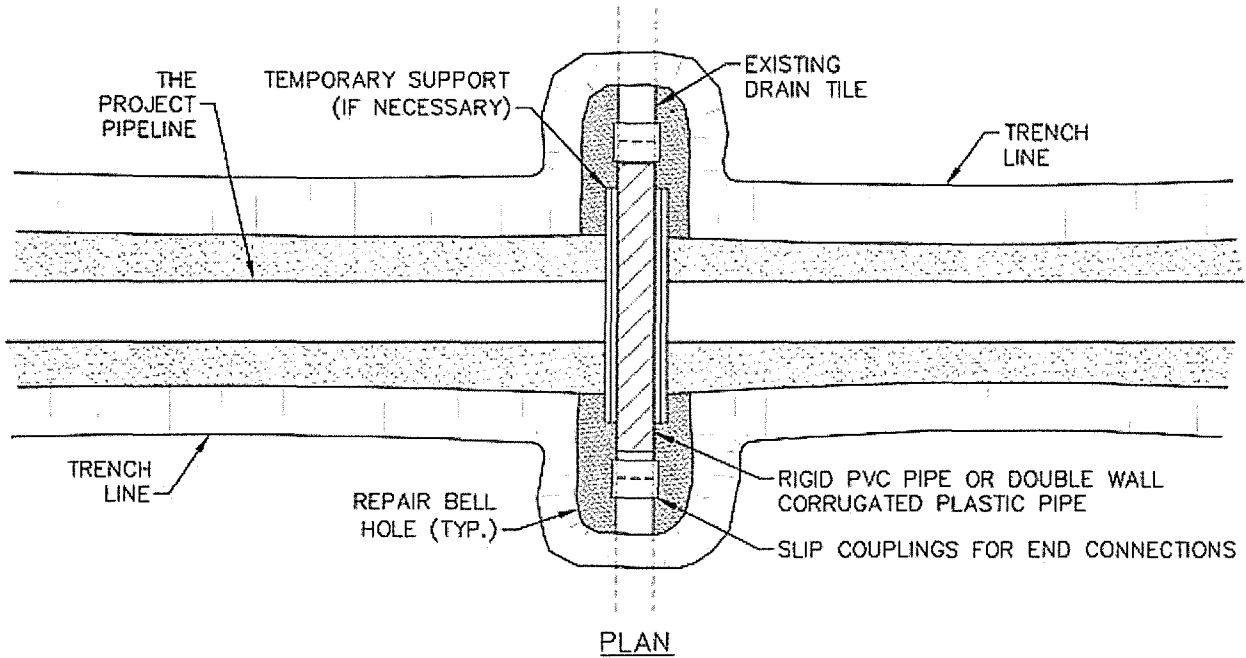
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KEYSTONE XL PROJECT

FIA # 4359	CHAINAGE:	DISCIPLINE # 03
TITLE DETAIL 27 HEADER/MAIN CROSSOVERS OF PIPELINE		
SCALE N.T.S.	DWG No 4359-03-ML-03-720	REV 02

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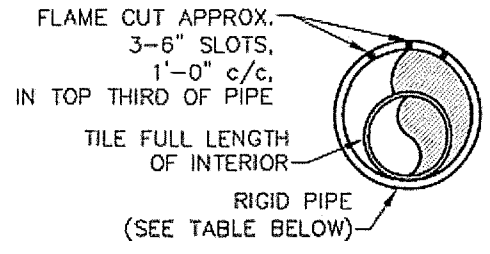
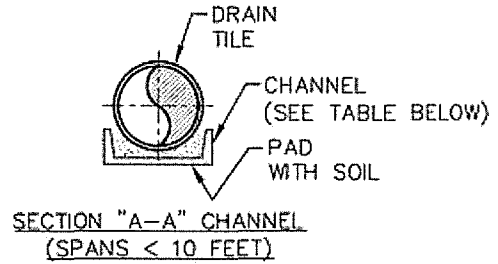
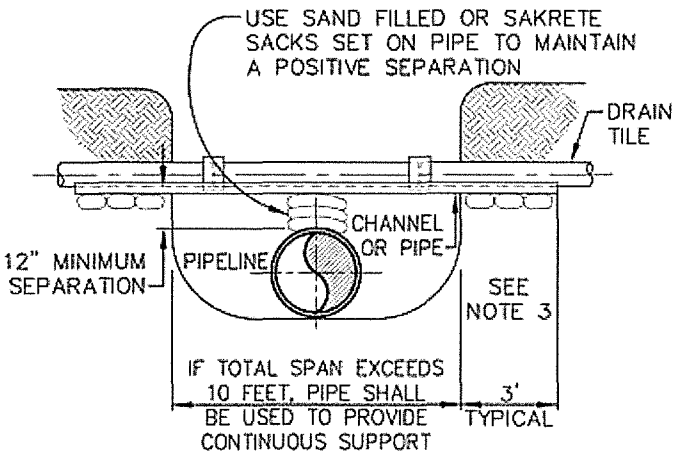
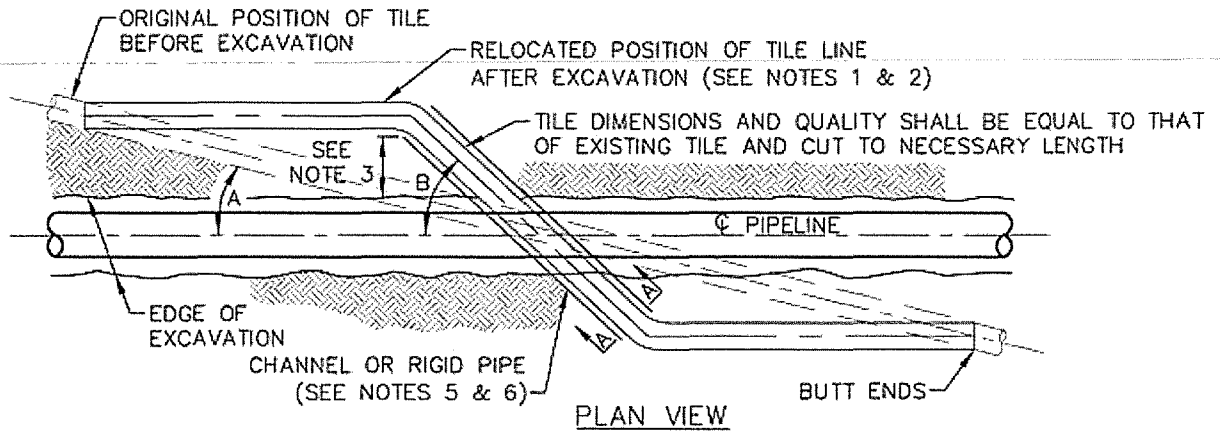
NOTES:

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

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	CHECKED BY:	DESIGN CHECKER:	TITLE		
	WSF	RW	<p>DETAIL 28 DRAINAGE AND IRRIGATION TEMPORARY DRAIN TILE REPAIR</p>		
SCALE N.T.S.		DWG No	4359-03-ML-03-721		REV 02

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



NOTES:

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

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

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

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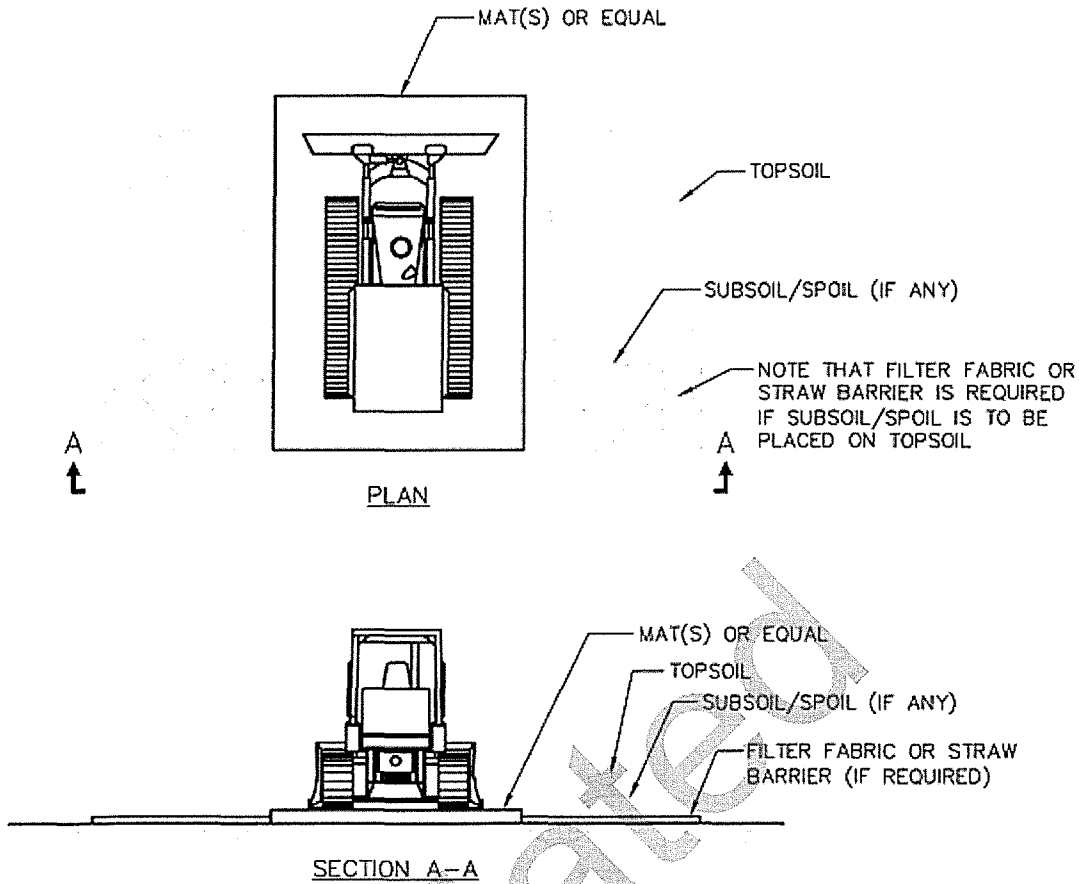
KEYSTONE XL PROJECT

FIA # 4359 CHAINAGE: DISCIPLINE # 03

TITLE: **DETAIL 29 DRAINAGE AND IRRIGATION PERMANENT DRAIN TILE REPAIR**

SCALE: N.T.S. DWG No: 4359-03-ML-03-722 REV: 02

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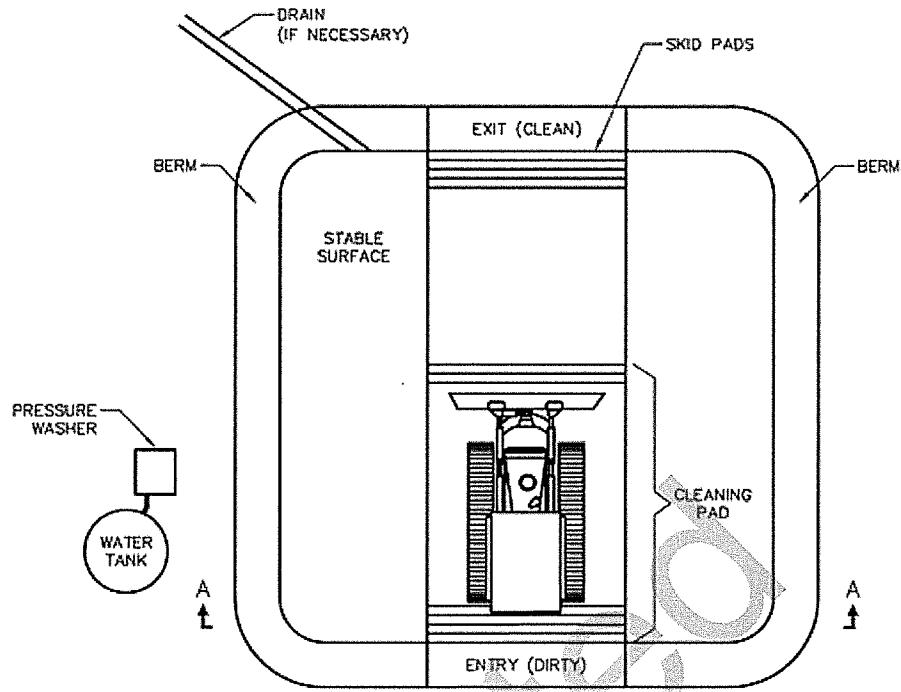
CLEANING STATION NOTES:

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

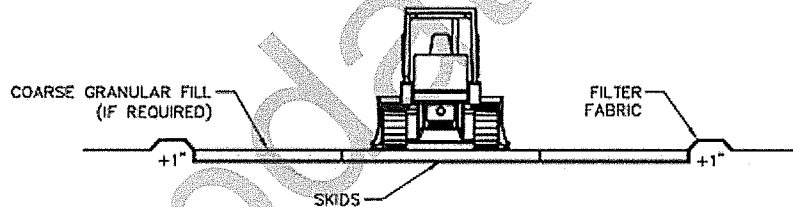
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	JMP NAME		2010-10-21 DATE	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	CHECKED BY: WSF		DESIGN CHECKER: RW	TITLE DETAIL 30 EQUIPMENT CLEANING STATION DETAIL		
SCALE N.T.S.		DWG No 4359-03-ML-05-713	REV 02			

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



PLAN



SECTION A-A

WASH STATION NOTES:

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

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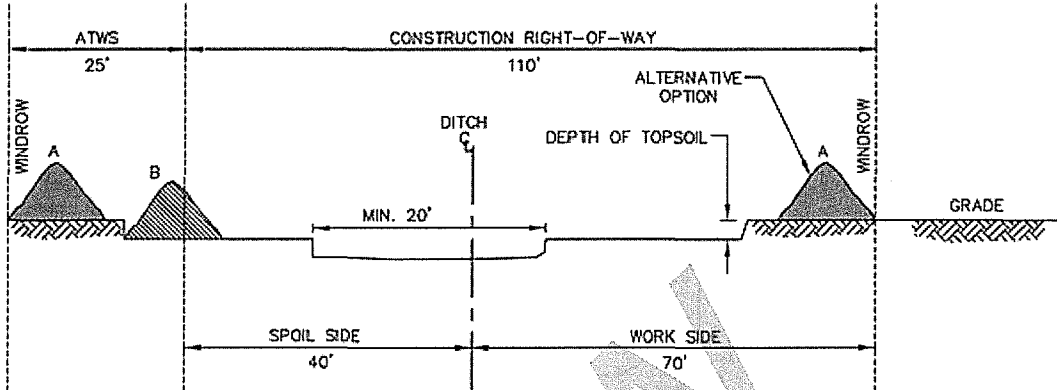
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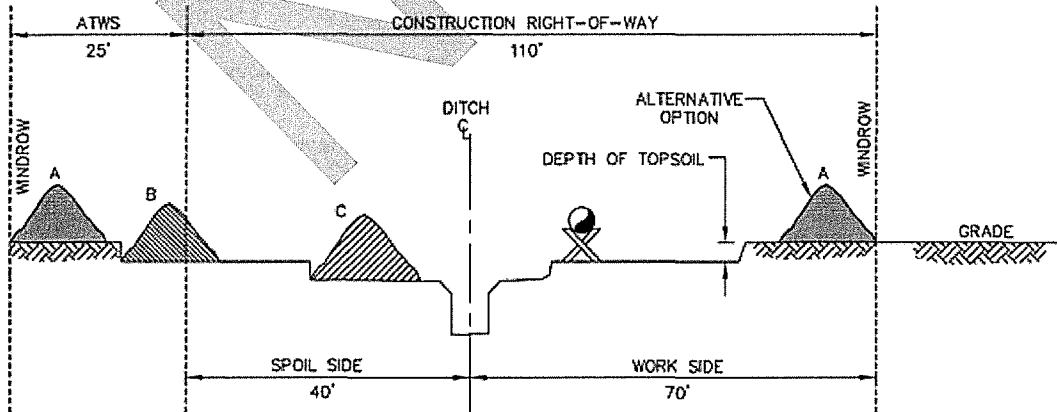
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TITLE DETAIL 31 EQUIPMENT WASH STATION DETAIL		
SCALE N.T.S.	DWG No 4359-03-ML-05-714	REV 02

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

- POTENTIAL LOCATIONS WHERE TRIPLE DITCH TOPSOIL CONSERVATION MAY BE COMPLETED ARE SHOWN ON THE ALIGNMENT SHEETS. KEYSTONE WILL DIRECT THE ACTUAL LOCATIONS WHERE TRIPLE DITCH WILL BE COMPLETED DURING, OR IMMEDIATELY PRIOR TO, TOPSOILING THE ROW. KEYSTONE MAY MODIFY TRIPLE DITCH PROCEDURES FROM THOSE DESCRIBED HERE TO ADDRESS SITE-SPECIFIC, OR SOIL-SPECIFIC, CONDITIONS.
- STRIP TOPSOIL ("A" HORIZON) ACCORDING TO THE "A" HORIZON DEPTHS AND CONSTRUCTION DETAILS SHOWN ON CONSTRUCTION ALIGNMENT SHEETS. PLACE "A" HORIZON IN THE ADDITIONAL TEMPORARY WORKSPACE OR THE WINDROW WITHIN THE WORKING SIDE OF THE CONSTRUCTION RIGHT-OF-WAY. IN AREAS OF THICKER "A" HORIZONS, "A" HORIZON MAY BE SPLIT TO BOTH SIDES OF THE RIGHT-OF-WAY.
REMOVE "B" HORIZON (2ND DITCH) TO DEPTHS SPECIFIED BY KEYSTONE AND STOCKPILE ON SPOIL SIDE. THE "B" HORIZON SHOULD BE REMOVED IN A STRIP AT LEAST 20 FEET WIDE OVER THE TRENCH TO ALLOW FOR STORAGE OF THE TRENCH SPOIL MATERIALS. MAINTAIN A MINIMUM OF 2 FEET BETWEEN "A" HORIZON AND "B" HORIZON STOCKPILES.



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



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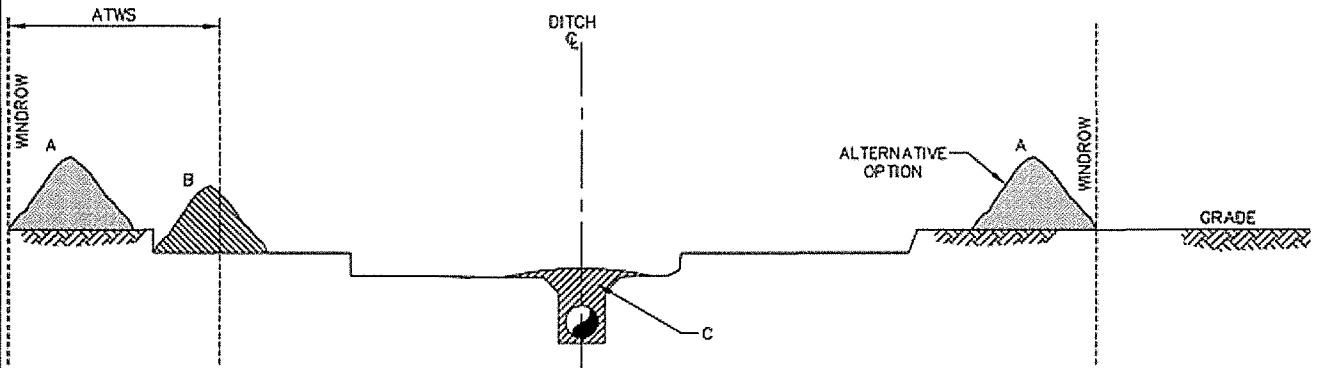
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KEYSTONE XL PROJECT

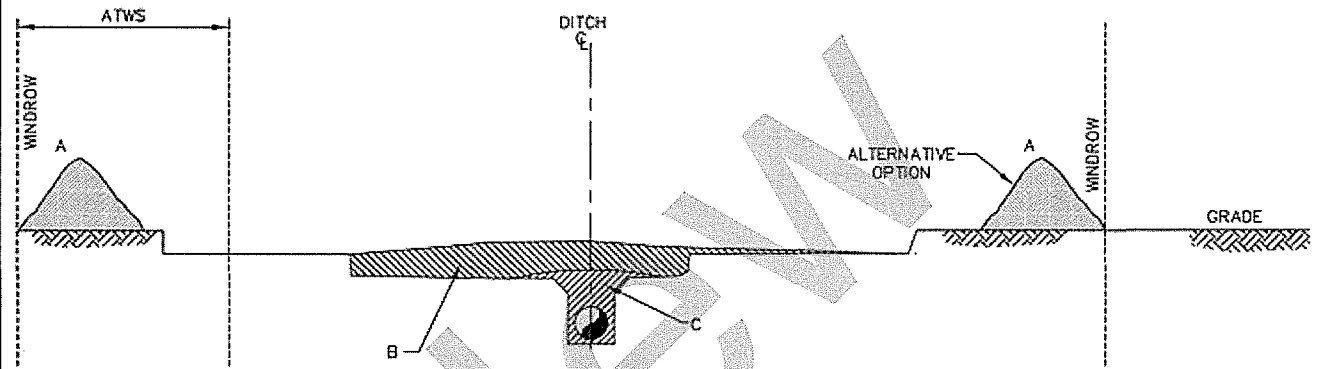
FA # 4359	CHAINAGE:	DISCIPLINE # 03
TITLE DETAIL 67 TOPSOIL CONSERVATION DITCH & SPOIL STRIPPING TRIPLE DITCH		
SCALE N.T.S.	DWG No 4359-03-ML-05-724	REV 03

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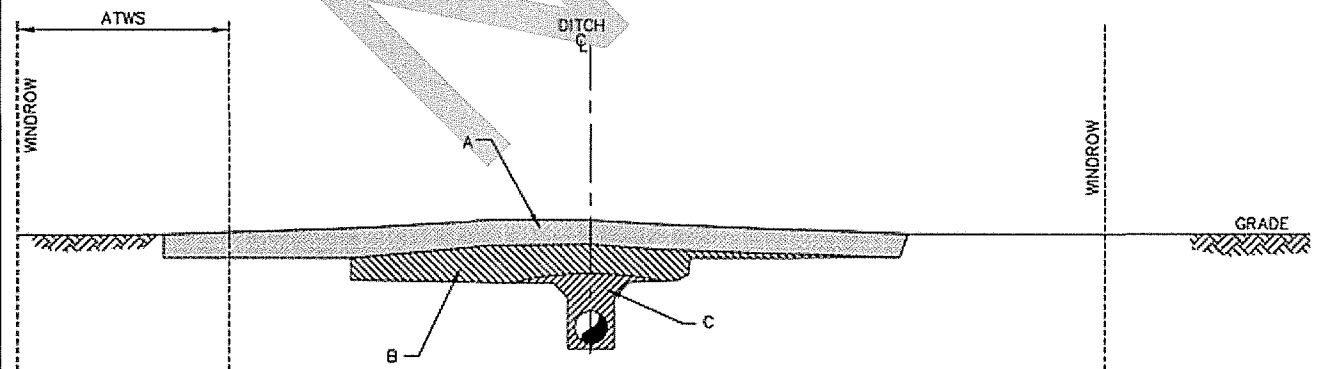
4. BACKFILL TRENCH AND COMPACT AS PER APPROVED PROCEDURE. PLACE THE SOIL HORIZONS BACK IN THEIR ORIGINAL SEQUENCE IN THE TRENCH.



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



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



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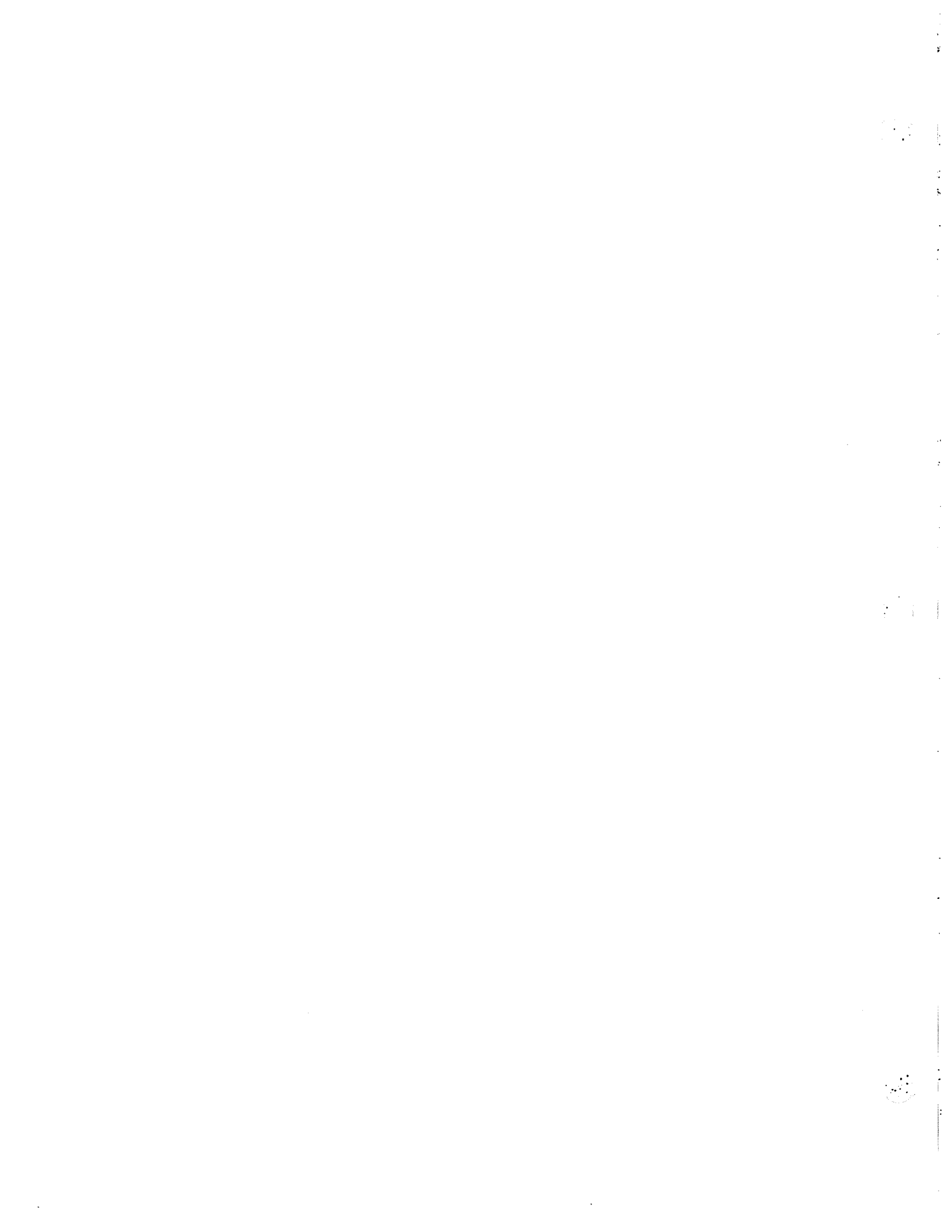
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KEYSTONE XL PROJECT

FIA # 4359	CHAINAGE:	DISCIPLINE # 03
TITLE DETAIL 67A TOPSOIL CONSERVATION DITCH & SPOIL STRIPPING TRIPLE DITCH		
SCALE N.T.S.	DWG No 4359-03-ML-05-725	REV 03



Finding Number	Amended Final Decision and Order	Update
	The Project	
14	The purpose of the Project is to transport incremental crude oil production from the Western Canadian Sedimentary Basin ("WCSB") to meet growing demand by refineries and markets in the United States ("U.S."). This supply will serve to replace U.S. reliance on less stable and less reliable sources of offshore crude oil. Ex TC-1, 1.1, p. 1; Ex TC-1, 3.0 p. 23; Ex TC-1, 3.4 p. 24.	The purpose of the Project is to transport incremental crude oil production from the Western Canadian Sedimentary Basin ("WCSB") and domestic production from the Williston Basin area to meet demand by refineries and markets in the United States ("U.S."). This supply will serve to replace U.S. reliance on less stable and less reliable sources of offshore crude oil and support the growth of crude oil production in the U.S. (See updated Findings 24-29)
15	The Project will consist of three segments: the Steele City Segment, the Gulf Coast Segment, and the Houston Lateral. From north to south, the Steele City Segment extends from Hardisty, Alberta, Canada, southeast to Steele City, Nebraska. The Gulf Coast Segment extends from Cushing, Oklahoma south to Nederland, in Jefferson County, Texas. The Houston Lateral extends from the Gulf Coast Segment in Liberty County, Texas southwest to Moore Junction, Harris County, Texas. It will interconnect with the northern and southern termini of the previously approved 298-mile-long, 36-inch-diameter Keystone Cushing Extension segment of the Keystone Pipeline Project. Ex TC-1, 1.2, p. 1. Initially, the pipeline would have a nominal capacity to transport 700,000 barrels per day ("bpd"). Keystone could add additional pumping capacity to expand the nominal capacity to 900,000 bpd. Ex TC-1, 2.1.2, p. 8.	The Project will consist of the Steele City Segment. From north to south, the Steele City Segment extends from Hardisty, Alberta, Canada, southeast to Steele City, Nebraska. It will interconnect with the previously approved and constructed 298-mile-long, 36-inch-diameter Keystone Cushing Extension segment of the Keystone Pipeline System allowing crude oil to be delivered to Gulf Coast Refineries. The pipeline would have a maximum capacity to transport 830,000 barrels per day.
16	The Project is an approximately 1,707 mile pipeline with about 1,380, miles in the United States. The South Dakota portion of the pipeline will be approximately 314 miles in length and will extend from the Montana border in Harding County to the Nebraska border in Tripp County. The Project is proposed to cross the South Dakota counties of Harding, Butte, Perkins, Meade, Pennington, Haakon, Jones, Lyman and Tripp. Ex TC-1, 1.2 and 2.1.1, pp. 1 and 8. Detailed route maps are presented in Ex TC-1, Exhibits A and C, as updated in Ex TC-14.	The Project is an approximately 1202 mile pipeline with about 876 miles in the United States. The South Dakota portion of the pipeline will be approximately 315 miles in length and will extend from the Montana border in Harding County to the Nebraska border in Tripp County. The Project is proposed to cross the South Dakota counties of Harding, Butte, Perkins, Meade, Pennington, Haakon, Jones, Lyman and Tripp.
17	Construction of the Project is proposed to commence in May of 2011 and be completed in 2012. Construction in South Dakota will be conducted in five spreads, generally proceeding in a north to south direction. The Applicant expects to place the Project in service in 2012. This in-service date is consistent with the requirements of the Applicant's shippers who have made the contractual commitments that underpin the viability and need for the project. Ex TC-1, 1.4, pp. 1 and 4; TR 26.	Construction of the Project is proposed to commence when all necessary permits are obtained. Construction in South Dakota will be conducted in three or four spreads, generally proceeding in a north to south direction. The Applicant expects to place the Project in service when construction is completed.
18	The pipeline in South Dakota will extend from milepost 282.5 to milepost 597, approximately 314 miles. The pipeline will have a 36-inch nominal diameter and be constructed using API 5L X70 or X80 high-strength steel. An external fusion bonded epoxy ("FBE") coating will be applied to the pipeline and all buried facilities to protect against corrosion. Cathodic protection will be provided by impressed current. The pipeline will have batching capabilities and will be able to transport products ranging from light crude oil to heavy crude oil. Ex TC-1, 2.2, 2.2.1, 6.5.2, pp. 8-9, 97 -98; Ex TC-8, ¶ 26.	The pipeline in South Dakota will extend from milepost 285.6 to milepost 600.9, approximately 315 miles. The pipeline will have a 36-inch nominal diameter and be constructed using API 5L X70M high-strength steel. An external fusion bonded epoxy ("FBE") coating will be applied to the pipeline and all buried facilities to protect against corrosion. Cathodic protection will be provided by impressed current. The pipeline will have batching capabilities and will be able to transport products ranging from light crude oil to heavy crude oil.
19	The pipeline will operate at a maximum operating pressure of 1,440 psig. For location specific low elevation segments close to the discharge of pump stations, the maximum operating pressure will be 1,600 psig. Pipe associated with these segments of 1,600 psig MOP are excluded from the Special Permit application and will have a design factor of 0.72 and pipe wall thickness of 0.572 inch (X-70) or 0.500 inch (X-80). All other segments in South Dakota will have a MOP of 1,440 psig. Ex TC-1, 2.2.1, p. 9.	At most locations, the pipeline will operate at a maximum operating pressure of 1,307 psig. For location specific low elevation segments close to the discharge of pump stations, the maximum operating pressure will be 1,600 psig. Pipe associated with these segments of 1,600 psig MOP will have a design factor of 0.72 and a nominal pipe wall thickness of 0.572 inch (X-70M). All other segments in South Dakota will have a MOP of 1,307 psig.

Finding Number	Amended Final Decision and Order	Update
20	The Project will have seven pump stations in South Dakota, located in Harding (2), Meade, Haakon, Jones and Tripp (2) Counties. TC-1, 2.2.2, p. 10. The pump stations will be electrically driven. Power lines required for providing power to pump stations will be permitted and constructed by local power providers, not by Keystone. Initially, three pumps will be installed at each station to meet the nominal design flow rate of 700,000 bpd. If future demand warrants, pumps may be added to the proposed pump stations for a total of up to five pumps per station, increasing nominal throughput to 900,000 bpd. No additional pump stations will be required to be constructed for this additional throughput. No tank facilities will be constructed in South Dakota. Ex TC-1, 2.1.2, p.8. Sixteen mainline valves will be located in South Dakota. Seven of these valves will be remotely controlled, in order to have the capability to isolate sections of line rapidly in the event of an emergency to minimize impacts or for operational or maintenance reasons. Ex TC-1, 2.2.3, pp. 10- 11.	The Project will have seven pump stations in South Dakota, located in Harding (2), Meade, Haakon, Jones and Tripp (2) Counties. TC-1, 2.2.2, p. 10. The pump stations will be electrically driven. Power lines required for providing power to pump stations will be permitted and constructed by local power providers, not by Keystone. Three to five pumps will be installed at each station to meet the maximum design flow rate of 830,000 bpd. No tank facilities will be constructed in South Dakota. Twenty mainline valves will be located in South Dakota. All of these valves will be remotely controlled, in order to have the capability to isolate sections of line rapidly in the event of an emergency to minimize impacts or for operational or maintenance reasons.
22	The Project will be designed, constructed, tested, and operated in accordance with all applicable requirements, including the U.S. Department of Transportation, Pipeline Hazardous Materials and Safety Administration (PHMSA) regulations set forth at 49 CFR Part 195, as modified by the Special Permit requested for the Project from PHMSA (see Finding 71). These federal regulations are intended to ensure adequate protection for the public and the environment and to prevent crude oil pipeline accidents and failures. Ex TC-1, 2.2, p. 8.	The Project will be designed, constructed, tested, and operated in accordance with all applicable requirements, including the U.S. Department of Transportation, Pipeline Hazardous Materials and Safety Administration (PHMSA) regulations set forth at 49 CFR Part 195, and the special conditions developed by PHMSA and set forth in Appendix Z to the Department of State ("DOS") January 2014 Final Supplemental Environmental Impact Statement ("Final SEIS"). These federal regulations and additional conditions are intended to ensure adequate protection for the public and the environment and to prevent crude oil pipeline accidents and failures.
23	The current estimated cost of the Keystone Project in South Dakota is \$921.4 million. Ex TC-1, 1.3, p. 1.	The current estimated cost of the Keystone XL Project in South Dakota is \$1.974 billion. The estimated cost of the South Dakota portion of the project has primarily increased due to the new technical requirements (for example, the 59 additional conditions set forth in the DOS Final SEIS), and inflation and additional costs (for example, increased project management; regulatory; and material storage and preservation costs) due to the projected six-year delay in starting construction.
Demand for the Facility		
24	The transport of additional crude oil production from the WCSB is necessary to meet growing demand by refineries and markets in the U.S. The need for the project is dictated by a number of factors, including increasing WCSB crude oil supply combined with insufficient export pipeline capacity; increasing crude oil demand in the U.S. and decreasing domestic crude supply; the opportunity to reduce U.S. dependence on foreign off-shore oil through increased access to stable, secure Canadian crude oil supplies; and binding shipper commitments to utilize the Keystone Pipeline Project. Ex TC-1, 3.0, p. 23.	The June 29, 2010 order recites Findings of Fact demonstrating the strong demand for the Project. Given the dynamic nature of the crude oil market, there have been changes in the nature of this demand since 2010. As demonstrated below, however market demand for the Project remains strong today. The transport of additional crude oil production from the WCSB continues to be necessary to meet demand by refineries and markets in the U.S. The need for the project is driven by a number of factors, including increasing domestic U.S. and Canadian, crude oil production combined with insufficient pipeline capacity; an energy efficient and safe method to transport this growing production; the opportunity to reduce U.S dependence on foreign offshore crude oil through increased access to North American supplies; and binding shipper commitments to utilize the Keystone Pipeline System.
25	According to the U.S. Energy Information Administration ("EIA"), U.S. demand for petroleum products has increased by over 11 percent or 2,000,000 bpd over the past 10 years and is expected to increase further. The EIA estimates that total U.S. petroleum consumption will increase by approximately 10 million bpd over the next 10 years, representing average demand growth of about 100,000 bpd per year (EIA Annual Energy Outlook 2008). Ex TC-1, 3.2, pp. 23-24.	United States production of crude oil has increased significantly, from approximately 6.5 million barrels per day (bpd) in 2012, and is expected to peak at 9.6 million bpd by 2019. However, even with the domestic production growth, the U.S. is expected to remain a net importer of crude oil. According to the U.S. Energy Information Administration ("EIA"), U.S. demand for crude oil has held steady at approximately 15 million bpd and is expected to remain relatively stable into the future. ¹
26	At the same time, domestic U.S. crude oil supplies continue to decline. For example, over the past 10 years, domestic crude production in the United States has declined at an average rate of about 135,000 bpd per year, or 2% per year. Ex TC-1, 3.3, p. 24. Crude and refined petroleum product imports into the U.S. have increased by over 3.3 million bpd over the past 10 years. In 2007, the U.S. imported over 13.4 million bpd of crude oil and petroleum products or over 60 percent of total U.S. petroleum product	The rise in U.S. crude oil production, predominantly light crude, has replaced most foreign imports of light crude. However the demand persists for imported heavy crude oil by U.S. refineries that are optimally configured to process heavy crude slates. ² The U.S. Gulf Coast continues to import approximately 3.5 million bpd of heavy and medium sour crude oil. ³

¹ Energy Information Administration (EIA) Annual Energy Outlook 2014

² Id.

³ Energy Information Administration – Company Level Imports

Finding Number	Amended Final Decision and Order	Update
	consumption. Canada is currently the largest supplier of imported crude oil and refined products to the U.S., supplying over 2.4 million bpd in 2007, representing over 11 percent of total U.S. petroleum product consumption (EIA 2007). Ex TC-1, 3.4, p.24.	
27	The Project will provide an opportunity for U.S. refiners in Petroleum Administration for Defense District III, the Gulf Coast region, to further diversify supply away from traditional offshore foreign crude supply and to obtain direct access to secure and growing Canadian crude supplies. Access to additional Canadian crude supply will also provide an opportunity for the U.S. to offset annual declines in domestic crude production and, specifically, to decrease its dependence on other foreign crude oil suppliers, such as Mexico and Venezuela, the top two heavy crude oil exporters into the U.S. Gulf Coast. Ex TC-1, 3.4, p. 24.	<p>Canadian production of heavy crude oil continues to grow, the vast majority of which is currently exported to the United States to be processed by U.S. refineries. North American crude oil production growth and logistics constraints have contributed to significant discounts on the price of landlocked crude and led to growing volumes of crude shipped by rail in the United States and, more recently Canada. As the DOS Final SEIS makes clear, in the absence of new pipelines, crude oil will continue to be transported via rail at an increasing rate.⁴</p> <p>The North Dakota Pipeline Authority estimates that rail export volumes from the U.S. Williston Basin have increased from approximately 40,000 bpd in 2010 to over 700,000 bpd in early 2014. Over 60% of crude oil transported from the Williston Basin is delivered by rail.⁵ The industry has also been making significant investments in increasing rail transport capacity for crude oil out of the Western Canadian Sedimentary Basin (WCSB).⁶ In recent years, rail transport of crude oil in Canada has grown from approximately 10,000 bpd in 2010 to approximately 270,000 bpd by the end of 2013.⁷ The DOS Final SEIS indicates that transportation of crude oil by pipeline is safer and less greenhouse gas intensive than crude oil transportation by rail.⁸</p> <p>The Project will provide an opportunity for U.S. refiners in Petroleum Administration for Defense District III, the Gulf Coast region, to further diversify supply away from traditional offshore foreign crude supply and to obtain direct access to secure and growing domestic crude supplies.</p>
28	Reliable and safe transportation of crude oil will help ensure that U.S. energy needs are not subject to unstable political events. Established crude oil reserves in the WCSB are estimated at 179 billion barrels (CAPP 2008). Over 97 percent of WCSB crude oil supply is sourced from Canada's vast oil sands reserves located in northern Alberta. The Alberta Energy and Utilities Board estimates there are 175 billion barrels of established reserves recoverable from Canada's oil sands. Alberta has the second largest crude oil reserves in the world, second only to Saudi Arabia. Ex TC-1, 3.1, p. 23.	Reliable and safe transportation of crude oil will help ensure that U.S. energy needs are not subject to unstable political events. Of Canada's 173 billion barrels of oil reserves, 97% or 167 billion, barrels are located in the oil sands. In terms of overall oil reserves, Canada's 173 billion barrels is third only to Venezuela and Saudi Arabia. ⁹ Canada is the largest foreign supplier of crude oil to the U.S. and is likely to remain as such for the foreseeable future. ¹⁰
29	Shippers have already committed to long-term binding contracts, enabling Keystone to proceed with regulatory applications and construction of the pipeline once all regulatory, environmental, and other approvals are received. These long-term binding shipper commitments demonstrate a material endorsement of support for the Project, its economics, proposed route, and target market, as well as the need for additional pipeline capacity and access to Canadian crude supplies. Ex TC-1, 3.5, p. 24.	Shippers have committed to long-term binding contracts, enabling Keystone to proceed with regulatory applications and construction of the pipeline once all regulatory, environmental, and other approvals are received. These long-term binding shipper commitments demonstrate a material endorsement of support for the Project, its economics, proposed route, and target market, as well as the need for additional pipeline capacity to access domestic and Canadian crude supplies. The DOS Final SEIS independently confirms the continuing strong market demand. ¹¹
	Environmental	
32	Table 6 to the Application summarizes the environmental impacts that Keystone's analysis indicates could be expected to remain after its Construction Mitigation and Reclamation Plan (CMR Plan) are implemented. Ex TC-1, pp. 31-37.	Table 6 is still applicable. The latest version of the CMR Plan is Rev4, April 2012. Attachment A to this Tracking Table is a redline version showing changes to the CMR Plan from Rev1 to the current Rev4. Overall changes to the CMR Plan were made to clarify language, provide additional detail related to construction procedures and incorporate lessons learned from previous pipeline construction, current right-of-way conditions and project requirements

⁴ Final Supplemental Environmental Impact Statement, Keystone XL Pipeline Project, January 2014 at 1.4.3.2 and 1.4.3.3.

⁵ North Dakota Pipeline Authority 2014 <https://ndpipelines.files.wordpress.com/2012/04/nd-rail-estimate-april-2014.jpg>

⁶ Final Supplemental Environmental Impact Statement Keystone XL Pipeline Project, January 2014 at 1.4.1.3

⁷ Transportation Safety Board of Canada <http://www.tsb.gc.ca/eng/recommandations-recommendations/rail/2014/rec-r1401-r1403.asp>

⁸ Final Supplemental Environmental Impact Statement, Keystone XL Pipeline Project, January 2014, Chapter 5 and Errata Sheet at <http://keystonepipeline-xl.state.gov/documents/organization/227464.pdf>.

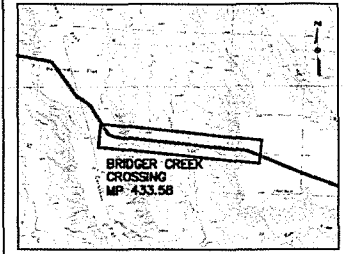
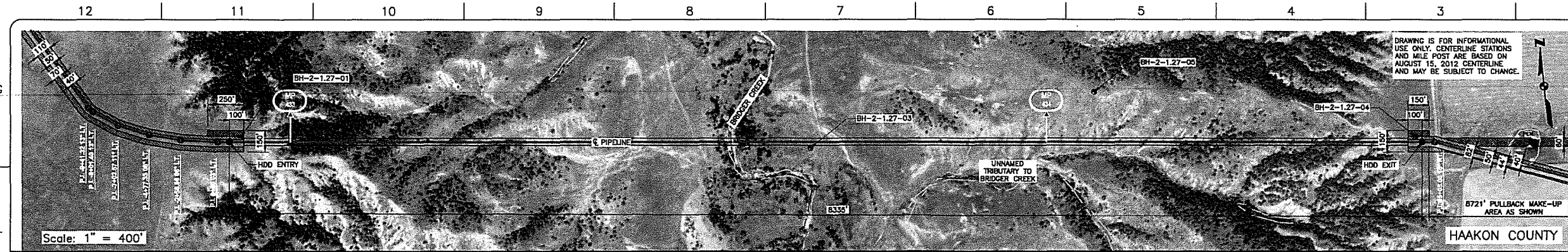
⁹ Canadian Association of Petroleum Producers (CAPP) Crude Oil Forecast, Markets & Transportation June 2014

¹⁰ EIA Annual Energy Outlook 2014

¹¹ Final Supplemental Environmental Impact Statement, Keystone XL Pipeline Project, January 2014 at 1.3.1 and 1.4.2.6

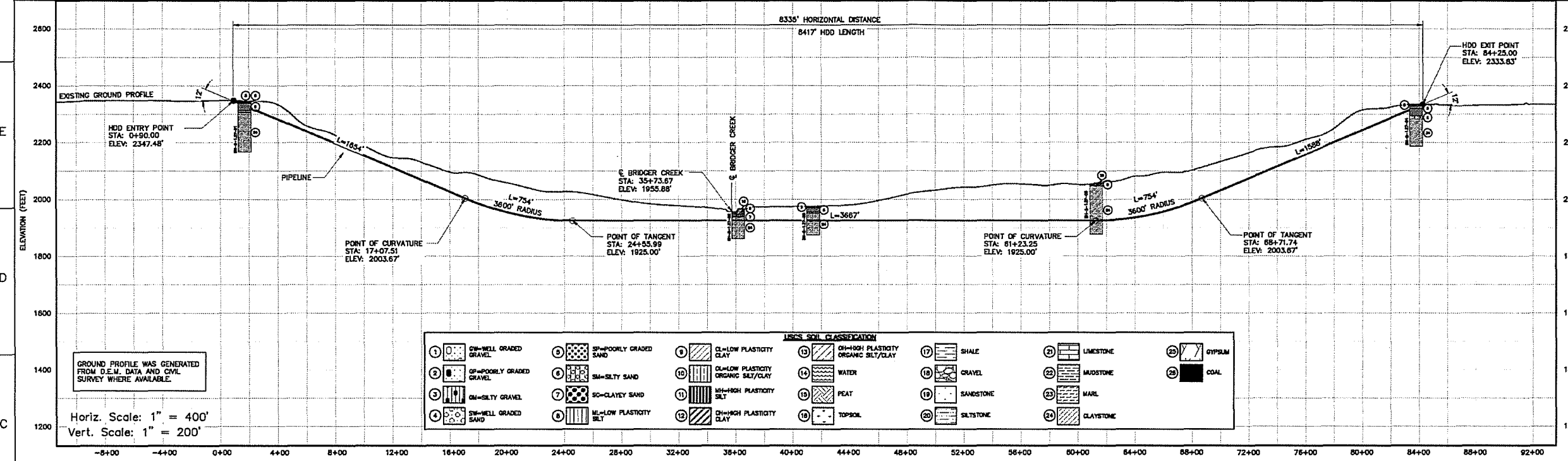
Finding Number	Amended Final Decision and Order	Update
33	The pipeline will cross the Unglaciaded Missouri Plateau. This physiographic province is characterized by a dissected plateau where river channels have incised into the landscape. Elevations range from just over 3,000 feet above mean sea level in the northwestern part of the state to around 1,800 feet above mean sea level in the White River valley. The major river valleys traversed include the Little Missouri River, Cheyenne River, and White River. Ex TC-1, 5.3.1, p. 30; Ex TC-4, ¶ 15. Exhibit A to the Application includes soil type maps and aerial photograph maps of the Keystone pipeline route in South Dakota that indicate topography, land uses, project mileposts and Section, Township, Range location descriptors. Ex TC-1, Exhibit A. Updated versions of these maps were received in evidence as Exhibit TC-14.	The soil type maps and aerial photograph maps of the Keystone pipeline route in South Dakota that indicate topography, land uses, project mileposts and Section, Township, Range location descriptors that were submitted in evidence as Exhibit TC-14 are still generally consistent in the description of the current Project route through South Dakota. Keystone will submit updated maps prior to the initiation of construction as required by Condition No. 6 of the Amended Final Decision and Order.
41	Fifteen perennial streams and rivers, 129 intermittent streams, 206 ephemeral streams and seven man-made ponds will be crossed during construction of the Project in South Dakota. Keystone will utilize horizontal directional drilling ("HDD") to cross the Little Missouri, Cheyenne and White River crossings. Keystone intends to use open-cut trenching at the other perennial streams and intermittent water bodies. The open cut wet method can cause the following impacts: loss of in-stream habitat through direct disturbance, loss of bank cover, disruption of fish movement, direct disturbance to spawning, water quality effects and sedimentation effects. Alternative techniques include open cut dry flume, open cut dam-and-pump and horizontal directional drilling. Exhibit C to the Application contains a listing of all water body crossings and preliminary site-specific crossing plans for the HDD sites. Ex TC-14. Permitting of water body crossings, which is currently underway, will ultimately determine the construction method to be utilized. Keystone committed to mitigate water crossing impacts through implementation of procedures outlined in the CMR Plan. Ex TC-1, 5.4.1, pp. 45-46.	Fifteen perennial streams and rivers, 129 intermittent streams, and 206 ephemeral streams will be crossed during construction of the Project in South Dakota. No man-made ponds are crossed. Keystone will utilize horizontal directional drilling ("HDD") to cross the Little Missouri, Cheyenne, Bad, and White rivers, as well as Bridger Creek. Keystone intends to use open-cut trenching at other perennial streams and intermittent water bodies. The open cut wet method can cause the following impacts: loss of in-stream habitat through direct disturbance, loss of bank cover, disruption of fish movement, direct disturbance to spawning, water quality effects and sedimentation effects. Alternative techniques include open cut dry flume, open cut dam-and-pump and horizontal directional drilling. To supplement Exhibit C to the Application, Attachment B to this Tracking Table contains the preliminary site-specific crossing plans for the two newly identified HDD crossings; Bad River and Bridger Creek.
50	The total length of Project pipe with the potential to affect a High Consequence Area ("HCA") is 34.3 miles. A spill that could affect an HCA would occur no more than once in 250 years. TC-12, ¶ 24.	The total length of Project pipe with the potential to affect a High Consequence Area ("HCA") is 19.9 miles. A spill that could affect an HCA would occur no more than once in 250 years.
54	Of the approximately 314-mile route in South Dakota, all but 21.5 miles is privately owned. 21.5 miles is state-owned and managed. The list is found in Table 14. No tribal or federal lands are crossed by the proposed route. Ex TC-1, 5.7.1, p. 75.	Of the approximately 315-mile route in South Dakota, all but 27.9 miles are privately owned. 1.7 miles are local government owned, and 26.3 miles are state-owned and managed. No tribal or federal lands are crossed by the route.
Design and Construction		
60	Keystone has applied for a special permit ("Special Permit") from PHMSA authorizing Keystone to design, construct, and operate the Project at up to 80% of the steel pipe specified minimum yield strength at most locations. TC-1, 2.2, p. 8; TR 62. In Condition 2, the Commission requires Keystone to comply with all of the conditions of the Special Permit, if issued.	Keystone withdrew its request to PHMSA for a special permit ("Special Permit") on August 5, 2010. Keystone will implement 59 additional safety measures as set forth in the DOS Final SEIS, Appendix Z. These measures provide an enhanced level of safety equivalent to or greater than those that would have applied under the previously requested Special Permit.
61	TransCanada operates approximately 11,000 miles of pipelines in Canada with a 0.8 design factor and requested the Special Permit to ensure consistency across its system and to reduce costs. PHMSA has previously granted similar waivers adopting this modified design factor for natural gas pipelines and for the Keystone Pipeline. Ex TC-8, ¶¶ 13, 17.	[Finding 61 is no longer relevant as Keystone has withdrawn its request for a Special Permit].
62	The Special Permit is expected to exclude pipeline segments operating in (i) PHMSA defined HCAs described as high population areas and commercially navigable waterways in 49 CFR Section 195.450; (ii) pipeline segments operating at highway, railroad, and road crossings; (iii) piping located within pump stations, mainline valve assemblies, pigging facilities, and measurement facilities; and (iv) areas where the MOP is greater than 1,440 psig. Ex TC-8, ¶ 16.	[Finding 62 is no longer relevant as Keystone has withdrawn its request for a Special Permit.]
63	Application of the 0.8 design factor and API 5L PSL2 X70 high-strength steel pipe results in use of pipe with a 0.463 inch wall thickness, as compared with the 0.512 inch wall thickness under the otherwise applicable 0.72 design factor, a reduction in thickness of .050 inches. TR 61. PHMSA previously found that the issuance of a waiver is not inconsistent with pipeline safety and that the waiver will provide a level of safety equal to or greater than that which would be provided if the pipeline were operated under the otherwise applicable regulations. Ex TC-8, ¶ 15.	The pipeline will operate at a maximum operating pressure of 1,307 psig. Use of API 5L X70 high-strength steel results in a 0.465 inch nominal pipe wall thickness. For location specific low elevation segments close to the discharge of pump stations, the maximum operating pressure will be 1,600 psig. Pipe associated with these segments of 1,600 psig MOP will have a design factor of 0.72 and a nominal pipe wall thickness of 0.572 inch (X-70M).

Finding Number	Amended Final Decision and Order	Update
68	TransCanada has thousands of miles of this particular grade of pipeline steel installed and in operation. TransCanada pioneered the use of FBE, which has been in use on its system for over 29 years. There have been no leaks on this type of pipe installed by TransCanada with the FBE coating and cathodic protection system during that time. When TransCanada has excavated pipe to validate FBE coating performance, there has been no evidence of external corrosion. Ex TC-8, ¶ 27.	TransCanada has thousands of miles of this particular grade of pipeline steel installed and in operation. TransCanada pioneered the use of FBE, which has been in use on its system for over 33 years. There have been no leaks on this type of pipe installed by TransCanada with the FBE coating and cathodic protection system during that time. When TransCanada has excavated pipe to validate FBE coating performance, there has been no evidence of external corrosion except for one instance where an adjacent foreign utility interfered with the cathodic protection system. No similar situations exist on the Project in South Dakota.
73	The Applicant has prepared a detailed CMR Plan that describes procedures for crossing cultivated lands, grasslands, including native grasslands, wetlands, streams and the procedures for restoring or reclaiming and monitoring those features crossed by the Project. The CMR Plan is a summary of the commitments that Keystone has made for environmental mitigation, restoration and post-construction monitoring and compliance related to the construction phase of the Project. Among these, Keystone will utilize construction techniques that will retain the original characteristics of the lands crossed as detailed in the CMR Plan. Keystone's thorough implementation of these procedures will minimize the impacts associated with the Project. A copy of the CMR Plan was filed as Exhibit B to Keystone's permit application and introduced into evidence as TC-1, Exhibit B.	Keystone has updated its CMR Plan since the Amended Final Decision and Order. Overall changes to the CMR Plan were made to clarify language, provide additional detail related to construction procedures and incorporate lessons learned from previous pipeline construction, current right-of-way conditions and project requirements. A redlined version of the CMR Plan showing changes since the version considered in 2010 is attached as Attachment A to this Tracking Table.
80	Keystone is in the process of preparing, in consultation with the area National Resource Conservation Service, construction/reclamation unit ("Con/Rec Unit") mapping to address differing construction and reclamation techniques for different soils conditions, slopes, vegetation, and land use along the pipeline route. This analysis and mapping results in the identification of segments called Con/Rec Units. Ex. TC-5; TC-16, DR 3-25.	In consultation with the area National Resource Conservation Service, Keystone has completed construction/reclamation unit ("Con/Rec Unit") mapping to address differing construction and reclamation techniques for different soils conditions, slopes, vegetation, and land use along the pipeline route.
83	Keystone will utilize HDD for the Little Missouri, Cheyenne and White River crossings, which will aid in minimizing impacts to important game and commercial fish species and special status species. Open-cut trenching, which can affect fisheries, will be used at other perennial streams. Keystone will use best practices to reduce or eliminate the impact of crossings at the perennial streams other than the Cheyenne and White Rivers. Ex TC-1, 5.4.1, p. 46; 5.6.2, p. 72; TC-16, DR 3-39.	Keystone will utilize HDD for the Little Missouri, Cheyenne, Bad and White River crossings, as well as Bridger Creek, which will aid in minimizing impacts to important game and commercial fish species and special status species. Open-cut trenching, which can affect fisheries, will be used at other perennial streams. Keystone will use best practices to reduce or eliminate the impact of crossings at the perennial streams that are open cut.
Operation and Maintenance		
90	The Keystone pipeline will be designed constructed, tested and operated in accordance with all applicable requirements, including the PHMSA regulations set forth at 49 CFR Parts 194 and 195, as modified by the Special Permit. These federal regulations are intended to ensure adequate protection for the public and the environment and to prevent crude oil pipeline accidents and failures. Ex TC-8, ¶ 2.	The Keystone pipeline will be designed constructed, tested and operated in accordance with all applicable requirements, including the PHMSA regulations set forth at 49 CFR Parts 194 and 195, and the 59 PHMSA Special Conditions as set forth in DOS Final SEIS, Appendix Z. These federal regulations and additional conditions are intended to ensure adequate protection for the public and the environment and to prevent crude oil pipeline accidents and failures.
Socio-Economic Factors		
107	Socio-economic evidence offered by both Keystone and Staff demonstrates that the welfare of the citizens of South Dakota will not be impaired by the Project. Staff expert Dr. Michael Madden conducted a socio-economic analysis of the Keystone Pipeline, and concluded that the positive economic benefits of the project were unambiguous, while most if not all of the social impacts were positive or neutral. S-2, Madden Assessment at 21. The Project, subject to compliance with the Special Permit and the Conditions herein, would not, from a socioeconomic standpoint: (i) pose a threat of serious injury to the socioeconomic conditions in the project area; (ii) substantially impair the health, safety, or welfare of the inhabitants in the project area; or (iii) unduly interfere with the orderly development of the region.	[Keystone has withdrawn its Special Permit application but will comply with the 59 additional conditions set forth in the DOS Final SEIS, Appendix Z, which provide an enhanced level of safety equivalent to or greater than those that would have applied under the requested Special Permit.] The increased cost of the Project reflected in updated Finding 23 is likely to result in increased tax revenue to the affected counties.



DRAWING IS FOR INFORMATIONAL USE ONLY. CENTERLINE STATIONS AND MILE POST ARE BASED ON AUGUST 15, 2012 CENTERLINE AND MAY BE SUBJECT TO CHANGE.

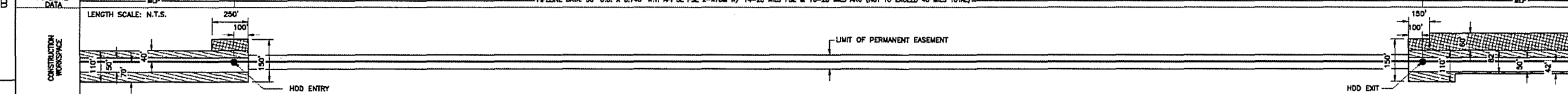
HAAGON COUNTY



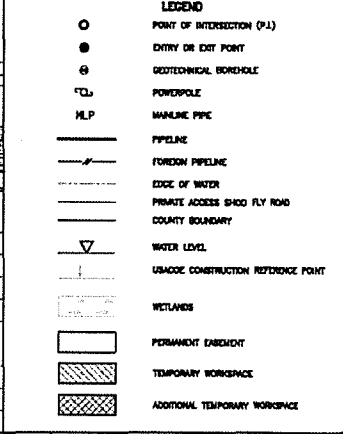
1: 0% - WELL GRADED GRAVEL	5: 3% - POORLY GRADED SAND	9: 0% - LOW PLASTICITY CLAY	13: 0% - HIGH PLASTICITY ORGANIC SILT/CLAY	17: SHALE	21: LIMESTONE	25: GYPSUM
2: 0% - POORLY GRADED GRAVEL	6: 8% - SILTY SAND	10: 0% - LOW PLASTICITY ORGANIC SILT/CLAY	14: WATER	18: GRAVEL	22: MAUDSTONE	26: COAL
3: 0% - SILTY GRAVEL	7: 50% - CLAYEY SAND	11: 0% - HIGH PLASTICITY SILT	15: PEAT	19: SANDSTONE	23: MARL	
4: 5% - WELL GRADED SAND	8: 0% - LOW PLASTICITY SILT	12: 0% - HIGH PLASTICITY CLAY	16: TOPSOIL	20: SILTSTONE	24: CLAYSTONE	

- INSTALLATION NOTES**
- ACCESS: ALL EQUIPMENT MUST ACCESS THE SITE ALONG THE CONSTRUCTION RIGHT-OF-WAY FROM PUBLIC OR APPROVED PRIVATE ROADS.
 - VEHICLE AND EQUIPMENT ACCESS CROSSINGS MAY BE INSTALLED IF APPROVED BY THE ENVIRONMENTAL INSPECTOR.
 - WORK SPACE: WORK SPACE LIMITS ARE SHOWN. CLEARING WILL BE RESTRICTED TO THE WORK SPACES INDICATED AT THE ENTRY AND EXIT POINTS AND PULLBACK MAKE-UP AREA ALONG THE ROUTE. CLEARING BETWEEN THE ENTRY AND EXIT POINTS IS LIMITED TO THE MINIMUM AMOUNT NECESSARY TO STAIN LOGS AND INSTALL PILING AND FILING TO DRIVE WATER (WHERE APPROVED).
 - WATER SOURCE: DRILL WATER AND PRE-INSTALLATION HYDROSTATIC TEST WATER SHALL BE OBTAINED FROM AN APPROVED SOURCE. THE CONTRACTOR SHALL SCREEN THE WATER TO PREVENT THE ENTRAPMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH THE ENVIRONMENTAL INSPECTOR AND REclamation PLAN (EQUIP AND PROJECT REQUIREMENTS). THE HOSE SHALL BE RIGID TO THE BOTTOM OF THE WORK BODY.
 - HYDROSTATIC TEST: PRE-INSTALLATION HYDROSTATIC TEST SHALL BE CONDUCTED IN ACCORDANCE WITH PERMIT REQUIREMENTS. THE CONTRACTOR SHALL DISCHARGE HYDROSTATIC TEST WATER IN ACCORDANCE WITH PERMIT REQUIREMENTS. DISCHARGE SHALL BE SENT BACK TO THE WATER SOURCE UNLESS OTHERWISE DIRECTED BY THE ENVIRONMENTAL INSPECTOR. CONTRACTOR SHALL NOT CAUSE DEBRIS OR SEDIMENTATION TO REDUCE THE VELOCITY OF THE DISCHARGE. THE CONTRACTOR SHALL UTILIZE AN ENERGY-DISSIPATING DEVICE AS DESCRIBED IN THE CWP.
 - SPILL-PREVENTION: ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND CONTINGENCY PLAN (SPECIFIC EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATER BODY OR WETLAND SHALL BE OPERATED AND REVIEWED IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL PLAN. EACH CONSTRUCTION CREW SHALL OPERATE ON APPROVED TOOLS AND MATERIALS TO STOP LEAKS AND SUPPLIES OF ARGON AND BURNER MATERIALS TO ALLOW RAPID COMPARTMENT AND RECOVERY OF SPILLED MATERIALS.
 - DEBRIS 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.
 - TOPSOIL SHALL BE STRIPPED AS REQUIRED BY PROJECT SPECIFICATIONS.
 - PRIOR TO PIPE PULLBACK, CONTRACTOR'S ACTUAL DRILL PROFILE SHALL BE SUBMITTED TO REVIEW FOR APPROVAL.
 - 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 ACCESS THE NEED FOR AND SUPPLY APPROPRIATE BALLAST DURING PULLBACK.
 - WASTE DISPOSAL: CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT REQUIREMENTS. UNDESIRABLE CONCENTRATIONS OF DRILLING FLUID BE DEPOSITED IN WATER BODIES OR WETLANDS. ANY DRILLING MUD WHICH INFRINGES UPON OTHER RIGHTS OR IS COLLECTED TO THE EJECTOR PUMP, AND REMOVED OF AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT REQUIREMENTS.
 - CLEANUP/RECLAMATION/RESTORATION: ALL DISTURBED AREAS SHALL BE RETURNED TO THE ORIGINAL CONTOUR. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED IN PROJECT DOCUMENTS.
 - NORMAL WORKING SPACE DIMENSIONS ARE SHOWN. LARGER AREAS MAY BE REQUIRED IN IRREGULAR TERRAIN. LARGER DIMENSIONS MAY BE PROVIDED AFTER LOCAL TOPOGRAPHICAL SURVEYS ARE PERFORMED.
 - PIPELINE DATA: 36" O.D. X 0.485" W.T. API 5L PSL 2-X70M W/ 14-20 MILS FBE & 16-20 MILS ARO (NOT TO EXCEED 40 MILS TOTAL)
 - PIPELINE DATA: 36" O.D. X 0.485" W.T. API 5L PSL 2-X70M W/ 14-20 MILS FBE

CROSSING INFORMATION	-7402.57 P.L. 11' LI. -4472.33 P.L. 06' LI. -2458.96 P.L. 06' LI. 01.00 P.L. 03' LI.	CLEARING HDD ENTRY POINT BH-2-1.27-01	17+407.51 P.T. OF CURVATURE 24+55.99 P.T. OF TANGENT 35+73.87 BRIGGER CREEK 36+17 BH-2-1.27-02 41+41 BH-2-1.27-03	81+28 BH-2-1.27-05 84+25.00 P.T. OF CURVATURE 88+71.74 P.T. OF TANGENT 84+25.00 BH-2-1.27-04 84+25.00 HDD EXIT POINT 88+71.74 P.L. 15' RT.
PIPELINE DATA	M-LP PIPELINE DATA: 36" O.D. X 0.485" W.T. API 5L PSL 2-X70M W/ 14-20 MILS FBE & 16-20 MILS ARO (NOT TO EXCEED 40 MILS TOTAL) M-LP			



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





TO BE DETERMINED

REFERENCE DRAWINGS	
DRAWING No	TITLE
4367-03-ML-02-028	ALIGNMENT SHEET

REVISION		APPROVAL							
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
A	2012-03-30	ISSUED FOR REVIEW	2095406	AH	YL	BS	REW	RQ	EXP
B	2012-06-07	UPDATED CENTERLINE (2012-08-15)	2095406	JB	YL	BS	KM	RQ	EXP

PROFESSIONAL ENGINEER/RPT RAYMOND E. WALLACE, JR. PE SD - 10070	PERMIT/ ENG. APPROVAL
	DATE _____
PRELIMINARY	
REV. NO.	DATE
	PERMIT NUMBER

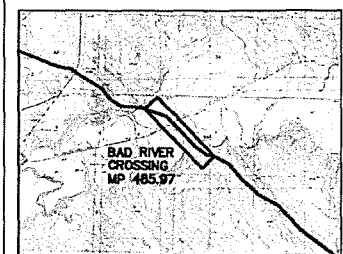
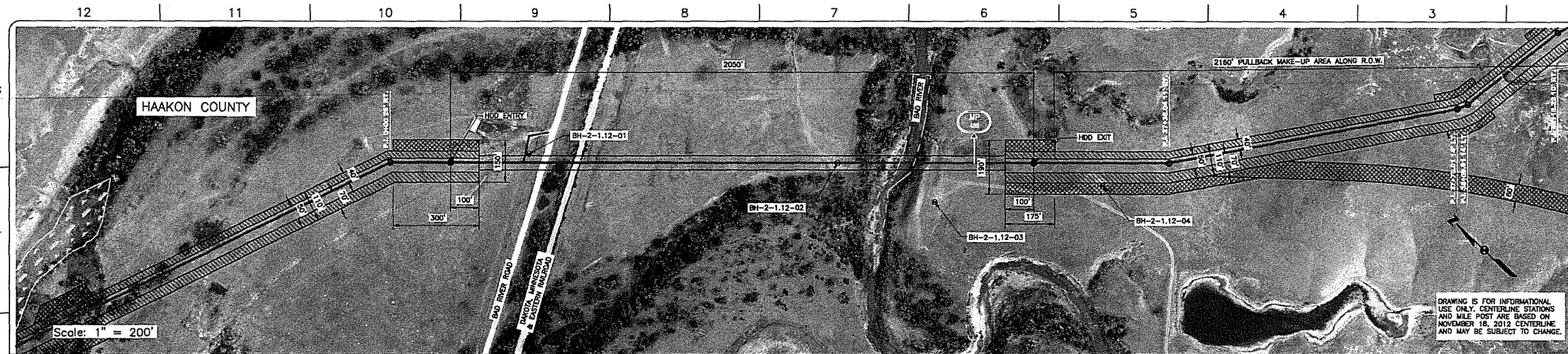



KEYSTONE XL (NPS 36 2014) FAITH SECTION

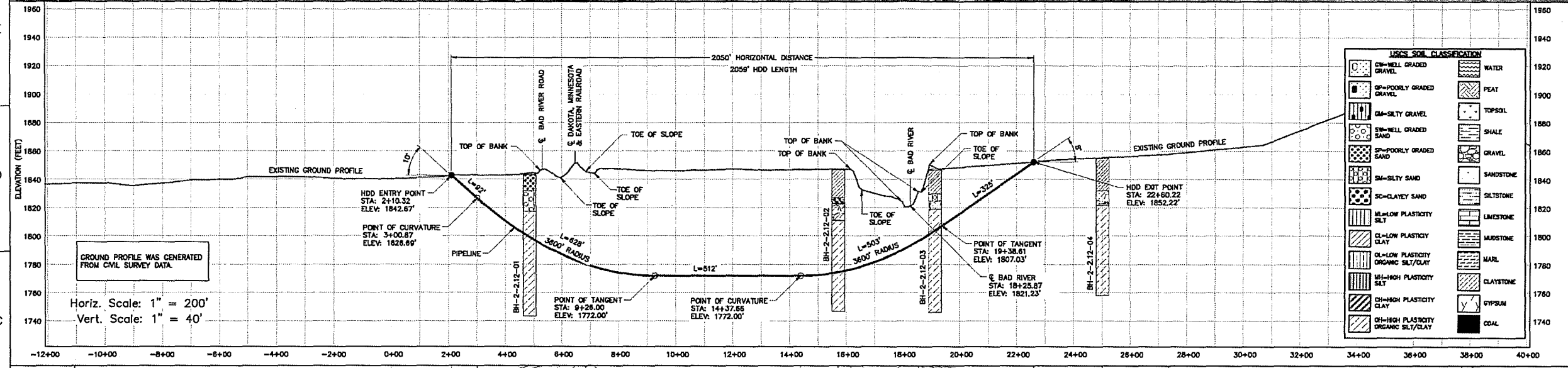
FA # 4367	CHAINAGE: MP 433.58	DISCIPLINE # 03
BRIGGER CREEK HDD INSTALLATION		
KEYSTONE XL PROJECT		
HAAGON COUNTY, SOUTH DAKOTA		

SCALE AS SHOWN
DRAWING No 4367-03-ML-03-003
REV B

TIME DESIGNLINE



- 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 ENTRAPMENT OF FISH OR DEBRIS AND IN ACCORDANCE WITH THE CONSTRUCTION MITIGATION AND RECLAMATION PLAN (CWRP) AND PROJECT REQUIREMENTS, THE HOSE SHALL BE NOT TO 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 SENT 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 CHANNEL. THE CONTRACTOR SHALL UTILIZE AN ENERGY-DISSIPATING DEVICE AS DESCRIBED IN THE CWRP.
 - 6) SPILL-PREVENTION: ALL PUMPS SHALL BE SET IN SECONDARY CONTAINMENT AND IN ACCORDANCE WITH THE SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SCCP). EQUIPMENT AND PUMPS OPERATING WITHIN 100 FEET OF ANY WATER BODY OR WETLAND SHALL BE OPERATED AND MAINTAINED IN ACCORDANCE WITH THE SCCP PLAN. EQUIPMENT REPAIRING 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 SUPPLY OF ABSORBENT AND DRAINAGE 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) HAZARDOUS WASTE: CONTRACTOR SHALL DISPOSE OF EXCESS DRILLING MUD AS DIRECTED BY THE COMPANY REPRESENTATIVE IN ACCORDANCE WITH PERMIT CONDITIONS. LEAKS OR OVERSPILLS SHALL BE IMMEDIATELY REPORTED TO THE COMPANY REPRESENTATIVE. ANY DRILLING MUD WHICH INADEQUATELY 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 RESTORED TO THE ORIGINAL CONDITIONS. DISTURBED AREAS SHALL BE SEEDED AS SPECIFIED IN PROJECT DOCUMENTS.
 - 13) NORMAL WORKING SPACE DIMENSIONS ARE SHOWN. LARGER AREAS MAY BE REQUIRED IN SPECIAL CASES. UPDATED DIMENSIONS MAY BE PROVIDED AFTER LOCAL TOPOGRAPHICAL SURVEYS ARE PERFORMED.
 - 14) PIPELINE DATA: 36" O.D. X 0.515" W.T., API 5L PSL 2-X70M W/ 14-20 MILS @ 15-20 MILS OF ARO (NOT TO EXCEED 40 MILS TOTAL).
 - 15) PIPELINE DATA: 36" O.D. X 0.485" W.T., API 5L PSL 2-X70M W/ 14-20 MILS PFC.



CROSSING INFORMATION SYSTEM	0+00 P.L. 26 RT.	2+10.32 HDD ENTRY POINT	3+00.87 PT OF CURVATURE	4+00	5+25	6+17	7+15	8+45	9+28.00 PT OF TANGENT	14+37.06 PT OF CURVATURE	15+72	16+15	17+95	18+45	19+14	19+38.81	22+60.22 HDD EXIT POINT	24+02	27+11.11 P.L. 11 LT.	37+70.01 P.L. 14 LT.	38+09.31 P.L. 14 LT.	
	PIPELINE DATA: 36" O.D. X 0.515" W.T., API 5L PSL 2-X70M W/ 14-20 MILS																					
PIPELINE DATA	PIPELINE DATA: 36" O.D. X 0.748" W.T., API 5L PSL 2-X70M W/ 14-20 MILS & 18-20 MILS OF ARO (NOT TO EXCEED 40 MILS TOTAL) SEE NOTE 15																					
CONSTRUCTION WORKSPACE	LIMIT OF PERMANENT EASEMENT																					
ENVIRONMENTAL MITIGATION/RECLAMATION	TOPSOIL SALVAGE METHOD STREAMS WETLANDS TIMING CONSTRAINTS MILEPOST MONITORING RECLAMATION SPECIAL CONSIDERATIONS																					

DRAWING No	REFERENCE DRAWINGS	TITLE
4368-03-ML-02-027	ALIGNMENT SHEET	
4368-03-ML-03-028	ALIGNMENT SHEET	

REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAFTING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER	COMPANY
A	2008-07-31	ISSUED FOR UNITED STATES DEPARTMENT OF STATE (2008-07-31 CL)	2095408	BM	JP	FP	REW	RG	EXP
B	2008-12-08	ISSUED FOR REVIEW (2008-12-01 CL)	2095408	BM	AH	FP	REW	RG	EXP
C	2011-07-06	UPDATED EASEMENTS	2095408	AH	AH	BS	REW	RG	EXP
D	2011-09-23	UPDATED CENTERLINE (2011-09-21 CL)	2095408	JB	AH	BS	REW	RG	EXP
E	2012-03-16	UPDATED CENTERLINE (2012-03-14 CL)	2095408	BM	AH	BS	REW	RG	EXP
F	2012-09-20	UPDATED CENTERLINE (2012-08-16 CL)	2095408	JB	AH	BS	KM	RG	EXP
G	2012-12-14	ISSUED FOR REVIEW	2095408	JB	AH	BS	KM	RG	EXP

PROFESSIONAL ENGINEER/RPT	PERMIT/ ENG. APPROVAL	
	DATE	
PRELIMINARY		
REV. NO.	DATE	PERMIT NUMBER:

TransCanada
In business to deliver

exp Energy Services Inc.
1+1.800.286.6441 | 1+1.800.388.5423
1323 Montgomery Drive
Tulsa, OK 74103
USA

KEYSTONE XL (NPS 36 2014) HAAKON SECTION
FA # 4368 | CHANGE: MP 485.97 | DISCIPLINE # 03

BAD RIVER HDD INSTALLATION
KEYSTONE XL PROJECT
HAAKON COUNTY, SOUTH DAKOTA

SCALE AS SHOWN | DRAWING No 4368-03-ML-03-001 | REV G