



GRENCORE CO₂ PIPELINE PROJECT

PLAN OF DEVELOPMENT

January 2011

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1.0 Introduction

This Plan of Development (POD) describes measures to be taken by Greencore Pipeline Company, LLC (Greencore) and its contractors (Contractor) during construction, operation, and maintenance of the Greencore CO₂ Pipeline Project (Project) that runs from Lost Cabin, Wyoming to Belle Creek, Montana (Figure 1). The primary objective of the POD is to establish procedures for implementation of Best Management Practices (BMPs) and mitigation measures for this project. This POD is based on the current Proposed Action as presented by Greencore. Updates and modification will be incorporated into this plan as necessary.

Measures identified in this plan apply to work within the project area defined as the right-of-way, access roads, temporary use areas, and other areas used during construction of the project. Greencore and Contractor personnel are to be thoroughly familiar with this plan and its contents prior to initiating construction on the project.

1.1 Purpose of Plan

The purpose of this POD is to provide guidelines and general reference for each construction phase, mitigation measures, operation, and maintenance of the Project. The POD incorporates site specific typical drawings and schematics for contractors and construction crews to ensure safe and proper construction. The POD should be used in conjunction with other site specific plans and permit stipulations and can be amended as construction modifications develop.

Detailed maps are provided in the alignment sheets referenced throughout this document. The alignment sheets contain detailed project mapping of the project right-of-way including the crossing points of linear features such as highways, county roads, utilities, railroads, and water bodies. Location and dimensions of Additional Temporary Work Space (ATWS) are also included on the alignment sheets. The alignment sheets are included separately.

1.2 Permits Stipulations and Timing Restrictions

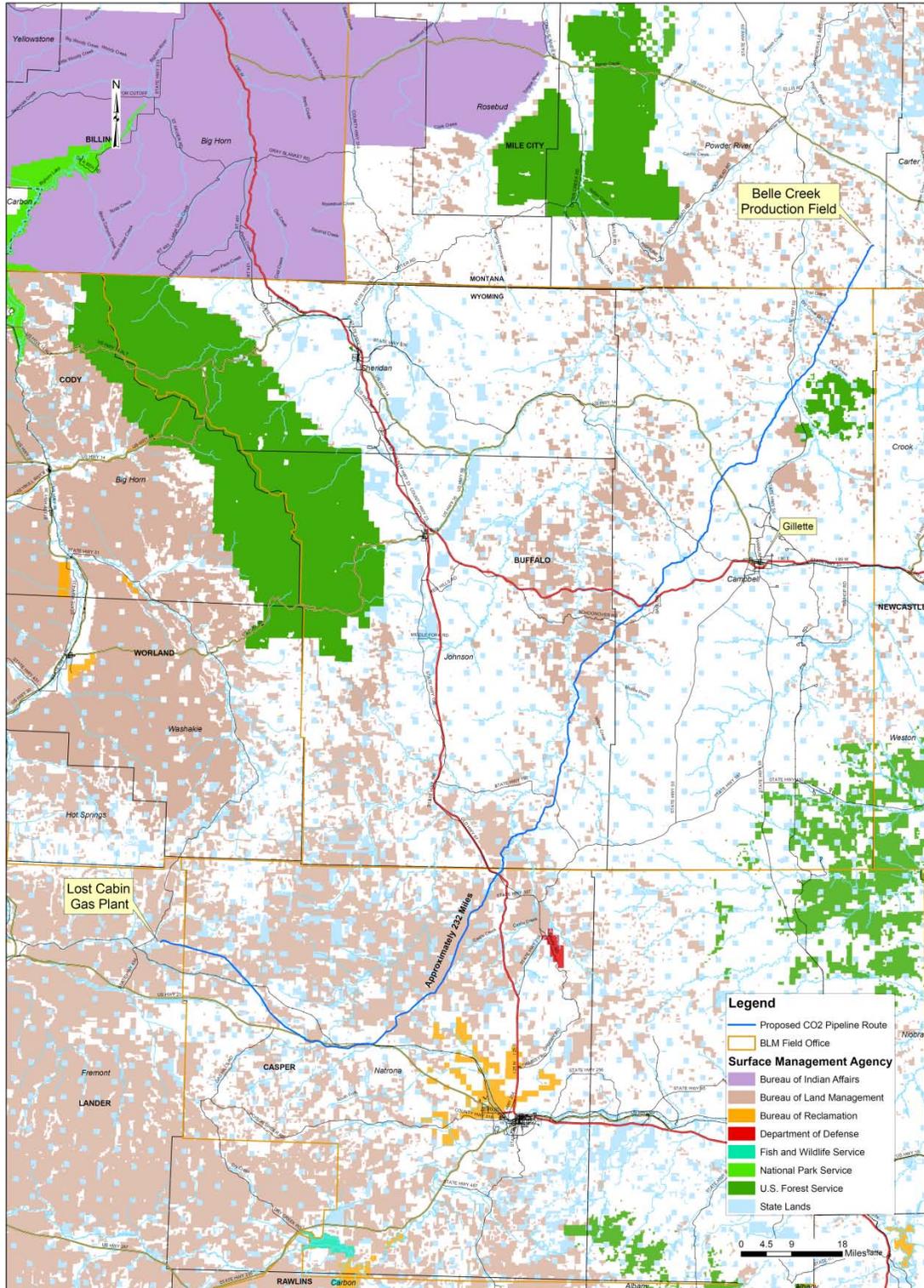
The project traverses several jurisdictional boundaries, including federal and state lands. Greencore will obtain all federal, state, and local permits prior to construction of the project. Construction timing restrictions will also apply to portions of the route and are described in the Environmental Assessment and indicated on the Alignment Sheets. Permit stipulations included in Appendix A. List of permits and/or agencies consulted are listed in Table 1.2-1.

Table 1.2-1
PERMIT LIST

Agency	Nature of Action	Authority
Federal Permits, Approvals, and Reviews		
U.S. Department of the Interior (USDOI), BLM	Grant right-of-ways and issue temporary use permits	Section 28 of the Mineral Leasing Act of 1920
	Issue materials sales contracts	Materials Act of 1947, as amended; 30 U.S.C. 601, 602; 43 CFR 3600
	Issue antiquities and cultural resource use permit to excavate or remove cultural resources on federal lands	Antiquities Act of 1906, 16 U.S.C. Section 431-433; Archaeological Resources Public Protection Act of 1979, 16 U.S.C. Section 470aa-47011; 43 CFR Part 3
	Approve pesticide use proposal	BLM Manual 9011.1, Guidelines for Conducting Chemical Pest Control Program
U.S. Fish and Wildlife Service (USFWS)	Section 7 Consultation process for endangered or threatened species	Endangered Species Act of 1973; 16 U.S.C. 1531 et seq.
U.S. Department of Transportation (DOT) Federal Highway Administration (FHA)	Issue permits to cross federal-aid highways	23 U.S.C. Sections 116, 123, 23 CFR Part 645 Subpart B
U.S. Army Corps of Engineers (USACOE)	Issue Section 404 permit for placement of dredged or filled material in waters of the U.S.	Section 404 of the Clean Water Act of 1972 (40 CFR 122-123); 33 U.S.C. Section 1344; 33 CFR Parts 323, 325
	Issue Section 10 permit for crossing navigable water in the United States	Section 10 of the Rivers and Harbors Act of 1899, 33 U.S.C. 401-413
U.S. Department of the Treasury Bureau of Alcohol, Tobacco and Firearms	Issue permits to purchase, store, and use explosives	Section 1102(a) of the Organized Crime Control Act of 1970, 18 U.S.C. Section 841-848; 27 CFR Part 181
Advisory Council on Historic Preservation (ACHP)	Review and compliance activities related to cultural resources	Section 106 National Historic Preservation Act (16 U.S.C. 470) (36 CFR Part 80)
State of Wyoming		
Department of Environmental Quality (DEQ) – Water Quality Division	Issue National Pollution Discharge Elimination System (NPDES) Permit for discharges; prepare Storm Water Pollution Prevention Plan	Wyoming Environmental Quality Act, W.S. 35-11-301
Wyoming Highway Department	Issue permits for oversize and overweight loads	Chapters 17 and 20 of the Wyoming Highway Department Rules and Regulations
	Issue encroachment permits	Chapter 12 of the Wyoming Highway Department Rules and Regulations
State Land Board	Issue easements to cross state lands	W.S. 35-20 and 36-20

Agency	Nature of Action	Authority
Wyoming State Engineer's Office	Grant permit to appropriate water for hydrostatic testing, dust control, and other uses	W.S.41-121 through 147
State Historic Preservation Office (SHPO)	Review compliance activities related to cultural resources	Section 106 National Historic Preservation Act (16 U.S.C. 470) (36 CFR Part 80)
Wyoming Public Service Commission	Issue certificate of public convenience and necessity	W.S. 1977 and Wyoming Administrative Procedures Act
County Commissioners	Road crossing permits, land use permits, and licenses	County zoning regulations
County Health Departments	Temporary sanitation facilities	County sanitation requirements
State of Montana		
DEQ – Director's Office	Review and comment on environmental activities; review and use federal EA to meet Montana Environmental Policy Act (MEPA) requirements	MEPA
DEQ – Permitting and Compliance Division - Water Protection Bureau	Issue Montana Pollution Discharge Elimination System (MPDES) Permit for discharges; prepare Storm Water Pollution Prevention Plan; 318 Authorization (short-term water quality standard for turbidity); Section 401 Water Quality Certification	Montana Water Quality Act MCA 75-5-101
Department of Natural Resources and Conservation (DNRC) – Water Resources Division	Issue Water Appropriation Permits (Beneficial Water Use Permit) and/or Water Wells Drilling/Alteration for hydrostatic testing and dust control	Montana Water Use Act of 1973
DNRC – Trust Land Management Division	Review and process applications for right-of-ways and easements across state-administered surface lands and navigable waterways	MCA 77-1-130
DNRC – Conservation Districts Bureau; and Floodplain Management Section	Issue 310 Permits to physically alter or modify bed or banks of perennial streams; Floodplain Development Permits for new construction within a designated 100 year floodplain	Montana Natural Streambed and Land Preservation Act; Montana Floodplain and Floodway Management Act
Department of Fish, Wildlife and Parks	SPA124 permit issuance; comment on project and effects on natural resources and sensitive species	Montana Stream Protection Act
Department of Transportation	Issue permits for state highway crossing permits and permits for oversize and overweight loads	Montana Department of Transportation Rules and Regulations
Department of Transportation	Issue encroachment permits	MDT Rules and Regulations
SHPO	Review and compliance activities related to cultural resources	Section 106 National Historic Preservation Act (16 U.S.C. 470) (36 CFR Part 80)
Counties	Issue road crossing permits, land use permits, licenses, and authorization for temporary sanitation facilities	County zoning and sanitation regulations

FIGURE 1 LOCATION MAP



GREENCORE PIPELINE COMPANY LLC
CO2 Pipeline - Preliminary Route Map

CH2MHILL

Issue Date: July 21, 2010

2.0 Project Overview

Greencore will construct and operate approximately 231.1 miles of 20 inch-diameter CO₂ pipeline from the Conoco Philips Lost Cabin Gas Plant in Fremont County, Wyoming to a point in the Belle Creek Field oil field in Powder River County, Montana. The proposed pipeline would transport CO₂ as a dense-phase fluid for a proposed Enhanced Oil Recovery (EOR) project at the Belle Creek Field and, potentially to other delivery points when markets develop.

The pipeline route follows existing pipeline corridors wherever possible to minimize the surface impact, and traverses BLM approved utility corridors to support accelerating the BLM NEPA permitting process.

The pipeline will be designed to flow initial start up volumes of 50 million standard cubic feet per day (MMSCFD) from Lost Cabin. Future CO₂ supplies up to 775 MMSCFD will require additional facilities to be installed at the Natrona Hub and the potential addition of a Mid-point pump station.

The pipeline will be federally regulated by the Department of Transportation under 49 Code of Federal Regulations Part 195: Transportation of Hazardous Liquid by Pipeline. It will be designed in accordance with the applicable requirements of DOT 195 and will incorporate pig launching and receiving facilities, mainline block valves, meter station, cathodic protection, and supervisory control field equipment. Denbury Resources Inc. (DRI) will provide the existing SCADA Control Center inclusive of leak detection monitoring system. The pipeline is to operate below 2220 psig, Maximum Operating Pressure (MOP). The minimum operating pressure to ensure the CO₂ remains in the dense phase (liquid) is 1,200 psig.

2.1 Project Location

Greencore proposes to construct from a point in Township 38 North (T38N), Range 90 West (R90W), Section 11 at the Lost Cabin Gas Plant to a point in the Belle Creek Field, T8S, R54E, Section 27 (Figure 1) and Alignment Sheets (included separately).

2.2 Project Facilities and Associated Appurtenances

There would be a launcher and meter at the receipt point and a receiver and meter at the delivery point. Two temporary pipe yards (approximately 40 acres) would be required and will be shown on separate maps. Scraper traps, block valves, and takeoff valves are listed in Table 2.2-1. Facility schematics are included in Appendix B.

*Table 2.2-1
VALVE OPERATORS / ACTUATORS*

Type	MP	Location
Lost Cabin – meter run and Block Valve	0.0	T38N, R90W
Block Valve	19.7	T37N, R87W
Block Valve	32.8	T36N, R85W
Natrona Hub – Scraper Receipt Trap/Launcher Trap, Tee Block	39.5	T35N, R84W

Type	MP	Location
Valve		
Block Valve	45.1	T35N, R84W
Block Valve	64.6	T37N, R81W
Block Valve	83.0	T40N,R80W
Future Interconnect – Scraper Receipt Trap/Launcher Trap, Tee and Block Valve	87.2	T41N,R79W
Block Valve	100.5	T42N,R78W
Block Valve	117.6	T45N,R78W
Block Valve	138.5	T47N,R76W
Future Mid Point Pump Station – Block Valve, Scraper Receipt Trap/Launcher Trap, Tee Block Valve	144.0	T48N, R76W
Block Valve	148.6	T49N,R75W
Block Valve	149.3	T49N,R75W
Block Valve	158.5	T50N,R74W
Block Valve	178.4	T52N,R73W
Block Valve	178.9	T52N,R73W
Pigging station – Block Valve, Scraper Receipt Trap/Launcher Trap, Tee	200.4	T55N,R71W
Block Valve	203.5	T57N,R70W
Block Valve	217.9	T57N,R70W, SEC12
Belle Creek Unit C Delivery/Terminus Point – Block valve, Scraper Receipt Trap, Tee and meter run	231.1	T8S,R54E

At approximate MPs 39.5, 144.0, and 231.1, Greencore would purchase land for future pump stations. At these locations, Greencore would install branch tees at mainline block valves to facilitate the future tie-in of these stations. These pump stations would be constructed when product volumes exceed 150 MMSCFD and would include valve manifolds, pumps, pigging equipment, power distribution, and control buildings. Each station would be within an approximate 3- to 10-acre fenced area.

Scraper traps, which include block valves, would be installed at the following locations: one at the Lost Cabin (MP 0.0), two at the future Natrona Hub (MP 39.5), two at the future Interconnect Station (MP 87.2), two at the future Mid Point Pump Station (MP 144.0), two at MP 200.4, and one at Belle Creek (MP 231.1). Block valves would be installed at approximately 15- to 20-mile intervals along the entire length of the pipeline with exception of additional block valves installed at major interstate and state highways for emergency response. The additional tees and valves would be installed at potential future delivery/receipt locations. Each scraper trap and block valve area would be graveled and enclosed using a chain link fence. Access would be year-round, depending upon winter weather.

The Belle Creek Delivery Facility would be constructed on an approximately 5-acre site located at the terminus of the pipeline. The site would consist of a meter building (35 feet wide x 75 feet long x 24 feet high), receiving scraper trap, flow control valve, communications and satellite dish, CO2 vent, and an electric service pole with a pad-mounted transformer. A 72-inch-high, brown, plastic-coated, chain-link security fence would be installed around the facility.

2.3 Land Requirements

Nominal construction area includes a 50 foot wide ATWS strip parallel and adjacent to the 50 foot permanent right-of-way. The pipeline impacts are described in detail in Table 2.3-1. Landownership is included in Table 2.3-2. ATWS would be needed at most road crossings, water crossings, arroyos, turnaround places, and areas with difficult terrain. These ATWS will vary in dimension depending on the need and terrain. All ATWS would be reclaimed and are identified on the alignment sheets and are listed in Appendix C.

Two pipe yard work areas would be used to store pipe prior to transport to the right-of-way. The pipe storage yards would be located near Casper and Gillette, Wyoming. Pipe would be transferred to the yard via the Burlington Northern Railroad or truck. After pipe unloading from rail cars, the pipe would be transported to the ROW by truck. The estimated number of trucks per day for pipe transport would be 5 to 6 during a 2-month period.

Table 2.3-1
ACRES DISTURBED, REMOVED, AND RECLAIMED

Component/Facility	Acres Disturbed	Acres Removed	Acres Reclaimed ¹
CO ₂ Pipeline, 231.1 miles ²	2,801.2	0.0	2,801.2
Lost Cabin (MP 0.0) – 2.9 acres Future Natrona Hub (MP 39.5) – 10.0 acres Future Interconnect Station (MP 87.2) – 0.4 acre Future Mid Point Pump Station (MP 144.0) – 5.0 acres Launcher/Receiver Facility (MP 200.4) – 0.4 acre Belle Creek Pump Station and Delivery Point (MP 231.1) – 5.0 acres	23.7	23.7	0.0
Block Valves and Take-off Valves, 20 at 0.2 acre ³	0.0	4.0	0.0
Measurement Facilities with Scraper Traps, 2 at 0.3 acre; Interconnect Station at 0.8 acre	1.4	1.4	0.0
Casper Pipeyard	21.5	0.0	0.0
Upton Pipeyard ⁴	14.9	0.0	0.0
Additional Temporary Workspace	377.1	0.0	377.1
Overall Total ⁴	3,224.9	29.1	3,178.3

Table 2.3-2
APPROXIMATE LAND OWNERSHIP

Land Status	Pipe Length (Ft.)	Pipe Length (Mi.)	Permanent Easement (acres)	Workspace (acres)	Additional Temp. Work Space (acres)
Wyoming	70775.5	13.4	48.7	113.7	26.1
Montana	7996.4	1.5	5.5	12.9	1.5
Private	796916	150.9	914.7	914.7	236.6
BLM	347268	65.8	398.6	398.6	124.2
Totals	1222955.9	231.6	1367.5	1439.9	388.4

2.4 Access Roads

Greencore proposes to use a combination of existing state, county, and BLM roads to gain access to the right-of-way during construction. Hauling equipment and materials will be done in accordance with state and local requirements. Modifications, including grading, may be required on some of these roads. Following construction completion, roadways will be returned to as good or better condition than prior to construction. Temporary access along the right-of-way will be reclaimed at the end of construction. Operations and maintenance activities could require year-round access post construction. The access roads are identified in Appendix D.

2.5 Pipeline Markers

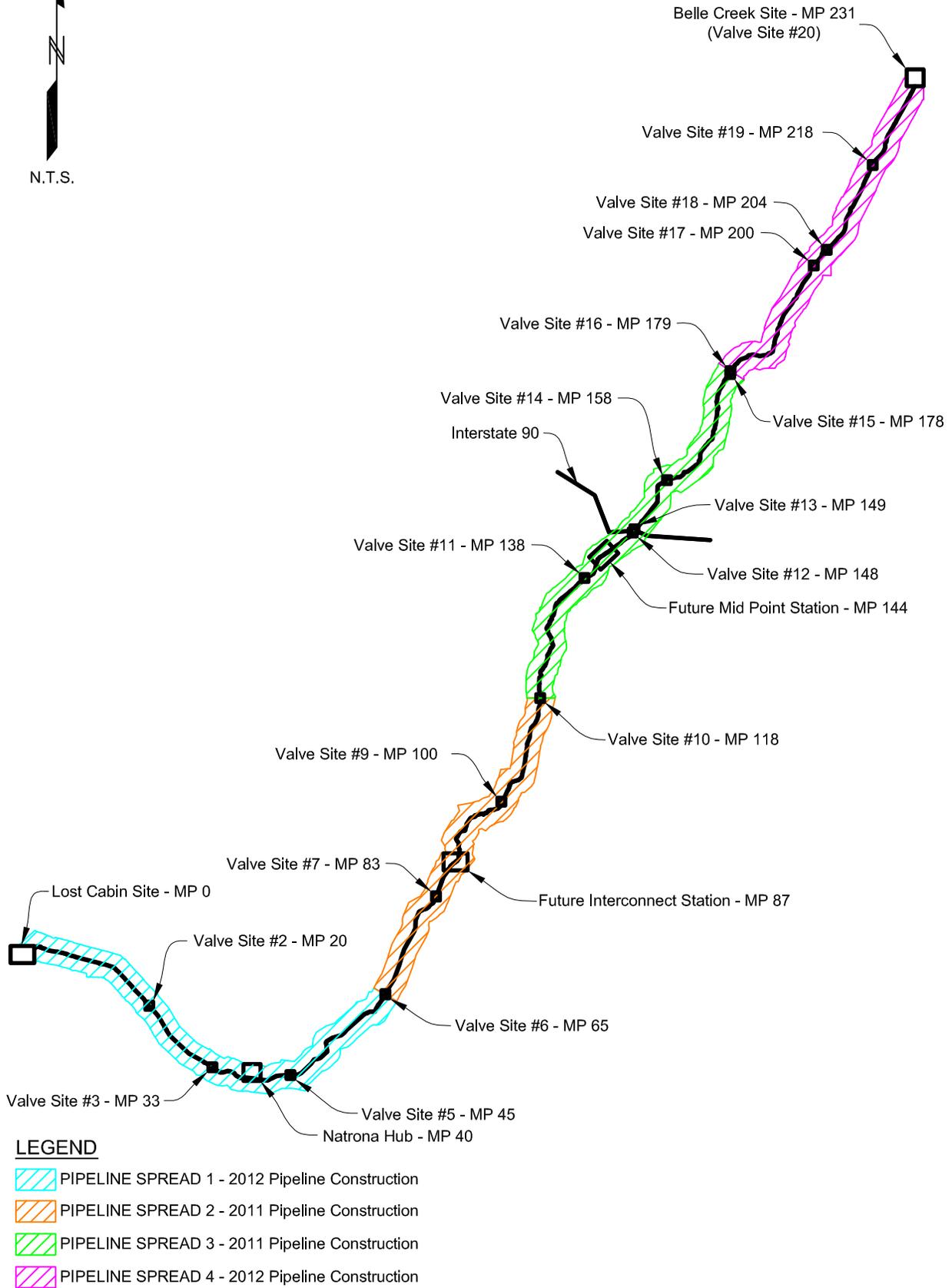
The line would be identified by pipeline markers placed at each public road crossing, railroad crossing and in accordance with CFR 195.410.

2.6 Construction Schedule and Transportation

Construction of the Project would be scheduled to begin upon receipt of BLM's Notice to Proceed (NTP). Construction would be completed over a two year period in spreads. Construction timeframe of the second and third spreads is anticipated to extend from August 1, 2011 through December 31, 2011. Construction timeframe of the first and fourth spreads is anticipated to extend from August 1, 2012 through December 31, 2012. Construction is anticipated to take approximately 15 to 20 weeks to complete in each year of construction. Reclamation may last an additional 4 weeks. This does not account for weather delays, holidays, or seasonal construction restrictions. The spread breakdown is listed below:

- 2012 Pipeline Construction Spread #1- MP 0- 65
- 2011. Pipeline Construction Spread #2 - MP 65- 118.
- 2011 Pipeline Construction Spread #3 - MP 118- 179.
- 2012 Pipeline Construction Spread #4- MP 179 - 232.

Construction flow is shown in Figure 1.



Transportation is expected to be provided by the pipeline contractor from Casper and Gillette with appropriately sized vehicles. Local resident workers from other parts of the project area would be expected to supply their own transportation to the work site; they would not be expected to report to Casper or Gillette. It is assumed that up to 61 percent of the workers would drive personal vehicles or work vehicles (e.g., welding truck, foreman's pickups) to the work site. At 1.8 persons per vehicle (BLM 1985), 163 workers per spread would generate 101 vehicle trips per spread during the morning and afternoon peak hours.

3.0 Pipeline Construction and Installation

The following section provides a description of each phase of standard construction along the right-of-way. Also included in this section are mitigation requirements that would be implemented by the Contractor. These mitigation measures are industry standards and should be used in conjunction with site specific plans included in the appendices and permit stipulations included in Appendix A.

3.1 Pre- Construction

By the time of construction, all biological and cultural impacts and permit stipulations will be determined. Contractors should know of any designated avoidance areas and seasonal restrictions. These designated areas will be included on the alignment sheets (included separately). Permit stipulations are included in Appendix A.

Civil engineering surveys will identify the centerline of the pipeline and the boundaries of both sides of the approved working limits before construction activities commence. Greencore's Construction Inspectors will be responsible for verifying that the limits of authorized construction work areas are staked prior to construction. Flagged or painted lath will be set at 200-foot intervals (maximum), or as required to maintain line of sight, along the proposed centerline. The edges of the work limits will be marked at 200-foot intervals (maximum), or as required to maintain line of sight, with flagged or painted lath. All ATWs will be marked in a similar fashion and all four corners of each temporary use area will be flagged or painted lath. This staking will clearly demark the boundary of the area that can be used or accessed by construction personnel. Equipment will not be parked or driven beyond these stakes.

Prior to earth moving activities, Best Management Practices (BMPs) should be installed to limit sediment transport and erosion. General areas requiring BMPs will be designated on the alignment sheets. BMPs are usually site specific and depend on current site and weather conditions. The Environmental Inspectors (EIs) will also be responsible for designating areas that need BMPs or make adjustments to BMPs, as needed. The Stormwater Pollution Prevention Plan (SWPPP) contains specific BMP information and installation. The SWPPP should be referred to throughout the project to ensure proper sediment and erosion control and reporting procedures (Appendix E).

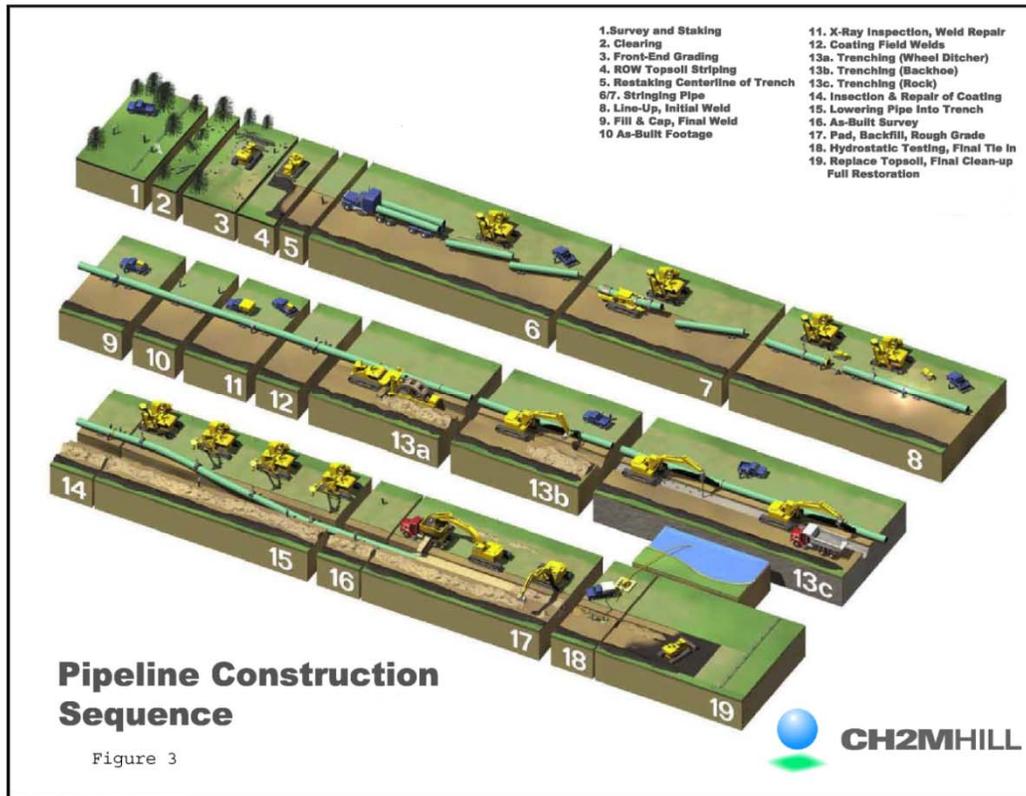
3.2 Construction Equipment and Construction Sequence

Typical construction equipment for this type of project includes pickup trucks, loaders, various sized dozers, shovels and backhoes, side booms, generators, and bending machines (Table 3.2-1). Most of the equipment to be used during right-of-way reclamation will consist of dozers, blades, and trackhoes. Typical schematics for construction, including wetland and stream crossings, are included in Appendix F. Figure 3 demonstrates the typical pipeline construction sequence.

Table 3.2-1
EQUIPMENT LIST

Equipment List	Estimated Number Required
Dozer with Ripper	1
Dozer with Winch and Angle Blade	4
Tow Tractor	1
Sideboom	8
Back hoe (3/4-yard)	4
Ditching Machine	1
Padding Machine	1
Motor Grader	1
Motor Crane	1
Bending Machine	1
Boring Machine	1
Air Compressor	2
Pipe Coating Trucks	1
Pumps	3
Flatbed Truck w/ Winch	4
Pickup	60
Stringing Truck	6
Crew Truck	11
Skid Truck	1
Dump Truck	2
Tractor with Lowboy	2
Mechanic's Truck	2
Fuel/Grease Truck	1
Water Truck with Sprinkler	1
Office Trailer	3
Warehouse Trailer	1
Welding Machines (200 amp, tractor-mounted)	1
Welder's Trucks (1 ton)	17
Tractor (reclamation)	2-4
Disc ploughs (reclamation)	2-4
Chisel ploughs (reclamation)	2-4
Reseeding equipment (reclamation)	2-4

FIGURE 3 PIPELINE SEQUENCE



If construction occurred during a storm event, vehicle traffic and equipment would be restricted to prevent rutting in excess of approximately 4 inches deep, except in areas where topsoil has been stripped and saved for reclamation.

3.3 Clearing, Grading, and Topsoiling

There will be several right-of-way configurations depending on proximity to other lines and available working space. The nominal right-of-way width would be 50' permanent and 50' temporary. Schematics for these different configurations are included in Appendix G.

During clearing, tree limbs and brush will be windrowed or piled for use during reclamation. Stumps will be left in place except over the trench line or removed as necessary to create a safe and level workspace. The Environmental Inspector (EI) will coordinate with the appropriate agency or landowner to locate areas for stump disposal. Trees will be felled inside the approved right-of-way boundaries. Greencore will acquire the appropriate timber sale agreement/permits from BLM prior to cutting or removing trees. Grading will not occur over historic trails, drainages, wetlands or ATWS.

Construction activity and ground disturbance will be limited to approved, staked areas. Whenever possible, grading will be limited to help preserve vegetation and reduce impact which will limit erosion and improve reclamation success. In mountain or hilly terrain where slopes run across the right-of-way, a level work area must be cut out of the hillside for safe construction. These areas should be reclaimed to the natural contours as much as possible.

Where grading is needed to create a safe, level, working area, approximately 4" – 6" of topsoil will be stripped from the full construction right-of-way prior to cut fill or grading operations. There may be some areas where the contractor would not need to grade and topsoil. For example, level fields or pastures may not need to be graded for construction. In these cases, the contractor can avoid topsoiling, except over the trench line, which would preserve the root system and increase reclamation success. Available topsoil will vary across the project. No matter the amount of topsoil removed, topsoil will be stockpiled separately from subsoil and will not be used to pad the trench or construct trench breakers. Topsoil will be used as the final layer of soil during the reclamation process.

In wetlands, only the topsoil on the trench line would be removed (dug) and segregated before digging and removing the subsoil (double-ditching method). The wetland boundaries will be flagged prior to construction. Topsoil removal in wetlands can range between 12-18 inches. In floodplains, the topsoil depth can range from 6-12 inches. Dry drainages or washes that cross the right-of-way will not be blocked with topsoil piles. Topsoil will be placed on the banks of the drainage so natural flows are not impeded and topsoil is not washed away.

3.4 Survey Monuments

All survey monuments found within the right-of-way will be protected. Survey monuments include, but are not limited to, General Land Office and BLM Cadastral Survey Corners, reference corners, witness points, U.S. Coastal and Geodetic benchmarks and triangulation stations, military control monuments, and recognizable civil (both public and private) survey monuments. If any survey monuments found within the right-of-way or temporary use areas are disturbed or obliterated during the course of the project, the Contractor will immediately report it to Greencore. Greencore will report the incident in writing to the Authorized Officer and the respective installing authority, if known.

3.5 Trenching

Construction methods used to excavate a trench will vary depending on soils, rock, terrain, and related factors. Construction schematics in Appendix F provide more details for the situations and techniques discussed below.

Excavated subsoil will be stored separately from windrowed topsoil piles (Section 3.3). Like topsoil, subsoil will not be stored in flowing water bodies, dry drainages or washes that cross the right-of-way. Gaps will be left periodically in the subsoil piles to avoid ponding and excess diversion of natural runoff during storm events, where necessary.

Measures will be taken to ensure that access is provided for private landowners or tenants to move vehicles, equipment, and livestock across the ditch where necessary. Adequate precautions will also be taken to ensure that livestock are not prevented from reaching water sources because of the open ditch. Measures to be taken include contacting livestock operators and providing adequate crossing locations. The EI would determine the need and placement of soft plugs for livestock and wildlife travel. If installed, the soft plugs would be of minimal compaction and installed with ramps.

The depth and width of the ditch will vary depending upon pipe diameter and soil types. A typical ditch will be excavated approximately 3-4 feet wide at the bottom and the sides will be sloped to Occupational Safety and Health Administration (OSHA) specifications (up to approximately 8 feet wide).

The minimum cover will vary depending on soil type and existing conditions. Table 3.5-1 stipulates the different cover requirements. These stipulations may change depending on the existence of other utilities.

*Table 3.5-1
COVER REQUIREMENTS*

Minimum Cover	No Rock	Rock Trench
Standard Trench	36"	30"
*Agricultural Land	60"	60"
Water Crossings (> 100' wide)	60"	60"
Drainage or Ephemeral waterways	60"	60"
Road Crossings	60"	60"
Drainage Ditch at Public Road Crossing	48"	48"

*Note: Double ditching required for agricultural areas.

Occasionally, the ditch could be excavated to depths greater than the minimum values specified to achieve specific cover. Greater depths of cover could be required at unpaved road crossings, foreign pipeline crossings, water bodies, and other obstructions (Appendix F). Machine excavation will not be performed closer than 5 feet from any existing pipeline encountered in the right-of-way unless authorized by the pipeline owners/operators. Existing pipeline locations will be marked in the field and 48-hour prior notification given to the operator of the underground utility. Where the pipeline traverses locations for which there are definite plans to level the land for irrigation or other purposes, the pipe will be buried at a depth to accommodate these plans.

3.6 Blasting

Where rock is encountered, tractor-mounted mechanical rippers or rock trenching equipment may be used to facilitate excavation. In areas where rippers or trenchers are not practical or sufficient, blasting may be employed. Blasting will be used only where necessary and conducted by a fully licensed operator. All necessary authorizations will be obtained and all safety precautions observed. All blasting work will be conducted in compliance with federal, state, and local laws, rules, and regulations. The Contractor is responsible for obtaining permits to store blasting materials.

3.7 Road and Railroad Crossings

Installation of road crossings shall be achieved by boring or open cut techniques depending upon local regulations, traffic, construction equipment availability and cost. Crossings at two track roads and gravel roads will typically be open cut. All County roads and state highways will be crossed via slick bore or small directional drill bore method. A means for mechanical protection for barrow ditches of County roads. Set-on concrete pipe weights will be used to cover the pipeline in these ditches. Road crossings shall not be cased.

All road and railroad crossings shall be designed in accordance with ASME B31.4 and API RP 1102. Table 3.7-1 below shows the anticipated major road and railroad crossings and crossing techniques. Road and railroad crossings have been identified on the Alignment Sheets (included separately).

Table 3.7-1
MAJOR ROAD AND RAILROAD CROSSINGS

Name	Location (MP)	Type of Surface	Width	Crossing Method
Burlington Northern Railroad	19.1	Tracks	240	Bore
Highway 20/26	33.1	Asphalt	576	Bore
Highway 20/26	45.4	Asphalt	360	Bore
Burlington Northern Railroad	46.0	Tracks	300	Bore
I-25 and Service Road	86.9	Asphalt	910	Bore
Highway 192 /Sussex Rd	107.0	Asphalt	360	Bore
I-90	149.8	Asphalt	960	Bore
Burlington Northern Railroad	166.0	Tracks	1020	Bore
Highway 14/16	178.9	Asphalt	240	Bore
Highway 59	201.2	Asphalt	300	Bore

3.8 Water Body Crossings

All water crossings and wetlands are identified on the Alignment Sheets (included separately) and totals by county are included in Table 3.8-1. A Nationwide Permit will be obtained from the Army Corps of Engineers for crossing jurisdictional waters. Four crossings methods are discussed below and the permit stipulations are included in Appendix A. Within jurisdictional boundaries, right-of-way clearing would be limited to 75 feet. BMP's will be used to protect water resources (Appendix E). ATWS have been designated in these areas to provide extra work space (Appendix C).

Construction equipment working in wetlands and waterbodies will be limited to that which is essential for right-of-way clearing, trench excavation, pipe fabrication and installation, and backfilling. In areas where there is no reasonable access to the right-of-way except through wetlands, non-essential equipment will be allowed to travel through wetlands only if the ground is firm enough or construction matting has been installed for a driving lane. All wetland and stream boundaries will be flagged or staked prior to clearing and grading. An EI will be present during the construction phase to ensure all BMPs are installed correctly. The EI and contractor should coordinate closely during these procedures to ensure permit compliance.

Water and wetland crossings should be reclaimed as soon as possible to protect water quality. Any material that has accumulated in an intermittent/ephemeral stream will be removed and all drainages will be returned as close as possible to pre-construction form. Unless otherwise required by permit, wetlands will not be reseeded. Seed will come from the wetland topsoil that has been segregated for reclamation. However, stream banks that contain upland vegetation shall be reseeded. Certified weed free mulch can be applied to wetlands that are temporarily dry. Stream banks and slopes leading directly to streams and wetlands will be

reseeded and natural ground matting will be installed to limit erosion and promote seed germination. Please refer to the Reclamation Plan in Appendix J for detailed procedures.

Table 3.8-1
CROSSING TOTALS BY COUNTY

	Ephemeral	Intermittent	Open Water	Perennial	Grand Total
Wyoming					
Fremont	5	1	0	0	6
Natrona	83	22	0	2	107
Johnson	26	4	2	8	40
Campbell	41	20	1	8	70
Subtotal	155	47	3	18	223
Montana					
Powder River	0	0	0	2	2
Subtotal	0	0	0	2	2
Total	155	47	3	20	225

3.8.1 HDD

Greencore will contract with firms that specialize in horizontal directional drilling (HDD). The selection and supervision of this drilling contractor will be the responsibility of Greencore.

The advantage of horizontal directional drilling is minimal surface impact, limited to the established entry (25 ft X 50 ft) and exit sites (15 ft X 20 ft) for drilling equipment which can be located outside the environmentally sensitive area. The entry and exit sites vary in size depending on the diameter of the drill and associated equipment required (see HDD Typical Crossing). No surface ground disturbance will occur between the entry and exit drill path locations. The typical minimum depth of the drill will be 25 ft or 6 ft below the stream bed whichever provides the highest margin of safety. There is always a potential for a frac-out situation. Procedures for controlling this situation are described in the Frac-out Contingency Plan in (Appendix H).

This method of crossing will eliminate any future ground surface disturbance associated with an operating company's required annual maintenance for bank stabilization and depth of cover control typically for an open ditch crossing. In some cases, equipment may still need to cross these areas to continue construction flow. In these cases, temporary bridges would be constructed and wetlands would be matted (Appendix F). Table 3.8-2 list all of the proposed HDD crossings. This method may be used at other locations if deemed necessary. Estimated water consumption at each crossing is described in the Frac-out Contingency Plan (Appendix H).

Table 3.8-2
HDD CROSSINGS: WATERBODIES, WETLANDS, RAILROADS, AND ROAD

Name	Milepost (MP)	Footage
Lost Cabin Rd/CR 158	0.20	120 FT
Diagonal HDD Crossing of Foreign Line, Arminto Road/CR 104 and Foreign Line	25.2	780 FT
HWY 20/26	33.10	550 FT
I-25 Service Rd, I-25 North & South Bound Lanes	86.90	785 FT
I-90	149.8	1732 FT
Wild Horse Creek-Extended Wetland	160.0	1400 FT
BNSF Railroad	165.9	450 FT
Horse Creek	199.5	1300 FT
Little Powder River	203.1	100 FT
Donner Reservoir	218.3	300 FT

3.8.2 Flume and Trench

The flume and trench method will be used in most situations where there is flowing water. Depending on the size of the drainage, the contractor will determine the proper size and number of flumes needed to handle expected volumes of water. The flumes would be placed in the drainage and sand bags would be placed around the inlet to direct flow into the pipes. The flumes could also utilize wing-walls to direct water to the inlet. Sandbags should also be placed around the outlet of the flumes to reduce backflow into the working area. During the placement of the flumes, the channel and banks should be disturbed as little as possible.

The pipeline trench would be dug beneath the flumes. Spoils from the trench would be placed in an upland area that is protected with BMPs to prevent discharge back into the channel. When backfilling the trench, no foreign material should be added to the stream channel and the channel should be recontoured as close as possible to original condition. An EI should be present during all water and wetland crossings and should coordinate closely with the contractor to ensure permit compliance. These areas should be reclaimed as soon as possible to protect water quality. A detailed schematic of this method is included in Appendix F

3.8.3 Open Cut

The open cut method will be used while crossing dry arroyos, swales, and minor drainages that are not carrying water. Spoils from the trench would be placed in an upland area. The channel should not be blocked in case a storm event results in flowing water. When backfilling the trench, no foreign material should be added to the channel and the channel should be recontoured as close as possible to original condition. These areas should be reclaimed as soon as possible to protect water quality. A detailed schematic of this method is included in Appendix F

3.8.4 Wetlands

The wetland boundaries will be flagged or staked prior to construction. Clearing would be kept to the minimum amount needed for safe pipeline construction. In wetlands, only the topsoil on the trench line would be removed (dug) and segregated before digging and removing the subsoil (double-ditching method). Topsoil removal in wetlands can range between 12-18 inches. BMPs will be installed along the construction perimeter to retain spoils on site

Pipeline construction operations within wetland boundaries will be reduced to a travel lane, ditchline and spoil storage area. Mats will be installed along the travel lane in saturated wetlands to support equipment and prevent soil compaction. Shrubs and trees interfering with travel lane installation will be cut at grade level to leave root systems intact. Tracked excavators will operate off “ditching mats” to excavate the trench across the wetland. Foreign material (upland soil, rock, tree stumps, etc.) will not be imported into the wetland to stabilize the working area.

If the trench fills with water and interferes with installation, the trench could be dewatered. Trench water would be disposed of in accordance with the Wyoming Department of Environmental Quality (WDEQ) or Montana Department of Environmental Quality (MDEQ) regulations (Appendix A). Any trench dewatering would be coordinated with the EI to ensure permit compliance.

After the pipe is installed, the trench line would be backfilled and the topsoil replaced on top. No crown would be left over the trench. These crossings should be reclaimed as soon as possible to protect water quality. A detailed schematic of this method is included in Appendix F.

3.9 Areas with Special Conditions

The project area has been surveyed and studied for potential impacts to environmental and cultural resources. The results of the study and mitigation measures are included in the Environmental Assessment (EA) that was prepared for the BLM, Casper Field Office. The pipeline has been routed to avoid impacts to special environmental and cultural resources, as much as possible. However, some areas are not avoidable entirely. To construct through these areas, timing restrictions and construction stipulations have been established to help protect these resources. Areas with special conditions have been identified on the Alignment Sheets (included separately) and environmental restraints are presented in Table 2-3 of the EA. Permit stipulations are included in Appendix A. The project does not cross any Wilderness Study Areas (WSAs) or Areas of Critical Environmental concern (ACECs). Other areas that require special considerations are described below.

3.9.1 Close Proximity to Collocated Facilities

The Greencore Pipeline is collocated with existing utilities for approximately 90 percent of the pipeline route. In certain areas Greencore is required to be within 20 feet of the utility. When this situation occurs, Greencore would take added precautions to support pipeline construction. Adjacent utilities would be staked the entire length and their representative would be notified prior to the initiation of construction. Construction activity would be limited over the adjacent utility.

3.9.2 Surface Slumping

The Greencore Pipeline right-of-way will be reviewed for surface slumping in the detailed engineering design phase of the project. If the problem is shallow surface slumping, no action is planned if outside the construction right-of-way as it would pose no threat to Greencore's proposed project. If the problem is more severe than shallow surface slumping, a design would be developed to address future surface slumping.

3.9.3 Bank Erosion

Water body crossings will be reviewed during the detailed design phase to insure all potential bank erosion issues are addressed. Crossing approaches will be tapered to gradual slopes and water bars installed, if required, to eliminate small abrupt changes in elevation. The new gradual slope would taper to match the undisturbed terrain. BMPs would be initiated as described in the Stormwater Management Plan to reduce erosion and limit sediment transport (Appendix E). Additional reclamation measures are described in the Reclamation Plan (Appendix J).

3.9.4 Highly Eroded Areas

The pipeline route crosses a variety of terrain with different existing erosion potentials. In highly erodible areas, the EI should designate or modify BMPs for these areas to increase stability. This may include additional BMPs, seeding and mulching. Different reclamation measures are described in the Reclamation Plan (Appendix J).

3.9.5 Active Faults

Active faults along the pipeline right-of-way would be studied during the detailed engineering phase of the project. If active faults exist, a design would be developed that would mitigate the effects from fault movement.

3.9.6 Areas of Historic or Cultural Significance

The Historic Texas Trail and Historic Bozeman Trail would also be crossed by this project and will be identified on the alignment sheets. Historic trails would not be graded. Trail crossings would be trenched and an archaeological monitor would be present during construction activities. Identified cultural sites may also require construction monitoring (Appendix A).

3.9.5 Paleontological Resources

Areas with potential paleontological resources may require construction monitoring. Refer to stipulations included in Appendix A.

3.10 Pipe Installation

Pipe installation will include stringing, bending for horizontal or vertical angles in the alignment, welding the pipe segments together, inspection, coating the joint areas to prevent corrosion, and then lowering-in and padding as described in greater detail below.

3.10.1 Stringing

Line pipe will be shipped directly from the manufacturer by rail to off-loading areas on private land and then hauled to staging areas where stringing trucks collect and deliver the pipeline to the right-of-way. Each individual joint of pipe will be unloaded with a side-boom or trackhoe

and placed (strung) parallel to the ditch in a continuous line. Sufficient pipe for road or waterbody crossings will be stockpiled at temporary use areas near the crossings.

Stringing operations will be coordinated with trenching and installation activities in order to properly manage the construction time at a particular tract of land. Gaps will be left at access points across the ditch to allow crossing of the right-of-way.

3.10.2 Bending

After joints of pipe are strung along the ditch but before the joints are welded or pressed together, individual joints of pipe will be bent to accommodate horizontal and vertical changes in direction. Field bends will be made utilizing a hydraulically operated bending machine. Where the deflection of a bend exceeds the allowable limits for a field-bent pipe, factory (induction) bends will be installed.

3.10.3 Welding

After pipe joints are bent, the pipe joints will be lined up end-to-end and clamped into position. The pipeline joints will be welded together in conformance with 49 CFR Part 195 Subpart D (Construction).

3.10.4 Welding Inspection

Welds will be visually inspected by an American Welding Society (AWS) certified inspector who is part of the construction management staff. Non-destructive radiographic inspection methods will be conducted in accordance with DOT requirements. Percentage of welds radiographically inspected will be according to 49 CFR Chapter 1, (192.243 Nondestructive testing). A specialized contractor, AWS certified to perform radiographic inspection, will be employed to perform this work. Any defects will be repaired or cut out as required under the specified regulations and standards. Documents that verify the integrity of the pipeline will be kept on file by Grencore for inspection by the Office of Pipeline Safety, US Department of Transportation.

3.10.5 Coating

To prevent corrosion, the pipe will be externally coated with fusion bonded epoxy coating prior to delivery. After welding, field joints will be coated with a tape wrap, shrinkable sleeve wrap, or field-applied fusion bond epoxy. This step is not necessary for pressure fitted pipe. Before the pipe is lowered into the ditch, the pipeline coating will be visually inspected and tested with an electronic detector, and any faults or scratches will be repaired.

3.10.6 Cathodic Protection

Cathodic protection test sites shall be installed at accessible locations, at intervals of 2 miles or less, to measure the pipe to soil potential for the establishment and maintenance of an effective cathodic protection system. Cathodic protection schematic is included in Appendix F.

3.10.7 Lowering-in and Padding

Before the pipe section is lowered into the ditch, inspection will be conducted to verify that the pipe is properly fitted and installed into the ditch, minimum cover is provided, and the trench bottom is free of rocks and other debris that could damage the external pipe coating. Side-boom tractors will be used to simultaneously lift the pipe section, position it over the ditch, and lower it in place. Specialized padding machines may be used to sift soil fines from the

excavated subsoils to provide rock-free pipeline padding and bedding. Sandbags may be used to pad the bottom of the ditch instead of, or in combination with, padding with soil fines. In rocky areas, padding material or a rock shield will be used to protect the pipe. No topsoil will be used to pad the pipe.

3.11 Backfilling

Backfilling will begin after a section of pipe has been successfully placed in the ditch. Trench breakers would then be installed, as needed. Prior to backfilling the trench, the equipment operator will check the trench for wildlife and/or livestock and will be sure any wildlife or livestock found in the trench is removed before backfilling begins. Backfill will be conducted using a bulldozer, rotary auger backfiller, padding machine, or other suitable equipment. Backfilling the trench will generally use the subsoil previously excavated from the trench, except in rocky areas where imported select fill material may be needed.

Backfill will be graded and compacted, where necessary for ground stability, by tamping or walking with a wheeled or tracked vehicle. Compaction will be performed to the extent that there are no voids in the trench. Backfill of trenches will not be performed where the soil is frozen to the extent that large consolidated masses are formed that will not break down. In irrigated agricultural areas, the backfill will be replaced at the same compaction density as the adjacent undisturbed soil. Backfill of trench at road crossings will be in accordance with the crossing permit. Any excavated materials or materials unfit for backfill will either be utilized elsewhere or properly disposed of in conformance with applicable laws or regulations. The Contractor will place a mound over the trench approximately 0.5-feet in height to account for subsidence (except for at road crossings where compaction will be adequate to keep roadway flat). Written authorization from the private landowner is required to eliminate the mound.

3.12 Pressure Testing and Water Use

Each pipeline will be tested in compliance with DOT regulations (49 CFR Parts 195). Prior to filling the pipeline for a pneumatic or hydrostatic test, each section of the pipeline will be cleaned by passing reinforced poly pigs through the interior of the line. The entire pipeline would be hydrostatically tested to at least 125 percent of maximum operating pressure. The test water would be obtained from a permitted source through a Water Use Agreement with the State Engineer and/or as negotiated with water rights owners or commercial wells. A detailed description of pressure testing procedures is included in Appendix I (Hydrotest Plan).

Consumptive water use would be required for directional drilling and dust abatement. Water would be obtained from a permitted source for mixing with bentonite during directional drilling at the HDD crossings (Table 3.8-2). Details on water use for HDD activities are described in the Frac-out Contingency Plan (Appendix H). Additional water would be obtained from permitted sources (irrigation companies or municipal sources) for dust abatement. The dust abatement contractor would be responsible for obtaining any necessary permits.

3.13 Cleanup and Reclamation

All construction debris and miscellaneous items will be removed from the construction site and disposed of properly by the contractor. No trash will be buried. All fences and roads will be replaced/rebuilt as negotiated with the landowner. Good housekeeping measures are also described in the Stormwater Pollution prevention Plan (Appendix E).

Disturbed portions of the construction workspace (including the right-of-way, travel lane, and ATWS) will be returned to pre-construction grades and contours as close as possible. Original drainage patterns will be reestablished and contours will be returned as close as possible to original condition. Topsoil will then be replaced over the right-of-way from the approximate area in which it was stripped. Reseeding and mulching will usually be completed as soon as possible, but may be dependent upon permit stipulations, weather conditions, and guidance from the agencies and fee-landowners. All disturbed areas will be seeded and mulched. Any temporary BMPs will be removed and final BMPs (water-bars, berms, slash material) will be installed as described in the Stormwater Pollution Prevention Plan (Appendix E). Details on reclamation procedures are also described in the Reclamation Plan (Appendix J).

Reclamation of lands disturbed by construction would be in accordance with applicable regulations and permit requirements. Species and seeding rates effective in controlling erosion would be used to revegetate the disturbed areas. Species would be selected after consideration of climatic adaptation, species adaptation to soil texture, possible adverse conditions such as drought or saline soils, palatability to wildlife, and shrub cover for wildlife. Seed would be planted by drilling or broadcasting. The use of a rangeland drill would be the preferred seeding method. Areas not accessible to a rangeland drill would be broadcast-seeded. Broadcast-seeding rates would be double those of drill application. Seeding would be performed during the appropriate period when the seeds would receive the benefit of winter or spring moisture.

BMPs for final reclamation are described in the Stormwater Management Plan and will be utilized to control erosion and promote seed growth (Appendix E). These BMPs may include, but are not limited to, water bars, biodegradable wattles and ground matting, mulch, and berms. Logs, limbs, shrubs, and excess rock may be randomly distributed across the right-of-way to block illegal use of motorized vehicles, help stabilize the disturbed ground, and present a more natural view. Details are described in the Reclamation Plan (Appendix I).

3.14 Livestock Barrier and Other Livestock Issues

Fences crossing the right-of-way will be braced, cut, and temporarily fitted with gates to permit construction traffic passage. During construction, the opening will be controlled as necessary (including use of cattle guards) to prevent the escape of livestock. Existing fences will be replaced and braces left in place upon completion of construction activities. During construction, the Contractor will take care not to obstruct or damage gates or cattle guards. Those damaged or made inoperable will be repaired to BLM and/or private landowner satisfaction. The Contractor will repair all damaged livestock facilities (corrals, fences, water sources, etc.) to BLM or private landowner's specifications.

3.15 Health and Safety

Greencore's Construction Inspectors will ensure that the Contractor implements the following health and safety measures:

- The Contractor will cease pipeline construction activities, with the exception of pneumatic or hydrostatic testing operations, by sunset. Nighttime construction (with the exception of pneumatic or hydrostatic testing) will not be permitted unless approved by Greencore.
- No burning of brush or debris, and no campfires, lunch fires, or warming fires will be allowed on the right-of-way.

- Water or chemical soil binders would be used to control dust along the right-of-way and access roads during construction in accordance with federal, state, and local requirements. Any dust control water would be used only at the landowner's request. Any dust control water would be obtained by permits or purchased through contracts with owners with valid, existing water rights. Dust abatement may be employed near the State Highway 26 corridor if dusty conditions impacts visibility.
- The Contractor will ensure that equipment is properly maintained to reduce emissions and noise. Vehicles and equipment will be operated at safe speeds at all times on the right-of-way.
- Camping is prohibited on the right-of-way.

3.16 Waste Disposal

Grencore Construction Inspectors will ensure that the Contractor implements the following waste disposal measures:

- No littering will be allowed on the right-of-way. Construction and operations sites will be maintained in a sanitary condition at all times and waste materials at these sites will be disposed of promptly at an appropriate waste disposal site. Waste is defined as all discarded matter including, but not limited to: human waste, discarded food, trash, garbage, refuse, oil drums, petroleum products, blasting boxes, and equipment.
- The Contractor will dispose of excess or unsuitable materials at commercial disposal sites, commercial recycling centers, and disposal sites approved by Grencore.
- The Contractor will comply with all hazardous waste disposal requirements.
- Human wastes, temporarily located within self-contained facilities (portable toilets), will be removed from the right-of-way and disposed of in accordance with applicable laws and regulations. These facilities will not be placed within 100' of a drainage or water body.

4.0 Operation and Maintenance Activities

Greencore will be responsible for monitoring pipeline operations after construction is completed. This would include environmental inspections and equipment and facility inspections. Inspection personnel will have the qualifications necessary to conduct stormwater inspections and reporting for pipelines.

An existing Denbury pipeline SCADA control center will be utilized with field SCADA equipment located at the Lost Cabin supply station, mainline valve sites, and Belle Creek meter stations, which would communicate data and status information back to the main control center. Future potential pump stations also will have unit control centers that communicate data and control status back to the existing Denbury SCADA control center. The main SCADA control center would continuously monitor pipeline pressure and flow conditions at supply and delivery points. The SCADA control system would be programmed to alarm anytime there is a deviation in pressure or flow indicating abnormal condition in the pipeline system. No hazardous materials or wastes would be used or produced as part of project operation.

Greencore's pipeline system will be operated and maintained in accordance with industry standard procedures to ensure safe operation and to maintain the integrity of its pipeline system. Greencore's operating and maintenance procedures will be developed in accordance with the safety standards outlined in 49 CFR Part 195 and other applicable regulations. These procedures will continue to be implemented during the operations and maintenance of the pipeline facilities.

4.1 Surveillance

Communications and detection systems for the project will be developed. The frequency of ground inspections of the pipeline will be in compliance with the Office of Pipeline Safety requirements. The right-of-way would be periodically inspected by an aerial patrol.

4.2 Right-of-Way Access

Surface travel along the right-of-way will generally be limited to periodic valve inspections, leak surveys, erosion control (Stormwater Inspection), and any pipeline repairs that may be needed. In addition, it will also be necessary to access the right-of-way for the corrosion control inspections and noxious weed surveys. This would typically be conducted with a field service truck or ATV.

4.3 Pipeline and Site Maintenance and Repair

Specialists and technicians would be on-call to service the pipeline. Surface traffic would be limited to workers performing pipeline and valve maintenance, periodic monitoring and inspection, and emergency repairs to the pipeline or associated equipment.

Repairs required because of minor corrosion and slight external mechanical damage to pipe and coating material can be made without interruption or with minimum interruption of service. Repairs are usually made under a reduced pipeline pressure and require a minimum amount of

excavation and heavy equipment. Other minor repairs include BMP maintenance, pipeline marker replacement, and debris removal.

Some settling of the backfilled trench will occur, particularly after the first winter following construction. In this case, subsidence and potholes will be filled if necessary and the surface restored to normal grade and reseeded. If subsidence is discovered in subsequent years, the potholes would be filled, if necessary, and the surface restored to normal grade and reseeded.

Pipeline failures or external mechanical damage needing major repairs may require shutdown of the pipeline. In these instances, the pipeline segment could be isolated between mainline valves. To facilitate these repairs, equipment, tools, pre-tested pipe, and other materials for emergency use could be stored at existing operations facilities.

4.4 Environmental Inspections

Grencore will be responsible for monitoring pipeline operations after construction is completed. This would include post construction inspection of stormwater management devices as stipulated in the stormwater permit from the WY DEQ and MT DEQ (Appendix E). Inspection personnel will have the qualifications necessary to conduct stormwater inspections and reporting for pipelines. Grencore will also be responsible for noxious weed control within the limits of the right-of-way. Noxious weeds will be monitored and mitigated per the Noxious Weed Management Plan (Appendix K). These activities will require access to the right-of-way as described in Section 4.2.

4.5 Wildlife Avoidance Periods

Pipeline maintenance will be scheduled with the appropriate agency to avoid any wildlife construction closures periods unless a waiver is obtained. Emergency maintenance in these areas during the wildlife constraint periods will require notification to the appropriate agency.

5.0 Emergency Procedures

The Emergency Response Plans are included in Appendix L. This includes a Safety Response Plan, Hazardous Materials Management and Spill Prevention, Containment, and Counter Measure Plan, and Fire Prevention and Suppression Plan. These plans address situation avoidance, control, training, inventory procedures, and emergency notifications. The Emergency Response Plans should be reviewed by all contractors and updated as needed to meet changing conditions and applicability with federal regulations.

6.0 Termination and Abandonment of Right-of-Way and Facilities

Prior to termination of the BLM right-of-way Grant, or any portion thereof, Greencore will contact the BLM Authorized Officer to arrange for a pre-termination meeting and joint inspection of the right-of-way. This meeting and inspection will take place a minimum of 30 days prior to termination. The meeting and inspection will be held so that an agreement on an acceptable termination and reclamation plan can be reached. This plan will include, but not be limited to, abandonment and/or removal of facilities, drainage structures and/or surface material, recontouring, replacing of topsoil, seeding, and monitoring (including monitoring of noxious weeds). The Authorized Officer must approve the plan in writing. Greencore will relinquish all, or those specified portions, of the right-of-way in accordance with the termination plan.

Appendix A

Permit Stipulations

To be inserted when received.

Appendix B
Facility Schematics

LOST CABIN/ARMINTO ROAD

(GRAVEL)

TO ARMINTO

SEC. 2
SEC. 11
T.38N., R.90W.
6TH P.M.
FREMONT COUNTY, WY
(2-1/2" DIA. BRASS CAP)

TEL. PED.
WY
KNOWN UTILITIES
(MAX. NEED LOCATE)

TEL. PED.
WY

2-30" DIA. CMP'S

2-30" DIA. CMP'S

2-30" DIA. CMP'S

02 CHK
1/2" DIA. ALUM.
AP SET)

B.M.
Co2-1
EL.=5504.77
(1-1/2" DIA. ALUM.
CAP SET)

3" PVC

BARBED WIRE FENCE

475.00'

475.00'

475.00'

475.00'

475.00'

475.00'

475.00'

475.00'

FUTURE ELK BASIN
METER STATION
AND LAUNCHER

METER STATION
AND LAUNCHER

OVERALL FOOTPRINT OF
PROPOSED GREENCORE
PIPELINE, LLC FACILITIES
(0.505 AC.)

50.00'
PERMANENT
EASEMENT

50.00'
TEMPORARY
WORKSPACE

5513

5512

5511

5510

5509

5508

5507

5506

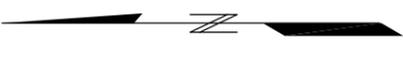
5505

5504

5503

5502

5501



TOPOGRAPHIC SURVEY

MAIN LINE VALVE # 1

INFORMATION PROVIDED BY APEX SURVEYING, INC. 05/10/10
DATUM SHOWN HEREON IS NOT THE PROJECT DATUM

DRAWN BY: DWC

SHEET: 1 OF 1

DATE: 08/16/10

FREMONT COUNTY, WYOMING

6399 S. FIDDLERS GREEN CR.,
STE. 500,
GREENWOOD VILLAGE, CO 80111
303-792-2211

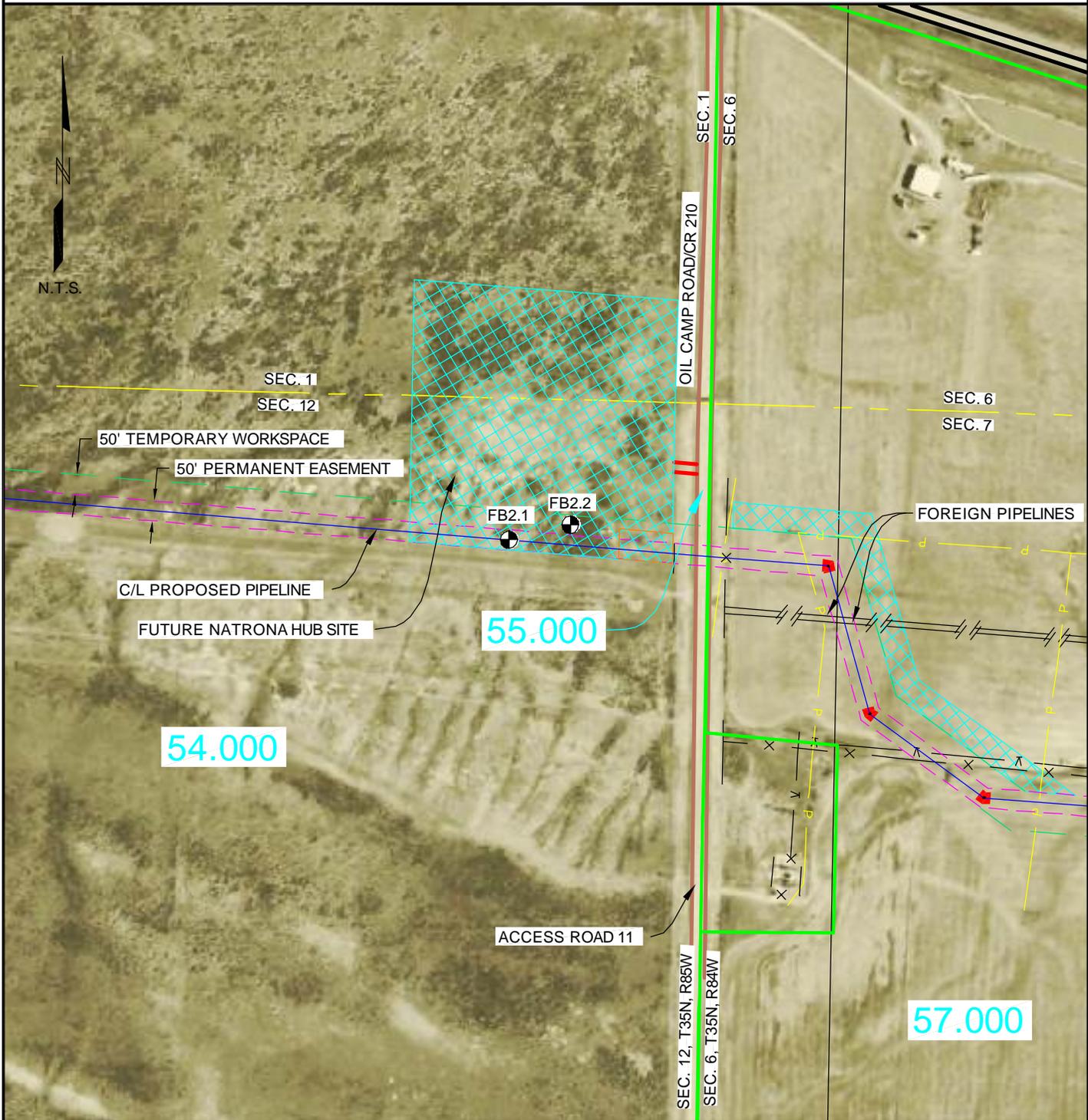


DRAWING NUMBER

VALVE SITE TOPOS

NATRONA HUB

A PORTION OF SECTION 12,
TOWNSHIP 35 NORTH, RANGE 85 WEST,
NATRONA COUNTY, WYOMING



PREPARED BY: **CH2MHILL**

CLIENT: **GREENCORE**
PIPELINE COMPANY, L.L.C.

REVISIONS			
NO.	DATE	BY	DESCRIPTION
A	8/18/10	JTS	ISSUED FOR REVIEW
B	8/26/10	JTS	REVISED STATE
C	9/20/10	JTS	ADDED MP'S AND TRACT NUMBERS
D	9/24/10	JTS	REVISED NATRONA HUB LOCATION

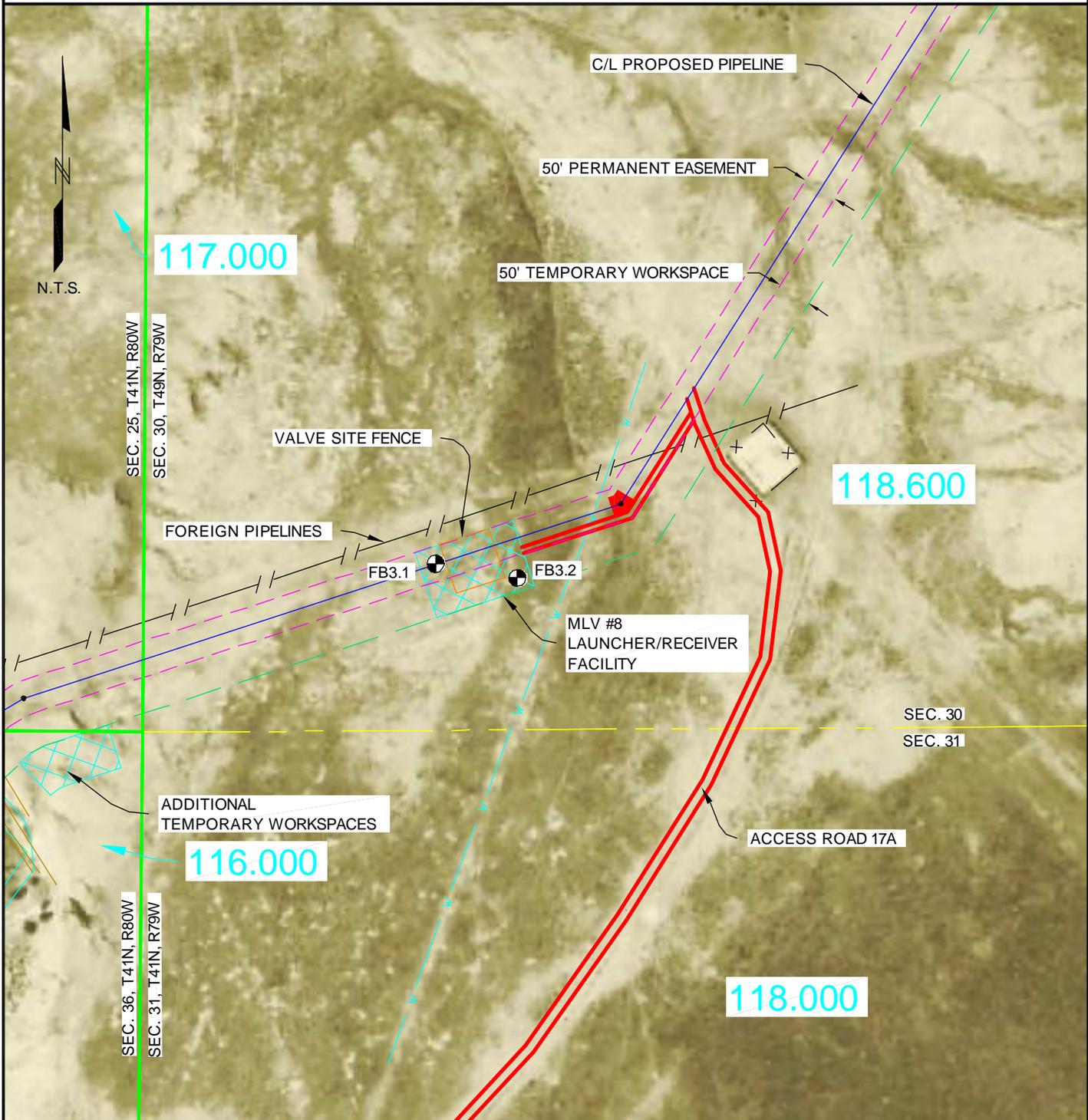
GREENCORE 20" CO2 PIPELINE
FACILITY DETAIL
SECTION 8, TOWNSHIP 35 NORTH, RANGE 84 WEST,
NATRONA HUB FACILITY @ MP 39

DRAWN BY: JTS	DRAWN DATE: 8/18/10	CHECKED BY: CLJ	PLOT DATE: 8/18/10
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NATRONA HUB FACILITY @ MP 39 (D)
REV.

MLV 8 LAUNCHER-RECEIVER FACILITY

A PORTION OF SECTION 30,
TOWNSHIP 41 NORTH, RANGE 79 WEST,
NATRONA COUNTY, WYOMING



PREPARED BY: **CH2MHILL**

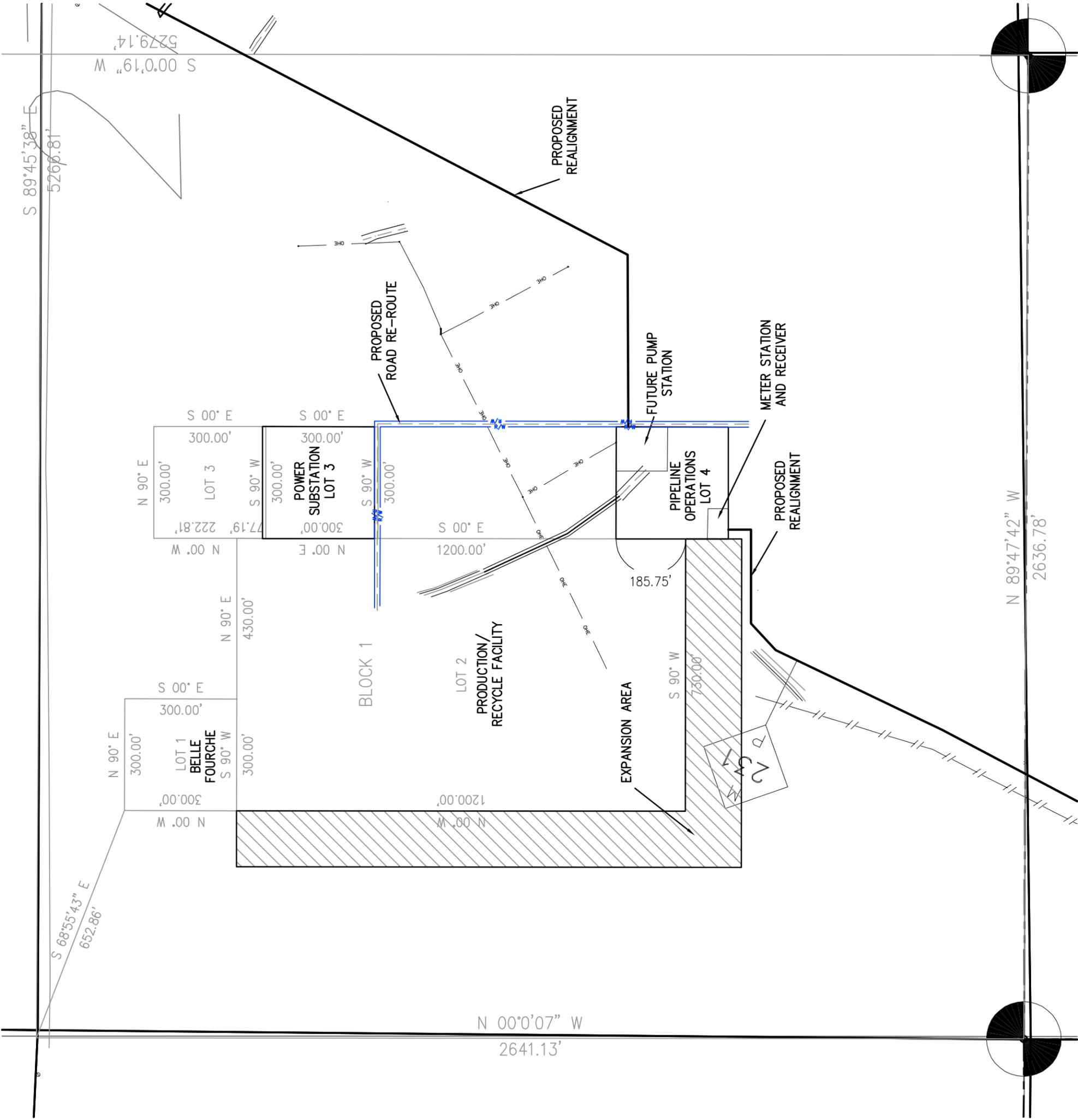
CLIENT: **GREENCORE**
PIPELINE COMPANY, L.L.C.

REVISIONS			
NO.	DATE	BY	DESCRIPTION
A	8/18/10	JTS	ISSUED FOR REVIEW
B	8/26/10	JTS	REVISED STATE
C	9/20/10	JTS	ADDED MP'S AND TRACT NUMBERS

GREENCORE 20" CO2 PIPELINE
FACILITY DETAIL
SECTION 30, TOWNSHIP 41 NORTH, RANGE 79 WEST,
MLV #8 LAUNCHER-RECEIVER FACILITY @ MP 87

DRAWN BY: JTS	DRAWN DATE: 8/18/10	CHECKED BY: CLJ	PLOT DATE: 8/18/10
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MLV #8 LAUNCHER-RECEIVER FACILITY @ MP 87 C
REV.



Appendix C

Additional Temporary Workspace

ADDITIONAL TEMPORARY WORKSPACE			
SIDE	Approx. MP	AREA (FT²)	ACRES
LEFT	0.10	26661	0.612
LEFT	0.15	11292	0.259
RIGHT	0.31	144868	3.326
LEFT	0.54	23562	0.541
RIGHT	0.88	5566	0.128
LEFT	0.95	27329	0.627
RIGHT	1.28	6500	0.149
RIGHT	1.31	6500	0.149
RIGHT	1.54	16799	0.386
RIGHT	1.71	35340	0.811
LEFT	3.19	10036	0.230
RIGHT	3.20	5715	0.131
LEFT	3.23	9464	0.217
RIGHT	3.23	5715	0.131
RIGHT	3.50	3793	0.087
RIGHT	3.57	11917	0.274
LEFT	4.09	10021	0.230
RIGHT	4.11	5647	0.130
RIGHT	4.13	5647	0.130
LEFT	4.61	10622	0.244
RIGHT	4.62	5250	0.121
RIGHT	4.64	6180	0.142
LEFT	4.65	9996	0.229
RIGHT	6.34	10136	0.233
RIGHT	6.37	9980	0.229
RIGHT	6.43	7319	0.168
RIGHT	6.43	7319	0.168
RIGHT	7.76	6428	0.148
RIGHT	7.83	6296	0.145
RIGHT	7.92	6549	0.150
RIGHT	7.99	6303	0.145
RIGHT	8.15	13000	0.298

ADDITIONAL TEMPORARY WORKSPACE			
SIDE	Approx. MP	AREA (FT²)	ACRES
RIGHT	8.17	5850	0.134
RIGHT	8.18	5850	0.134
RIGHT	8.19	13000	0.298
RIGHT	9.06	10250	0.235
RIGHT	9.10	10250	0.235
RIGHT	9.63	6560	0.151
RIGHT	9.71	9977	0.229
RIGHT	9.79	6380	0.146
LEFT	10.08	63360	1.455
LEFT	10.08	5622	0.129
RIGHT	10.13	7734	0.178
RIGHT	10.57	2001	0.046
RIGHT	10.62	6425	0.148
RIGHT	10.81	10588	0.243
RIGHT	11.08	1250	0.029
RIGHT	11.12	2925	0.067
RIGHT	11.17	6140	0.141
RIGHT	11.69	6442	0.148
RIGHT	11.74	2081	0.048
RIGHT	11.78	1302	0.030
LEFT	11.95	5835	0.134
RIGHT	11.96	13000	0.298
LEFT	11.97	6337	0.145
LEFT	12.21	6766	0.155
LEFT	12.23	6799	0.156
RIGHT	12.76	13951	0.320
RIGHT	13.04	21596	0.496
RIGHT	13.13	3732	0.086
LEFT	14.27	22633	0.520
LEFT	14.38	7442	0.171
LEFT	14.52	22631	0.520
RIGHT	14.54	7538	0.173
RIGHT	15.04	10000	0.230
RIGHT	15.55	5000	0.115

ADDITIONAL TEMPORARY WORKSPACE			
SIDE	Approx. MP	AREA (FT²)	ACRES
RIGHT	16.60	17846	0.410
RIGHT	16.74	7245	0.166
LEFT	19.11	28345	0.651
RIGHT	19.22	29591	0.679
RIGHT	19.84	9250	0.212
LEFT	19.84	3700	0.085
RIGHT	22.39	47908	1.100
RIGHT	23.69	23563	0.541
RIGHT	23.75	18800	0.432
LEFT	24.91	5802	0.133
RIGHT	24.92	7554	0.173
LEFT	24.93	5802	0.133
RIGHT	24.94	7554	0.173
RIGHT	25.12	87500	2.009
RIGHT	25.45	83725	1.922
RIGHT	25.65	36718	0.843
RIGHT	25.86	96299	2.211
RIGHT	28.42	6500	0.149
RIGHT	28.44	6500	0.149
RIGHT	29.73	7486	0.172
RIGHT	29.76	8110	0.186
RIGHT	30.45	14262	0.327
RIGHT	30.58	36168	0.830
LEFT	31.67	19130	0.439
LEFT	31.72	17917	0.411
LEFT	32.19	35300	0.810
LEFT	32.33	15764	0.362
LEFT	32.40	7645	0.176
LEFT	32.56	1517	0.035
LEFT	32.86	128875	2.959
RIGHT	32.93	87002	1.997
RIGHT	33.18	61951	1.422
LEFT	34.22	6126	0.141
LEFT	34.34	6126	0.141

ADDITIONAL TEMPORARY WORKSPACE			
SIDE	Approx. MP	AREA (FT²)	ACRES
LEFT	34.59	5556	0.128
LEFT	34.67	45529	1.045
RIGHT	35.49	10036	0.230
RIGHT	36.37	22630	0.520
RIGHT	36.66	6155	0.141
RIGHT	36.68	6991	0.160
RIGHT	36.88	62763	1.441
RIGHT	37.06	43015	0.987
RIGHT	37.53	33369	0.766
RIGHT	37.75	8449	0.194
LEFT	38.20	7330	0.168
LEFT	38.23	7827	0.180
LEFT	39.68	77177	1.772
RIGHT	41.62	10634	0.244
RIGHT	41.82	20317	0.466
RIGHT	44.99	80000	1.837
RIGHT	45.36	60000	1.377
LEFT	45.45	27962	0.642
RIGHT	45.96	32215	0.740
LEFT	46.10	51844	1.190
RIGHT	48.45	8461	0.194
RIGHT	48.49	8461	0.194
LEFT	49.45	5625	0.129
RIGHT	49.53	68250	1.567
RIGHT	50.35	77477	1.779
RIGHT	51.61	11847	0.272
RIGHT	51.78	100237	2.301
RIGHT	52.42	80779	1.854
RIGHT	54.94	176061	4.042
RIGHT	55.63	2205	0.051
RIGHT	55.89	11949	0.274
RIGHT	55.94	11949	0.274
RIGHT	56.06	12961	0.298
RIGHT	56.11	12961	0.298

ADDITIONAL TEMPORARY WORKSPACE			
SIDE	Approx. MP	AREA (FT²)	ACRES
RIGHT	57.03	6267	0.144
RIGHT	57.10	6483	0.149
RIGHT	57.21	7458	0.171
RIGHT	57.41	39153	0.899
RIGHT	57.60	4796	0.110
RIGHT	57.83	7975	0.183
RIGHT	57.90	6748	0.155
RIGHT	58.05	24997	0.574
RIGHT	58.25	9057	0.208
RIGHT	58.34	9105	0.209
RIGHT	58.43	9180	0.211
RIGHT	58.73	82175	1.886
RIGHT	58.98	1640	0.038
RIGHT	59.02	2586	0.059
RIGHT	59.10	13370	0.307
RIGHT	59.23	12930	0.297
RIGHT	59.37	17938	0.412
RIGHT	59.50	10245	0.235
RIGHT	59.60	6729	0.154
RIGHT	60.36	7570	0.174
LEFT	61.51	48996	1.125
LEFT	61.84	103507	2.376
LEFT	62.31	98276	2.256
LEFT	62.66	48605	1.116
RIGHT	62.77	17226	0.395
RIGHT	64.56	66469	1.526
RIGHT	64.67	7969	0.183
LEFT	66.58	9597	0.220
LEFT	66.62	9597	0.220
RIGHT	66.73	9021	0.207
RIGHT	66.77	9021	0.207
RIGHT	67.06	14860	0.341
RIGHT	67.20	20275	0.465
RIGHT	67.31	2824	0.065

ADDITIONAL TEMPORARY WORKSPACE			
SIDE	Approx. MP	AREA (FT²)	ACRES
RIGHT	67.41	17400	0.399
LEFT	67.54	5625	0.129
RIGHT	67.55	17195	0.395
LEFT	67.56	5625	0.129
RIGHT	67.65	16538	0.380
RIGHT	67.78	13175	0.302
RIGHT	67.95	27072	0.621
RIGHT	68.10	5827	0.134
RIGHT	68.18	10173	0.234
RIGHT	68.56	86478	1.985
RIGHT	69.00	37832	0.869
RIGHT	69.21	14436	0.331
RIGHT	69.60	50029	1.149
RIGHT	69.97	78349	1.799
RIGHT	70.41	75403	1.731
RIGHT	70.85	68530	1.573
RIGHT	71.35	78613	1.805
RIGHT	72.10	190282	4.368
RIGHT	72.56	45507	1.045
RIGHT	74.19	14005	0.322
RIGHT	74.54	157958	3.626
RIGHT	74.97	17495	0.402
RIGHT	75.20	75696	1.738
RIGHT	75.41	24525	0.563
RIGHT	76.52	13009	0.299
LEFT	76.69	8089	0.186
LEFT	76.72	8347	0.192
RIGHT	76.75	163943	3.764
LEFT	78.35	8434	0.194
LEFT	78.37	8434	0.194
RIGHT	78.60	7459	0.171
RIGHT	78.63	7459	0.171
RIGHT	79.22	13215	0.303
RIGHT	79.33	15574	0.358

ADDITIONAL TEMPORARY WORKSPACE			
SIDE	Approx. MP	AREA (FT²)	ACRES
RIGHT	79.44	2561	0.059
RIGHT	79.61	5791	0.133
RIGHT	79.76	15045	0.345
RIGHT	80.04	8083	0.186
RIGHT	80.12	1677	0.038
RIGHT	80.22	8307	0.191
RIGHT	80.55	4861	0.112
RIGHT	80.79	7595	0.174
RIGHT	80.87	7082	0.163
RIGHT	81.07	65372	1.501
RIGHT	81.17	7833	0.180
RIGHT	81.31	45500	1.045
RIGHT	81.72	100170	2.300
RIGHT	82.35	52076	1.196
RIGHT	82.97	12011	0.276
RIGHT	83.05	17218	0.395
RIGHT	83.09	7959	0.183
RIGHT	83.20	13265	0.305
RIGHT	83.65	8375	0.192
RIGHT	84.03	25910	0.595
RIGHT	84.71	59001	1.354
RIGHT	85.28	19046	0.437
LEFT	85.30	13319	0.306
LEFT	85.68	105473	2.421
RIGHT	85.94	59104	1.357
RIGHT	86.29	132201	3.035
LEFT	86.55	33980	0.780
RIGHT	87.03	7573	0.174
RIGHT	87.09	8261	0.190
RIGHT	89.03	19374	0.445
RIGHT	89.30	42789	0.982
LEFT	89.88	3927	0.090
RIGHT	89.89	8116	0.186
LEFT	89.96	9163	0.210

ADDITIONAL TEMPORARY WORKSPACE			
SIDE	Approx. MP	AREA (FT²)	ACRES
RIGHT	89.96	8325	0.191
RIGHT	90.23	13994	0.321
RIGHT	90.37	13731	0.315
LEFT	90.77	8595	0.197
RIGHT	90.78	4738	0.109
RIGHT	92.00	11392	0.262
LEFT	92.01	19557	0.449
RIGHT	92.15	15054	0.346
LEFT	93.71	35604	0.817
LEFT	93.79	2510	0.058
LEFT	93.85	2750	0.063
RIGHT	95.39	10211	0.234
RIGHT	95.45	19859	0.456
RIGHT	95.56	6622	0.152
LEFT	95.57	12295	0.282
RIGHT	96.75	5177	0.119
LEFT	96.76	9672	0.222
RIGHT	96.95	16748	0.384
LEFT	96.96	7737	0.178
RIGHT	97.23	5392	0.124
LEFT	97.23	7502	0.172
LEFT	97.45	2691	0.062
RIGHT	97.48	7573	0.174
LEFT	97.90	7456	0.171
RIGHT	97.90	5419	0.124
LEFT	98.08	12050	0.277
RIGHT	98.14	12051	0.277
LEFT	98.54	3491	0.080
LEFT	98.59	3863	0.089
RIGHT	98.72	12471	0.286
LEFT	98.73	10864	0.249
LEFT	99.30	28301	0.650
RIGHT	99.33	15666	0.360
LEFT	99.66	2987	0.069

ADDITIONAL TEMPORARY WORKSPACE			
SIDE	Approx. MP	AREA (FT²)	ACRES
LEFT	99.69	2386	0.055
RIGHT	100.60	55062	1.264
LEFT	100.61	28556	0.656
RIGHT	101.21	12721	0.292
RIGHT	101.43	7549	0.173
RIGHT	103.04	160358	3.681
RIGHT	103.62	32551	0.747
RIGHT	103.79	26806	0.615
RIGHT	104.14	77486	1.779
RIGHT	104.51	132142	3.034
RIGHT	105.22	159691	3.666
RIGHT	106.59	11016	0.253
RIGHT	106.68	11016	0.253
RIGHT	108.69	151671	3.482
RIGHT	109.23	16250	0.373
RIGHT	110.18	20000	0.459
RIGHT	111.05	60000	1.377
RIGHT	113.34	40015	0.919
RIGHT	117.58	7969	0.183
RIGHT	117.62	5877	0.135
RIGHT	118.49	8039	0.185
RIGHT	118.52	8039	0.185
RIGHT	118.65	9305	0.214
RIGHT	118.69	9305	0.214
RIGHT	119.48	8084	0.186
RIGHT	119.50	7623	0.175
RIGHT	119.68	20099	0.461
RIGHT	119.72	11747	0.270
RIGHT	120.02	6814	0.156
LEFT	120.02	6827	0.157
LEFT	120.04	5547	0.127
RIGHT	120.04	6814	0.156
RIGHT	120.57	8428	0.193
LEFT	120.60	6351	0.146

ADDITIONAL TEMPORARY WORKSPACE			
SIDE	Approx. MP	AREA (FT²)	ACRES
LEFT	120.60	6351	0.146
RIGHT	120.95	32380	0.743
RIGHT	121.95	53069	1.218
RIGHT	122.76	64169	1.473
RIGHT	123.33	13117	0.301
LEFT	123.41	5842	0.134
RIGHT	123.41	7064	0.162
LEFT	123.44	5842	0.134
RIGHT	123.44	7064	0.162
RIGHT	123.84	20624	0.473
RIGHT	123.95	12248	0.281
RIGHT	124.39	26892	0.617
RIGHT	124.83	13470	0.309
RIGHT	124.92	28783	0.661
RIGHT	125.46	33583	0.771
RIGHT	125.66	6477	0.149
RIGHT	125.87	15000	0.344
RIGHT	126.05	8371	0.192
RIGHT	126.08	10246	0.235
RIGHT	126.24	8615	0.198
LEFT	126.33	26479	0.608
RIGHT	126.38	7933	0.182
RIGHT	126.87	17672	0.406
RIGHT	128.02	46252	1.062
RIGHT	128.11	6700	0.154
RIGHT	128.17	6938	0.159
RIGHT	128.19	6938	0.159
RIGHT	128.85	54466	1.250
RIGHT	129.30	76021	1.745
RIGHT	130.30	88149	2.024
RIGHT	130.72	8174	0.188
RIGHT	130.96	105456	2.421
RIGHT	131.35	60961	1.399
RIGHT	132.30	7793	0.179

ADDITIONAL TEMPORARY WORKSPACE			
SIDE	Approx. MP	AREA (FT²)	ACRES
RIGHT	132.36	13151	0.302
RIGHT	132.84	5933	0.136
RIGHT	132.99	7509	0.172
RIGHT	133.21	57678	1.324
RIGHT	133.45	9893	0.227
RIGHT	133.47	7233	0.166
RIGHT	133.74	24312	0.558
RIGHT	134.48	68319	1.568
RIGHT	134.92	43924	1.008
RIGHT	135.09	12970	0.298
RIGHT	135.13	13337	0.306
RIGHT	136.25	5791	0.133
RIGHT	136.42	69150	1.587
RIGHT	137.62	11442	0.263
RIGHT	138.37	12001	0.275
RIGHT	138.43	5456	0.125
RIGHT	138.63	28832	0.662
RIGHT	138.92	33503	0.769
RIGHT	139.15	20062	0.461
RIGHT	139.55	49427	1.135
RIGHT	139.88	23455	0.538
RIGHT	140.44	56979	1.308
RIGHT	142.52	7761	0.178
RIGHT	142.58	35166	0.807
RIGHT	142.85	38667	0.888
RIGHT	143.25	16630	0.382
RIGHT	143.40	8459	0.194
LEFT	143.41	61108	1.403
LEFT	143.63	107670	2.472
RIGHT	143.84	18218	0.418
RIGHT	144.10	30029	0.689
RIGHT	144.48	13385	0.307
RIGHT	145.54	27440	0.630
RIGHT	145.87	7963	0.183

ADDITIONAL TEMPORARY WORKSPACE			
SIDE	Approx. MP	AREA (FT²)	ACRES
RIGHT	146.09	43415	0.997
RIGHT	146.74	50822	1.167
RIGHT	147.12	40834	0.937
RIGHT	147.42	9603	0.220
RIGHT	147.59	5599	0.129
RIGHT	147.71	2885	0.066
RIGHT	147.78	11895	0.273
RIGHT	148.06	15564	0.357
RIGHT	148.21	13877	0.319
RIGHT	148.51	676	0.016
RIGHT	148.55	3556	0.082
LEFT	148.61	1579	0.036
RIGHT	148.63	2557	0.059
RIGHT	148.69	35767	0.821
RIGHT	148.89	39137	0.898
LEFT	148.93	288501	6.623
LEFT	149.14	14151	0.325
LEFT	149.23	15665	0.360
LEFT	149.30	5837	0.134
LEFT	149.50	12664	0.291
RIGHT	149.56	9452	0.217
RIGHT	150.88	31374	0.720
RIGHT	151.16	31404	0.721
RIGHT	151.40	18919	0.434
RIGHT	152.13	5719	0.131
RIGHT	152.28	22666	0.520
RIGHT	152.88	1992	0.046
RIGHT	152.90	1572	0.036
RIGHT	152.93	4035	0.093
RIGHT	153.30	6036	0.139
RIGHT	153.32	6175	0.142
RIGHT	154.25	75475	1.733
RIGHT	154.42	39915	0.916
RIGHT	156.72	2630	0.060

ADDITIONAL TEMPORARY WORKSPACE			
SIDE	Approx. MP	AREA (FT²)	ACRES
RIGHT	156.85	2680	0.062
RIGHT	157.54	71250	1.636
RIGHT	158.29	9750	0.224
RIGHT	158.42	74827	1.718
RIGHT	158.53	11522	0.265
LEFT	158.54	10107	0.232
RIGHT	158.75	28620	0.657
RIGHT	159.36	21250	0.488
RIGHT	159.89	22627	0.519
LEFT	159.97	38750	0.890
LEFT	160.08	40000	0.918
RIGHT	160.25	142646	3.275
RIGHT	160.31	18042	0.414
LEFT	160.31	16573	0.380
RIGHT	161.41	27462	0.630
RIGHT	161.58	11050	0.254
RIGHT	161.63	8422	0.193
RIGHT	162.06	6947	0.159
RIGHT	162.13	6597	0.151
RIGHT	162.41	29615	0.680
RIGHT	162.82	52954	1.216
LEFT	163.06	43133	0.990
LEFT	163.14	11450	0.263
LEFT	163.39	16782	0.385
RIGHT	163.48	13879	0.319
RIGHT	163.78	44332	1.018
RIGHT	164.08	5311	0.122
RIGHT	164.29	2665	0.061
RIGHT	164.35	8539	0.196
RIGHT	164.65	5210	0.120
RIGHT	165.17	34522	0.793
RIGHT	165.62	80509	1.848
RIGHT	165.74	2509	0.058
LEFT	166.07	68793	1.579

ADDITIONAL TEMPORARY WORKSPACE			
SIDE	Approx. MP	AREA (FT²)	ACRES
RIGHT	166.07	69174	1.588
RIGHT	166.81	8298	0.190
RIGHT	167.14	12234	0.281
RIGHT	167.50	6170	0.142
RIGHT	167.57	6124	0.141
RIGHT	168.31	46512	1.068
RIGHT	168.48	1431	0.033
RIGHT	169.11	45286	1.040
RIGHT	169.34	5590	0.128
RIGHT	169.59	58944	1.353
RIGHT	169.88	51998	1.194
RIGHT	170.41	6132	0.141
RIGHT	170.73	37374	0.858
RIGHT	170.82	2826	0.065
RIGHT	170.84	6324	0.145
RIGHT	170.87	11881	0.273
RIGHT	171.34	1326	0.030
RIGHT	171.51	5811	0.133
RIGHT	171.58	6760	0.155
RIGHT	171.86	1161	0.027
RIGHT	172.34	4998	0.115
LEFT	172.52	57725	1.325
RIGHT	172.75	5212	0.120
RIGHT	173.18	65982	1.515
RIGHT	173.75	37749	0.867
RIGHT	174.36	25210	0.579
RIGHT	175.21	71783	1.648
RIGHT	175.41	13854	0.318
RIGHT	175.52	2049	0.047
RIGHT	175.86	12518	0.287
RIGHT	175.93	11714	0.269
RIGHT	176.38	17680	0.406
RIGHT	177.06	6933	0.159
RIGHT	177.50	15296	0.351

ADDITIONAL TEMPORARY WORKSPACE			
SIDE	Approx. MP	AREA (FT²)	ACRES
LEFT	177.52	7425	0.170
LEFT	177.61	15235	0.350
LEFT	177.73	22538	0.517
RIGHT	177.86	13744	0.316
LEFT	178.61	108134	2.482
RIGHT	178.93	4864	0.112
LEFT	179.02	41837	0.960
LEFT	179.17	5654	0.130
LEFT	179.79	7258	0.167
RIGHT	179.87	11846	0.272
RIGHT	180.15	92423	2.122
RIGHT	180.34	10683	0.245
RIGHT	180.41	9230	0.212
RIGHT	180.84	87051	1.998
RIGHT	181.20	4851	0.111
RIGHT	181.31	11647	0.267
RIGHT	181.43	7611	0.175
RIGHT	182.01	53973	1.239
RIGHT	182.52	41555	0.954
LEFT	182.67	5615	0.129
LEFT	182.67	5615	0.129
RIGHT	182.72	68242	1.567
RIGHT	182.85	18513	0.425
RIGHT	183.22	5898	0.135
RIGHT	183.29	6056	0.139
RIGHT	184.07	25894	0.594
RIGHT	184.25	11762	0.270
RIGHT	184.84	12130	0.278
RIGHT	185.29	10069	0.231
RIGHT	185.52	5180	0.119
RIGHT	185.81	6616	0.152
RIGHT	186.08	9999	0.230
RIGHT	186.21	2859	0.066
LEFT	186.22	5431	0.125

ADDITIONAL TEMPORARY WORKSPACE			
SIDE	Approx. MP	AREA (FT²)	ACRES
LEFT	186.56	6593	0.151
RIGHT	186.56	1198	0.028
LEFT	186.61	3494	0.080
RIGHT	186.62	5947	0.137
RIGHT	186.71	12263	0.282
RIGHT	186.85	3576	0.082
RIGHT	186.90	5614	0.129
RIGHT	186.96	2560	0.059
RIGHT	187.30	3472	0.080
RIGHT	187.40	18478	0.424
RIGHT	187.80	2057	0.047
RIGHT	187.92	16394	0.376
RIGHT	188.00	17470	0.401
RIGHT	188.07	1544	0.035
RIGHT	188.12	5539	0.127
RIGHT	188.28	3719	0.085
RIGHT	188.34	3008	0.069
RIGHT	188.39	5351	0.123
RIGHT	188.49	3732	0.086
RIGHT	188.61	9903	0.227
RIGHT	189.43	12316	0.283
RIGHT	189.76	6388	0.147
RIGHT	189.98	4189	0.096
RIGHT	190.08	14497	0.333
RIGHT	190.67	6749	0.155
RIGHT	190.88	22081	0.507
RIGHT	192.19	16291	0.374
RIGHT	192.62	18750	0.430
RIGHT	193.37	6189	0.142
RIGHT	193.43	6093	0.140
RIGHT	194.61	6201	0.142
RIGHT	195.09	148238	3.403
RIGHT	195.48	42250	0.970
RIGHT	196.00	3705	0.085

ADDITIONAL TEMPORARY WORKSPACE			
SIDE	Approx. MP	AREA (FT²)	ACRES
RIGHT	196.05	2884	0.066
RIGHT	196.75	14226	0.327
RIGHT	196.84	3850	0.088
RIGHT	196.92	37566	0.862
RIGHT	197.03	7016	0.161
RIGHT	198.50	10054	0.231
RIGHT	198.53	10054	0.231
RIGHT	199.73	10000	0.230
RIGHT	200.07	3235	0.074
RIGHT	200.12	3741	0.086
RIGHT	200.39	36107	0.829
RIGHT	200.48	11468	0.263
RIGHT	201.00	29372	0.674
RIGHT	201.21	143182	3.287
RIGHT	202.12	7621	0.175
RIGHT	202.26	15993	0.367
RIGHT	202.32	13771	0.316
RIGHT	202.62	8751	0.201
RIGHT	202.94	12471	0.286
RIGHT	203.21	135128	3.102
RIGHT	203.90	40026	0.919
RIGHT	204.25	42399	0.973
RIGHT	204.58	8266	0.190
RIGHT	205.87	33431	0.767
RIGHT	208.36	9393	0.216
RIGHT	208.44	3939	0.090
RIGHT	208.90	6423	0.147
RIGHT	209.12	22500	0.517
RIGHT	209.84	15000	0.344
RIGHT	210.05	10000	0.230
RIGHT	210.35	11808	0.271
RIGHT	210.67	37473	0.860
RIGHT	211.02	11872	0.273
RIGHT	211.36	9947	0.228

ADDITIONAL TEMPORARY WORKSPACE			
SIDE	Approx. MP	AREA (FT²)	ACRES
RIGHT	211.48	66714	1.532
RIGHT	212.00	4892	0.112
RIGHT	212.09	12370	0.284
RIGHT	212.18	4759	0.109
RIGHT	212.51	20000	0.459
RIGHT	212.94	14490	0.333
RIGHT	213.04	3952	0.091
RIGHT	213.13	14610	0.335
RIGHT	213.74	17496	0.402
RIGHT	214.13	15528	0.356
RIGHT	214.28	19919	0.457
RIGHT	214.47	21914	0.503
RIGHT	214.92	57655	1.324
RIGHT	215.31	38212	0.877
RIGHT	215.95	27172	0.624
LEFT	216.22	57565	1.322
RIGHT	216.46	17509	0.402
RIGHT	216.87	18750	0.430
LEFT	217.96	7425	0.170
RIGHT	218.07	101289	2.325
RIGHT	218.48	94610	2.172
RIGHT	218.79	26288	0.604
RIGHT	218.95	2247	0.052
RIGHT	219.13	4161	0.096
RIGHT	219.16	5261	0.121
RIGHT	219.44	829	0.019
RIGHT	219.48	2838	0.065
RIGHT	219.92	41116	0.944
RIGHT	220.20	28059	0.644
RIGHT	221.01	63192	1.451
RIGHT	221.37	26019	0.597
RIGHT	221.90	93914	2.156
RIGHT	222.37	34836	0.800
RIGHT	223.57	9750	0.224

ADDITIONAL TEMPORARY WORKSPACE			
SIDE	Approx. MP	AREA (FT²)	ACRES
RIGHT	223.65	32522	0.747
RIGHT	223.90	25000	0.574
RIGHT	224.40	12327	0.283
RIGHT	224.44	11884	0.273
RIGHT	224.83	4039	0.093
RIGHT	224.93	5980	0.137
RIGHT	225.04	22569	0.518
RIGHT	225.17	20787	0.477
RIGHT	225.25	5905	0.136
RIGHT	225.41	74691	1.715
RIGHT	225.97	8959	0.206
RIGHT	226.21	90284	2.073
RIGHT	227.57	271016	6.222
RIGHT	228.54	10227	0.235
RIGHT	229.08	32768	0.752
RIGHT	229.51	11149	0.256
RIGHT	229.55	11149	0.256
RIGHT	229.71	12330	0.283
LEFT	230.19	5625	0.129
LEFT	230.21	5625	0.129
RIGHT	230.22	151991	3.489
RIGHT	230.93	15810	0.363

Appendix D

Access Roads

Access Road Number	Location by Quadrangle Sheet	Road Description	Road Use	Owner Names	Length of Road to be Used (miles)
0	Lysite SE	New construction - Access Road to Station	TBD	Private	0.08
1A	Lysite SE	Private Access Road from CR to Station	Heavy	Private	0.11
1B	Lysite SE	Access from CR 158 to easement	Heavy	BLM	0.26
1C	Lysite SE	Access from CR 158 to easement	Heavy	BLM/Private	0.14
1E	Lysite SE	Access from CR 158 to easement	Heavy	BLM/Private	0.05
1F	Lysite SE	Access from CR 158 to easement	Heavy	BLM	0.06
1G	Lysite SE	Access from CR 158 to easement	Heavy	BLM	0.02
1H	Badwater	Access from CR 158 to easement	Heavy	BLM/Private	0.27
1I	Badwater	Access from CR 158 to easement	Heavy	BLM	0.42
1K	Badwater	Access from CR 158 to easement	Heavy	BLM	0.11
1L	Arminto; Badwater SE	Access from CR 158 to easement	Heavy	BLM	0.65
1N	Arminto	Access from CR 158 to easement	Heavy	BLM	1.75
1Q	Arminto	Access from CR 158 to easement	Heavy	BLM	1.13
2C	Arminto	Access from Arminto Rd. to easement	Heavy	Private	0.87
2C-1		Access from easement to easement over Railroad	Heavy		0.15

Access Road Number	Location by Quadrangle Sheet	Road Description	Road Use	Owner Names	Length of Road to be Used (miles)
2D	Waltman NW	Access from Arminto Rd. to easement	Heavy	Private	0.15
2E	Waltman NW	Access from Arminto Rd. to easement	Heavy	BLM/State	0.31
2G	Waltman	Access from Arminto Rd. to easement	Heavy	BLM/Private	0.29
3	Waltman	Access from HWY 20/26 to easement	Heavy	Private	1.00
4	Waltman	Access from HWY 20/26 to easement	Heavy	Private	0.55
5	Hell's Half Acre	Access from HWY 20/26 to easement	Heavy	County/Private	0.21
5A	Hell's Half Acre	Existing Access to Express Pipeline Valve site.	Heavy	County/Private/Public	0.06
6	Hell's Half Acre	Access from HWY 20/26 to easement	Heavy	BLM	0.16
8	Hell's Half Acre	Access from HWY 20/26 to easement	Heavy	BLM/Private	0.31
9	Hell's Half Acre	Access from HWY 20/26 to easement	Heavy	Private	0.18
10	Hell's Half Acre	Access from HWY 20/26 to easement	Heavy	Private	0.59
11		Access from HWY 20/26 to easement	Heavy		0.29
11A-1		Access from CR 210 to Natrona Hub	TBD		0.01
11A		Access from HWY 20/26 to easement	Heavy		0.16

Access Road Number	Location by Quadrangle Sheet	Road Description	Road Use	Owner Names	Length of Road to be Used (miles)
12	Natrona	Access from HWY 20/26 to easement/to be constructed to valve	Heavy	BLM	0.06
13	Natrona	Access from HWY 20/26 to easement	Heavy	Private	0.35
14	Natrona; Burlington Lake; Reynolds Reservoir; Merino	Becomes Private Per CTY Map at Sec 29	Heavy	BLM/State/Private	5.41
14A		Access from CR 126 to easement	Heavy		0.37
14B		Access from CR 126 to easement	Heavy		0.50
14B-2		Access from CR 126 to easement	Heavy		0.38
14C-1		Access from CR 126 to easement	Heavy		0.38
15A		Access from CR 110 to easement	Heavy		2.22
15A-1	Merino	Private Access - Divide Road	Heavy	BLM	1.43
15A-2	Merino	Public Access - 33 Mile Road/CR 125	Heavy	BLM	0.01
15B	Merino	Public Access - Long Canyon Road	Heavy	BLM	0.18
15C	Merino	Public Access - Long Canyon Road	Heavy	BLM	0.25

Access Road Number	Location by Quadrangle Sheet	Road Description	Road Use	Owner Names	Length of Road to be Used (miles)
15D	Camel Hump Reservoir	Public Access - Long Canyon Road	Heavy	BLM/State	0.27
15D-1	Camel Hump Reservoir	Public Access - Long Canyon Road	Heavy	BLM	0.95
15D-2	Camel Hump Reservoir	Public Access - Long Canyon Road	Heavy	BLM	0.15
15E	Camel Hump Reservoir	Public Access - Long Canyon Road	Heavy	BLM	0.05
15F	Government Creek	Public Access - Long Canyon Road	Heavy	BLM	0.45
15G	Government Creek	Public Access from Smokey Gap Road New Construction	Heavy	BLM	0.04
16A	Government Creek	2-Track Trail	Heavy	BLM/Public/Private/State	1.27
17A	Government Creek	WY DOT I-25	Heavy	BLM	1.37
18B	Dugout Ranch; Dead Woman Crossing	County/Tisdale Mtn Road	Heavy	BLM/Public/Private	4.84
18B-1	Dugout Ranch	Private Access from AR-18B	Heavy	BLM/Private	1.63
18B-2	Dugout Ranch	Private Access from AR 18B	Heavy	BLM	0.44
19	Dead Woman Crossing; Linch	Public Access from County RD 192	Heavy	State/Private	4.81
19A	Dead Woman Crossing	Sussex Field Road - Private Road	Heavy	BLM/Private	1.04
19B	Dead Woman Crossing; Sussex	Sussex Field Road - Private Road	Heavy	Private	2.10

Access Road Number	Location by Quadrangle Sheet	Road Description	Road Use	Owner Names	Length of Road to be Used (miles)
19C	Dead Woman Crossing	Access from Sussex Field Road (Private road) - Mainline Valve #9 Access/To be constructed	Heavy	Private	0.01
20	House Creek	Private Access from County Road 192	Heavy	Private	2.16
21-1	Fort Reno	Streeter Rd (Private)	Heavy	BLM/State/Private	3.60
21A	House Creek	Public Access from Streeter Road	Heavy	Private	0.23
21B	House Creek	Public Access from Streeter Road	Heavy	Private	0.11
23	Fort Reno	Private Access from Streeter Road	Heavy	Private	2.65
23A	Fort Reno	Private Access from AR-23	Heavy	BLM/Private	0.35
24	Fort Reno	The Edwin J. Streeter Family Revocable Trust & Dixie Lee Streeter-Easement	Heavy	Private	0.40
25	Hoe Ranch	Public Access - Lower Sussex Road/AR-22	Heavy	BLM/Private	2.30
26	Hoe Ranch	Private Access - Iragaway RD	Heavy	State/Private	1.58
26A	Hoe Ranch	Access From End of AR-26	Heavy	State/Private	2.21
26A-1	Hoe Ranch	Private - Access from AR-26A	Heavy	State	0.12
27	Hoe Ranch; Bowman Flat; Negro Butte	Access From Easement & End of AR-26A	Heavy	BLM/State/Private	13.06
27A	Hoe Ranch	Private Access from AR-27	Heavy	BLM/Private	0.11

Access Road Number	Location by Quadrangle Sheet	Road Description	Road Use	Owner Names	Length of Road to be Used (miles)
27B	Bowman Flat	Private Access from AR-27	Heavy	BLM	0.01
27C	Bowman Flat	Private Access from AR-27	Heavy	Private	0.38
27D	Bowman Flat	Private Access from Easement @ end of 27C	Heavy	Private	0.10
27E	Bowman Flat; Negro Butte	Private Access from Easement @ end of 27D	Heavy	Private	0.53
27F	Negro Butte	Private Access from AR-27	Heavy	BLM	0.06
28A	Negro Butte	Access from Beaver Creek Road	Heavy	BLM	0.02
29A	Negro Butte	Public Access from Beaver Creek Road	Heavy	BLM/Private	4.59
29B	Negro Butte	Private Access from AR 29A	Light	Private	1.06
29C	Negro Butte	Private Access from AR 29A	Heavy	Private	0.49
29D	Negro Butte; Laskie Draw	Public Access from Schoonover Road	Heavy	BLM/State	0.61
29E	Morgan Draw	Public Access from Schoonover Road	Heavy	Private	0.63
29F	Morgan Draw	Public Access from Buffalo Cut Across Road	Heavy	BLM/Private	0.96
29G	Morgan Draw	Public Access from Buffalo Cut Across Road	Heavy	BLM/Private	1.88
31	Morgan Draw	Public Access from Barber Creek Road . Extend this road to Access Mainline #12	Heavy	Private	0.46

Access Road Number	Location by Quadrangle Sheet	Road Description	Road Use	Owner Names	Length of Road to be Used (miles)
30A	Morgan Draw	Public Access from Barber Creek Road . Extend this road to Access Mainline #13	Heavy	Private	0.01
34A	Scott Dam	Public Access from CR 63 Kingsbury Road	Heavy	Private	0.82
35-1	Jeffers Draw	Public Access from CR 63 Kingsbury Road to Valve #14	Heavy	Private	1.95
34B	Jeffers Draw	Public Access from CR 63 Kingsbury Road	Heavy	Private	0.10
35A	Oriva	Public Access from Montgomery Road	Heavy	BLM/Private	4.73
35B	Jeffers Draw	Public Access from Montgomery Road	Heavy	Private	0.48
36B	Oriva NW; Oriva	Public Access @ the end of Penrose Peak Road	Heavy	State/Private	4.06
36C	Oriva NW	Private Access from AR 36B	Heavy	Private	3.38
37	Oriva NW	Private Access from Intersection of AR 37A & AR 38 Twenty Mile Land Company	Heavy	State/Private	7.51
37A	Oriva NW	Gravel Lease Rd	Heavy	Private	1.38
38	Oriva NW; Wildcat	Private Access from Intersection of AR 37 & AR 37A	Heavy	BLM/State/Private	6.17

Access Road Number	Location by Quadrangle Sheet	Road Description	Road Use	Owner Names	Length of Road to be Used (miles)
39A	Wildcat	Public Access - Taylor Rd - CR 107 - New construction to Valve Site #15	Heavy	Private	0.02
40A	Wildcat	Public Access - Taylor Rd - CR 107 - New construction to Valve Site #16 SCADA	Heavy	Private	0.03
42A	Calf Creek; Weston SW	Public Access from Collins Road	Heavy	BLM/Private	5.90
42A-1	Oliver Draw	Brown - Kennedy - New Construction to Valve Site # 17	Heavy	Private	0.01
42B	Weston SW	Private Access from AR-42A	Heavy	Private	0.58
42C	Oliver Draw; Weston SW; Calf Creek	Private Access from AR-42A	Heavy	Private	4.50
43	Oliver Draw	Public Access from HWY 59	Heavy	BLM/Private	2.22
44	Tuttle Draw; Rocky Butte SW	Public Access - US 59 - New Construction to Valve # 18 SCADA	Heavy	Private	2.33
45	Tuttle Draw	Public Access from HWY 59	Heavy	BLM/Private	3.13
45A	Tuttle Draw	Private Access from AR 45	Heavy	BLM/Private	2.60
45-1		Rocky Point Rd. to easement			17.98
46-1		AR 45-1 to easement			3.20
47A	Mitten Butte	Public Access - Trail Creek Road - New Construction Short piece to Valve Site # 19	Heavy	Private	0.01

Access Road Number	Location by Quadrangle Sheet	Road Description	Road Use	Owner Names	Length of Road to be Used (miles)
48A	Mitten Butte	Public Access - Parks Road CR 81	Heavy	Private	1.15
49A	Belle Creek SW	Public Access from Ranch Creek Road	Heavy	Private	1.91
49B	Belle Creek SW	Private Access from AR-49A	Heavy	Private	0.04
49C	Belle Creek SW	Private Access from AR-49A	Heavy	Private	0.16
50	Belle Creek South	Public Access from Ranch Creek Road	Heavy	Private	0.74
50A	Belle Creek South	Private Access from AR-50	Heavy	Private	0.99
50B	Belle Creek South	Public Access - Ranch Creek Road & New Construcion Access to Valve #20	Heavy	Private	0.04
51	Belle Creek South	Public Access from Ranch Creek Road - Access into Belle Creek Station and Valve #21		Private	0.61

Appendix E

Stormwater Pollution Prevention Plan

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- C Seed Mix
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- E Notice of Termination

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- 1 Estimated Disturbance
- 2 Typical Water Bar Spacing

1.0 Coverage Under This Permit

This permit is for the regulation of stormwater runoff from construction activities, and specific allowable non-stormwater discharges. The term "construction activity" includes ground surface disturbing activities, including, but not limited to, clearing, grading, excavation, demolition installation of new or improved haul and access roads, staging areas, stockpiling of fill materials, and borrow areas. "Stormwater" is precipitation-induced surface runoff.

Congress amended the CWA in 1987 to establish a comprehensive framework for addressing stormwater discharges under the National Pollutant Discharge Elimination System (NPDES) program. On November 16, 1990, the Environmental Protection Agency (EPA) published "Phase 1" regulations requiring all stormwater discharges associated with industrial facilities, including construction projects where five or more surface acres are disturbed, to obtain NPDES permits. In Wyoming, the program is known as the Wyoming Pollutant Discharge Elimination System or WYPDES. In Montana, the Department of Environmental Quality (DEQ) is authorized to administer the NPDES Program through the Montana Pollutant Discharge Elimination System (MPDES) Program.

The Stormwater Pollution Prevention Plan (SWPPP) should identify possible pollution sources that may contribute pollutants to stormwater and identify Best Management Practices (BMPs) that, when implemented, will reduce or eliminate any possible water quality impacts. The SWPPP maps must be completed and implemented by the time the project breaks ground. This plan should be modified as construction plans or conditions change.

2.0 Project Description and Location

Greencore will construct and operate approximately 231.1 miles of 20 inch-diameter CO₂ pipeline from the Conoco Philips Lost Cabin Gas Plant in Fremont County, Wyoming to a point in the Belle Creek Field oil field in Powder River County, Montana. The proposed pipeline would transport CO₂ as a dense-phase fluid for a proposed Enhanced Oil Recovery (EOR) project at the Belle Creek Field and, potentially to other delivery points when markets develop.

The pipeline route follows existing pipeline corridors wherever possible to minimize the surface impact, and traverses BLM approved utility corridors to support accelerating the BLM NEPA permitting process.

The pipeline will be designed to flow initial start up volumes of 50 million standard cubic feet per day (MMSCFD) from Lost Cabin. Future CO₂ supplies up to 775 MMSCFD will require additional facilities to be installed at the Natrona Hub and the potential addition of a Mid-point pump station.

Construction of the Project would be scheduled to begin upon receipt of BLM's Notice to Proceed (NTP). Construction would be completed over a two year period in spreads. Construction timeframe of the second and third spreads is anticipated to extend from August 1, 2011 through December 31, 2011. Construction timeframe of the first and fourth spreads is anticipated to extend from August 1, 2012 through December 31, 2012. Construction is anticipated to take approximately 15 to 20 weeks to complete in each year of construction. Reclamation may last an additional 4 weeks. This does not account for weather delays, holidays, or seasonal construction restrictions. The spread breakdown is listed below:

- 2012 Pipeline Construction Spread #1- MP 0- 65
- 2011 Pipeline Construction Spread #2 - MP 65- 118.
- 2011 Pipeline Construction Spread #3 - MP 118- 179.
- 2012 Pipeline Construction Spread #4- MP 179 - 232.

Greencore proposes to construct from a point in Township 38 North (T38N), Range 90 West (R90W), Section 11 at the Lost Cabin Gas Plant to a point in the Belle Creek Field, T8S, R54E, Section 27. Figure 1 is the General Location Map. The alignment sheets (included separately) contain the location information and all of the water crossings.

2.1 Soil Data

The proposed project is located in two physiographic provinces. From west to east along the proposed route are the Wyoming Basins province and the Un-glaciated Missouri Plateau section of the Great Plains province (Wyoming State Geological Survey [WSGS] 2010a,b,c). The Wyoming Basin province is characterized by plateaus and isolated mountain ranges and generally occupies the southwestern third of Wyoming. Different soil characteristics crossed by the pipeline are described in Attachment A.

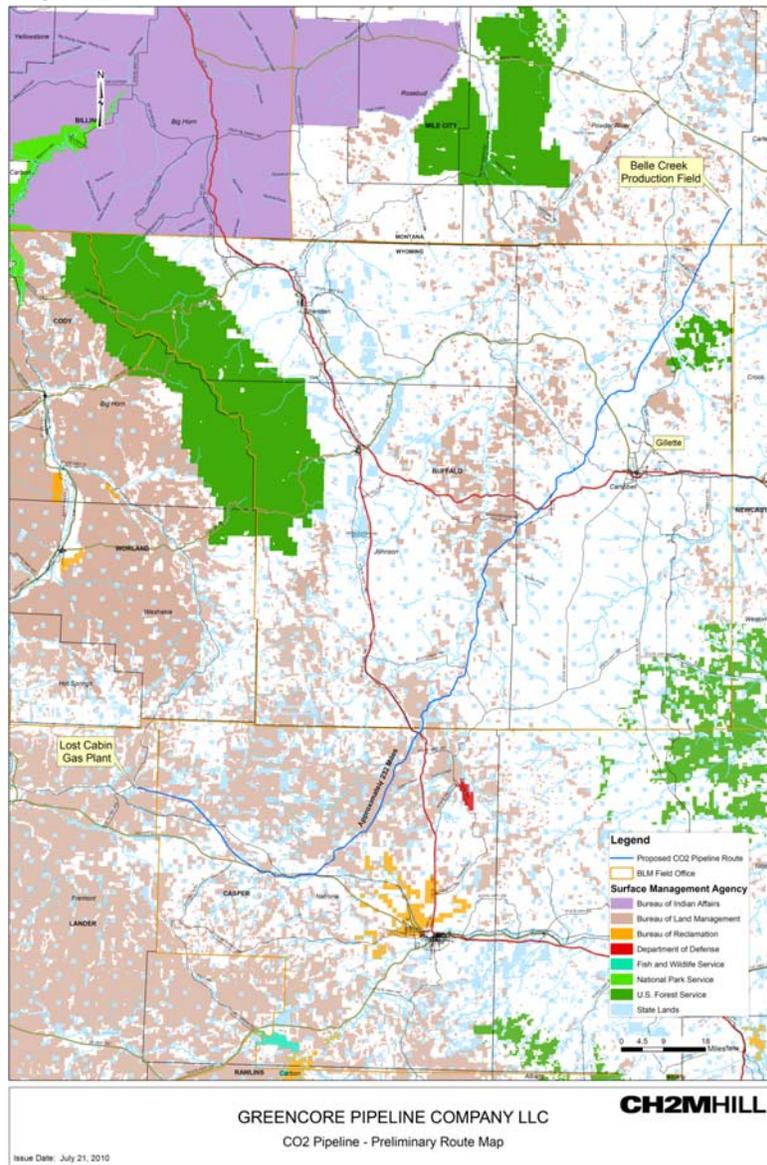
2.2 Receiving Waters

The pipeline corridor crosses multiple drainages. Please see the alignment sheets (included separately) for locations. Construction will follow Army Corps of Engineer Permit stipulations.

2.3 Runoff Coefficient

The runoff coefficient is the partial amount of rainfall which will become runoff. The project crosses a wide range of soil types and vegetation cover. In rough rocky terrain with low vegetation cover, the runoff coefficient typically ranges from 0.20 – 0.50. On range land and pastures, the runoff coefficient typically ranges from 0.15 – 0.45. Post-construction levels will be near these levels by reseeding, mulching, and through the installation and monitoring of BMPs (Attachment B).

FIGURE I – GENERAL LOCATION MAP



3.0 Nature of Construction Activity

The construction procedures are described in detail in the Plan of Development (POD). The construction corridor would be staked and the ground cleared and graded to the extent necessary for safe construction. Topsoil will be windrowed to the side and not mixed with soil excavated from the trench. After the trench is dug, pipe will be strung beside the trench, section welded, and then lowered into the trench. The trench will be backfilled and then available topsoil would be brought back over the corridor. All disturbed areas would be reclaimed and seeded. Damaged fences, etc. would be repaired or replaced. Temporary use areas, temporary access areas, and storage yards would also be reclaimed. Areas that were preexisting would be returned to near previous condition or as negotiated.

3.1 Estimated Disturbance Area

The pipeline route follows existing pipeline corridors wherever possible to minimize the surface impact, and traverses BLM approved utility corridors to limit new disturbance. The estimated impacts are described in Table 1 below.

TABLE 1—ESTIMATED DISTURBANCE

Component/Facility	Acres Disturbed	Acres Removed	Acres Reclaimed ¹
CO ₂ Pipeline, 231.1 miles ²	2,801.2	0.0	2,801.2
Lost Cabin (MP 0.0) – 2.9 acres Future Natrona Hub (MP 39.5) – 10.0 acres Future Interconnect Station (MP 87.2) – 0.4 acre Future Mid Point Pump Station (MP 144.0) – 5.0 acres Launcher/Receiver Facility (MP 200.4) – 0.4 acre Belle Creek Pump Station and Delivery Point (MP 231.1) – 5.0 acres	23.7	23.7	0.0
Block Valves and Take-off Valves, 20 at 0.2 acre ³	0.0	4.0	0.0
Measurement Facilities with Scraper Traps, 2 at 0.3 acre; Interconnect Station at 0.8 acre	1.4	1.4	0.0
Casper Pipeyard	21.5	0.0	0.0
Upton Pipeyard ⁴	14.9	0.0	0.0
Additional Temporary Workspace	377.1	0.0	377.1
Overall Total ⁴	3,224.9	29.1	3,178.3

3.2 Sequence of Major Soil Disturbance Activities

General construction stages and changes in site erosion potential and stormwater runoff that accompany each stage are described below. The stages could vary depending on specific site

conditions. The Environmental Inspectors (EIs) will ensure the proper location of BMPs. The alignment sheets (included separately) indicate the primary areas of BMP installation.

Stage 1: Preconstruction

Stormwater runoff from the site is at pre-developed levels and erosion is minimal. Site perimeter erosion controls may be required prior to initial disturbance to protect areas designated as high importance such as drainages and wetlands. The EI should review the project area and become familiar with the natural drainage patterns and identify potential problem areas.

Stage 2: Clearing and Grading for Access

Measures are implemented to control erosion and sediment. BMPs are installed on the edge of disturbance and out of the way of equipment operation. Erosion from the site increases to moderate levels and stormwater potential runoff volume begin to increase as vegetation is removed and site areas become compacted by heavy equipment. New drainage patterns may form and BMPs should be installed to address new flow directions.

Stage 3: Full Clearing and Grading

Full clearing and grading can result in moderate to high levels of erosion as the site is prepped for construction. All necessary vegetation is removed and stormwater runoff could increase significantly from a heavy storm event. All primary BMPs should be installed including perimeter protection, inlet and outlet protection, and construction access protection. Major storms could cause significant erosion and sediment yield. Regular inspection and maintenance of sediment control practices could be required at this time.

Stage 4: Active Construction

Clearing is completed and construction is at its peak. Moderate to high erosion rates can continue and stormwater runoff volumes can approach maximum. Temporary berms and diversions may be used to control surface flows at this time if existing BMPs are not adequate in certain areas. All drainages and outlets off site should be protected. The frequency of inspection and reporting could be increased to ensure compliance.

Stage 5: Site Stabilization

Post-construction stormwater management measures will be installed. Erosion and sediment BMPs should be permanent in design. All temporary and synthetic BMPs, such as siltfence, should be removed if possible. Natural BMPs should be utilized such as earth berms, water bars, slash material, rock, ground matting, and wattles. All disturbed areas, other than driving/work surfaces, should be reseeded. Seed on steeper slopes should be protected with ground matting, mulch, or tackifiers. Drilling or hydromulching are preferred seeding methods in most situations. All BMPs should be designed and installed for long term performance. When construction is completed, the entire right-of-way and temporary use areas will be returned as close as possible to the natural contours.

4.0 Best Management Practices

BMPs encompass a wide range of erosion and sediment control practices, both structural and non-structural, that are intended to reduce or eliminate any possible water quality impacts from stormwater leaving a construction site. The individual BMPs appropriate for a particular construction site are largely dependent on potential pollutant sources present, the nature of the construction activity, and specific-site conditions.

BMPs will be used to minimize erosion and sediment transport during construction and post construction phases. All control measures must be properly selected, installed, and maintained in accordance with any relevant manufacturer specifications and good engineering practices. If periodic inspections or other information indicates a control has been used inappropriately or installed incorrectly, the operator must replace or modify the control device as soon as practicable.

The potential for erosion and sediment transport is greatest in areas where ground surfaces have been disturbed and soil is exposed to wind and water. In an effort to protect existing water quality, both temporary and permanent BMPs have been designed to minimize the effects of erosion caused by stormwater runoff. BMPs will be selected based on soil properties, steepness of the slope, weather conditions, and anticipated surface flow. These practices will focus on Erosion Control (prevention and control of erosion) and Sediment Control (the removal of sediment from runoff).

Attachment B provides a variety of standard erosion and sediment control devices. In general, natural and biodegradable materials are preferred over synthetic devices in most situations. Common natural BMPs include wattles, weed free straw, slash material, rocks, logs, diversion berms, and water bars. Siltfence and other synthetic materials are considered temporary BMPs and should be removed or replaced with natural materials when the project area is reclaimed.

The implementation of BMPs will vary from location to location depending on site and seasonal conditions. In most cases, a combination of non-structural and structural devices should be used to control erosion and sediment transport. These devices should be installed in all locations where there is potential for erosion and sediment transport and where water quality could be impacted. This includes steep slopes, stream and river banks, arroyo banks, and wetland borders. The exact placement BMPs should be field fitted by the EIs and should be modified if site conditions or construction plans change.

4.1 Structural Practices

Structural practices include diversion structures, erosion and sediment devices, inlet and outlet protection, and siltfence. These devices are used to limit erosion and trap sediment. The EI should be responsible for designating the type and location of each structural BMP.

During construction, temporary erosion-control measures, including wattles, siltfences, straw bale structures, slope breakers, diversion ditches, and water bars should be employed as deemed necessary to reduce erosion and runoff from the right-of-way to adjacent areas. The spacing of

water bars on slopes is site specific; depending on slope percent, precipitation, soil/rock material, and natural drainage patterns. Table 2 indicates typical spacing requirements.

TABLE 2—TYPICAL WATER BAR SPACING

Slope %	Spacing (feet)
<5 %	No structures
5 –15%	300 feet
15-30 %	200 feet
>30%	100 feet

In most cases, natural fiber wattles are preferred for this project. These devices generally require less maintenance than siltfence and straw bales and will eventually biodegrade. Velocity dissipation devices must be placed at any discharge locations including culverts and spill ways. Rock, fiber wattles, straw bales, or siltfence could be used. Slash and rock from project clearing could also be used in conjunction with the devices above or as stipulated by the landowner. These devices should be installed to slow the water velocity, decrease erosion, and decrease sediment transport which protects water quality in receiving streams, wetlands, etc. Structural practices are generally designed to retain sediment on-site to the extent feasible.

Gravel/stone ramps should be installed at access points to public roadways to prevent or minimize tracking of mud, dirt, sediment, or similar materials onto the roadway, if necessary. Deposits that have been tracked by vehicles or have been transported off the right-of-way by wind or stormwater onto a public road will be removed as soon as practical.

4.2 Non-Structural Practices

Non-structural practices are interim and permanent measures designed to prevent erosion and sediment from leaving the construction site. Examples of this include preserving as much vegetation as possible, seeding, mulching, ground- matting, and leaving vegetation for buffer zones. Non-structural practices also include establishing spill response procedures, designating travel and parking areas, and worker education.

During the clearing phase of this project, vegetation would only be cut/graded if it impedes safe construction or travel or where a permanent driving service will be established. When possible, grasses and shrubs could be driven over instead of removed. Vegetative buffers should be retained on the banks of arroyos, streams, and between construction and wetland areas.

Recontouring to natural topography will be accomplished without disruption to adjacent, undisturbed habitat. All areas disturbed by construction will be restored and reseeded to stabilize the areas as soon as practical. An appropriate seed mix for the area is provided in Attachment C.

4.3 Existing Controls

There are no known existing controls on this project.

4.4 Other Controls

The following control measures and good housekeeping practices should be implemented. Some of these activities are covered under separate permits or considered industry standards.

Dust Control

Water trucks would be used to control airborne dust on the construction site and graded traffic routes if feasible or required by permit. Topsoil and spoil storage piles will be sprayed, as needed, to minimize the effects of wind erosion and to reduce fugitive dust, if necessary.

Garbage

Regular disposal for garbage, rubbish, construction wastes, and sanitary waste will be maintained at all times during construction. Sanitary sewage facilities (portable chemical toilets) will be provided at designated locations and will not be located within 100 feet of a waterway or wetland. Sanitary waste will be collected and removed for disposal at an appropriate licensed sewage disposal facility. No sewage will be buried, dumped, or discharged to drainages or wetlands.

Hazardous Materials

Hazardous materials and petroleum products to be used in construction of the project are limited to fuel for construction equipment and vehicles, as well as small quantities of paints and solvents. All hazardous materials or products will be properly contained and disposed of in accordance with applicable laws, rules, and regulations.

Fueling

Equipment will not be refueled or lubricated within 100 feet of any waterway or wetland. Fuel and lubricants will be delivered via service trucks. These materials will not be stored on the corridor.

Spills

Any spills of liquid or dry materials will be promptly cleaned up. Spills of toxic or hazardous material will be reported to the appropriate state or local government agency. Appropriate steps will be taken by the owner/operator in the event that a previously unreported or unanticipated hazardous waste or contaminated site is discovered during construction. The Emergency Response plan is included in the Plan of Development.

Equipment

Construction equipment and vehicles will be inspected for leaks and necessary repairs will be made before returning the equipment to service. All equipment will be cleaned and inspected and no leaking equipment will be allowed on the construction site.

5.0 Potential Sources of Pollution

The potential sources of pollution expected for this project would come primarily from disturbed and stored soil and vehicle tracking. Large rain events or sudden snow melting would be the primary reasons for sediment transport. This could occur across the project area at any time. Areas around drainages and wetlands are most vulnerable and are the primary areas for BMP installation. All waterways and wetlands are identified on the alignment sheets (included separately).

6.0 Other Discharges

No industrial activities or hazardous waste storage will take place onsite. Discharge will only come from construction activities. This permit does not authorize the discharge of hazardous substances or oil resulting from an on-site spill. The discharge of hazardous substances or oil in stormwater discharges from the construction site must be prevented or minimized in accordance with the SWPPP. This permit does not relinquish federal reporting requirements of 40 CFR Part 110, 40 CFR Part 117 and 40 CFR Part 302 relating to spills or other releases of oils or hazardous substances.

Discharges from construction dewatering activities may be authorized by this permit, provided that:

- The source is groundwater and/or groundwater combined with stormwater that does not contain pollutants in concentrations exceeding the State water standards.
- Discharge must be dispersed over appropriate energy dispersion devices to reduce scouring and erosion.
- Discharge does not reach waterways or wetlands.

Several drainage are planned to be horizontal directionally drilled (HDD). Bore pits may collect groundwater and/or stormwater. In this case, water collected in bore pits could be pumped out and discharged onto the ground as authorized by permit. Dissipation devices would be utilized at the discharge points. The devices could include straw bale barriers, siltfence and synthetic ground matting. Discharge should be directed to well vegetated upland areas. The EI should determine the appropriate dissipation methods based on site conditions. BMP schematics are included in Attachment B.

7.0 Approved State and Local Plans

This plan is consistent with the requirements specified in Wyoming and Montana stormwater programs. This plan should be used in conjunction with any other state and local requirements. This plan will be updated as necessary to remain consistent with any changes applicable to protection of surface water resources or permits approved by state or local agencies. This plan should also be amended to incorporate changes to the construction plan and changing site conditions.

8.0 Maintenance

The construction contractor will be responsible for the installation and maintenance of BMPs. Greencore's designated EI will be responsible for ensuring that the construction contractor is in compliance with this plan. Maintenance of erosion control measures will be performed based on inspection results. Replacement or modifications to BMPs may be necessary to meet unanticipated conditions.

All erosion and sediment control measures and other protective measures identified in the SWPPP must be maintained in effective operating condition. If site inspections identify BMPs that are not operating effectively, require modification, or additional devices, maintenance must be performed as soon as possible and before the next storm event to maintain the continued effectiveness of stormwater controls.

Sediment from sediment traps or sedimentation ponds must be removed when design capacity has been reduced by 50 percent. This sediment should be dispersed in an upland area where the sediment will not enter back into stormwater flow. This plan should be modified to accommodate any changes in construction plans or anticipated impacts.

9.0 Inspections

During construction, qualified personnel will inspect disturbed areas and structural and non-structural control measures. "Qualified personnel" means a person knowledgeable in the principles and practice of erosion and sediment controls, who possesses the skills to assess conditions at the construction site that could impact stormwater quality and to assess the effectiveness of any sediment and erosion control measures selected to control the stormwater discharges.

9.1 Inspection Schedule

During construction, inspections must be conducted a minimum of every 14 calendar days and within 24 hours of any precipitation event that exceeds 0.5 inches. Inspection frequency can be increased depending on agency, owner, or site requirements. Inspections can be reduced to at least once every month if the entire site is temporarily stabilized, if runoff is unlikely due to winter conditions or if construction is occurring during a seasonally dry periods in an arid or semi-arid area. Inspection would not be required during the winter if snow covers the entire site. This exemption is applicable only during the period when melting conditions do not exist. Individual state requirements should also be reviewed. After construction activities are completed, inspection should occur at least once a month until the project area is stable.

9.2 Inspection Locations

Inspections must include all areas of the site disturbed by construction activity and areas used for storage of materials that are exposed to precipitation. Inspector(s) must look for evidence of, or the potential for, pollutants entering the stormwater conveyance system. Sedimentation and erosion control measures identified in the plan must be observed to ensure proper operation. Discharge locations must be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to waters of the United States, where accessible. Where discharge locations are inaccessible, nearby downstream locations should be inspected to the extent that such inspections are practicable. Locations where vehicles enter or exit the site must be inspected for evidence of off-site sediment tracking.

Utility line installation, pipeline construction, and other examples of long, narrow, linear construction activities may limit the access of post construction inspection personnel to the project areas. Inspection of these areas could require that vehicles compromise temporary or even permanently stabilized areas, cause additional disturbance of soils, and increase the potential for erosion. In these circumstances, controls must be inspected on the same frequencies as other construction projects, but representative inspections may be performed. For representative inspections, personnel must inspect controls along the construction site for 0.25 mile above and below each access point where a roadway, undisturbed right-of-way, or other similar feature intersects the construction site and allows access to the areas described above. The conditions of the controls along each inspected 0.25 mile segment may be considered as representative of the condition of controls along that reach extending from the end of the 0.25 mile segment to either the end of the next 0.25 mile inspected segment, or to the end of the project, whichever occurs first.

The spread of noxious weeds on the project site must also be noted. Weeds often spread quickly after land disturbance, even when proper seeding has been implemented. Monitoring of these weeds should be incorporated into the inspection program. The operator is responsible for weed mitigation. Noxious weeds could be controlled by utilizing one or more of the following: (1) biological control, (2) cultural control, (3) herbicide control, or (4) physical control. The county weed specialist can be contacted for assistance in weed control.

9.3 Reporting

An inspection report will be immediately prepared and signed by the EI following each inspection in accordance with the discharge permit. The EI should identify all non compliance issues. This identification should include the cause and remedy so the contractor can correct the problem. All modifications and maintenance to BMPs should be conducted as soon as feasible. Modifications and/or location of additional BMPs should be noted in the inspection reports and maps.

Copies of the inspection reports will be retained at the construction site during construction and retained for three years by the owner/operator after construction. A copy of the Inspection Form is located in Attachment D.

9.4 Termination

After final stabilization of the construction project and it has been determined by the EI the project area has regained 70% of the background cover, a Notice of Termination (NOT) can be filed for the permit. A NOT for both Wyoming and Montana is included in Attachment E. Copies of all records and information resulting from monitoring activities required by this permit will be retained by Greencore for a minimum of 3 years.

Stormwater Pollution Prevention Plan Certification

Certification Statement of Owner/Operator

Any person signing documents required by this permit shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature:

Greencore Representative

Contractor's Certification

All contractors responsible for installation, implementation, and maintenance of stormwater BMPs or may affect stormwater management on this project must be thoroughly familiar with the regulations and practices described in this plan.

Contractor: _____
Name

Title

Company

Subcontractor: _____
Name

Title

Company

Subcontractor: _____
Name

Title

Company

Subcontractor: _____
Name

Title

Company

Attachment A: Soil Descriptions

From MP	To MP	Limiting Factor
0.0	0.3	pH, Water Erosion
0.3	0.5	Water Erosion
0.5	0.7	pH, Water Erosion
0.7	1.2	Water Erosion
1.2	1.2	Shallow Bedrock (Soft), Permeability, Water Erosion
1.2	1.3	Shallow Bedrock (Soft), Water Erosion
1.3	1.5	Sandy, Water Erosion
1.5	1.8	Sandy
1.8	2.8	Sandy, Water Erosion
2.8	4.2	Sandy, Wind Erosion.
4.2	4.4	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
4.4	4.6	Shallow Bedrock (Soft), Sandy, Water Erosion
4.6	5.5	Shallow Bedrock (Soft) Water Erosion
5.5	5.6	Shallow Bedrock (Soft), Permeability
5.6	6.3	Shallow Bedrock (Soft) Water Erosion
6.3	6.4	Shallow Bedrock (Soft), Clayey, Permeability, pH, Sodic, Water Erosion
6.4	6.8	Shallow Bedrock (Soft), Water Erosion
6.8	10.7	Sandy, Water Erosion
10.7	10.8	Shallow Bedrock (Soft), Water Erosion
10.8	12.6	Sandy, Water Erosion
12.6	12.6	Shallow Bedrock (Soft), Water Erosion
12.6	12.9	Sandy, Water Erosion
12.9	13.0	Shallow Bedrock (Soft), Water Erosion
13.0	13.2	Sandy, pH, Sodic, Water Erosion
13.2	13.5	Sandy, Water Erosion
13.5	13.7	Shallow Bedrock (Soft), Water Erosion
13.7	14.1	Sandy, Water Erosion
14.1	14.2	Shallow Bedrock (Soft), Water Erosion

From MP	To MP	Limiting Factor
14.2	14.4	Sandy, Water Erosion
14.4	14.6	Shallow Bedrock (Soft), Water Erosion
14.6	14.6	Sandy, Water Erosion
14.6	14.7	Shallow Bedrock (Soft), Water Erosion
14.7	14.7	Sandy, Water Erosion
14.7	15.1	Shallow Bedrock (Soft), Water Erosion
15.1	15.6	Sandy, pH, Sodic, Water Erosion
15.6	15.7	Shallow Bedrock (Soft), Permeability
15.7	15.8	Shallow Bedrock (Soft), Water Erosion
15.8	16.0	Shallow Bedrock (Soft), Water Erosion
16.0	16.4	Sandy, Water Erosion
16.4	16.6	Shallow Bedrock (Soft), Water Erosion
16.7	17.0	Sandy, Water Erosion
17.0	17.1	Shallow Bedrock (Soft), Water Erosion
17.1	17.3	Sandy, Water Erosion
17.3	17.4	Shallow Bedrock (Soft), Clayey, Permeability, pH, Sodic, Water Erosion
17.4	17.6	Clayey, Permeability, pH, Sodic, Water Erosion
17.6	18.5	Sandy, Water Erosion
18.5	18.7	Shallow Bedrock (Soft), Clayey, Permeability, pH, Sodic, Water Erosion
18.7	18.8	Sandy, Water Erosion
18.9	19.0	Clayey, Permeability, pH, Sodic, Water Erosion
19.0	19.6	Sandy, Water Erosion
19.6	19.7	Clayey, Permeability, pH, Sodic, Water Erosion
19.7	20.3	Sandy, pH, Water Erosion
20.3	20.7	Clayey, Permeability, pH, Sodic, Water Erosion
20.7	21.0	Shallow Bedrock (Soft), Clayey, Permeability, pH, Sodic, Water Erosion
21.0	22.6	Sandy, Water Erosion
22.6	22.6	Clayey, Permeability, Water Erosion
22.6	23.9	Sandy, Water Erosion
23.9	24.0	Sandy, Permeability, pH, Sodic, Water Erosion
24.0	24.5	Sandy, Water Erosion
24.5	24.6	Sandy, Permeability, pH, Sodic, Water Erosion

From MP	To MP	Limiting Factor
24.6	32.1	Sandy, Water Erosion
32.1	32.3	Shallow Bedrock (Soft)
32.3	32.4	Sandy, Water Erosion
32.4	32.6	Shallow Bedrock (Soft)
32.6	32.6	Sandy, Water Erosion
32.6	32.9	Shallow Bedrock (Soft)
32.9	32.9	Clayey, Water Erosion
32.9	34.6	Sandy, Water Erosion
34.6	34.7	Shallow Bedrock (Soft)
34.7	35.7	Sandy, Water Erosion
35.7	35.7	Sandy, Water Erosion
35.7	36.1	Clayey, Permeability, pH, Water Erosion
36.1	36.6	Sandy, Water Erosion
36.6	36.8	Shallow Water Table, Water Erosion
36.8	37.6	Sandy, Water Erosion
37.6	37.7	Shallow Water Table, Water Erosion
37.7	38.6	Sandy, Water Erosion
38.6	39.4	Clayey, Water Erosion
39.4	39.5	Shallow Bedrock (Soft), Clayey, Permeability, pH, Sodic, Water Erosion
39.5	39.7	Clayey, Water Erosion
39.7	39.8	Shallow Bedrock (Soft), Clayey, Permeability, pH, Sodic, Water Erosion
39.8	39.9	Clayey, Water Erosion
39.9	40.2	Clayey, Permeability, pH, Water Erosion
40.2	40.3	Permeability, Water Erosion
40.3	40.3	Clayey, Permeability, pH, Water Erosion
40.3	40.5	Permeability, Water Erosion
40.5	40.7	Clayey, Permeability, pH, Water Erosion
40.7	40.9	Water Erosion
40.9	40.9	Clayey, Permeability, pH, Water Erosion
40.9	41.2	Sandy, Water Erosion
41.2	41.5	Clayey, Permeability, pH, Water Erosion
41.5	41.6	Water Erosion

From MP	To MP	Limiting Factor
41.6	42.1	Clayey, Permeability, pH, Water Erosion
42.1	42.3	Water Erosion
42.3	42.3	Clayey, Permeability, pH, Water Erosion
42.3	42.6	Water Erosion
42.6	45.4	Sandy, Water Erosion
45.4	46.0	Clayey, Permeability, pH, Sodic, Water Erosion
46.0	46.8	Sandy, Water Erosion
46.8	47.0	Sandy, Permeability, pH, Sodic, Water Erosion
47.0	50.6	Sandy, Water Erosion
50.6	51.5	Water Erosion
51.5	51.6	Sandy, Water Erosion
51.6	51.7	Water Erosion
51.7	52.1	Sandy, Water Erosion
52.1	52.2	Water Erosion
52.2	52.4	Sandy, Water Erosion
52.4	52.5	Water Erosion
52.5	52.7	Sandy, Water Erosion
52.7	52.7	Water Erosion
52.7	52.8	Sandy, Water Erosion
52.8	52.9	Water Erosion
52.9	52.9	Sandy, Permeability, pH, Sodic, Water Erosion
52.9	53.4	Water Erosion
53.4	53.5	Sandy, Water Erosion
53.5	53.7	Water Erosion
53.7	54.0	Sandy, Water Erosion
54.0	55.3	Sandy, Permeability, pH, Sodic, Water Erosion
55.3	55.5	Clayey, Permeability, pH, Sodic, Water Erosion
55.5	55.7	Clayey, Permeability, pH, Water Erosion
55.7	55.8	Sandy, Permeability, pH, Sodic, Water Erosion
55.8	55.9	Clayey, Permeability, pH, Sodic, Water Erosion
55.9	56.9	Sandy, Permeability, pH, Sodic, Water Erosion
56.9	57.1	Clayey, Permeability, Shallow Water Table, Water Erosion

From MP	To MP	Limiting Factor
57.1	57.1	Sandy, Permeability, pH, Sodic, Water Erosion
57.1	57.2	Clayey, Permeability, Shallow Water Table, Water Erosion
57.2	57.4	Sandy, Permeability, pH, Sodic, Water Erosion
57.4	57.7	Permeability, Sodic, Water Erosion
57.7	57.8	Clayey, Permeability, Shallow Water Table, Water Erosion
57.8	58.8	Shallow Bedrock (Soft), Clayey, Permeability, Sodic, Water Erosion
58.8	58.9	Water Erosion
58.9	59.8	Clayey, Permeability, Shallow Water Table, Water Erosion
59.8	60.1	Clayey, Permeability, Water Erosion
60.1	60.5	Shallow Bedrock (Soft), Clayey, Permeability, Sodic, Water Erosion
60.5	61.2	Clayey, Permeability, Water Erosion
61.2	61.8	Sandy, Permeability, pH, Sodic, Water Erosion
61.8	62.7	Shallow Bedrock (Soft), Clayey, Permeability, Sodic, Water Erosion
62.7	62.8	Sandy, pH, Water Erosion
62.8	63.5	Sandy, Water Erosion
63.5	63.6	Sandy, Permeability, pH, Sodic, Water Erosion
63.6	63.6	Sandy, Water Erosion
63.6	65.7	Sandy, Permeability, pH, Sodic, Water Erosion
65.7	65.8	Shallow Water Table, Water Erosion
65.8	67.2	Sandy, Permeability, pH, Sodic, Water Erosion
67.2	67.3	Shallow Bedrock (Soft), Clayey, Permeability, Sodic, Water Erosion
67.3	67.6	Sandy, Permeability, pH, Sodic, Water Erosion
67.6	67.8	Shallow Bedrock (Soft), Clayey, Permeability, Sodic, Water Erosion
67.8	67.9	Sandy, Permeability, pH, Sodic, Water Erosion
67.9	68.4	Shallow Bedrock (Soft), Clayey, Permeability, Sodic, Water Erosion
68.4	68.5	Sandy, Permeability, pH, Sodic, Water Erosion
68.5	68.6	Shallow Bedrock (Soft), Clayey, Permeability, Sodic, Water Erosion
68.6	68.8	Sandy, Permeability, pH, Sodic, Water Erosion
68.8	68.9	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
68.9	71.0	Shallow Bedrock (Soft), Clayey, Permeability, Sodic, Water Erosion
71.0	71.4	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
71.4	71.5	Shallow Bedrock (Soft), Clayey, Permeability, Sodic, Water Erosion

From MP	To MP	Limiting Factor
71.5	71.7	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
71.7	71.7	Shallow Bedrock (Soft), Clayey, Permeability, Sodic, Water Erosion
71.7	72.5	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
72.5	72.7	Shallow Bedrock (Soft), Clayey, Permeability, Sodic, Water Erosion
72.7	73.0	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
73.0	73.7	Shallow Bedrock (Soft), Clayey, Permeability, Sodic, Water Erosion
73.7	74.9	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
74.9	75.2	Shallow Bedrock (Soft), Clayey, Permeability, Sodic, Water Erosion
75.2	75.4	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
75.4	75.5	Permeability, Water Erosion
75.5	75.5	Shallow Water Table, Water Erosion
75.5	76.0	Permeability, Water Erosion
76.0	76.2	Shallow Bedrock (Soft), Clayey, Permeability, Sodic, Water Erosion
76.2	76.4	Permeability, Water Erosion
76.4	76.5	Shallow Water Table, Water Erosion
76.5	76.7	Clayey, Permeability, pH, Water Erosion
76.7	77.3	Sandy, Permeability, pH, Sodic, Water Erosion
77.3	78.5	Clayey, Permeability, Water Erosion
78.5	79.3	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
79.3	79.6	Clayey, Permeability, pH, Water Erosion
79.6	80.0	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
80.0	80.7	Clayey, Permeability, pH, Water Erosion
80.7	82.9	Shallow Bedrock (Soft), Clayey, Permeability, Sodic, Water Erosion
82.9	83.1	Clayey, Permeability, pH, Water Erosion
83.1	84.1	Shallow Bedrock (Soft), Clayey, Permeability, Sodic, Water Erosion
84.1	84.3	Clayey, Permeability, pH, Water Erosion
84.3	86.3	Shallow Bedrock (Soft), Clayey, Permeability, Sodic, Water Erosion
86.3	86.4	Clayey, Permeability, Shallow Water Table, Water Erosion
86.4	86.5	Shallow Bedrock (Soft), Clayey, Permeability, Sodic, Water Erosion
86.5	86.8	Clayey, Permeability, Shallow Water Table, Water Erosion
86.8	87.0	Shallow Water Table, Water Erosion
87.0	87.4	Shallow Bedrock (Soft), Clayey, Permeability, Sodic, Water Erosion

From MP	To MP	Limiting Factor
87.4	87.5	Shallow Bedrock (Soft)
87.5	87.7	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
87.7	88.1	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
88.1	88.4	Clayey, Permeability, pH, Sodic, Water Erosion
88.4	88.6	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
88.6	89.6	Clayey, Permeability, pH, Sodic, Water Erosion
89.6	89.8	Clayey, Permeability, Water Erosion
89.8	89.9	Clayey, Permeability, pH, Sodic, Water Erosion
89.9	90.1	Clayey, Permeability, Water Erosion
90.1	90.3	Clayey, Permeability, pH, Sodic, Water Erosion
90.3	91.3	Clayey, Permeability, Water Erosion
91.3	91.3	Shallow Bedrock (Soft), Water Erosion
91.3	91.3	Clayey, Permeability, Water Erosion
91.3	91.4	Shallow Bedrock (Soft), Water Erosion
91.4	91.6	Clayey, Permeability, Water Erosion
91.6	91.6	Shallow Bedrock (Soft), Water Erosion
91.6	91.7	Clayey, Permeability, Water Erosion
91.7	91.7	Shallow Bedrock (Soft), Water Erosion
91.7	92.2	Clayey, Permeability, Water Erosion
92.2	92.8	Sandy, Water Erosion
92.8	93.2	Clayey, Permeability, Water Erosion
93.2	93.6	Sandy, Water Erosion
93.6	93.6	Clayey, Permeability, Water Erosion
93.6	93.7	Clayey, Permeability, pH, Sodic, Water Erosion
93.7	93.8	Sandy, Permeability, pH, Sodic, Water Erosion
93.8	93.9	Shallow Bedrock (Soft)
93.9	94.9	Sandy, Water Erosion
94.9	95.3	Sandy, Permeability, pH, Sodic, Water Erosion
95.3	95.4	Sandy, Water Erosion
95.4	95.4	Shallow Water Table, Water Erosion
95.4	95.4	Permeability
95.4	95.6	Shallow Water Table, Water Erosion

From MP	To MP	Limiting Factor
95.6	95.6	Sandy, Permeability, pH, Sodic, Water Erosion
95.6	95.6	Shallow Water Table, Water Erosion
95.6	96.0	Water Erosion
96.0	96.0	Shallow Bedrock (Soft), Water Erosion
96.0	96.1	Sandy, Water Erosion
96.1	96.1	Shallow Bedrock (Soft), Water Erosion
96.10	96.5	Sandy, Water Erosion
96.5	96.6	Sandy, Permeability, pH, Sodic, Water Erosion
96.6	96.9	Shallow Water Table, Water Erosion
96.9	97.2	Sandy, Water Erosion
97.2	97.5	Shallow Water Table, Water Erosion
97.5	97.7	Sandy, Water Erosion
97.7	97.7	Shallow Bedrock (Soft), Water Erosion
97.7	98.0	Sandy, Water Erosion
98.0	98.0	Shallow Bedrock (Soft), Water Erosion
98.0	98.2	Sandy, Water Erosion
98.2	98.2	Shallow Bedrock (Soft), Water Erosion
98.2	98.4	Sandy, Water Erosion
98.4	98.9	Shallow Bedrock (Soft), Water Erosion
98.9	99.1	Sandy, Water Erosion
99.1	99.1	Shallow Bedrock (Soft), Water Erosion
99.1	99.1	Sandy, Water Erosion
99.1	99.2	Shallow Bedrock (Soft), Water Erosion
99.2	99.4	Shallow Water Table, Water Erosion
99.4	99.4	Shallow Bedrock (Soft), Water Erosion
99.4	99.9	Sandy, Water Erosion
99.9	100.0	Water Erosion
100.0	100.0	Shallow Bedrock (Soft), Water Erosion
100.0	100.1	Water Erosion
100.1	100.7	Shallow Bedrock (Soft), Water Erosion
100.7	100.7	Sandy, Water Erosion
100.7	100.8	Shallow Bedrock (Soft), Water Erosion

From MP	To MP	Limiting Factor
100.8	101.2	Sandy, Water Erosion
101.2	101.3	Shallow Bedrock (Soft), Water Erosion
101.3	101.6	Sandy, Water Erosion
101.6	101.6	Shallow Bedrock (Soft), Permeability, Water Erosion
101.6	102.3	Sandy, Water Erosion
102.3	102.3	Shallow Bedrock (Soft), Water Erosion
102.3	102.6	Sandy, Water Erosion
102.9	102.9	Slope
103.3	103.6	Shallow Bedrock (Soft), Water Erosion
103.7	104.2	Clayey, Permeability, Water Erosion, Slope
104.2	104.3	Clayey, Permeability, Water Erosion
104.3	104.4	Sandy, Water Erosion
104.4	104.5	Clayey, Permeability, Water Erosion
104.5	104.9	Sandy, Water Erosion
104.9	104.9	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
104.9	105.0	Shallow Bedrock (Soft)
105.0	105.5	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
105.5	105.6	Clayey, Permeability, Water Erosion
105.6	106.1	Sandy, Water Erosion
106.1	108.0	Clayey, Permeability, Water Erosion
108.0	108.2	Sandy, Water Erosion
108.2	108.2	Clayey, Permeability, Water Erosion
108.2	109.1	Sandy, Water Erosion
109.1	109.4	Clayey, Permeability, Water Erosion
109.4	109.8	Sandy, Water Erosion
109.8	110.4	Clayey, Permeability, Water Erosion
110.4	110.5	Shallow Bedrock (Soft), Water Erosion
110.5	110.7	Clayey, Permeability, Water Erosion
110.7	110.9	Shallow Bedrock (Soft), Water Erosion
110.9	111.1	Clayey, Permeability, Water Erosion
111.1	111.1	Shallow Bedrock (Soft), Water Erosion
111.1	111.2	Clayey, Permeability, Water Erosion

From MP	To MP	Limiting Factor
111.2	111.3	Shallow Bedrock (Soft), Water Erosion
111.3	111.4	Clayey, Permeability, Water Erosion
111.4	111.7	Shallow Bedrock (Soft), Water Erosion
111.7	112.1	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
112.1	112.3	Shallow Bedrock (Soft), Water Erosion
112.3	113.2	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
113.2	113.3	Clayey, Permeability, pH, Water Erosion
113.3	113.5	Water Erosion
113.5	113.5	Clayey, Permeability, pH, Water Erosion
113.5	113.6	Water Erosion
113.6	113.7	Sandy, Water Erosion
113.7	114.0	Water Erosion
114.0	115.1	Clayey, Permeability, Water Erosion
115.1	116.4	Sandy, Water Erosion
116.4	116.4	Clayey, Permeability, Water Erosion
116.4	116.5	Sandy, Water Erosion
116.5	116.5	Clayey, Permeability, Water Erosion
116.5	116.6	Sandy, Water Erosion
116.6	117.2	Clayey, Permeability, Water Erosion
117.2	117.3	Clayey, Permeability, pH, Sodic, Water Erosion
117.3	117.7	Water Erosion
117.7	118.2	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
118.2	118.7	Shallow Bedrock (Hard), Sandy, Water Erosion
118.7	119.8	Sandy, Water Erosion
119.8	120.3	Shallow Bedrock (Soft), Water Erosion
120.3	120.4	Sandy, Water Erosion
120.4	120.9	Shallow Bedrock (Soft), Water Erosion
121.0	121.0	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
121.0	122.9	Shallow Bedrock (Soft), Water Erosion
122.9	123.3	Water Erosion
123.3	123.4	Sandy, Water Erosion
123.4	123.4	Shallow Bedrock (Soft), Water Erosion

From MP	To MP	Limiting Factor
123.4	123.6	Sandy, Water Erosion
123.6	123.8	Clayey, Permeability, Water Erosion
123.8	124.8	Shallow Bedrock (Soft), Water Erosion
124.8	125.3	Sandy, Water Erosion
125.3	127.6	Shallow Bedrock (Soft), Water Erosion
128.0	128.1	Sandy, Water Erosion
128.1	128.8	Water Erosion
128.8	128.9	Shallow Bedrock (Soft), Water Erosion
128.9	129.0	Sandy, Water Erosion
129.0	129.2	Shallow Bedrock (Soft), Water Erosion
129.2	129.3	Shallow Bedrock (Soft), Sandy, Water Erosion
129.3	130.7	Shallow Bedrock (Soft), Water Erosion
130.7	130.7	Water Erosion
130.7	131.1	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
131.1	132.3	Water Erosion
132.3	132.3	Clayey, Water Erosion
133.0	133.4	Water Erosion
133.4	134.0	Sandy
134.0	135.0	Water Erosion
135.0	135.8	Sandy
135.8	136.0	Water Erosion
136.0	136.1	Sandy
136.1	136.3	Water Erosion
136.3	136.6	Sandy
136.6	136.9	Water Erosion
136.9	137.1	Sandy
137.1	137.4	Water Erosion
137.4	137.6	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
137.6	137.9	Water Erosion
137.9	138.6	Sandy
138.6	138.8	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion, Slope
138.8	139.0	Water Erosion

From MP	To MP	Limiting Factor
139.0	139.0	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
139.0	139.5	Water Erosion
139.5	139.6	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion, Slope
139.6	139.7	Water Erosion, Slope
139.7	139.8	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion, Slope
139.8	140.1	Water Erosion
140.1	140.2	Clayey, Water Erosion
140.2	140.7	Water Erosion, Slope
140.7	140.7	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
140.7	141.4	Water Erosion
141.4	141.4	Shallow Water Table, Water Erosion
141.4	141.5	Water Erosion
141.5	141.6	Shallow Water Table, Water Erosion
141.6	141.9	Water Erosion
141.9	141.9	Shallow Water Table, Water Erosion
141.9	142.5	Water Erosion
142.5	142.6	Permeability, Water Erosion
142.6	142.6	Shallow Water Table, Water Erosion
142.6	142.7	Permeability, Water Erosion
142.7	142.8	Shallow Water Table, Water Erosion
142.8	142.8	Permeability, Water Erosion
142.8	142.9	Shallow Water Table, Water Erosion, Slope
142.9	143.2	Water Erosion
143.2	143.3	Shallow Water Table, Water Erosion
143.3	143.6	Water Erosion
143.6	143.7	Permeability, Water Erosion
143.7	144.1	Water Erosion
144.1	144.2	Shallow Water Table, Water Erosion
144.2	144.4	Water Erosion
144.4	144.5	Shallow Water Table, Water Erosion
144.5	144.7	Water Erosion
144.7	144.8	Shallow Water Table, Water Erosion

From MP	To MP	Limiting Factor
144.8	144.9	Water Erosion
144.9	145.1	Permeability, Water Erosion
145.1	145.2	Water Erosion
145.2	145.3	Sandy, Wind Erosion
145.3	145.4	Water Erosion
145.4	145.6	Shallow Water Table, Water Erosion, Slope
145.6	145.8	Water Erosion
145.8	146.2	Shallow Water Table, Water Erosion, Slope
146.2	146.6	Water Erosion
146.6	146.6	Shallow Water Table, Water Erosion
146.6	146.7	Water Erosion
146.7	146.7	Shallow Water Table, Water Erosion
146.7	146.8	Water Erosion
146.8	147.2	Shallow Water Table, Water Erosion, Slope
147.2	147.6	Water Erosion
147.6	147.8	Clayey, Water Erosion
147.8	148.4	Water Erosion
148.4	148.7	Clayey, Water Erosion
148.7	148.8	Shallow Water Table, Water Erosion
148.8	149.8	Water Erosion
149.8	149.8	Shallow Water Table, Water Erosion
149.8	149.9	Water Erosion
149.9	149.9	Shallow Water Table, Water Erosion
149.9	150.2	Water Erosion
150.2	150.5	Shallow Water Table, Water Erosion
150.5	151.0	Water Erosion
151.0	151.1	Shallow Water Table, Water Erosion
151.1	151.1	Water Erosion
151.1	151.4	Shallow Water Table, Water Erosion
151.4	151.9	Water Erosion
151.9	152.0	Shallow Water Table, Water Erosion
152.0	152.1	Water Erosion

From MP	To MP	Limiting Factor
152.1	152.3	Shallow Water Table, Water Erosion
152.3	152.4	Sandy
152.4	152.4	Shallow Water Table, Water Erosion
152.4	152.7	Sandy
152.7	152.7	Water Erosion
152.7	152.8	Sandy
152.8	153.2	Water Erosion
153.2	153.3	Shallow Water Table, Water Erosion
153.3	153.7	Water Erosion
153.7	153.8	Shallow Water Table, Water Erosion
153.8	156.7	Water Erosion
156.7	156.8	Sandy
156.8	157.4	Water Erosion
157.4	157.4	Sandy
157.4	157.9	Water Erosion
157.9	158.0	Sandy, Wind Erosion
158.0	158.0	Sandy
158.0	158.0	Sandy, Wind Erosion
158.0	158.1	Sandy
158.1	159.2	Water Erosion
159.2	159.2	Sandy, Wind Erosion
159.2	159.3	Water Erosion
159.3	159.4	Shallow Water Table, Water Erosion
159.4	159.5	Sandy
159.5	159.9	Water Erosion
159.9	160.1	Shallow Water Table, Water Erosion
160.1	161.2	Water Erosion
161.2	161.3	Shallow Water Table, Water Erosion
161.3	162.2	Water Erosion
162.2	162.3	Clayey, Permeability, Water Erosion
162.3	162.4	Sandy
162.4	162.5	Clayey, Permeability, Water Erosion

From MP	To MP	Limiting Factor
162.5	162.7	Shallow Water Table, Water Erosion
163.0	163.1	Shallow Bedrock (Soft), Sandy, Water Erosion
163.1	163.3	Water Erosion
163.3	163.4	Clayey, Permeability, Water Erosion
163.5	163.8	Shallow Water Table, Water Erosion
164.1	164.4	Clayey, Permeability, Water Erosion
164.5	165.1	Water Erosion
165.1	165.9	Shallow Bedrock (Soft), Clayey, Permeability, Water Erosion
172.5	172.5	Slope
177.8	178.2	Clayey, Permeability, Water Erosion
178.2	178.3	Sandy
178.3	179.1	Clayey, Permeability, Water Erosion
179.1	179.1	Shallow Water Table, Water Erosion
179.1	179.4	Clayey, Permeability, Water Erosion
179.4	180.4	Permeability, Water Erosion
180.4	180.4	Water Erosion
180.4	180.5	Permeability, Water Erosion
180.5	181.4	Water Erosion
181.4	181.4	Shallow Bedrock (Soft)
181.4	181.5	Water Erosion
181.5	181.7	Shallow Bedrock (Soft)
181.7	182.2	Water Erosion
182.2	182.5	Shallow Bedrock (Soft)
182.5	182.9	Water Erosion
182.9	183.1	Permeability, Water Erosion
183.1	183.2	Water Erosion
183.2	183.3	Permeability, Water Erosion
183.3	183.5	Water Erosion
183.5	183.6	Shallow Bedrock (Soft)
183.6	183.8	Water Erosion
183.8	184.0	Shallow Bedrock (Soft), Permeability, Water Erosion
184.0	184.6	Water Erosion

From MP	To MP	Limiting Factor
184.6	184.6	Shallow Bedrock (Soft), Permeability, Water Erosion
184.6	184.9	Water Erosion
184.9	185.1	Sandy
185.1	185.2	Water Erosion
185.2	185.2	Sandy
185.2	185.3	Water Erosion
185.3	185.7	Sandy
185.7	186.4	Shallow Bedrock (Soft), Permeability, Water Erosion
186.4	186.8	Water Erosion
186.8	186.9	Shallow Bedrock (Soft), Water Erosion
186.9	187.2	Shallow Bedrock (Soft), Permeability, Water Erosion
188.9	189.8	Clayey, Permeability, Water Erosion
189.8	190.0	Water Erosion
190.0	190.1	Sandy
190.1	190.3	Water Erosion
190.3	190.5	Shallow Bedrock (Soft)
190.5	190.6	Water Erosion
190.6	190.9	Permeability, Water Erosion
190.9	191.7	Water Erosion
191.7	191.8	Shallow Water Table, Water Erosion
191.8	191.9	Water Erosion
191.9	192.1	Sandy, Water Erosion
192.1	192.5	Water Erosion
192.5	192.6	Sandy, Water Erosion
192.6	192.6	Water Erosion
192.6	193.1	Sandy, Water Erosion
193.1	193.1	Water Erosion
193.1	193.3	Sandy, Water Erosion
193.3	193.3	Water Erosion
193.3	193.7	Sandy, Water Erosion
193.7	193.8	Permeability, Water Erosion
193.8	194.0	Sandy, Water Erosion

From MP	To MP	Limiting Factor
194.0	194.4	Sandy
194.4	194.6	Sandy, Water Erosion
194.6	194.8	Shallow Water Table, Water Erosion
194.8	195.7	Sandy
195.7	196.0	Water Erosion
196.0	196.2	Sandy
196.2	196.6	Water Erosion
196.6	196.7	Sandy
196.7	198.9	Water Erosion
198.9	199.4	Sandy, Shallow Water Table
199.4	199.7	Permeability, Water Erosion
199.7	200.0	Permeability, Water Erosion
200.0	200.1	Water Erosion
200.1	200.1	Permeability, Water Erosion
200.1	201.0	Clayey, Permeability, Water Erosion
201.0	201.0	Water Erosion
201.0	201.1	Clayey, Permeability, Water Erosion
201.1	201.3	Water Erosion
201.3	201.4	Sandy, Water Erosion
201.4	201.9	Water Erosion
201.9	202.0	Sandy, Water Erosion
202.0	202.0	Water Erosion
202.0	202.4	Sandy, Water Erosion
202.4	202.6	Shallow Water Table, Water Erosion
202.6	202.7	Sandy, Shallow Water Table
202.7	202.8	Shallow Water Table, Water Erosion
202.8	203.1	Sandy, Shallow Water Table
203.1	203.3	Clayey, Permeability, Water Erosion
203.3	203.5	Sandy
203.5	204.6	Water Erosion
204.6	204.9	Permeability, Water Erosion
204.9	205.2	Water Erosion

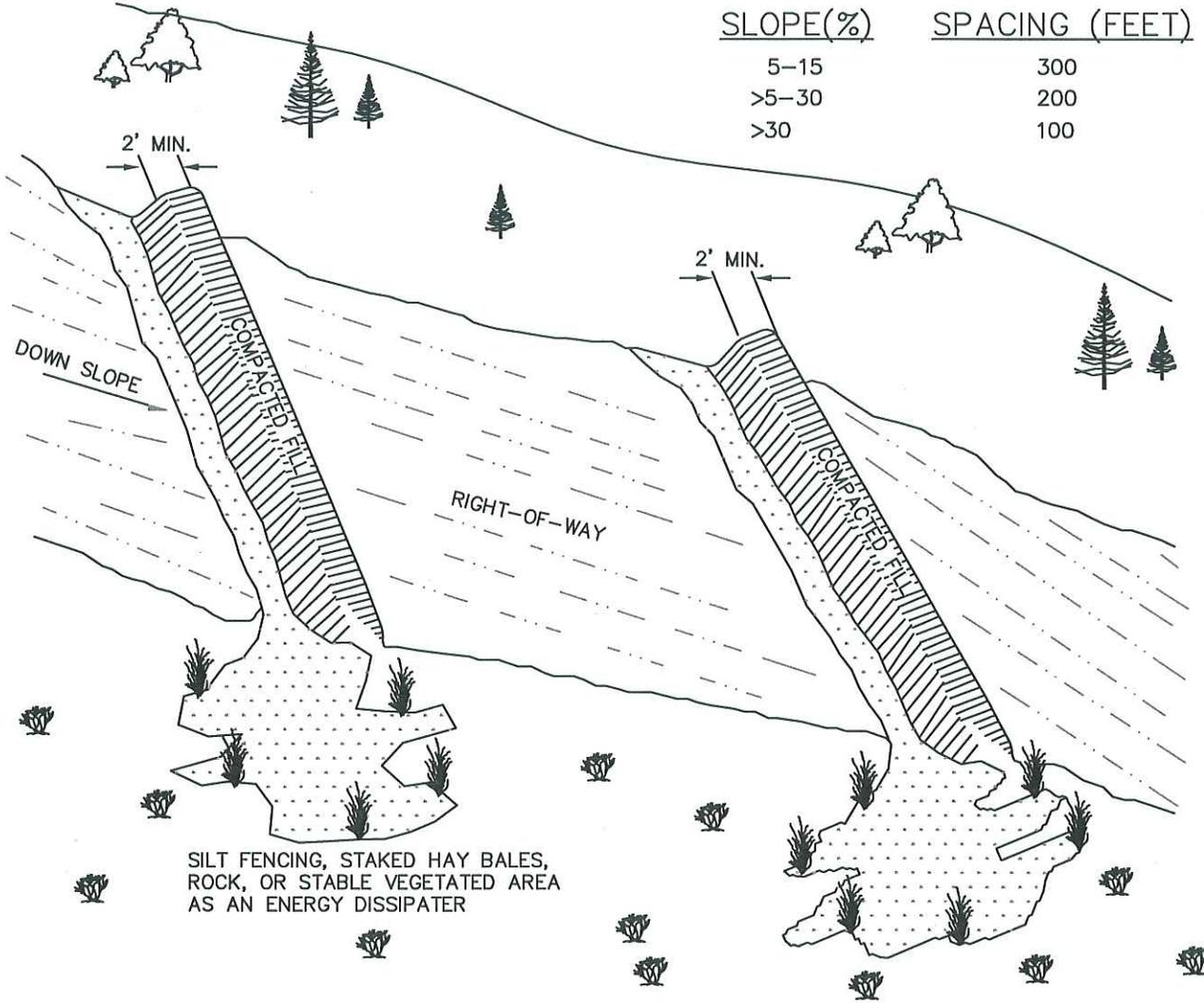
From MP	To MP	Limiting Factor
205.2	205.2	Sandy
205.2	205.3	Water Erosion
205.3	205.7	Sandy
205.7	205.8	Water Erosion
205.8	205.9	Shallow Water Table, Water Erosion
205.9	206.0	Sandy, Water Erosion
206.0	206.0	Sandy
206.0	206.1	Sandy, Water Erosion
206.1	206.3	Sandy
206.3	206.3	Water Erosion
206.3	206.8	Sandy
206.8	207.0	Water Erosion
207.0	207.1	Sandy
207.1	208.3	Water Erosion
208.3	208.4	Shallow Water Table, Water Erosion
208.4	211.2	Water Erosion
211.2	211.4	Sandy
211.4	211.4	Water Erosion
211.4	211.6	Sandy
211.6	211.7	Water Erosion
211.7	211.9	Permeability, Water Erosion
211.9	213.2	Water Erosion
213.2	213.5	Sandy
213.5	214.1	Water Erosion
214.1	214.2	Shallow Water Table, Water Erosion
214.2	215.5	Water Erosion
215.5	215.7	Sandy
215.7	215.7	Water Erosion
215.7	215.8	Sandy
215.8	215.9	Water Erosion
215.9	216.0	Shallow Bedrock (Soft), Permeability, Water Erosion
216.0	216.2	Water Erosion, Slope

From MP	To MP	Limiting Factor
216.2	216.3	Shallow Bedrock (Soft), Permeability, Water Erosion
216.3	217.0	Water Erosion
217.0	217.1	Permeability, Water Erosion
217.1	217.2	Water Erosion
217.2	217.3	Sandy
217.3	217.4	Water Erosion
217.4	217.6	Sandy
217.6	217.9	Water Erosion
217.9	218.0	Clayey, Permeability, Water Erosion
218.0	218.2	Water Erosion
218.2	218.3	Sandy, Shallow Water Table
218.3	218.5	Permeability, Water Erosion
218.5	218.7	Water Erosion
218.7	219.0	Sandy, Water Erosion
219.0	219.2	Sandy
219.2	219.3	Clayey, Permeability, Water Erosion
219.3	219.4	Sandy
219.4	219.6	Water Erosion
219.6	219.7	Sandy
219.7	219.8	Water Erosion
219.8	219.9	Sandy
219.9	220.1	Water Erosion
220.1	220.4	Sandy
220.4	220.5	Clayey, Permeability, Water Erosion
220.5	220.9	Water Erosion
220.9	221.0	Shallow Bedrock (Soft), Permeability, Water Erosion, Slope
221.0	221.0	Water Erosion
221.0	221.1	Sandy
221.1	221.1	Shallow Bedrock (Soft), Permeability, Water Erosion
221.1	221.2	Sandy
221.2	221.4	Shallow Bedrock (Soft), Permeability, Water Erosion
221.4	221.5	Sandy

From MP	To MP	Limiting Factor
221.5	221.6	Shallow Bedrock (Soft), Permeability, Water Erosion
221.6	221.6	Water Erosion
221.6	221.8	Sandy
221.8	221.8	Shallow Bedrock (Soft), Permeability, Water Erosion
221.8	221.8	Sandy
221.8	221.9	Shallow Bedrock (Soft), Permeability, Water Erosion
221.9	222.0	Sandy
222.0	222.2	Water Erosion
222.2	222.3	Shallow Bedrock (Soft), Permeability, Water Erosion
222.3	222.4	Water Erosion
222.5	222.6	Clayey, Permeability
222.6	222.8	Sandy
223.0	223.0	Clayey, Permeability
223.0	223.1	Sandy
223.1	223.1	Clayey, Permeability
223.1	224.2	Sandy
224.2	224.4	Clayey, Permeability
224.4	224.6	Shallow Bedrock (Soft), Clayey, Permeability
224.6	224.8	Sandy
224.8	224.8	Clayey, Permeability
224.8	224.9	Sandy
224.9	224.9	Permeability, Sodic, Water Erosion
224.9	225.1	Clayey, Permeability
225.1	225.3	Clayey
225.3	226.3	Clayey, Permeability
226.3	227.5	Shallow Bedrock (Soft), Clayey, Permeability, Slope
227.5	227.6	Shallow Bedrock (Soft), Clayey, Slope
227.6	227.7	Shallow Bedrock (Soft), Clayey, Permeability
227.7	227.8	Shallow Bedrock (Soft), Clayey
227.8	228.3	Shallow Bedrock (Soft), Clayey, Permeability
228.3	228.4	Clayey, Permeability
228.4	228.5	Shallow Bedrock (Soft), Clayey, Permeability

From MP	To MP	Limiting Factor
228.5	228.5	Clayey, Permeability
228.5	228.5	Shallow Bedrock (Soft), Clayey, Permeability
228.5	228.6	Clayey, Permeability
228.6	228.6	Sandy
228.6	228.7	Clayey, Permeability
228.7	228.7	Shallow Bedrock (Soft), Clayey, Permeability
228.7	228.9	Sandy
228.9	229.0	Clayey, Permeability
229.0	229.3	Sandy
229.3	229.9	Clayey, Permeability
229.9	230.0	Shallow Bedrock (Soft), Clayey, Permeability
230.0	230.1	Clayey, Permeability
230.1	230.6	Shallow Bedrock (Soft), Clayey, Permeability
230.6	230.8	Clayey, Permeability
230.8	230.9	Sandy
230.9	231.4	Clayey, Permeability
231.4	231.6	Shallow Bedrock (Soft), Clayey, Permeability

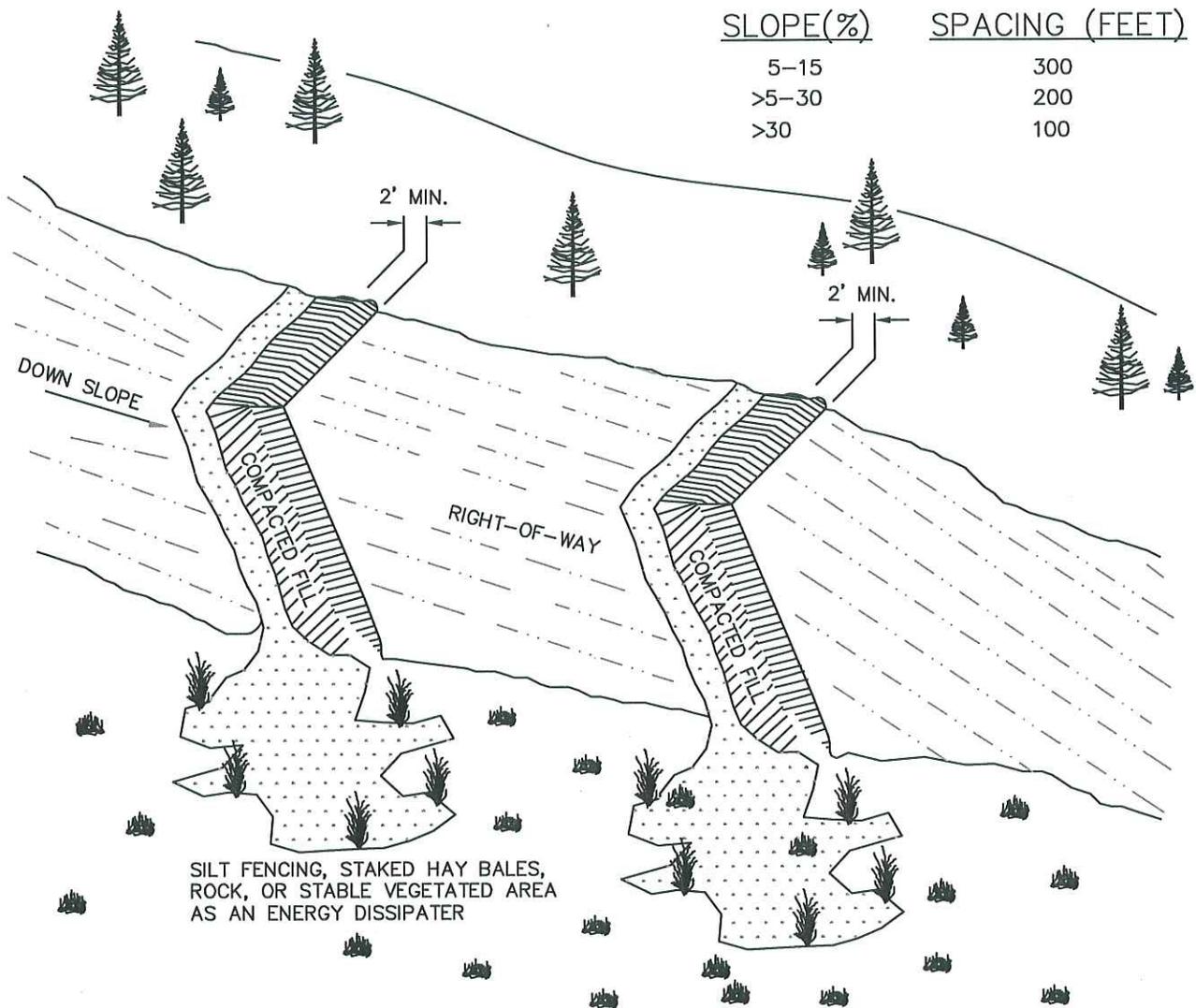
Attachment B: Best Management Practices



SLOPE BREAKER NOTES:

1. SLOPE BREAKERS SHALL BE CONSTRUCTED OF COMPACTED NATIVE SOIL AND INSTALLED AT LOCATIONS AS SHOWN ON THE CONSTRUCTION DRAWINGS OR AS DIRECTED BY THE COMPANY INSPECTOR.
2. SLOPE BREAKER SHALL BE ORIENTED AS SHOWN OR OTHER PATTERN AS DIRECTED BY THE COMPANY INSPECTOR TO DIRECT THE WATER OFF THE R.O.W.
3. SLOPE BREAKERS SHALL BE CONSTRUCTED AT A 2-8% GRADIENT ACROSS THE SLOPE.
4. THE SLOPE BREAKERS SHALL BE 18" DEEP (AS MEASURED FROM THE TROUGH TO THE TOP OF THE SLOPE BREAKER). THE TROUGH WILL BE A MINIMUM OF 5' WIDE ACROSS THE WIDTH OF THE RIGHT-OF-WAY.
5. THE OUTLET OF THE SLOPE BREAKER MUST FREELY DISCHARGE ALL RUNOFF OFF THE DISTURBED R.O.W. INTO A STABLE, WELL VEGETATED AREA OR INTO AN ENERGY DISSIPATER.
6. WHERE SLOPE BREAKERS EXTEND BEYOND THE EDGE OF THE CONSTRUCTION R.O.W. TO DIRECT RUNOFF INTO STABLE, WELL VEGETATED AREAS, THESE LOCATIONS MUST BE APPROVED BY THE COMPANY INSPECTOR.
7. INSTALL A TRENCH BREAKER (SEE DETAIL 505 OR 501) AT EVERY SLOPE BREAKER.

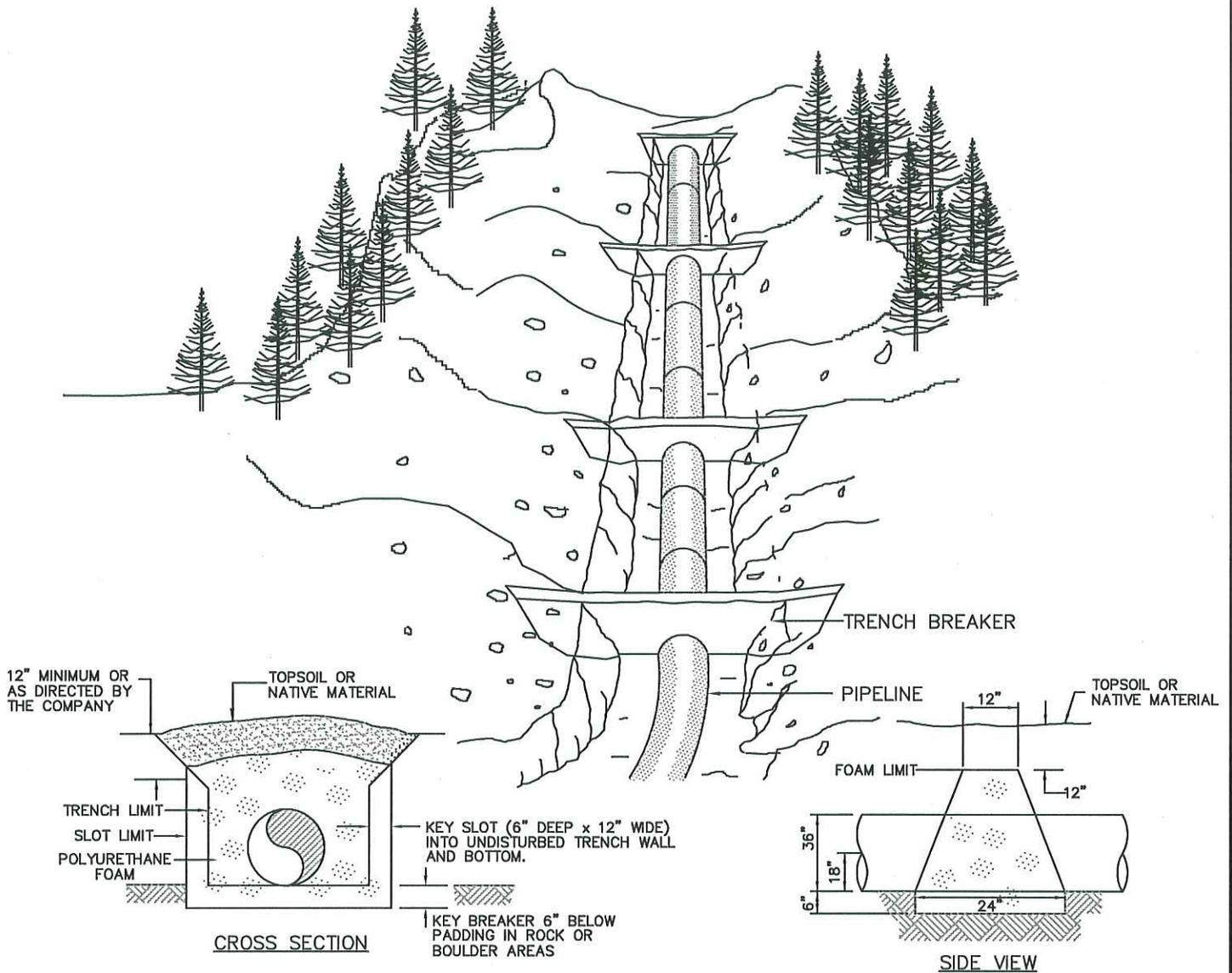
REVISIONS						DRAWN BY:		  TYPICAL SLOPE BREAKER WITH LONGITUDINAL & CROSS SLOPES (SHT. 1 OF 3)
△						CHECKED BY:		
△						REVIEWED BY:		
△						APPROVED BY:		
△						PROJECT MANAGER:		
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.	PROJECT NUMBER	DRAWING NUMBER	REV.
						2568-01	TYP-034	A



SLOPE BREAKER NOTES:

1. SEE DETAIL 500A FOR SLOPE BREAKER DETAIL AND NOTES.
2. INSTALL A TRENCH BREAKER (SEE TYP-049 OR TYP-050) AT EVERY SLOPE BREAKER.
3. IF SLOPE BREAKERS EXIST AND THE SPACING BETWEEN SLOPE BREAKERS IS LESS THAN THE SPACING SHOWN ON TYP-048A, THEN MATCH THE EXISTING SPACING.

REVISIONS						DRAWN BY:	  TYPICAL SLOPE BREAKER WITH LONGITUDINAL & CROSS SLOPES (SHT. 3 OF 3)				
△						CHECKED BY:					
△						REVIEWED BY:					
△						APPROVED BY:					
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NO.	DESCRIPTION	DATE	BY	CHK.	APPR.	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-034B	REV.	A



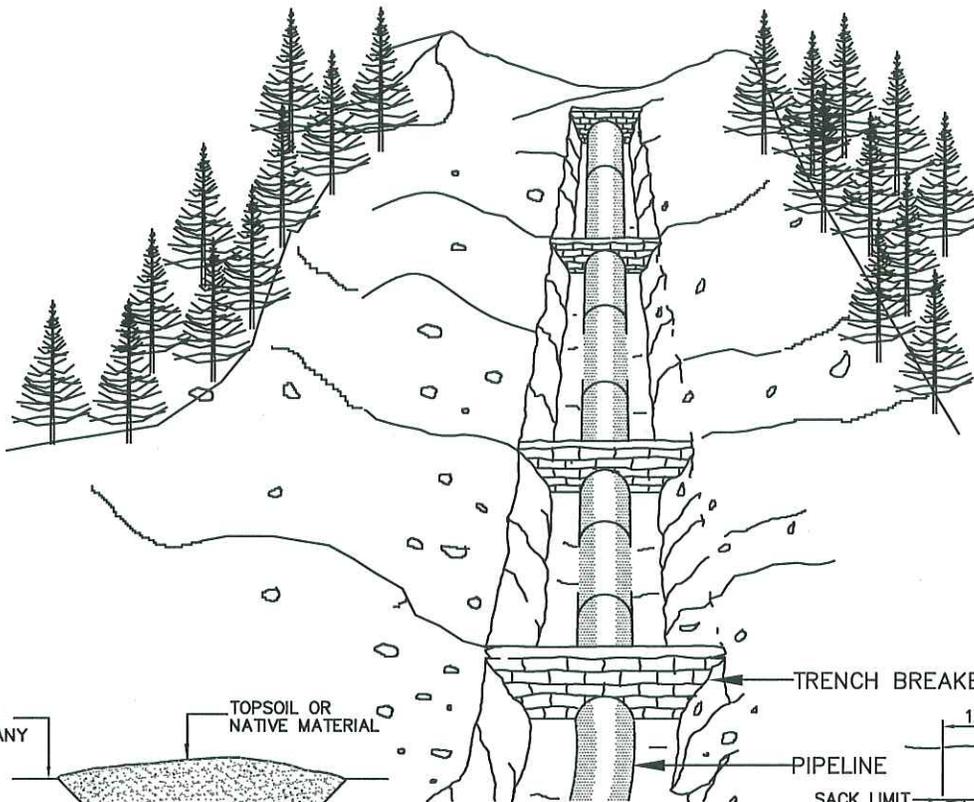
NOTES:

1. POLYURETHANE FOAM SHALL CONFORM TO ALL APPLICABLE ENVIRONMENTAL REGULATIONS CONCERNING CHEMICAL COMPOSITION.
2. FOAM WITH 2 LB./CU.FT. DENSITY AND 30 P.S.I. MINIMUM COMPRESSIVE STRENGTH SHALL BE USED.
3. IF FORMING REQUIRED, STYROFOAM BOARD MAY BE USED.
4. TRENCH BREAKERS SHALL BE INSTALLED:
 - ON SLOPES ALONG THE TRENCH LINE WHERE THE NATURAL DRAINAGE PATTERN, PROFILE, AND TYPE OF BACKFILL MATERIAL MAY RESULT IN LOSS OF BACKFILL MATERIAL OR ALTERATION OF THE NATURAL PATTERN;
 - AT THE BASE OF SLOPES ADJACENT TO WATERBODIES AND WETLANDS;
 - WHERE NEEDED TO AVOID DRAINING A WETLAND;
 - ON UPLAND SLOPES, AT THE SAME SPACING AS SLOPE BREAKERS AND UP SLOPE OF SLOPE BREAKERS;
 - IN CULTIVATED LAND AND RESIDENTIAL AREAS WHERE PERMANENT SLOPE BREAKERS ARE NOT TYP. INSTALLED, AT THE SAME SPACING AS IF PERMANENT SLOPE BREAKERS WERE REQUIRED.
5. BREAKER SPACING AND CONFIGURATION MAY CHANGE AS DETERMINED BY COMPANY OR SIMILARLY QUALIFIED PROFESSIONAL.
6. ALL MATERIALS SHALL BE SUPPLIED BY CONTRACTOR.
7. INSTALL ONE TRENCH BREAKER UNDER EVERY SLOPE BREAKER.

REVISIONS						DRAWN BY:					
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△						REVIEWED BY:					
△						APPROVED BY:					
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△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-035	REV. A
NO.	DESCRIPTION	DATE	BY	CHK	APPR						

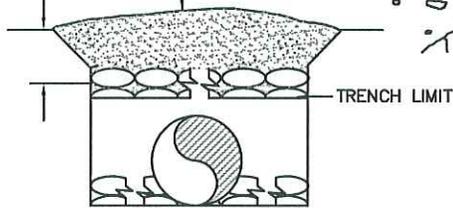


TYPICAL
FOAM TRENCH BREAKER



12" MINIMUM OR AS DIRECTED BY COMPANY

TOPSOIL OR NATIVE MATERIAL



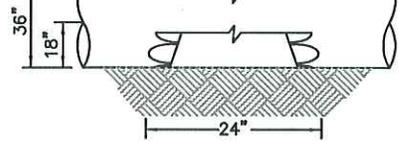
CROSS SECTION

TRENCH BREAKER

PIPELINE

SACK LIMIT

TOPSOIL OR NATIVE MATERIAL

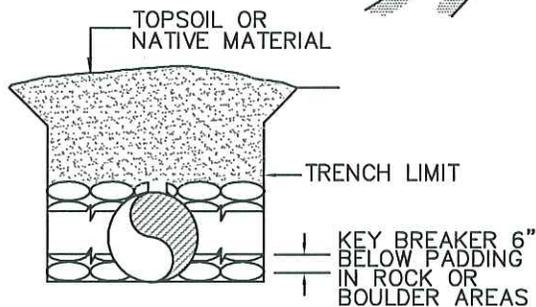
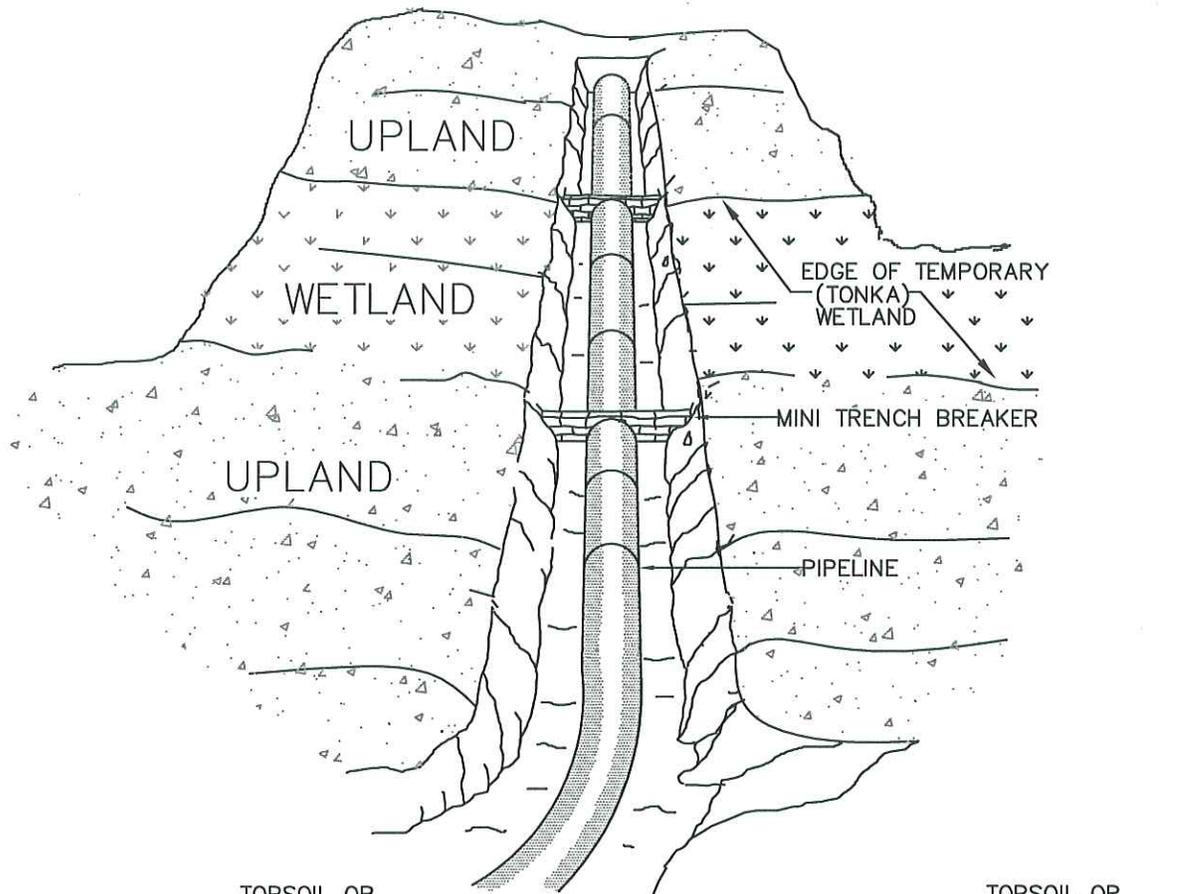


SIDE VIEW

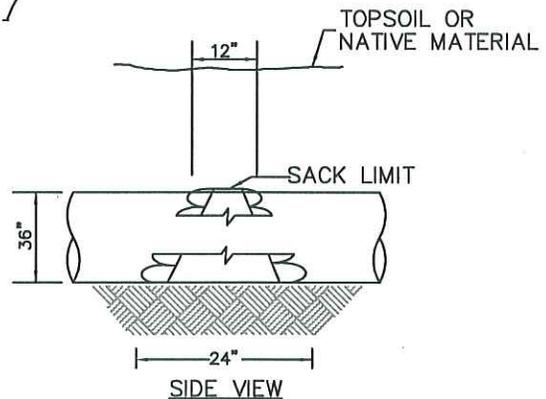
NOTES:

1. TRENCH BREAKERS SHALL BE INSTALLED:
 - ON SLOPES ALONG THE TRENCH LINE WHERE THE NATURAL DRAINAGE PATTERN, PROFILE, AND TYPE OF BACKFILL MATERIAL MAY RESULT IN LOSS OF BACKFILL MATERIAL OR ALTERATION OF THE NATURAL PATTERN
 - AT THE BASE OF SLOPES ADJACENT TO WATERBODIES AND WETLANDS
 - WHERE NEEDED TO AVOID DRAINING A WETLAND
 - ON UPLAND SLOPES, AT THE SAME SPACING AS SLOPE BREAKERS AND UP SLOPE OF SLOPE BREAKERS
 - IN AGRICULTURAL \geq 5 PERCENT LAND AND RESIDENTIAL AREAS WHERE PERMANENT SLOPE BREAKERS ARE NOT TYPICALLY INSTALLED, AT THE SAME SPACING AS IF PERMANENT SLOPE BREAKERS WERE REQUIRED.
2. OPEN WEAVE HEMP OR JUTE SACKS SHALL BE FILLED WITH A MINIMUM OF 55lbs IN A MIXTURE OF SAND & SUBSOIL.
3. BREAKER SPACING AND CONFIGURATION, INCLUDING THE NEED TO KEY THE BREAKER INTO THE UNDISTURBED SOIL AT THE SIDES AND BOTTOM OF THE TRENCH, MAY CHANGE AS DETERMINED BY COMPANY ENGINEER OR SIMILARLY QUALIFIED PROFESSIONAL.
4. ALL MATERIALS SHALL BE SUPPLIED BY CONTRACTOR.
5. INSTALL ONE TRENCH BREAKER UNDER EVERY SLOPE BREAKER.

REVISIONS						DRAWN BY:		  TYPICAL TRENCH BREAKER REQUIREMENTS					
△						CHECKED BY:							
△						REVIEWED BY:							
△						APPROVED BY:							
△						PROJECT MANAGER:							
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-036	REV.	A



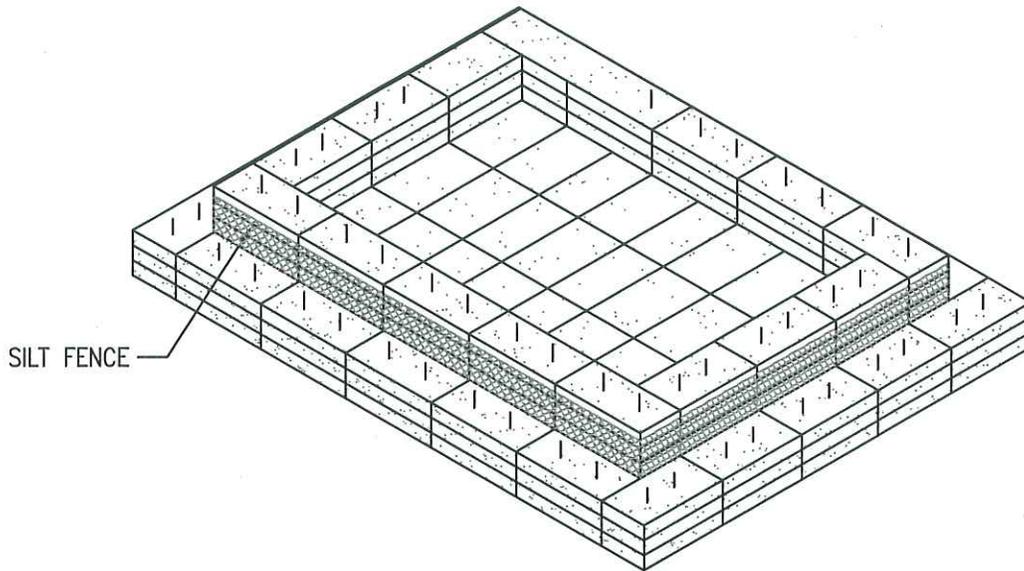
CROSS SECTION



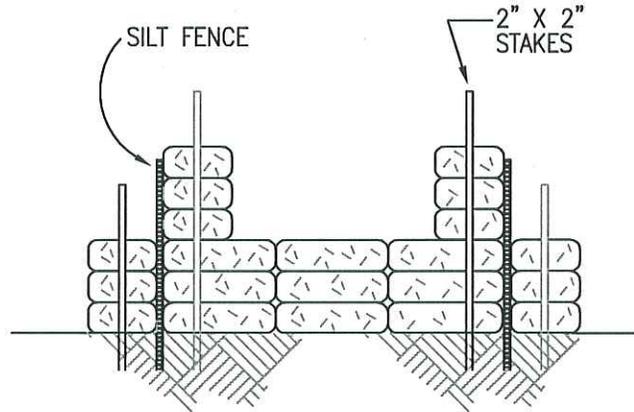
NOTES:

1. MINI-TRENCH BREAKERS SHALL BE INSTALLED AT EDGE OF EACH TEMPORARY (TONKA) WETLAND.
2. OPEN WEAVE HEMP OR JUTE SACKS SHALL BE FILLED WITH A MINIMUM OF 55lbs. OF SAND OR SUBSOIL.
3. BREAKER CONFIGURATION MAY BE CHANGED AS DETERMINED BY COMPANY ENGINEER OR SIMILARLY QUALIFIED PROFESSIONAL.

REVISIONS						DRAWN BY:		<p style="text-align: center;">TYPICAL MINI-TRENCH BREAKER</p>
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△						REVIEWED BY:		
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NO.	DESCRIPTION	DATE	BY	CHK.	APPR.	PROJECT NUMBER	DRAWING NUMBER	REV.
						2568-01	TYP-037	A



PERSPECTIVE VIEW

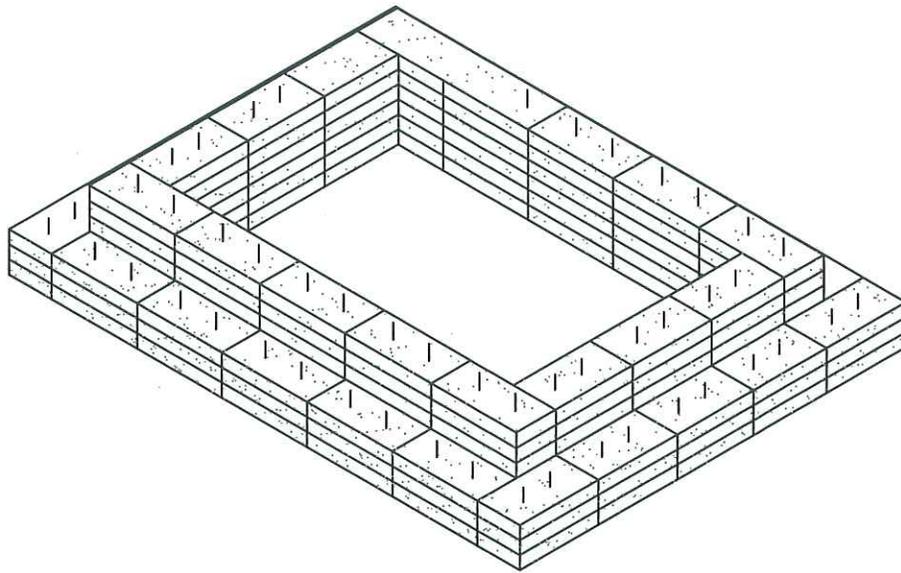


OPTION 1

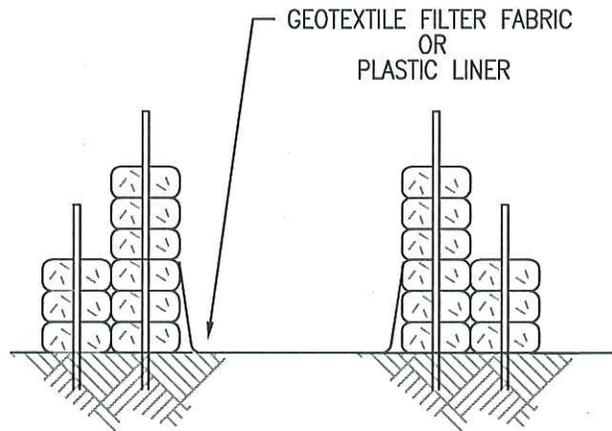
NOTES:

1. INSTALL A STRAW BALE DEWATERING STRUCTURE WHEREVER IT IS NECESSARY AND AS DIRECTED BY THE COMPANY'S INSPECTOR TO PREVENT THE FLOW OF HEAVILY SILT LADEN WATER INTO WATER BODIES OR WETLANDS.
2. DISCHARGE SITE SHALL BE WELL VEGETATED AND THE TOPOGRAPHY OF THE SITE SUCH THAT WATER WILL FLOW AWAY FROM ANY WORK AREAS. THE AREA DOWN SLOPE FROM THE DEWATERING SITE MUST BE REASONABLY PLANE OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.
3. IN AREAS OF HIGHLY ERODIBLE SOILS, LINE ENTIRE STRUCTURE WITH GEOTEXTILE FILTER FABRIC, PLASTIC SHEETING, OR STRAW.
4. THE DIMENSIONS OF THE STRUCTURE SHALL BE DETERMINED IN THE FIELD BASED UPON SITE CONDITIONS.
5. DISCHARGE RATES SHALL BE SUCH THAT WATER WILL NOT OVERFLOW THE TOP OF THE STRUCTURE.
6. INSTALL A SPLASH PUP IF THE DISCHARGE VELOCITY IS EXCESSIVE. (TYP-064)

REVISIONS						DRAWN BY:		  TYPICAL STRAW BALE DEWATERING STRUCTURE LARGE VOLUME - OPTION 1 (SHT. 1 OF 2)					
△						CHECKED BY:							
△						REVIEWED BY:							
△						APPROVED BY:							
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△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-038	REV.	A
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.								



PERSPECTIVE VIEW



OPTION 2

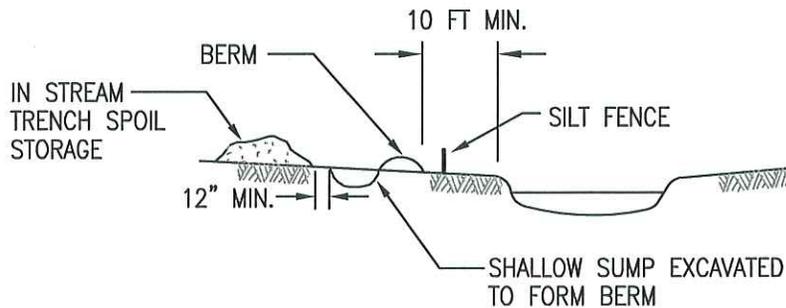
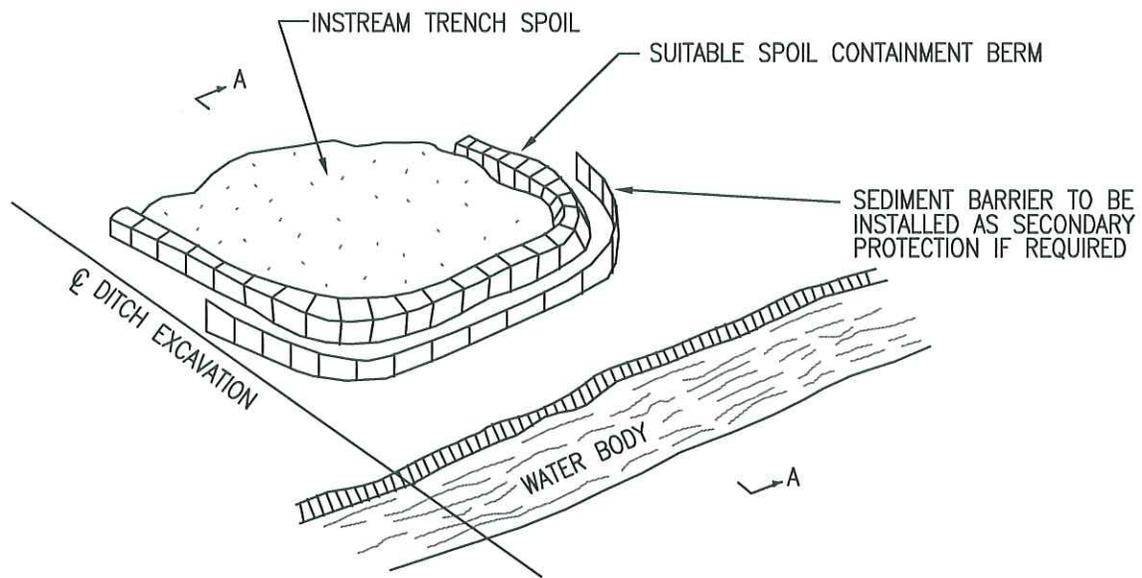
NOTES:

1. INSTALL A STRAW BALE DEWATERING STRUCTURE WHEREVER IT IS NECESSARY AND AS DIRECTED BY THE COMPANY'S INSPECTOR TO PREVENT THE FLOW OF HEAVILY SILT LADEN WATER INTO WATER BODIES OR WETLANDS.
2. DISCHARGE SITE SHALL BE WELL VEGETATED AND THE TOPOGRAPHY OF THE SITE SUCH THAT WATER WILL FLOW AWAY FROM ANY WORK AREAS. THE AREA DOWN SLOPE FROM THE DEWATERING SITE MUST BE REASONABLY PLANE OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.
3. IN AREAS OF HIGHLY ERODIBLE SOILS, LINE ENTIRE STRUCTURE WITH GEOTEXTILE FILTER FABRIC, PLASTIC SHEETING, OR STRAW.
4. THE DIMENSIONS OF THE STRUCTURE SHALL BE DETERMINED IN THE FIELD BASED UPON SITE CONDITIONS.
5. DISCHARGE RATES SHALL BE SUCH THAT WATER WILL NOT OVERFLOW THE TOP OF THE STRUCTURE.
6. INSTALL A SPLASH PUP IF THE DISCHARGE VELOCITY IS EXCESSIVE. (TYP-064)

REVISIONS						DRAWN BY:					
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△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE					
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TYPICAL STRAW BALE DEWATERING STRUCTURE
LARGE VOLUME - OPTION 2 (SHT. 2 OF 2)

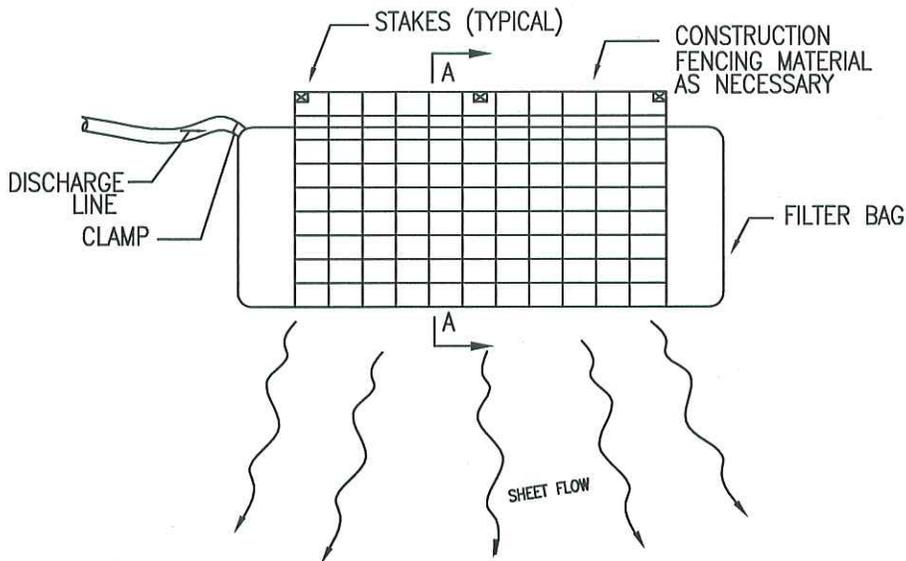


SECTION A-A

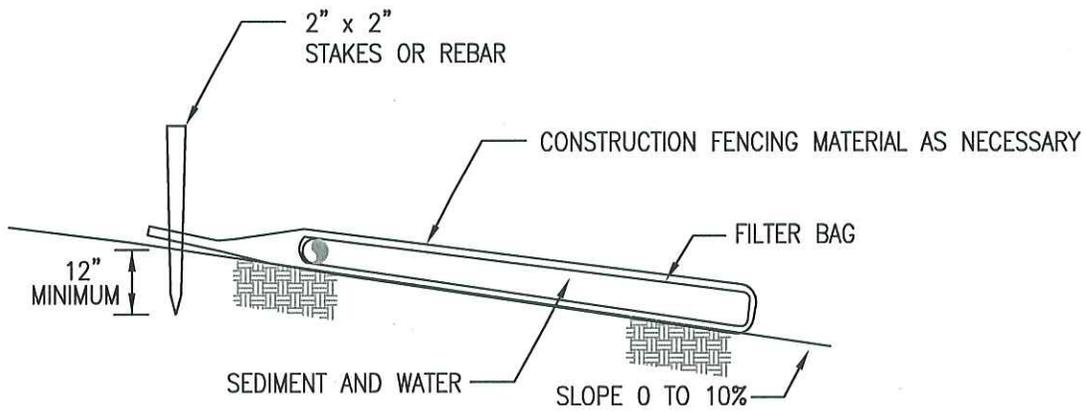
NOTE:

1. SOIL CONTAINMENT BERMS ARE TO BE USED WHERE INSTREAM TRENCH SPOIL COULD REENTER THE WATERBODY DIRECTLY OR INDIRECTLY AND WITH SIMULTANEOUS UTILIZATION OF SEDIMENT BARRIERS IF REQUIRED.
2. MATERIAL USED FOR THE CONTAINMENT BERM SHOULD BE A MINIMUM OF 10 FT. FROM THE WATERS EDGE. IT SHOULD BE KEPT TO A HEIGHT WHICH REMAINS STABLE DURING THE CONSTRUCTION PERIOD.
3. CARE SHOULD BE TAKEN THAT THE SPOIL PILE DOES NOT OVERTOP THE CONTAINMENT BERM.
4. THE CONTAINMENT BERM SHOULD BE DISMANTLED AND THE SITE RESTORED TO THE ORIGINAL CONDITION UPON COMPLETION OF THE WATER CROSSING.
5. WHERE POSSIBLE, RIPARIAN VEGETATION SHALL BE LEFT IN PLACE.
6. STAGED MOVEMENT OF INSTREAM SPOIL MAY BE REQUIRED IF QUANTITIES ARE EXCESSIVE.
7. CARE AND ATTENTION MUST BE TAKEN TO ENSURE SPOIL CONTAINMENT BERMS ARE MAINTAINED.
8. FULL CONSIDERATION FOR OVERALL SLOPE STABILITY IS REQUIRED WHEN SELECTING A SPOIL CONTAINMENT LOCATION.

REVISIONS						DRAWN BY:	 CH2MHILL TYPICAL TEMPORARY SOIL CONTAINMENT BERM					
△						CHECKED BY:						
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△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-039	REV.	A
NO.	DESCRIPTION	DATE	BY	CHK	APPR.							



PLAN

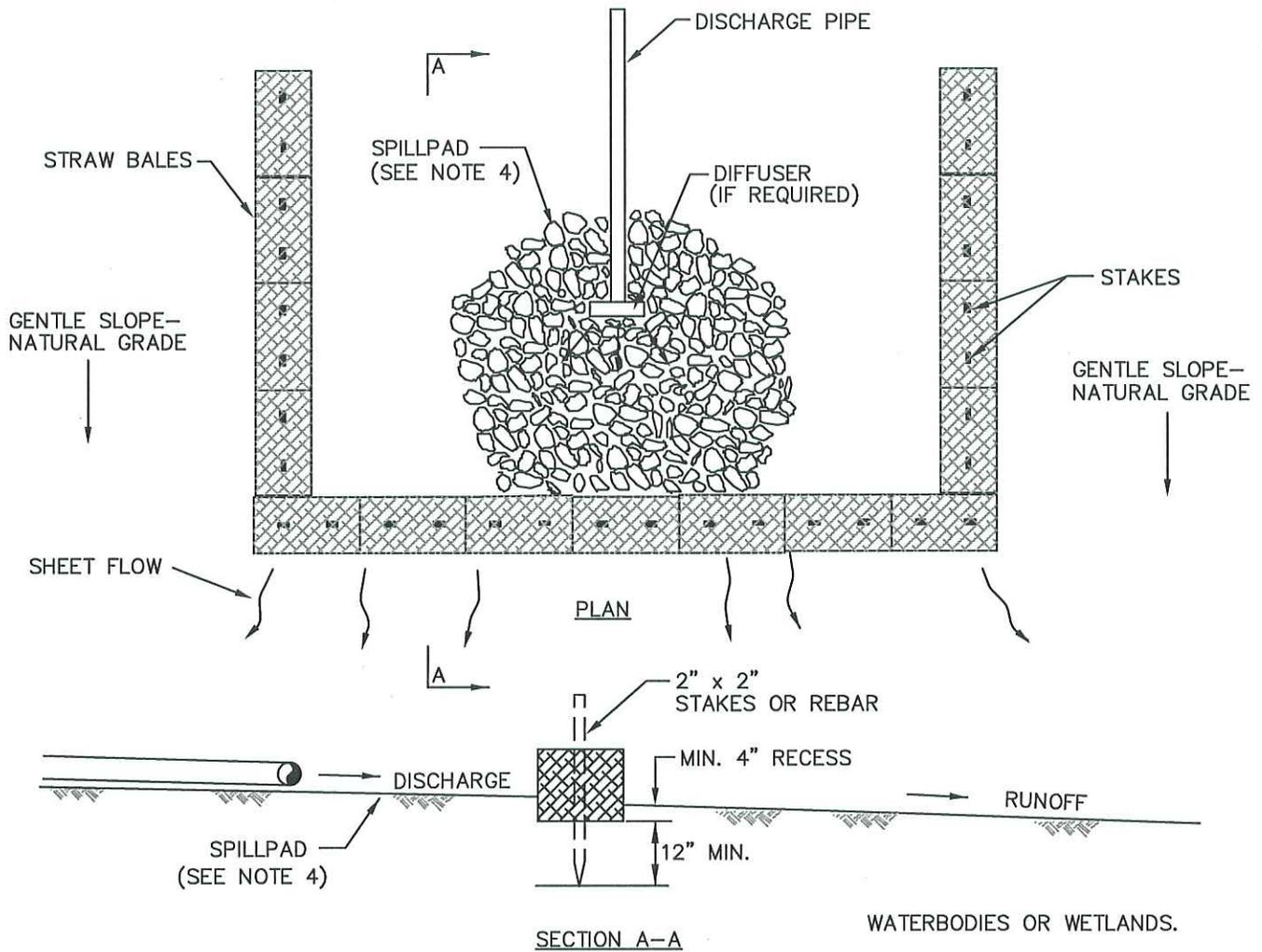


SECTION "A-A"

NOTES:

1. INSTALL A DEWATERING GEOTEXTILE FILTER BAG AS DIRECTED BY THE COMPANY'S INSPECTOR TO PREVENT THE FLOW OF HEAVILY SILT LADEN WATER INTO WATERBODIES OR WETLANDS.
2. DISCHARGE SITE SHALL BE WELL VEGETATED AND THE TOPOGRAPHY OF THE SITE SUCH THAT WATER WILL FLOW AWAY FROM ANY WORK AREAS. THE AREA DOWN SLOPE FROM THE DEWATERING SITE MUST BE REASONABLY PLANE OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.
3. TO ATTACH THE DISCHARGE HOSE, CUT A CORNER OF THE BAG, INSERT DISCHARGE HOSE, AND SECURE THE HOSE TO THE BAG.
4. A SINGLE FILTER BAG SHOULD NOT BE USED FOR FLOWS GREATER THAN 600 GALLONS PER MINUTE.
5. REPLACE FILTER BAG BEFORE IT IS COMPLETELY FILLED WITH SEDIMENT. MONITOR DISCHARGE TO AVOID OVER PRESSURING DUE TO PLUGGING, WHICH MAY RESULT IN RUPTURE.
6. DISPOSE OF USED FILTER BAG AND SEDIMENT AT A SITE APPROVED BY THE COMPANY'S INSPECTOR.

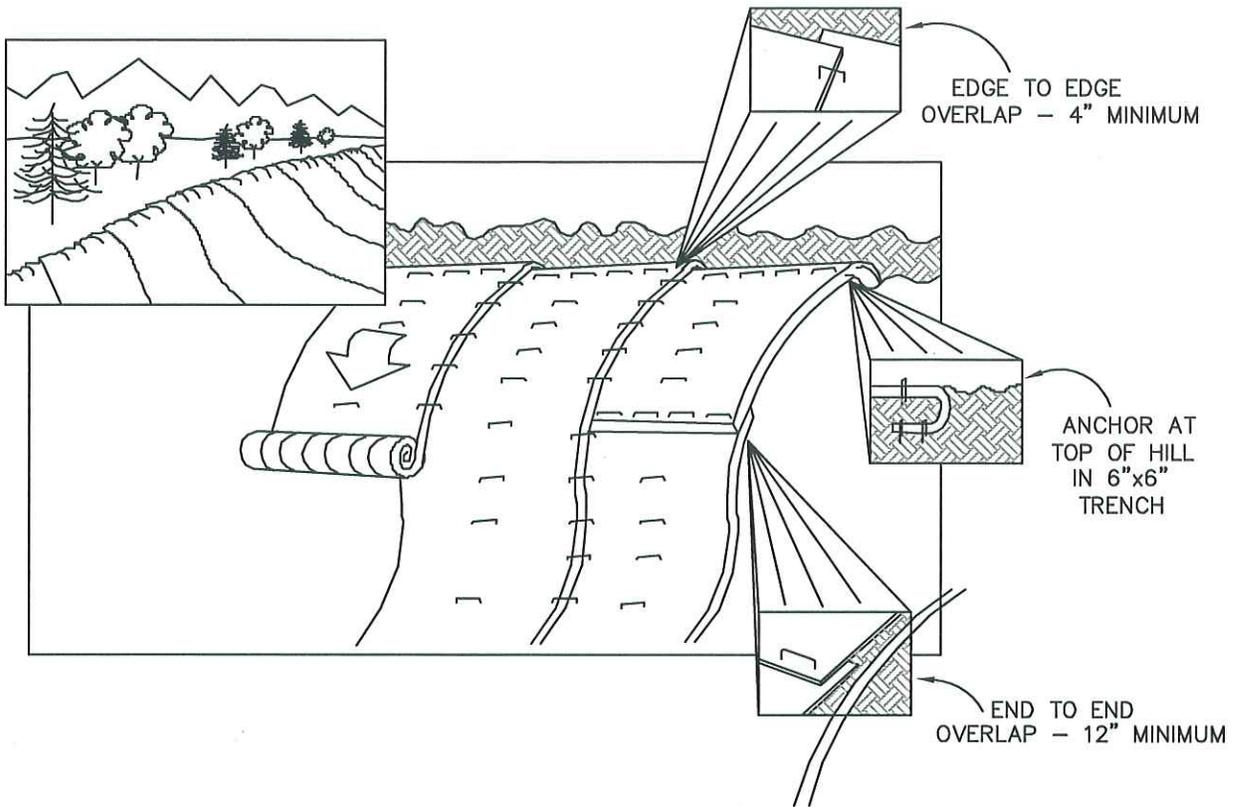
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△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		REV. A				
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.							



NOTES:

1. INSTALL A STRAW BALE DEWATERING STRUCTURE WHEREVER IT IS NECESSARY AND AS DIRECTED BY THE COMPANY INSPECTOR TO PREVENT THE FLOW OF SILT LADEN WATER INTO WATERBODIES OR WETLANDS.
2. DISCHARGE SITE SHALL BE WELL VEGETATED AND THE TOPOGRAPHY OF THE SITE SUCH THAT WATER WILL FLOW INTO THE DEWATERING STRUCTURE AND AWAY FROM ANY WORK AREAS. THE AREA DOWN SLOPE FROM THE DEWATERING SITE MUST BE REASONABLY PLANE OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.
3. ANCHOR STRAW BALES SECURELY IN PLACE WITH TWO WOODEN STAKES OR REBAR. ENTRENCH ("KEY") STRAW BALES INTO THE GROUND TO A DEPTH OF 4".
4. DIRECT THE PUMPED WATER ONTO A STABLE SPILL PAD CONSTRUCTED OF STRAW BALES, ROCK FILL, WEIGHTED TIMBERS, OR WOVEN GEOTEXTILE STAKED TO THE GROUND SURFACE (SUCH AS MIRAFI 600X, TERRAFIX 400W) OR AN APPROVED EQUIVALENT.
5. DISCHARGE RATES SHALL BE SUCH THAT WATER WILL NOT OVERFLOW THE TOP OF THE STRUCTURE.
6. MANUFACTURED FILTER BAGS (TYP-059) AREA SUITABLE ALTERNATIVE TO STRAW BALE STRUCTURES FOR TRENCH DEWATERING.
7. INSTALL A SPLASH PUP (TYP-064) IF THE DISCHARGE VELOCITY IS ERODING THE SOILS.

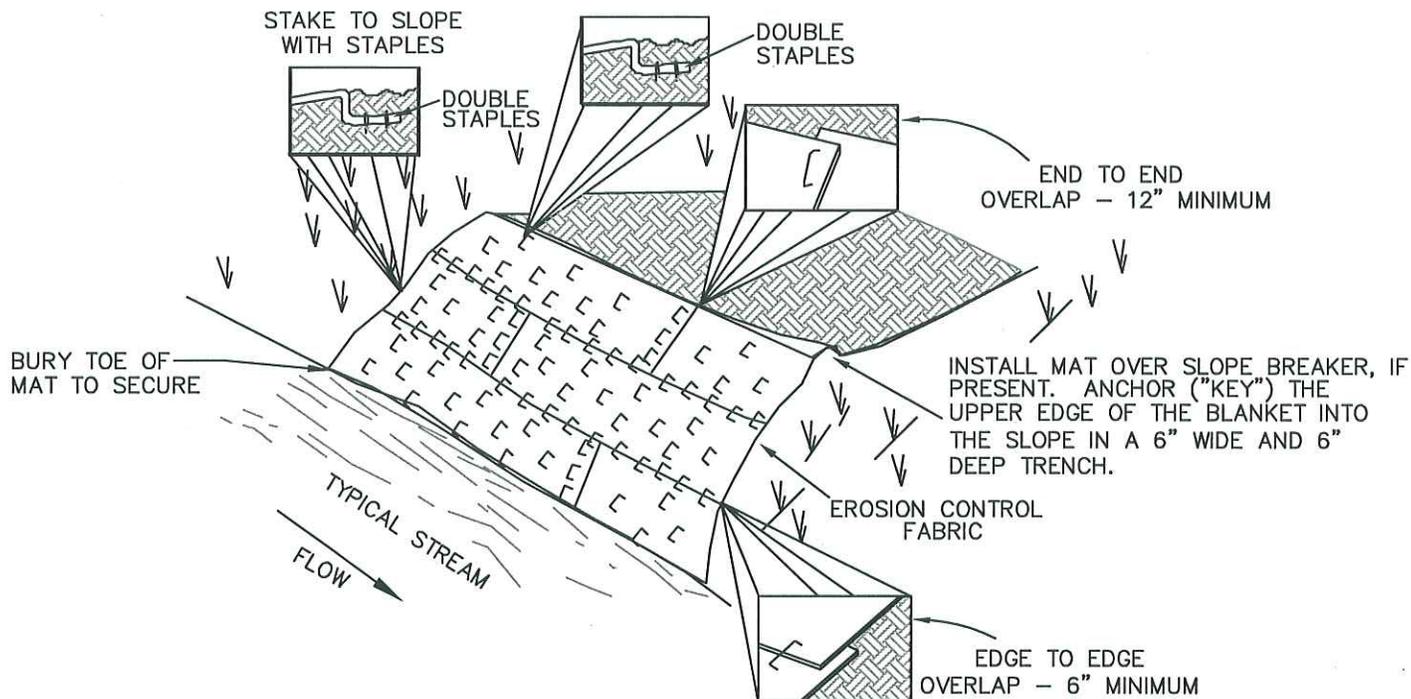
REVISIONS						DRAWN BY:		  TYPICAL STRAW BALE DEWATERING - SMALL VOLUME (SHT. 1 OF 2)		
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△						APPROVED BY:				
△						PROJECT MANAGER:				
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		PROJECT NUMBER	DRAWING NUMBER	REV.
NO.	DESCRIPTION	DATE	BY	CHK	APPR.	2568-01	TYP-049	A		



NOTES:

1. EROSION CONTROL MATTING (BLANKETS) SHALL BE USED AT THE FOLLOWING LOCATIONS:
 - ALL SLOPES OVER 33%.
 - AS DIRECTED BY THE COMPANY INSPECTOR.
2. THE EROSION CONTROL MAT SHALL BE MADE OF BIODEGRADABLE NATURAL FIBER, UNLESS OTHERWISE APPROVED BY THE COMPANY INSPECTOR. EROSION CONTROL MATS SHALL BE FURNISHED IN CONTINUOUS ROLLS OF 30' OR GREATER WITH A MINIMUM WIDTH OF 4'.
3. THE EROSION CONTROL MAT SHALL BE BON TERRA CS2 OR NORTH AMERICAN GREEN SC150 OR SC150BN OR A COMPANY APPROVED EQUIVALENT WITH THESE SPECIFICATIONS:
 - 70% STRAW AND 30% COCONUT (COIR) FABRIC
 - WEIGHT OF 0.5 LBS/YD
 - UNDERLAIN WITH PHOTODEGRADABLE PLASTIC NETTING OR NATURAL FIBER NET AND OVERLAIN WITH UV STABILIZED PLASTIC
 - NETTING OR NATURAL FIBER NET. SHALL BE DRIVEN INTO THE
4. STAPLES SHALL BE MADE OF 11 GAUGE WIRE, U-SHAPED WITH 6" LEGS AND A 1" CROWN AND GROUND FOR THE FULL LENGTH OF THE STAPLE LEGS. LONGER STAPLES MAY BE REQUIRED IN LOOSE OR SANDY SOILS.
5. MATTING SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR AS STATED BELOW:
 - THE TOP OF THE BLANKET SHALL EXTEND 3' PAST THE UPPER EDGE OF THE SLOPE.
 - ANCHOR ("KEY") THE UPPER EDGE OF THE BLANKET INTO THE SLOPE IN A 6" WIDE BY 6" DEEP TRENCH.
 - BLANKET ROLL SHALL BE ON UPHILL SIDE OF TRENCH. DOUBLE STAPLE EVERY 12" BEFORE BACKFILLING AND COMPACTING TRENCH.
 - BRING MAT ROLL BACK OVER THE TOP OF THE TRENCH AND CONTINUE TO ROLL DOWN SLOPE. STAPLE EVERY 12" WHERE MAT EXITS THE TRENCH AT TOP OF SLOPE.
 - THE EDGES OF PARALLEL BLANKETS SHALL BE OVERLAPPED A MIN. OF 4" AND STAPLED EVERY 12" THE LENGTH OF THE EDGE.
 - WHEN BLANKETS ARE SPLICED DOWN SLOPE TO ADJOINING MATS, THE UPPER BLANKET SHALL BE PLACED OVER THE LOWER MAT (SHINGLE STYLE) WITH APPROXIMATELY 12" OF OVERLAP. STAPLE THROUGH THE OVERLAPPED AREA EVERY 12".
 - STAPLE DOWN THE CENTER OF THE BLANKET(S). TWO STAPLES IN EVERY SQUARE YARD.
 - STAPLE ACROSS THE BOTTOM OF THE EROSION CONTROL MATTING EVERY 12".
6. THE EROSION CONTROL MATTING SHALL MAKE UNIFORM CONTACT WITH THE SOIL UNDERNEATH WITH NO BRIDGING OF RILLS OR GULLIES.
7. MONITOR FOR WASHOUTS, STAPLE INTEGRITY OR MAT MOVEMENT. PRIOR TO COMPLETION OF CONSTRUCTION, REPLACE OR REPAIR AS NECESSARY.

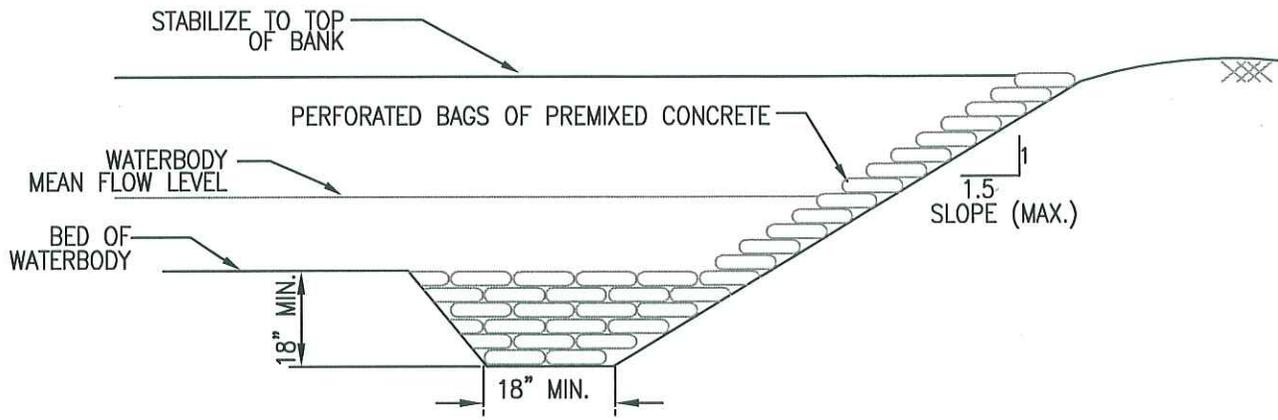
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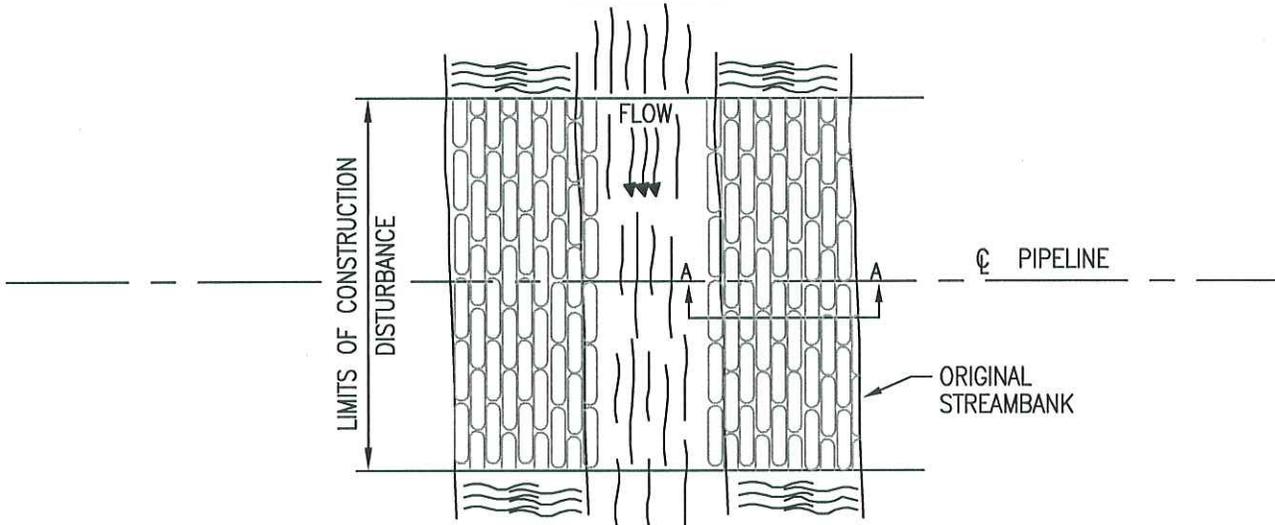
NOTES:

1. EROSION CONTROL MATTING (BLANKETS) SHALL BE PLACED ON THE BANKS OF ALL WATERBODIES WHERE VEGETATION HAS BEEN REMOVED AND/OR AS DIRECTED BY THE COMPANY INSPECTOR.
2. THE TYPE OF EROSION CONTROL MAT SHALL BE MADE OF BIODEGRADABLE NATURAL FIBERS, UNLESS OTHERWISE APPROVED BY THE COMPANY INSPECTOR. EROSION CONTROL MATS SHALL BE FURNISHED IN CONTINUOUS ROLLS OF 30' OR GREATER WITH A MINIMUM WIDTH OF 4'.
3. THE EROSION CONTROL MAT SHALL BE BON TERRA CF7 OR A COMPANY APPROVED EQUIVALENT WITH THESE SPECIFICATIONS:
 - 100% WOVEN COCONUT (COIR) FABRIC.
 - WEIGHT OF 1.2 LBS/YD.
 - 50% OPEN AREA.
4. STAPLES SHALL BE MADE OF 11 GAUGE WIRE, U-SHAPED WITH 6" LEGS AND A 1" CROWN. STAPLES SHALL BE DRIVEN INTO THE GROUND FOR THE FULL LENGTH OF THE STAPLE LEGS. LONGER STAPLES MAY BE REQUIRED IN LOOSE OR SANDY SOILS.
5. MATTING SHALL BE INSTALLED ACCORDING TO MANUFACTURE SPECIFICATIONS OR AS STATED BELOW:
 - THE TOP OF THE BLANKET SHALL EXTEND A MINIMUM OF 2' PAST THE UPPER EDGE OF THE ORDINARY HIGH WATER MARK. IF A SLOPE BREAKER IS PRESENT ON THE APPROACH SLOPE, THE BLANKET SHALL EXTEND OVER THE CREST AND THE THROUGH OF THE SLOPE BREAKER.
 - INSTALL BLANKET(S) ACROSS THE SLOPE IN THE DIRECTION OF WATER FLOW.
 - ANCHOR ("KEY") THE UPSTREAM EDGE OF THE BLANKET(S) INTO THE SLOPE USING A 6" WIDE BY 6" DEEP TRENCH. DOUBLE STAPLE EVERY 12" BEFORE BACKFILLING AND COMPACTING TRENCH.
 - ANCHOR ("KEY") THE UPPER EDGE OF THE BLANKET INTO THE SLOPE IN A 6" WIDE BY 6" DEEP TRENCH. DOUBLE STAPLE EVERY 12" BEFORE BACKFILLING AND COMPACTING TRENCH.
 - THE EDGES OF PARALLEL BLANKETS SHALL BE OVERLAPPED A MINIMUM OF 6". THE UPPER BLANKET SHALL BE PLACED OVER THE LOWER BLANKET (SHINGLE STYLE) AND STAPLED EVERY 12" THE LENGTH OF THE EDGE.
 - WHEN BLANKET ENDS, THE UPSTREAM BLANKET SHALL BE PLACED OVER THE DOWNSTREAM BLANKET (SHINGLE STYLE) WITH AT LEAST 12" OF OVERLAP. STAPLE THROUGH THE OVERLAPPED AREA EVERY 12"
 - STAPLE DOWN THE CENTER OF THE BLANKET(S) WITH THREE STAPLES IN EVERY SQUARE YARD.
 - STAPLE ACROSS THE BOTTOM OF THE EROSION CONTROL MATTING EVERY 12".
6. THE EROSION CONTROL MATTING SHALL MAKE UNIFORM CONTACT WITH THE SOIL UNDERNEATH WITH NO BRIDGING OF RILLS OR GULLIES.
7. MONITOR FOR WASHOUTS, STAPLE INTEGRITY OR MAT MOVEMENT PRIOR TO COMPLETION OF CONSTRUCTION. REPLACE OR REPAIR AS NECESSARY.

REVISIONS						DRAWN BY:	TYPICAL EROSION CONTROL MATTING STREAMBANKS					
△						CHECKED BY:						
△						REVIEWED BY:						
△						APPROVED BY:						
△						PROJECT MANAGER:						
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-041	REV.	A
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SECTION A-A



PLAN VIEW

NOTES:

1. STREAM BANK CONCRETE STRUCTURES SHALL CONSIST OF ALTERNATIVE ROWS OF PERFORATED SACK OF PREMIXED CONCRETE.
2. THE USE OF CONCRETE BANK STRUCTURES SHALL BE LIMITED TO AREAS WHERE FLOWING CONDITIONS PREVENT EFFECTIVE VEGETATIVE STABILIZATION TECHNIQUES.
3. WATERBODY CONCRETE STRUCTURES SHALL BE CONSTRUCTED AS FOLLOWS:
 - CONSTRUCT CONCRETE STRUCTURE BOUNDARIES IN A MANNER SUCH THAT THEY SHALL NOT BE UNDERMINED FROM THE SIDE.
 - REMOVE ALL STUMPS, ORGANIC MATTER AND WORK MATERIAL.
 - GRADE THE BANK TO A MAXIMUM SLOPE OF 1.5:1.
 - CUT THE SUBGRADE SUFFICIENTLY DEEP FOR THE FINISHED GRADE OF THE CONCRETE BAGS TO BE AT THE SAME ELEVATION AS SURROUNDING AREA.
 - COMPACT THE SUBGRADE TO A DENSITY APPROXIMATELY EQUAL TO THE SURROUNDING SOILS.
 - CONSTRUCT TOE OF TRENCH TO "KEY" IN BOTTOM OF ARMOR PROTECTION. THE TRENCH SHALL BE A MINIMUM OF 18" WIDE AND 18" DEEP.
 - PLACE CONCRETE BAGS ON SLOPE TO BE PROTECTED. INSTALL BAGS TO A DEPTH APPROXIMATELY 1.5 TO 2 TIMES THE WIDTH OF THE BAG OR AT LEAST 12" THICK ON THE SLOPE AND THICKER AT BASE.

REVISIONS						DRAWN BY:	<p style="margin: 0;">TYPICAL CONCRETE STRUCTURE AT WATERBODY BANKS</p>					
△						CHECKED BY:						
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△						APPROVED BY:						
△						PROJECT MANAGER:						
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-042	REV.	A
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.							

NOTES:

APPLICATIONS AND LOCATIONS

1. HYDRO-MULCH WITH TACKIFIER SHALL BE USED AT LOCATIONS IDENTIFIED IN THE GEOTECHNICAL PLAN, RECLAMATION PLAN, AND/OR AS DIRECTED BY THE COMPANY INSPECTOR TO PROTECT SOIL AGAINST EROSION.
2. THE CONTRACTOR SHALL BE REQUIRED TO USE EXTENSION HOSES TO REACH INACCESSIBLE AREAS. WHERE THE USE OF EXTENSION HOSES IS NOT SUFFICIENT TO REACH AREAS, EROSION CONTROL MATTING CAN BE SUBSTITUTED.
3. HYDRO-MULCH AND TACKIFIER SHALL BE APPLIED AT A RATE OF 3000 LBS/ACRE RESPECTIVELY, IN A SINGLE APPLICATION. HYDRO-MULCH AND TACKIFIER SHALL PRODUCE A UNIFORM, MAT-LIKE COVERING ON THE GROUND.
4. WHEN DIRECTED BY THE COMPANY INSPECTOR, TOPSOIL STOCKPILES SHALL BE EITHER WET WITH WATER OR TACKIFIER TO PROVIDE AN UNERODABLE CRUST OR TO CONTROL WIND EROSION.

HYDRO-MULCH MATERIAL

5. THE HYDRO-MULCH MATERIAL SHALL CONSIST OF WOOD FIBERS MEETING THE FOLLOWING PHYSICAL AND CHEMICAL PROPERTIES:

- MOISTURE CONTENT 12% ± 3%
- ORGANIC MATTER (OVEN-DRIED BASIS) 99.2% ± 0.2%
- ASH CONTENT 0.7% ± 0.2%
- WATER HOLDING CAPACITY 100 GRAMS MINIMUM

NOTE: WATER HOLDING CAPACITY – 1000 GRAMS OF OVEN-DRIED MULCH SATURATED, DRAINED AND WEIGHED.

6. THE HYDRO-MULCH MATERIAL SHALL MEET THE FOLLOWING ADDITIONAL REQUIREMENTS:
 - THE FIBERS SHALL NOT CONTAIN ANY GROWTH OR GERMINATION INHIBITING FACTORS.
 - THE FIBERS SHALL NOT BE PRODUCED FROM RECYCLED MATERIAL SUCH AS SAWDUST, PAPER, CARDBOARD, OR PULP AND PAPER PLANT RESIDUE.
 - THE FIBERS SHALL BE DYED TO FACILITATE VISUAL METERING DURING APPLICATION.
7. HYDRO-MULCH SHALL BE SUPPLIED IN 50 POUND NET WEIGHT BAGS. EACH PACKAGE SHALL BE MARKED BY THE MANUFACTURE TO SHOW THE AIR-DRY WEIGHT CONTENT.
8. THE HYDRO-MULCH MATERIAL SHALL BE OF SUCH A CONSISTENCY THAT AFTER BEING COMBINED IN A SLURRY TANK WITH WATER AND APPROVED TACKIFIER, THE FIBERS IN THE MATERIAL SHALL BE UNIFORMLY SUSPENDED TO FORM A HOMOGENOUS SLURRY.
9. MULCH WHICH HAS BEEN DAMAGED BY MOISTURE OR OTHER MEANS SHALL NOT BE ACCEPTED.
10. IF REQUESTED, THE CONTRACTOR SHALL SUBMIT A MINIMUM 1-POUND BAG OF THE PRODUCT PROPOSED FOR USE ON THE PROJECT TO THE COMPANY FOR TESTING. OR, IF REQUESTED, THE CONTRACTOR SHALL SUBMIT A SIGNED STATEMENT CERTIFYING THAT THE MATERIAL FURNISHED HAS BEEN LABORATORY AND FIELD-TESTED AND THAT IS IT MEETS REQUIREMENTS FOR ITS INTENDED USE. THE COMPANY MAY ACCEPT THE HYDRO-MULCH MATERIAL FOR USE BASED ON A CERTIFICATE OF COMPLIANCE.

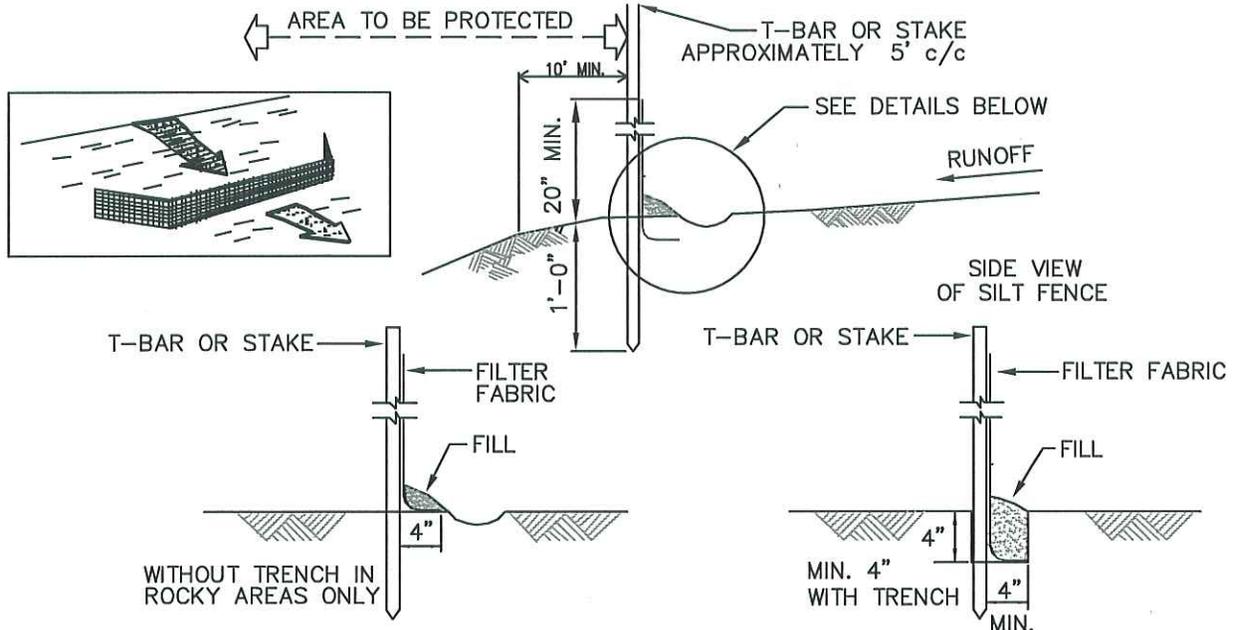
TACKIFIER MATERIAL

11. TACKIFIER SHALL MEET THE FOLLOWING REQUIREMENTS:
 - BE OF A BIODEGRADABLE ORGANIC FORMULATION. CONSIST OF SPECIFICALLY BLENDED COMPATIBLE HYDROCOLLOIDS (SOLUBLE POLYSACCHARIDES, GUM GUM OR PLANGAGE). STARCH-BASED TACKIFIERS ARE UNACCEPTABLE.
 - HAVE AN EQUILIBRIUM AIR-DRY MOISTURE CONTENT AT TIME OF MANUFACTURE OF 8% ± 2% WITH A MINIMUM WATER HOLDING CAPACITY OF 6.5 TIMES BY WEIGHT OF DRY MATERIAL BE ABLE TO HYDRATE AND UNIFORMLY DISPERSING IN CIRCULATING WATER TO FORM A HOMOGENOUS SLURRY AND REMAIN IN SUCH A STATE IN THE HYDRAULIC MIXING UNIT (USUALLY A HYDRO-MULCHER).
12. TACKIFIER SHALL BE SUPPLIED IN PACKAGES MARKED BY THE MANUFACTURE TO SHOW WEIGHT CONTENT. TACKIFIER WHICH HAS BEEN DAMAGED BY MOISTURE OR OTHER MEANS SHALL NOT BE ACCEPTED

REVISIONS						DRAWN BY:	 GREENCORE PARTIAL COMPANY LLC  CH2MHILL TYPICAL HYDRO-MULCH AND TACKIFIER				
△						CHECKED BY:					
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△						APPROVED BY:					
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△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-043	REV.	A
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1. HYDRAULICALLY APPLIED MULCH (HYDRO-MULCH) WITH TACKIFIER MAY BE USED IN LIMITED AREAS, IN LIEU OF MECHANICALLY ANCHORED STRAW MULCH (DETAIL 501), WHERE A MECHANICAL MULCH CRIMPER CANNOT BE SAFELY OR EFFECTIVELY OPERATED, SUCH AS SOME STEEP SLOPES OR ROCKY AREAS. LOCATIONS FOR THE USE OF HYDRO-MULCH AND TACKIFIER MUST BE APPROVED BY THE COMPANY INSPECTOR PRIOR TO APPLICATION.
2. APPLY HYD'RO-MULCH AT THE RATE OF APPROXIMATELY 3000 POUNDS OF AIR-DRIED FIBER/ACRE AS NECESSARY TO PROVIDE AT LEAST 75 PERCENT GROUND COVER. APPLY THE TACKIFIER AT THE RATE RECOMMENDED BY THE MANUFACTURER. APPLY THE HYDRO-MULCH AND TACKIFIER TO PRODUCE A UNIFORM, AT-LIKE GROUND COVER.
3. THE HYDRAULICALLY APPLIED MULCH SHALL HAVE THE FOLLOWING PROPERTIES:
 - THE MULCH SHALL CONSIST OF AIR-DRIED, 100 PERCENT VIRGIN-WOOD-FIBERS MANUFACTURED FROM WHOLE WOOD CHIPS;
 - MAXIMUM MOISTURE CONTENT OF 12 PERCENT (PLUS OR MINUS 3 PERCENT);
 - THE MULCH SHALL NOT BE PRODUCED FROM RECYCLED MATERIALS AND SHALL NOT CONTAIN ANY GROWTH OR GERMINATION INHIBITING FACTORS;
 - THE MULCH SHALL BE DYED TO FACILITATE VISUAL METERING AND EVEN APPLICATION;
 - THE MULCH SHALL BE SUPPLIED IN PACKAGES MARKED BY THE MANUFACTURER TO SHOW THE AIR-DRY WEIGHT.
4. THE TACKIFIER SHALL CONSIST OF A BIODEGRADABLE, ORGANIC, WATERSOLUBLE, NATURAL VEGETABLE GUM FORMULATION SUCH AS GUAR GUM. ASPHALT-BASED TACKIFIERS SHALL NOT BE USED.
5. APPLY HYDRO-MULCH AND TACKIFIER IMMEDIATELY FOLLOWING SEEDING.
6. AVOID FURTHER DISTURBANCE OF THE SLOPE SURFACE FOLLOWING APPLICATION OF HYDRO-MULCH AND TACKIFIER. WHERE DISTURBANCE OCCURS, RESEED IF NECESSARY, AND REAPPLY HYDRO-MULCH AND TACKIFIER.
7. DO NOT USE OR APPLY HYDRO-MULCH AND TACKIFIER WITHIN 100 FEET OF WATERBODIES OR WETLANDS.

REVISIONS						DRAWN BY:	 GREENCORE <small>PERFORMANCE CONSTRUCTION</small> CH2MHILL EROSION CONTROL HYDRO-MULCH AND TACKIFIER					
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△						PROJECT MANAGER:						
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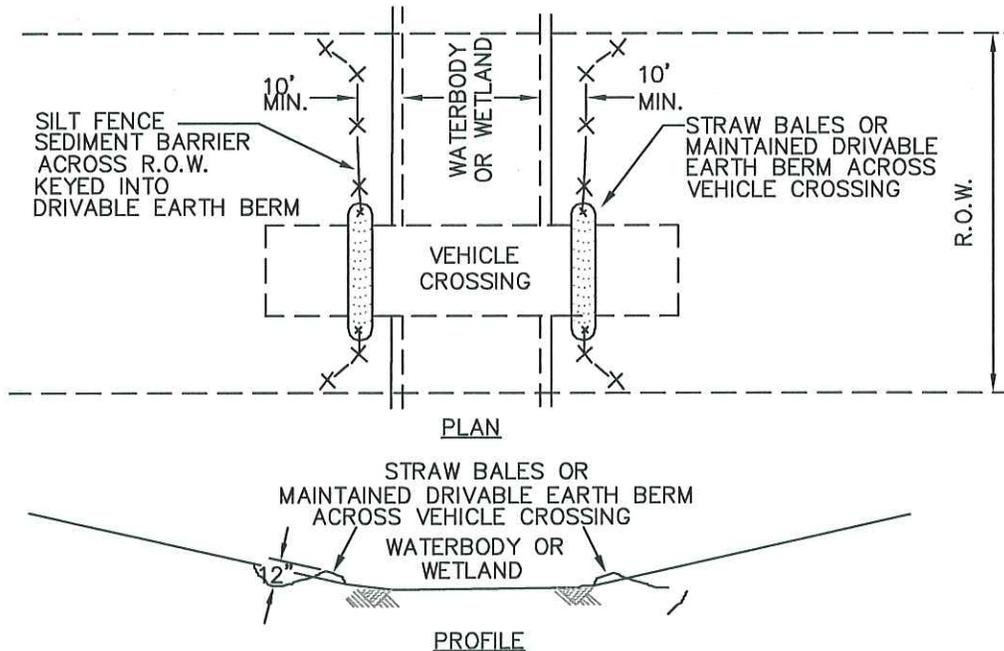
1. GENERALLY WHEN A LONG SEDIMENT BARRIER IS REQUIRED, SILT FENCE WILL BE UTILIZED RATHER THAN STRAW BALES AT:
 - * THE BASE OF ALL SLOPES ABOVE ROADS, SPRINGS, WETLANDS, IMPOUNDMENTS AND PERENNIAL AND INTERMITTENT STREAMS.
 - * THE DOWN SLOPE RIGHT-OF-WAY EDGE WHERE ANY OF THE ABOVE MENTIONED LOCATIONS ARE ADJACENT TO THE RIGHT-OF-WAY.
 - * BETWEEN TOPSOIL/SPOIL STOCKPILES AND PERENNIAL OR INTERMITTENT STREAMS OR WETLANDS WHERE BUFFER ZONE REQUIREMENTS CANNOT BE MET.
 - * ALONG R.O.W. BOUNDARIES OF WETLAND CONSTRUCTION.
 - * ACROSS CONSTRUCTION R.O.W. AT ALL WATERBODY CROSSINGS.
 - * AS SPECIFIED IN THE SPILL PREVENTION, CONTAINMENT, AND COUNTERMEASURE PLAN.
 - * AS DIRECTED BY THE COMPANY INSPECTOR.
2. THE SILT FENCE SHALL BE CONSTRUCTED AS FOLLOWS: FABRIC USED FOR THE SILT FENCE SHALL BE A "STANDARD STRENGTH" GEOTEXTILE, SUCH AS MIRAFI 100X OR AN APPROVED EQUIVALENT. THE FABRIC SHALL BE CUT FROM A CONTINUOUS FABRIC ROLL. THE HEIGHT OF THE FENCE SHALL NOT EXCEED 36". SPLICES SHALL ONLY BE DONE AT POSTS AND SHALL CONSIST OF A MINIMUM OF 6" OF OVERLAP WITH BOTH ENDS SECURED TO THE POST. POSTS SHALL BE POSITIONED A MAXIMUM OF 5' APART. POSTS SHALL CONSIST OF 2"x2" WOODEN STAKES OF SUFFICIENT LENGTH TO EXTEND A MINIMUM OF 12" INTO THE GROUND. FABRIC SHALL BE STAPLED OR WIRED TO POSTS A MAXIMUM OF EVERY 9".
3. THE SILT FENCE SHALL BE INSTALLED AS SPECIFIED BY THE MANUFACTURER OR AS FOLLOWS:
 - * A TRENCH, 4" WIDE AND 4" DEEP, SHALL BE EXCAVATED ALONG THE CONTOUR THE POST SHALL BE DRIVEN INTO THE BOTTOM OF THE TRENCH ON THE DOWNSTREAM SIDE OF THE FILTER FABRIC. THE TRENCH SHALL BE BACK FILLED AND COMPACTED, ENSURING 4" OF FENCE IS BURIED WITHIN THE TRENCH.
 - * IN AREAS WHERE THE TERRAIN IS TOO ROCKY FOR TRENCHING, A 4" GROUND FLAP WITH ROCK FILL TO HOLD IT IN PLACE SHALL BE USED.

REVISIONS						DRAWN BY:	  TYPICAL SILT FENCE SEDIMENT BARRIER (SHT. 1 OF 3)	
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NOTES: (CONT.)

- * SILT FENCES PLACED AT THE TOE OF A SLOPE SHALL BE SET AT LEAST 6' DOWN GRADIENT FROM THE TOE OF THE SLOPE (WHERE POSSIBLE) IN ORDER TO INCREASE PONDING.
 - * SILT FENCE PLACED AT THE TOP OF SLOPES SHALL BE AT LEAST 10' BELOW THE CREST.
 - * SILT FENCES PLACED AT THE BASE OF SPOIL OR TOPSOIL STOCKPILES SHALL EXTEND AROUND THE BASE OF THE PILES IN ORDER TO CONTAIN ANY SEDIMENTS AND/OR PREVENT FLOW-AROUND.
 - * WHEN INSTALLING SILT FENCES IN DRAINAGES, EXTEND THE FENCE UP THE CHANNEL BANKS AND TURN BOTH ENDS AT A SLIGHT ANGLE TOWARDS THE CENTER OF THE RIGHT-OF-WAY.
 - * UPON THE REQUEST OF THE COMPANY INSPECTOR, STRAW BALES SHALL BE USED IN CONJUNCTION WITH THE SILT FENCE.
4. SILT FENCES SHALL BE CHECKED AND MAINTAINED ON A REGULAR BASIS. THE DEPTH OF THE ANCHOR TRENCH SHALL BE ADJUSTED IF UNDERMINED. SHOULD INSPECTION REVEAL SEDIMENT LOADING AT OR NEAR 40% CAPACITY, THE SEDIMENT SHALL BE REMOVED AND PLACED IN AN AREA WHERE IT SHALL NOT RE-ENTER THE SILT FENCE IMPOUNDMENT OR A WATERWAY.
 5. SILT FENCE SHALL BE REMOVED ONLY AS DIRECTED BY THE COMPANY INSPECTOR.
 6. EROSION CONTROL STRUCTURES SHALL BE INSPECTED DAILY IN AREAS OF ACTIVE CONSTRUCTION. STRUCTURES SHALL BE INSPECTED WEEKLY AT INACTIVE CONSTRUCTION AREAS AND WITHIN 24 HOURS OF EACH RAINFALL EVENT WITH 0.5 INCH OR MORE. STRUCTURES SHALL BE REPAIRED AS NECESSARY.

INSTALLATIONS AT VEHICLE CROSSINGS OF WATERBODIES AND WETLANDS



1. IF REQUIRED, A 15' GAP SHALL BE LEFT IN THE SILT FENCE TO ACCOMMODATE TRAFFIC. HOWEVER, A SECTION OF SILT FENCE OR A DRIVABLE EARTH BERM TIED INTO ADJACENT SILT FENCE SHALL BE USED TO CLOSE THE GAP AT THE END OF EACH DAY. THE SILT FENCE USED TO CLOSE THE GAP MUST OVERLAP THE ENDS OF THE PERMANENT SILT FENCE FOR A MINIMUM OF 24", AND SHALL BE "KEYED" INTO THE GROUND THE SAME AS THE FILTER FABRIC ON EITHER SIDE OF THE GAP.
2. A MAINTAINED DRIVABLE EARTH BERM MAY BE INSTALLED ACROSS THE VEHICLE CROSSING IN LIEU OF SILT FENCE DURING ACTIVE CONSTRUCTION.
3. BERM MUST BE TIED INTO SILT FENCE.
4. BERM MUST BE MAINTAINED TO ENSURE SEDIMENT TRAPPING CAPACITY.
5. WHEN ACTIVE CONSTRUCTION IS COMPLETE, INSTALL SILT FENCE ACROSS ENTIRE R.O.W.

REVISIONS						DRAWN BY:		  TYPICAL SILT FENCE SEDIMENT BARRIER (SHT. 2 OF 3)			
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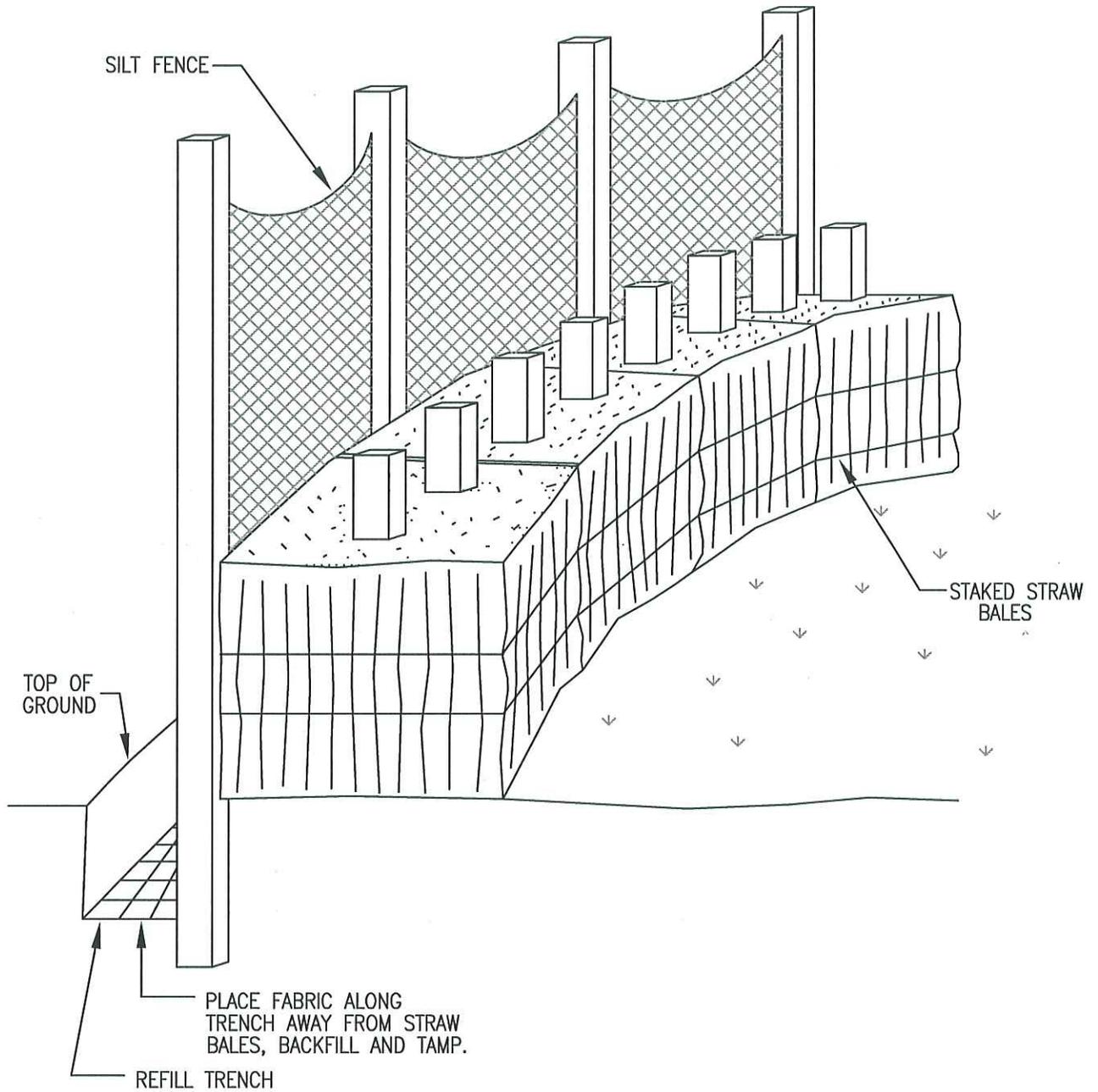
SLOPE PROTECTION

THE MAXIMUM SIZE OF THE DRAINAGE AREA SHOULD BE 0.25 ACRES PER 100 FEET OF FENCE LENGTH. THE MAXIMUM LENGTH OF SLOPE SHOULD BEHIND THE FENCE IS 100 FEET.

MAXIMUM SLOPE LENGTH ABOVE A
24" TO 30" HIGH SILT FENCE

SLOPE	LENGTH (FT)
<2%	500
2 TO 5%	200
5 TO 10%	150
10 TO 20%	100
20 TO 30%	70
30 TO 40%	40
40 TO 50%	25

REVISIONS						DRAWN BY:	  TYPICAL SILT FENCE SEDIMENT BARRIER (SHT. 3 OF 3)					
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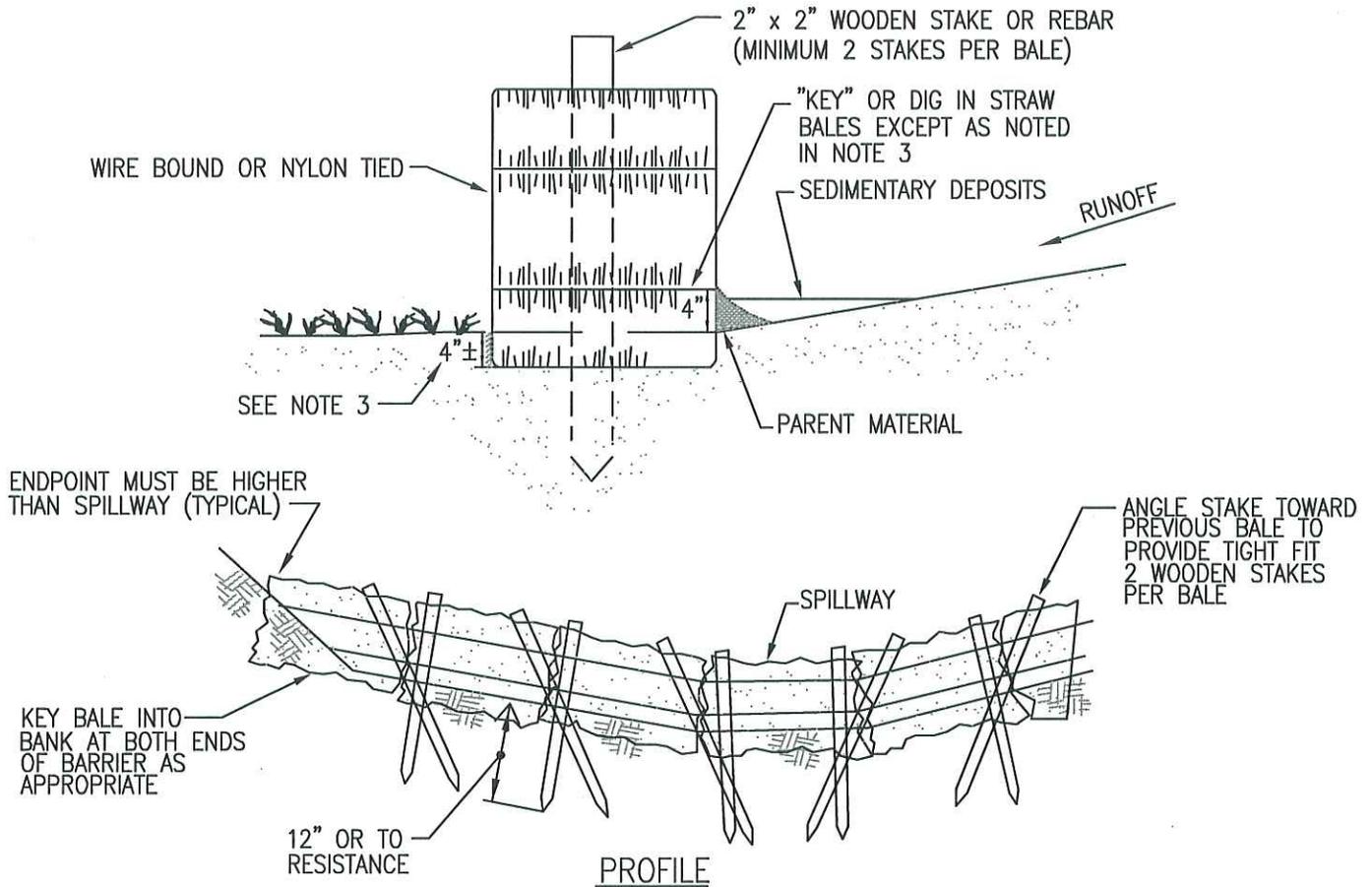


NOTE:

1. WHERE EXTREMELY ERODIBLE SOIL CONDITIONS EXIST, AT THE DIRECTION OF THE COMPANY'S INSPECTOR A COMBINED STRAW BALE AND SILT FENCE SEDIMENT CONTROL BARRIER SHALL BE INSTALLED. FOR INSTALLATION CONDITIONS AND INSTRUCTIONS SEE:

- TYP-060: SILT FENCE SEDIMENT BARRIERS
- TYP-062: STRAW BALE SEDIMENT BARRIERS

REVISIONS						DRAWN BY:		<p style="margin: 0;">TYPICAL STRAW BALE AND SILT FENCE</p>		
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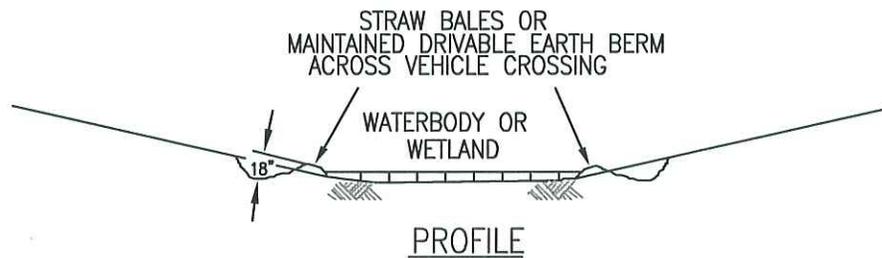
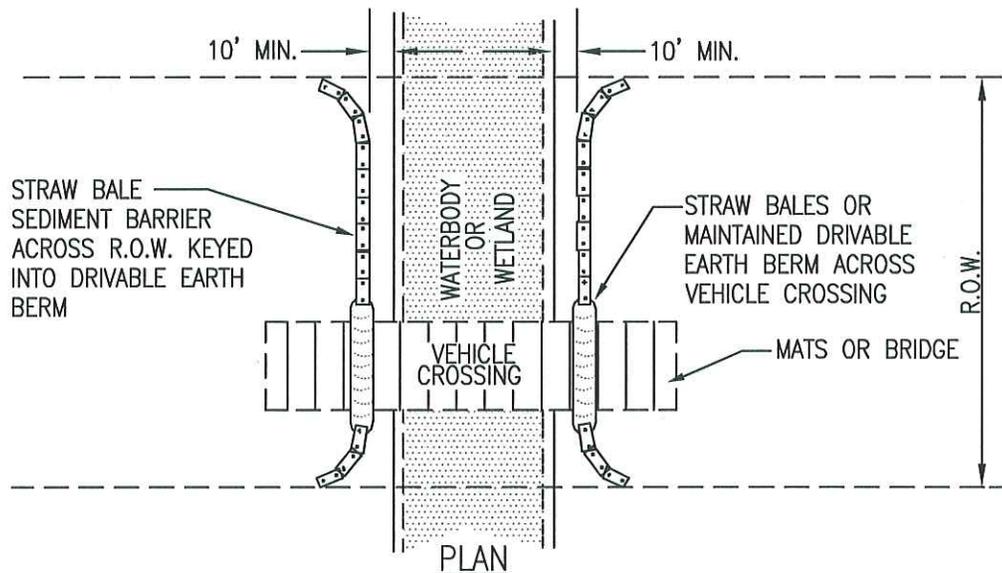
NOTES:

1. STRAW BALE SEDIMENT BARRIERS SHALL BE INSTALLED AT THE FOLLOWING LOCATIONS:
 - THE BASE OF ALL SLOPES ABOVE ROADS, SPRINGS, WETLANDS, IMPOUNDMENTS AND FLOWING STREAMS.
 - THE DOWNSLOPE RIGHT-OF-WAY EDGE WHERE ANY OF THE ABOVE-MENTIONED LOCATIONS ARE ADJACENT TO THE RIGHT-OF-WAY.
 - BETWEEN TOPSOIL/SPOIL STOCKPILES AND STREAMS OR WETLANDS AS NEEDED.
 - ALONG R.O.W. BOUNDARIES IN WETLAND CONSTRUCTION.
 - AS SPECIFIED IN THE SPILL PREVENTION, CONTAINMENT, AND COUNTERMEASURE PLAN.
 - AS DIRECTED BY THE COMPANY'S REPRESENTATIVE.
2. STRAW BALE SEDIMENT BARRIERS SHALL CONSIST OF A R.O.W. OF STRAW BALES, PLACED ON THE FIBER-CUT EDGE (TIES NOT IN CONTACT WITH THE GROUND). BALES SHALL BE TIGHTLY ABUTTED TO ONE ANOTHER. THE BARRIER SHALL BE ONE BALE HIGH. ONLY CERTIFIED "NOXIOUS WEED-FREE" STRAW SHALL BE USED WHENEVER POSSIBLE.
3. ENTRENCH ("KEY") STRAW BALES INTO THE GROUND TO A DEPTH OF 4" EXCEPT IN FROZEN, SATURATED, OR EXTREMELY ROCKY SOILS. PLACE PARENT MATERIAL ON UPSTREAM SIDE OF STRAW BALES TO PREVENT UNDERMINING.
4. WALK ON STRAW BALES TO INSURE ADEQUATE BALE-TO-SOIL CONTACT.
5. ANCHOR STRAW BALES SECURELY IN PLACE WITH TWO WOODEN OR STEEL REBAR STAKES DRIVEN THROUGH THE TOPS OF THE BALES. THE STAKES SHALL PENETRATE THE GROUND A DISTANCE OF 12" UNLESS ROCK OR AN IMPERMEABLE LAYER IS ENCOUNTERED:
 - THE FIRST, CENTER AND END BALES OF THE BARRIER SHALL HAVE STAKES DRIVEN VERTICALLY THROUGH THE BALE.
 - BALES, OTHER THAN THOSE LOCATED AT THE ENDS OR CENTER OF THE BARRIER, SHALL HAVE THE FIRST STAKE DRIVEN THROUGH THE TOP OF THE BALE AT AN ANGLE SO THAT THE STAKE PASSES THROUGH THE PREVIOUSLY PLACED BALE, IN ORDER TO PROVIDE TIGHT CONTACT BETWEEN BALES. THE SECOND STAKE SHALL BE DRIVEN VERTICALLY THROUGH THE TOP OF THE BALE.

REVISIONS						DRAWN BY:	TYPICAL STRAW BALE SEDIMENT BARRIER (SHT. 1 OF 2)					
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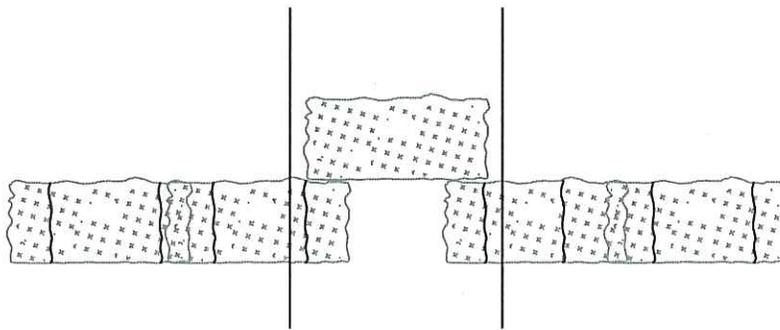
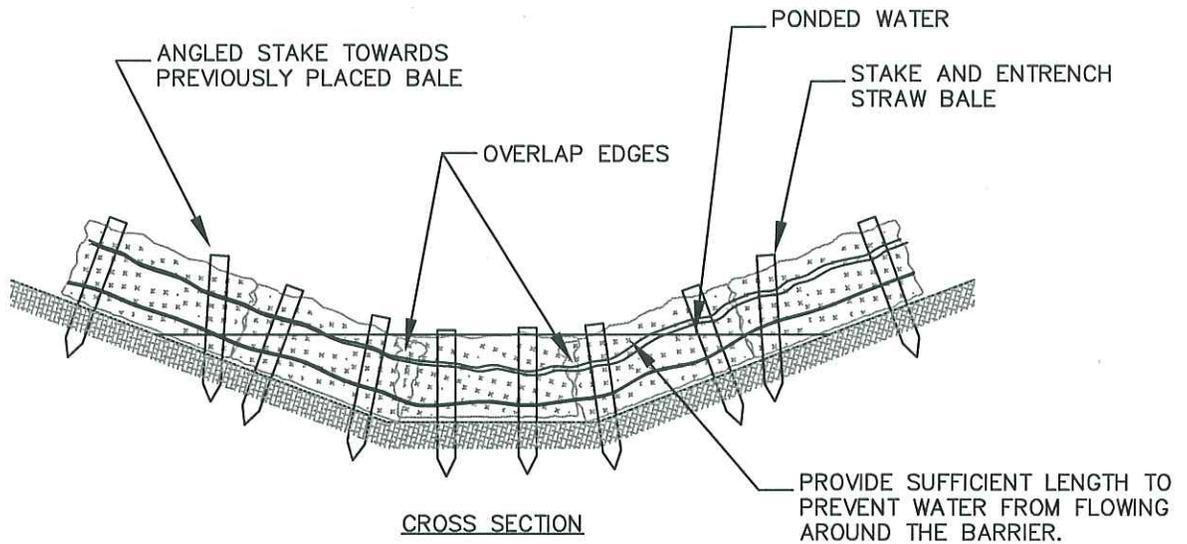
6. PLACE STRAW BALES SO THEY ARE EFFECTIVE BUT DO NOT HINDER CONSTRUCTION. IF NECESSARY A 15' GAP IN STRAW BALE BARRIERS SHALL BE PROVIDED AS NEEDED TO ACCOMMODATE TRAFFIC ON TEMPORARY CONSTRUCTION ROADS. THE GAP SHALL BE CLOSED AT THE END OF EACH WORK DAY, USING STRAW BALE BARRIERS, OR A DRIVABLE EARTH BERM TIED INTO ADJACENT STRAW BALES. THE BALES USED TO CLOSE THE GAP SHALL BE PLACED ON THE UPHILL SIDE OF THE STRAW BALE BARRIER, THE END BALES OF THE GAP SEGMENT SHALL OVERLAP A MINIMUM OF 12".
7. MONITOR FOR UNDERMINING OR FLOW-AROUND. INSPECT BALE POSITION TO ASSURE THAT THEY REMAIN CLOSE TOGETHER. MAINTAIN STRAW BALE BARRIERS BY REPLACING DAMAGED BALES AND REMOVING SEDIMENT LOAD. WHEN SEDIMENT LOAD IS GREATER THAN 60% BEHIND THE BARRIER, SEDIMENT SHALL BE REMOVED AND PLACED IN AN AREA WHERE IT SHALL NOT REENTER THE BARRIER OR A WATERWAY. IF SEDIMENT BEHIND STRAW BALE BARRIERS CANNOT BE REMOVED, A SECOND R.O.W. OF BALES SHALL BE INSTALLED UPSLOPE OF THE BARRIER.
8. WHERE STRAW BALES AND SILT FENCE ARE INSTALLED AS A UNIT, THE STRAW BALES SHALL BE INSTALLED ON THE DOWN SLOPE SIDE OF THE SILT FENCE.
9. EROSION CONTROL STRUCTURES SHALL BE INSPECTED DAILY IN AREAS OF ACTIVE CONSTRUCTION. STRUCTURES SHALL BE INSPECTED WEEKLY AT INACTIVE CONSTRUCTION AREAS AND WITHIN 24 HOURS OF EACH 0.5 INCH RAINFALL EVENT. STRUCTURES SHALL BE REPAIRED AS NECESSARY.
10. STRAW BALE BARRIERS SHALL BE REMOVED ONLY AS DIRECTED BY THE COMPANY'S REPRESENTATIVE.



DRIVABLE BERM NOTES:

1. A MAINTAINED DRIVABLE EARTH BERM MAY BE INSTALLED ACROSS VEHICLE CROSSINGS IN LIEU OF STRAW BALES.
2. BERM MUST BE TIED INTO STRAW BALES.
3. BERM MUST BE MAINTAINED TO ENSURE SEDIMENT TRAPPING CAPACITY.

REVISIONS						DRAWN BY:	TYPICAL STRAW BALE SEDIMENT BARRIER (SHT. 2 OF 2)					
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△						APPROVED BY:						
△						PROJECT MANAGER:						
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-048A	REV.	A



SLOPE PROTECTION

THE MAXIMUM SIZE OF THE DRAINAGE AREA SHOULD BE 0.25 ACRES PER 100 FEET OF FENCE LENGTH. SEE TABLE FOR MORE INFORMATION ABOUT HILLSIDE LENGTH.

MAXIMUM HILLSIDE LENGTH FOR GIVEN SLOPE

SLOPE	LENGTH (FT)
<2%	250
2 TO 5%	100
5 TO 10%	50
10 TO 20%	35
>20%	15

REVISIONS						DRAWN BY:		  TYPICAL STRAW BALE DEWATERING - SMALL VOLUME (SHT. 2 OF 2)					
△						CHECKED BY:							
△						REVIEWED BY:							
△						APPROVED BY:							
△						PROJECT MANAGER:							
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-049A	REV.	A
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.								

Attachment C: Recommended Seed Mixes Based on Ecological Sites

Loam Soils Seed Mix		
Name	Common Name	Rate
Elymus Trachycaulus SSP. Trachycaulus VAR. Pryor	Slender wheatgrass	5
Oryzopsis Hymenoides VAR.	Indian Ricegrass	3
Pascopyrum Smithii VAR. Rosanna	Western Wheatgrass	5
Pseudoroegneria Spicata SSP. Spicata VAR. Goldar	Bluebunch Wheatgrass	1.5
Stipa Viridula VAR. Lodorm	Green Needlegrass	1.5
Sandy Soils Seed Mix		
Name	Common Name	Rate
Elymus Lanceolatus SSP. Dasustachyum VAR. Critana, Bannock	Thickspike Wheatgrass	2.5
Elymus Trachycaulus SSP. Trachycaulus VAR. Pryor	Slender Wheatgrass	2.5
Oryzopsis Hymenoides VAR. Nezpar	Indian Ricegrass	3
Pascopyrum Smithii VAR. Rosanna	Western Wheatgrass	5
Stipa Comata	Needle-and-Thread	3
Alkaline / Saline Soil Mix		
Name	Common Name	Rate
Elmus Elymoides	Bottlebrush Squirreltail	2.5
Elymus Lanceolatus SSP. Dasustachyum VAR. Critana, Bannock	Thickspike Wheatgrass	2
Leymus Cinereus VAR. Trailhead	Great Basin Wildrye	2
Oryzopsis Hymenoides VAR. Nezpar	Indian Ricegrass	3
Pascopyrum Smithii VAR. Rosanna	Western Wheatgrass	5
Sporobolus Airoides VAR. Salado	Alkali Sacaton	0.5
Artemisia tridentata	Big Sagebrush	0.5
Atriplex Gardneri	Gardner Saltbush	0.5

Attachment D: Inspection Form

Attachment E: Notice of Termination

NOTICE of TERMINATION
for projects covered under the

**Large Construction
General Permit**



Use this form to terminate coverage under the Large Construction General Permit for stormwater discharges (WYR10-0000). Do not use this form to transfer permit coverage to another operator.

1. Name, address, and telephone number of the company, individual, or organization which received authorization to discharge stormwater under the general stormwater permit for large construction activities:

Name: _____

Address: _____

Telephone: _____ Fax: _____

2. Authorization number assigned to this project: WYR10-
If this is a WYDOT highway project, list project number(s):

3. Project name and address or legal description of the location of the construction activity for which the original notice of intent (NOI) was filed:

Quarter/ quarter Section Township Range:

County: _____

4. Describe the condition of the permitted site. Is it revegetated, built over, paved over, other? See Part 5 of the permit for a description of when coverage may be terminated.

5. Certification:

I certify under penalty of law that for the construction project and permit described above, **disturbed soils have been finally stabilized, as defined in Part 2.8. (or as modified in Part 5.3)**, to the extent necessary to ensure that stormwater runoff from the site will not cause violation of Wyoming water quality standards (Chapter 1 of the Wyoming Water Quality Rules and Regulations).

I understand that by submitting this notice I am terminating coverage under Wyoming's Large Construction General Permit (WYR10-0000) for stormwater discharges. I also understand that if, at a later date, it is determined that the site was inadequately reclaimed, I may be liable for discharging pollutants without a permit.

Printed Name of Person Signing	Title
--------------------------------	-------

Signature	Date	Telephone
-----------	------	-----------

Authorized signatories for this notice of termination are the following:	
For corporations:	A principal executive officer of at least the level of vice president, or the manager of one or more manufacturing, production, or operating facilities, provided the manager is authorized to make management decisions which govern the overall operation of the facility from which the discharge originates.
For partnerships:	A general partner.
For a sole proprietorship:	The proprietor.
For a municipal, state, federal or other public facility:	Either a principal executive officer or ranking elected official.

Section 35-11-901 of Wyoming Statutes provides that: "Any person who knowingly makes any false statement, representation, or certification in any application, . . . shall, upon conviction, be fined not more than ten thousand dollars (\$10,000) per day for each violation or imprisoned for not more than one year or both."

Upon completion mail or hand deliver this notice to:

WYPDES Stormwater Section
 DEQ/WQD
 122 West 25th Street
 Herschler Building - 4 W
 Cheyenne, WY 82002



Montana Department of
ENVIRONMENTAL QUALITY

WATER PROTECTION BUREAU

Agency Use

Permit No.:

Date Rec'd

Amount Rec'd

Check No.

Rec'd By

FORM
NOT

**Notice of Termination (NOT)
Storm Water Discharge Associated With Construction Activity
MTR100000**

This form is used to notify the Department that a facility or site has achieved final stabilization and permit coverage under the Department's *General Permit for Storm Water Discharges Associated with Construction Activity* (MTR100000) and should be terminated. The Notice of Termination (NOT) process is addressed in Part I of the permit MTR100000 and defined in Part V of the permit and in the Administrative Rules of Montana (ARM) 17.30.1102. Final stabilization means the time at which all soil-disturbing activities at a site have been completed and a vegetative cover has been established with a density of at least 70% of the pre-disturbance levels, or equivalent permanent, physical erosion reduction methods has been employed.

You must type or print legibly; forms that are not legible or are unsigned will be returned. Do not leave blank spaces. You must maintain a copy of the completed form for your records.

Section A - Site or Facility Information:

Permit Authorization or NOI Number: MTR10

Facility or Site Name

Site Location

Nearest City or Town

Section B - (Owner/Operator) Information:

Owner or Operator Name

Mailing Address

City, State, and Zip Code

Phone Number

Section C - Fees:

There are no fees associated with terminating permit coverage; however, permit coverage will not be terminated until all permit fees, including annual fees are paid. You may contact the Department to receive an invoice or determine the outstanding fee.

Section D - CERTIFICATION

I certify that the site or facility identified in Section B of this NOT form has reached final stabilization as required in the Department's *General Permit for Storm Discharges Associated with Construction Activity* (MTR100000). Final stabilization means the time at which all soil-disturbing activities at the site have been completed and a vegetative cover has been established with a density of at least 70% of the pre-disturbance levels, or equivalent permanent, physical erosion reduction methods has been employed.

I understand that sediment is defined as a waste under the Montana Water Quality Act. Discharge of wastes to state waters without a current permit is a violation of 75-5-605(2), MCA.

Applicant Information: This application must be completed, signed, and certified as follows:

- For a corporation, by a principal officer of at least the level of vice president;
- For a partnership or sole proprietorship, by a general partner or the proprietor, respectively; or
- For a municipality, state, federal, or other public facility, by either a principal executive officer or ranking elected official.

All Applicants Must Complete the Following Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information; including the possibility of fine and imprisonment for knowing violations. [75-5-633, MCA]

Delegation of Signature Authority: For persons signing this NOT form on behalf of the authorized signatory identified above, the undersigned represents that he or she is authorized to sign this form on behalf of the permit owner or operator identified in this form. A copy of the letter of authorization, or equivalent, granting signature authority must be attached to this application.

Owner/Operator

A. Name (Type or Print)

B. Title (Type or Print)

C. Phone No.

D. Signature

E. Date Signed

The Department will not process this application form until all of the requested information is supplied, the application is complete, and the appropriate fees are paid. Return this application form (Form NOT), and the applicable fee to:

Department of Environmental Quality
Water Protection Bureau
PO Box 200901
Helena, MT 59620-0901
(406) 444-3080

INSTRUCTIONS FOR Form NOT – Notice of Termination

IMPORTANT: This form is used to notify the Department that a facility or site has achieved final stabilization and permit coverage under the Department's *General Permit for Storm Water Discharges Associated with Construction Activity* (MTR100000) should be terminated. The Notice of Termination (NOT) process is addressed in Part I of the permit MTR100000 and defined in Part V of the permit and in the Administrative Rules of Montana (ARM) 17.30.1102. Final stabilization means the time at which all soil-disturbing activities at a site have been completed and a vegetative cover has been established with a density of at least 70% of the pre-disturbance levels, or equivalent permanent, physical erosion reduction methods has been employed. Storm Water Construction General Permit documents and related forms are available from the Storm Water Program at (406) 444-3080 or on the DEQ website at: <http://www.deq.mt.gov>

You must type or print legibly; forms that are not legible will be returned. Do not leave blank spaces. You must maintain a copy of the completed form for your records.

SPECIFIC ITEM INSTRUCTIONS

Section A – Site or Facility Information:

The site name means the land or property where the facility or activity is physically located or conducted, including other land used in connection with the facility or activity. This information must be identical to the information provided in the facility's permit, authorization or confirmation of the receipt letter. The permit number is the 9-digit code beginning with MTR1. The permit number and site name are used to identify the site and must be identical to the information provided in the facility's permit, authorization or letter of confirmation.

Section B –Applicant (Owner/Operator) Information:

Give the name, as it is legally referred to, of the person, business, public organization, or other entity to whom the permit authorization was issued or was subsequently transferred using a permit transfer notification (PTN) form. A Notice of Termination may only be submitted by the current owner or operator. The operator is the legal entity which controls the facility's operation.

Appendix F

Construction Schematics

DRAWING NUMBER	DRAWING TITLE
TYP-001	TYPICAL TEMPORARY FENCE AND GATE
TYP-002	TYPICAL PERMANENT FENCE AND GATE
TYP-003	PIPE LINE MARKER
TYP-004	TYPICAL MLV FENCING
TYP-005	TYPICAL UNCASSED ROAD CROSSING: BORED
TYP-006	TYPICAL UNCASSED ROAD CROSSING: OPEN-CUT
TYP-007	TYPICAL OVERHEAD POWERLINE CROSSING
TYP-008	TYPICAL FOAM PILLOW SUPPORT
TYP-009	TYPICAL TRAIL/TWO TRACK ROAD CROSSING
TYP-010	TYPICAL BORED TRAIL CROSSING
TYP-011	TYPICAL BURIED CABLE CROSSING
TYP-012	TYPICAL FOREIGN PIPELINE CROSSING
TYP-013	TYPICAL SMALL DITCH/CREEK CROSSING
TYP-014	TYPICAL SMALL DITCH/CREEK CROSSING WITH EXTRA COVER
TYP-015	TYPICAL WATERBODY CROSSING H.D.D.
TYP-015A	TYPICAL RAILROAD CROSSING H.D.D.
TYP-015B	TYPICAL HIGHWAY CROSSING H.D.D.
TYP-016	TYPICAL WATERBODY CROSSING HORIZONTAL BORE
TYP-016A	TYPICAL WATERBODY CROSSING OPEN-CUT DRY FLUME
TYP-017	TYPICAL WATERBODY CROSSING OPEN-CUT DAM AND PUMP
TYP-018	TYPICAL FLOWING WATERBODY CROSSING OPEN-CUT
TYP-019	TYPICAL WETLAND CROSSING PROCEDURE
TYP-019A	TYPICAL WETLAND CROSSING PROCEDURE
TYP-020	TYPICAL NON-FLOWING CROSSING OPEN-CUT
TYP-021	TYPICAL TEMPORARY CROSSING RAMP OVER FOREIGN PIPELINE
TYP-022	TYPICAL PORTABLE WATERBODY BRIDGE
TYP-023	TYPICAL RAILROAD BRIDGE
TYP-024	TYPICAL TIMBER MAT BRIDGE
TYP-025	TYPICAL ROCK FLUME BRIDGE
TYP-026	TYPICAL FLEX-FLOAT BRIDGE
TYP-027	TYPICAL BRIDGE DETAIL NOTES
TYP-028	TYPICAL TEMPORARY PIPE STOCK PILES
TYP-029	TYPICAL PERMANENT PIPE STOCK PILES
TYP-030	TYPICAL BORED CANAL CROSSING
TYP-031	TYPICAL TRAFFIC CONTROL PLAN
TYP-032	TYPICAL CONSTRUCTION ROW PROFILE: GREENFIELD
TYP-032A	TYPICAL CONSTRUCTION ROW PROFILE: SHARED CORRIDOR
TYP-032B	TYPICAL CONSTRUCTION ROW PROFILE: GREENFIELD STATE PROPERTY
TYP-032C	TYPICAL CONSTRUCTION ROW PROFILE: SHARED CORRIDOR STATE PROPERTY
TYP-032D	TYPICAL CONSTRUCTION ROW PROFILE: SIDE HILL CONSTRUCTION (RIGHT SIDE)
TYP-032E	TYPICAL CONSTRUCTION ROW PROFILE: SIDE HILL CONSTRUCTION (LEFT SIDE)
TYP-033	TYPICAL TEMPORARY ACCESS PAD TO PAVED ROAD
TYP-034	TYPICAL SLOPE BREAKER WITH LONGITUDINAL & CROSS SLOPES (SHT. 1 OF 3)
TYP-034A	TYPICAL SLOPE BREAKER WITH LONGITUDINAL & CROSS SLOPES (SHT. 2 OF 3)
TYP-034B	TYPICAL SLOPE BREAKER WITH LONGITUDINAL & CROSS SLOPES (SHT. 3 OF 3)
TYP-035	TYPICAL FOAM TRENCH BREAKER
TYP-036	TYPICAL TRENCH BREAKER REQUIREMENTS
TYP-037	TYPICAL MINI-TRENCH BREAKER
TYP-038	TYPICAL STRAW BALE DEWATERING STRUCTURE LARGE VOLUME - OPTION 1 (SHT. 1 OF 2)
TYP-038A	TYPICAL STRAW BALE DEWATERING STRUCTURE LARGE VOLUME - OPTION 2 (SHT. 2 OF 2)
TYP-039	TYPICAL TEMPORARY SOIL CONTAINMENT BERM
TYP-040	TYPICAL EROSION CONTROL MATTING UPLAND SLOPES
TYP-041	TYPICAL EROSION CONTROL MATTING STREAMBANKS
TYP-042	TYPICAL CONCRETE STRUCTURE AT WATERBODY BANKS
TYP-043	TYPICAL HYDRO-MULCH AND TRACKIFIER
TYP-044	EROSION CONTROL HYDRO-MULCH AND TRACKIFIER
TYP-045	TYPICAL GEOTEXTILE FILTER BAG FOR DEWATERING
TYP-046	TYPICAL SILT FENCE SEDIMENT BARRIER (SHT. 1 OF 3)
TYP-046A	TYPICAL SILT FENCE SEDIMENT BARRIER (SHT. 2 OF 3)
TYP-046B	TYPICAL SILT FENCE SEDIMENT BARRIER (SHT. 3 OF 3)
TYP-047	TYPICAL STRAW BALE AND SILT FENCE
TYP-048	TYPICAL STRAW BALE SEDIMENT BARRIER (SHT. 1 OF 2)
TYP-048A	TYPICAL STRAW BALE SEDIMENT BARRIER (SHT. 2 OF 2)
TYP-049	TYPICAL STRAW BALE DEWATERING - SMALL VOLUME (SHT. 1 OF 2)
TYP-049A	TYPICAL STRAW BALE DEWATERING - SMALL VOLUME (SHT. 2 OF 2)
TYP-050	TYPICAL SPLASH PUP FOR TEST WATER DISCHARGE
TYP-051	TYPICAL CATHODIC PROTECTION TEST STATION
TYP-052	TYPICAL CATHODIC PROTECTION COUPON TEST STATION
TYP-053	TYPICAL THERMITE WELD CONNECTION
TYP-054	TYPICAL PIPE GROUNDING ARRANGEMENTS
TYP-055	TYPICAL PROTECTIVE COATING DETAILS
TYP-056	TYPICAL CONSTRUCTION STAKING COLOR CODE SYSTEM
TYP-057	TYPICAL AERIAL MARKER
TYP-058	DUAL TERMINAL BOX FOR FOREIGN PIPELINE CROSSING

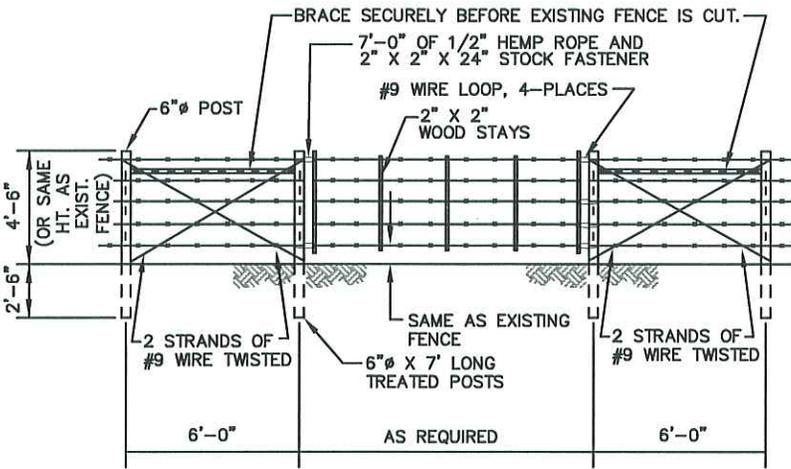
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△						CHECKED BY:
△						REVIEWED BY:
△						APPROVED BY:
△						PROJECT MANAGER:
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.	PROJECT NUMBER





INDEX

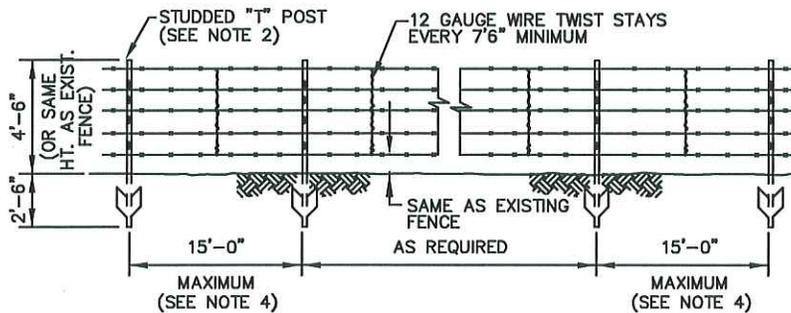
PROJECT NUMBER	2568-01	DRAWING NUMBER	INDEX
REV.			A



TEMPORARY BARBED WIRE FENCE GATE

NOTE:

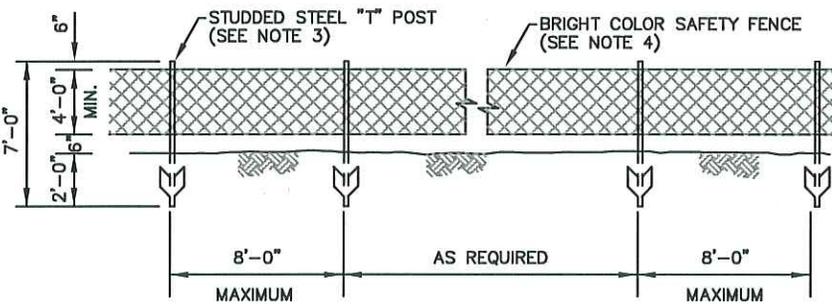
1. CONTRACTOR SHALL FURNISH ALL MATERIAL TO BUILD TEMPORARY GATE TO MATCH EXISTING FENCE.
2. CONTRACTOR SHALL REBUILD FENCE TO ORIGINAL CONDITION AND SHALL REMOVE ALL TEMPORARY MATERIALS. HOWEVER, BRACE WILL REMAIN AS PART OF THE PERMANENT INSTALLATION. (SEE FENCE RESTORATION DETAIL)
3. CONTRACTOR RESPONSIBLE FOR THE CONDITION AND STRUCTURAL INTEGRITY OF FENCING AND GATE THROUGHOUT THE DURATION OF ITS USE.



TEMPORARY BARBED WIRE FENCE

NOTE:

1. CONTRACTOR SHALL FURNISH ALL MATERIAL TO BUILD TEMPORARY FENCE.
2. ONLY HEAVY DUTY DARK GREEN STUDDED STEEL "T" POSTS WITH ENAMEL PAINT ALUMINUM TIPS AND THREE STUD RIVETED (MINIMUM) ANCHOR PLATE SHALL BE USED.
3. CONTRACTOR SHALL INSTALL AT LOCATIONS DESIGNATED BY COMPANY INSPECTOR.
4. POST SPACING AS SHOWN UNLESS DIRECTED OTHERWISE BY COMPANY INSPECTOR.
5. CONTRACTOR RESPONSIBLE FOR THE CONDITION AND STRUCTURAL INTEGRITY OF FENCING THROUGHOUT THE DURATION OF ITS USE.



SAFETY/EXCLUSION FENCE

NOTE:

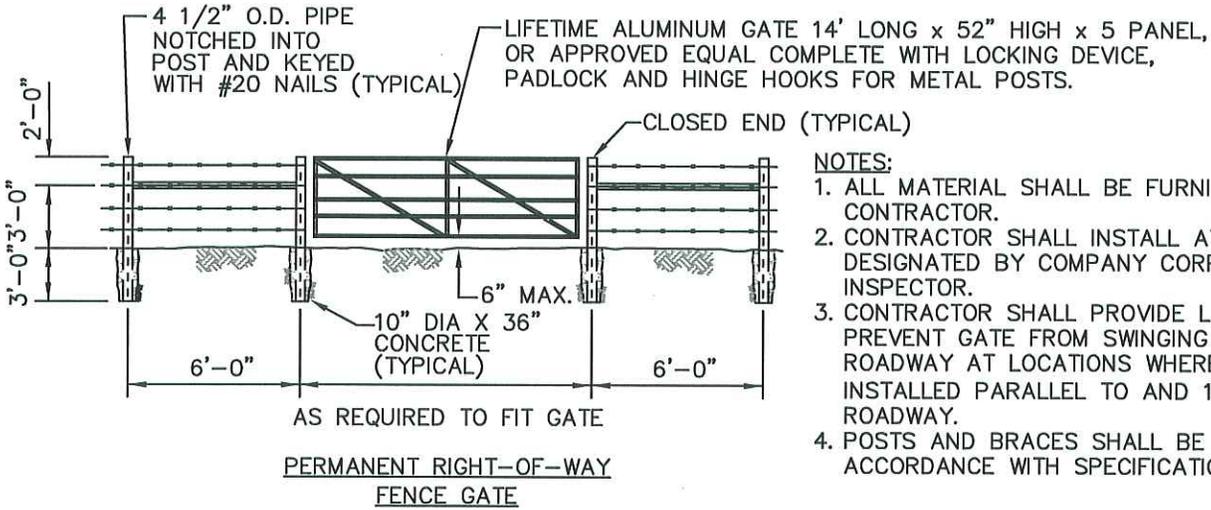
1. ALL MATERIAL SHALL BE FURNISHED BY CONTRACTOR.
2. CONTRACTOR SHALL INSTALL AT LOCATIONS DESIGNATED BY COMPANY INSPECTOR.
3. ONLY HEAVY DUTY STUDDED STEEL "T" POSTS, PREFERABLY PAINTED A BRIGHT COLOR, SHALL BE USED.
4. ONLY DURABLE, WIND RESISTANT, HIGH VISIBILITY FENCING FABRIC FABRICATED OF HIGH DENSITY POLYETHYLENE OR SIMILAR MATERIALS SHALL BE USED.
5. FENCING INSTALLED IN CONJUNCTION WITH EXTENDED DURATION CONSTRUCTION AT ROADWAYS WILL ADDITIONALLY HAVE REFLECTIVE PROPERTIES.
6. "T" POSTS SHALL BE INSTALLED IN STABLE SOIL A MINIMUM OF 12" FROM THE EDGE OF EXCAVATIONS.
7. FABRIC TO BE ATTACHED TO "T" POSTS WITH A MINIMUM OF TWO (2) 16 GAGE TIE WIRES PER POST. ALTERNATELY, POST CAN BE "WOVEN" INTO FABRIC AND A SINGLE TIE WIRE MAY BE INSTALLED.
8. CONTRACTOR RESPONSIBLE FOR THE CONDITION AND STRUCTURAL INTEGRITY OF FENCING THROUGHOUT THE DURATION OF ITS USE.

REVISIONS						DRAWN BY:	
△						CHECKED BY:	
△						REVIEWED BY:	
△						APPROVED BY:	
△						PROJECT MANAGER:	
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE	
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.		



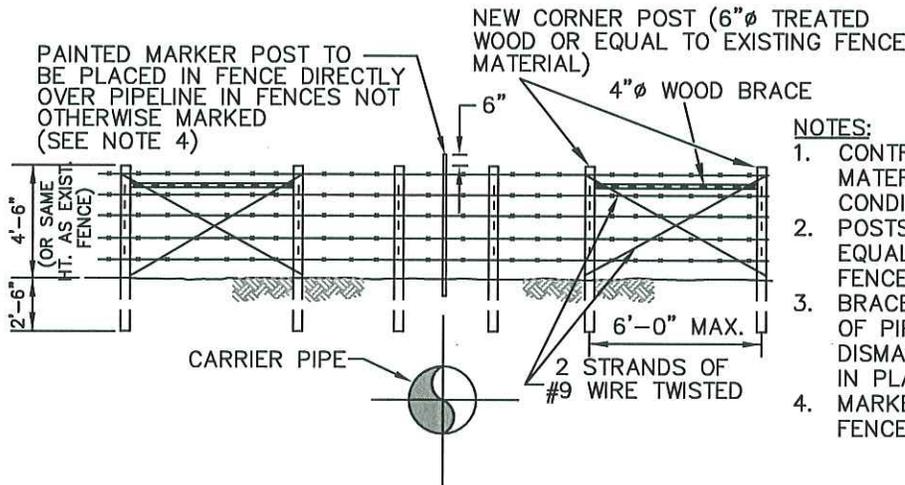
TYPICAL
TEMPORARY FENCE AND GATE

PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-001	REV.	A
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NOTES:

1. ALL MATERIAL SHALL BE FURNISHED BY CONTRACTOR.
2. CONTRACTOR SHALL INSTALL AT LOCATIONS DESIGNATED BY COMPANY CORPORATION INSPECTOR.
3. CONTRACTOR SHALL PROVIDE LATCH OR STOP TO PREVENT GATE FROM SWINGING OUT OVER ROADWAY AT LOCATIONS WHERE GATE IS INSTALLED PARALLEL TO AND 14' OR LESS FROM ROADWAY.
4. POSTS AND BRACES SHALL BE PAINTED IN ACCORDANCE WITH SPECIFICATIONS.

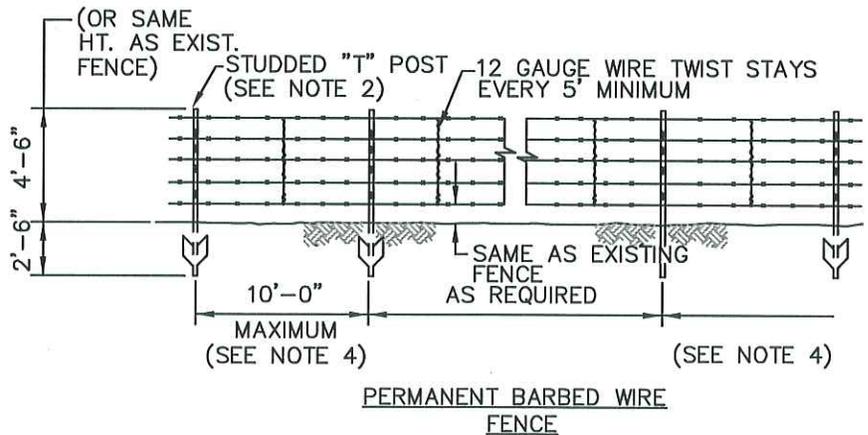


NOTES:

1. CONTRACTOR SHALL FURNISH ALL NECESSARY MATERIAL TO RESTORE FENCE TO ORIGINAL CONDITION.
2. POSTS, WIRE AND OTHER MATERIAL SHALL BE OF EQUAL OR NEW MATERIAL TO MATCH EXISTING FENCE.
3. BRACE SPAN TO BE CONSTRUCTED ON EACH SIDE OF PIPELINE CROSSING PRIOR TO INITIAL DISMANTLING OF FENCE. BRACE SPAN TO REMAIN IN PLACE WHEN FENCE IS RESTORED.
4. MARKERS TO BE INSTALLED AT PROPERTY LINE FENCES ONLY.

NOTE:

1. CONTRACTOR SHALL FURNISH ALL MATERIAL TO BUILD PERMANENT FENCE.
2. ONLY HEAVY DUTY DARK GREEN STUDDED STEEL "T" POSTS WITH ENAMEL PAINT ALUMINUM TIPS AND THREE STUD RIVETED (MINIMUM) ANCHOR PLATE SHALL BE USED.
3. CONTRACTOR SHALL INSTALL AT LOCATIONS DESIGNATED BY COMPANY INSPECTOR.
4. POST SPACING TO MATCH PRE EXISTING SPACING FOR PERMANENT REPAIRS. POST SPACING FOR NEW PERMANENT FENCING TO BE AS SHOWN UNLESS DIRECTED OTHERWISE BY THE COMPANY INSPECTOR.

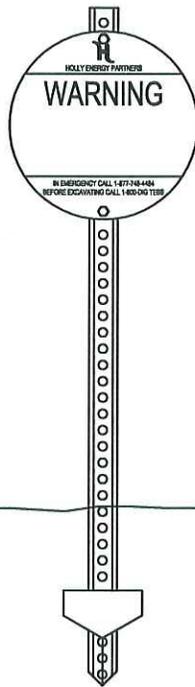


REVISIONS						DRAWN BY:	
△						CHECKED BY:	
△						REVIEWED BY:	
△						APPROVED BY:	
△						PROJECT MANAGER:	
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE	
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.		

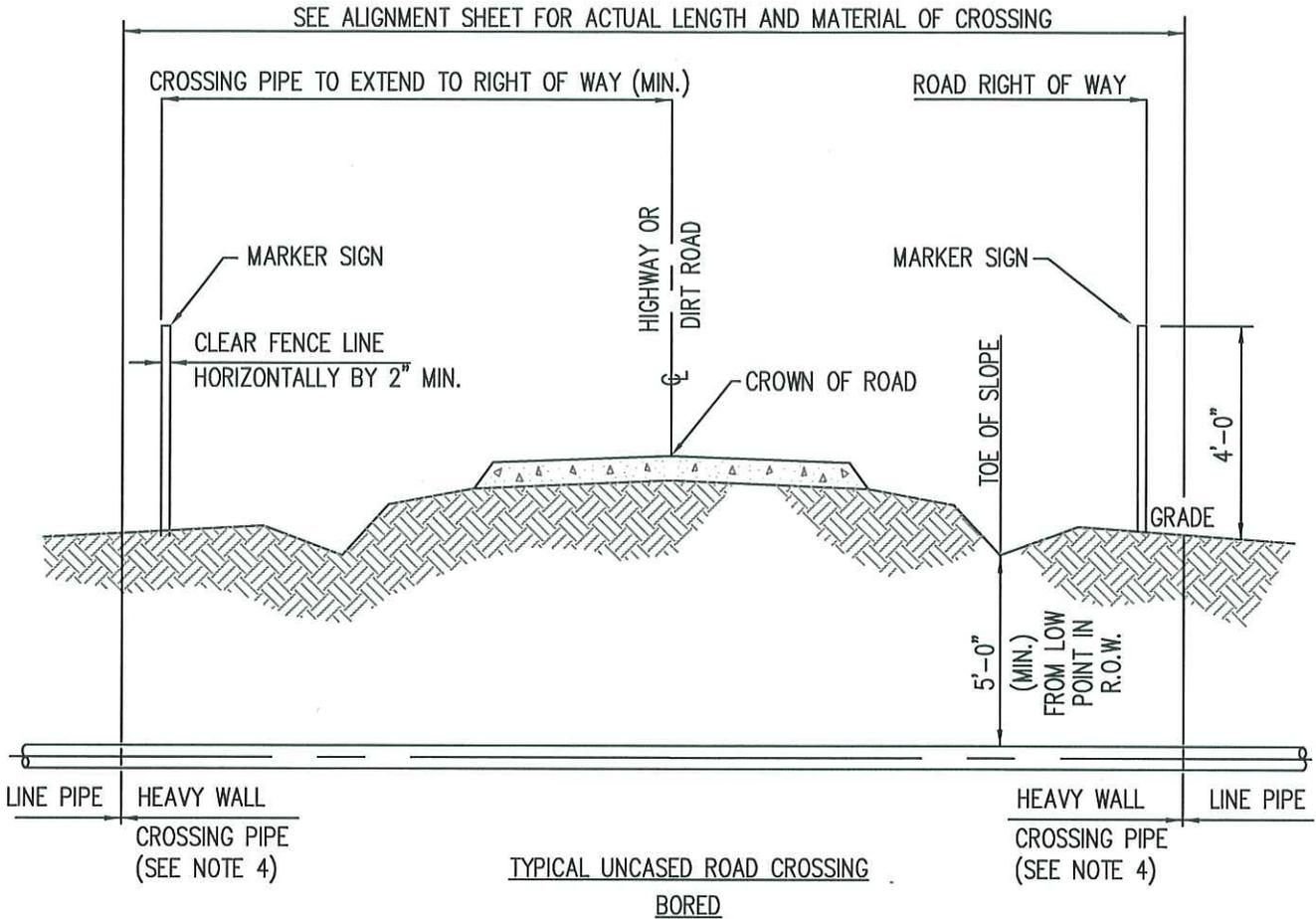

GREENCORE
 PROJECTS COMPANY, L.P.
CH2MHILL

TYPICAL
 PERMANENT FENCE AND GATE

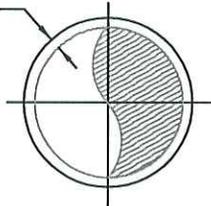
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REVISIONS						DRAWN BY:		 CH2MHILL TYPICAL PIPE LINE MARKER					
△						CHECKED BY:							
△						REVIEWED BY:							
△						APPROVED BY:							
△						PROJECT MANAGER:							
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-003	REV.	A
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.								



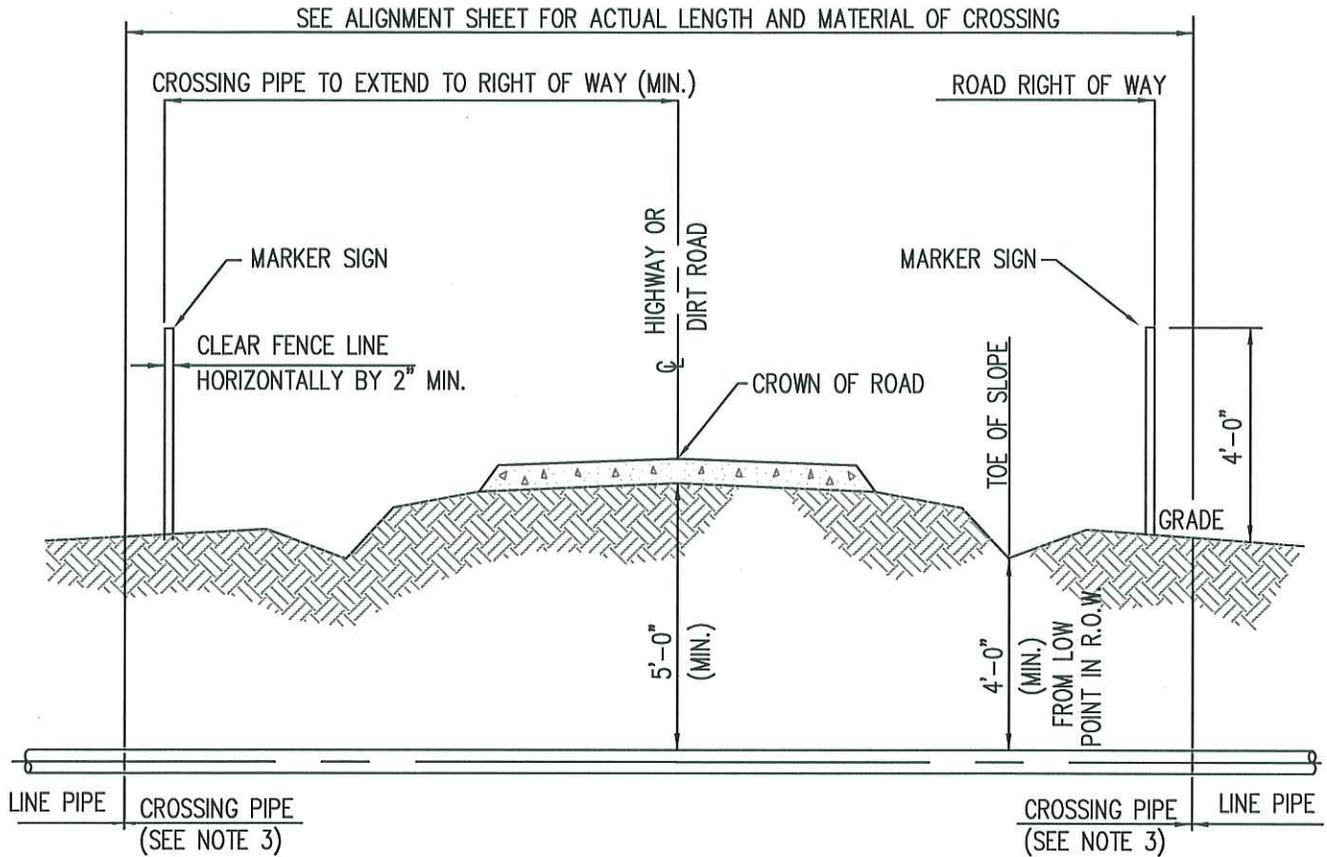
BORE ANNULUS TO BE NO LARGER THAN 1" GREATER THAN COATED LINE PIPE



NOTES:

1. CROSSINGS SHALL BE IN ACCORDANCE WITH APPLICABLE PERMIT.
2. ROAD CROSSING PIPE SHALL EXTEND AT MINIMUM TO RIGHT OF WAY LINE. THE TYPE AND MINIMUM REQUIRED LENGTH OF PIPE FOR CROSSINGS OF ROADS SHALL BE AS SPECIFIED ON ALIGNMENT SHEETS.
3. PIPE FOR BORED CROSSINGS TO INCLUDE ABRASION-RESISTANT (ARB) COATING.
4. PIPELINE MARKER & TEST STATIONS TO BE INSTALLED ON R.O.W. LINE NEXT TO FENCE IF POSSIBLE.
5. THE CROSSING PIPE SHALL BE STRAIGHT WITH NO VERTICAL OR HORIZONTAL BENDS WITHIN ROAD RIGHT OF WAY.

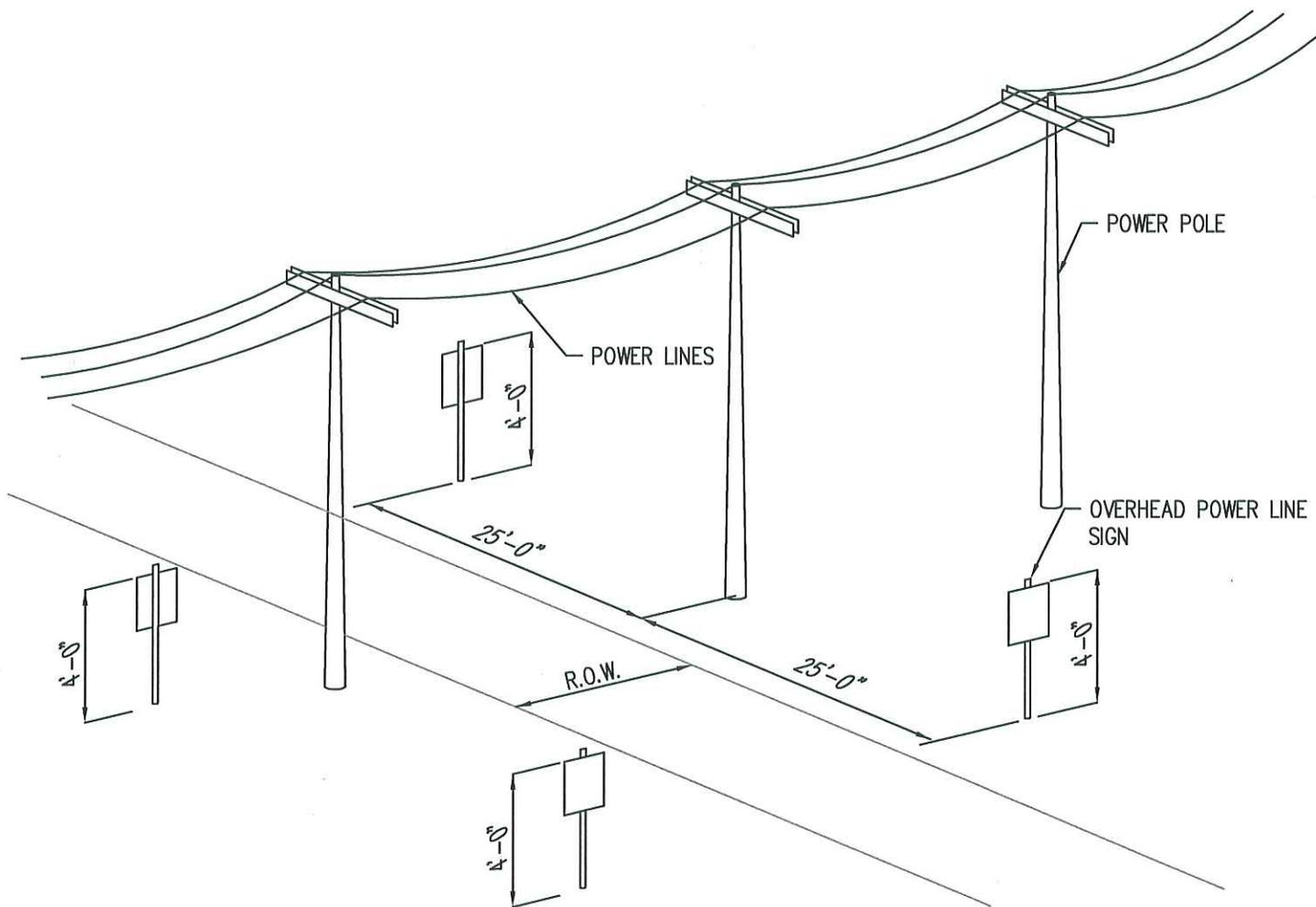
REVISIONS						DRAWN BY:		CH2MHILL TYPICAL UNCASSED ROAD CROSSING: BORED					
△						CHECKED BY:							
△						REVIEWED BY:							
△						APPROVED BY:							
△						PROJECT MANAGER:							
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-005	REV.	A



NOTES:

1. CROSSINGS SHALL BE IN ACCORDANCE WITH APPLICABLE PERMIT.
2. ROAD CROSSING PIPE SHALL EXTEND AT MINIMUM TO RIGHT OF WAY LINE.
3. THE TYPE AND MINIMUM REQUIRED LENGTH OF PIPE FOR CROSSINGS OF ROADS SHALL BE AS SPECIFIED ON ALIGNMENT SHEETS.
4. PIPELINE MARKER & TEST STATIONS TO BE INSTALLED ON R.O.W. LINE NEXT TO FENCE IF POSSIBLE.
5. THE CROSSING PIPE SHALL BE STRAIGHT WITH NO VERTICAL OR HORIZONTAL BENDS WITHIN ROAD RIGHT OF WAY.
6. REFER TO DWG. NO. TYP-007 FOR PAVEMENT REPAIR METHODS.

REVISIONS						DRAWN BY:	<p style="margin: 0;">TYPICAL UNCASSED ROAD CROSSING: OPEN-CUT</p>					
△						CHECKED BY:						
△						REVIEWED BY:						
△						APPROVED BY:						
△						PROJECT MANAGER:						
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-006	REV.	A
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.							



NOTES:

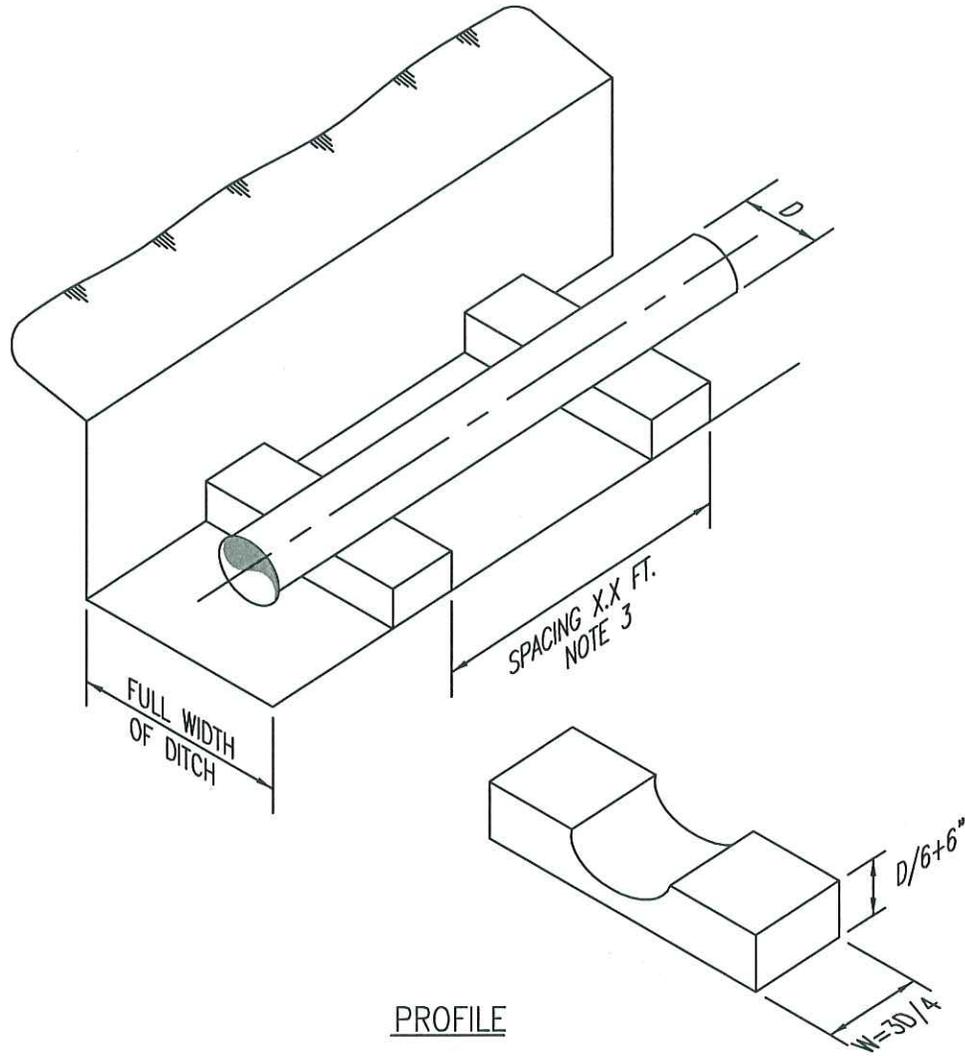
- OVERHEAD POWER LINE SIGNS SHALL BE PLACED APPROXIMATELY 25 FEET ON EITHER SIDE OF THE OVERHEAD POWER LINES IN PLAIN VIEW OF THOSE TRAVELING IN EITHER DIRECTION UNDER THE LINES.

MINIMUM SAFE LIMITS OF APPROACH DISTANCES	
VOLTAGE RANGE (PHASE TO PHASE) KV	PHASE TO GROUND
2.1 TO 15	2'-0"
15.1 TO 35	2'-4"
35.1 TO 46	2'-6"
46.1 TO 72.5	3'-0"
72.6 TO 121	3'-4"
138 TO 145	3'-6"
161 TO 169	3'-8"
230 TO 242	5'-0"
345 TO 362	7'-0"
500 TO 552	11'-0"
700 TO 765	15'-0"

REF. OSHA 29 CFR CH XVII

- THE ABOVE CLEARANCES APPLY IN ALL DIRECTIONS. VERTICAL OR HORIZONTAL
- A WARNING SIGN SHALL BE INSTALLED AT FOUR CORNERS OF CROSSING, WARNING CONSTRUCTION CREWS OF OVERHEAD POWERLINES.

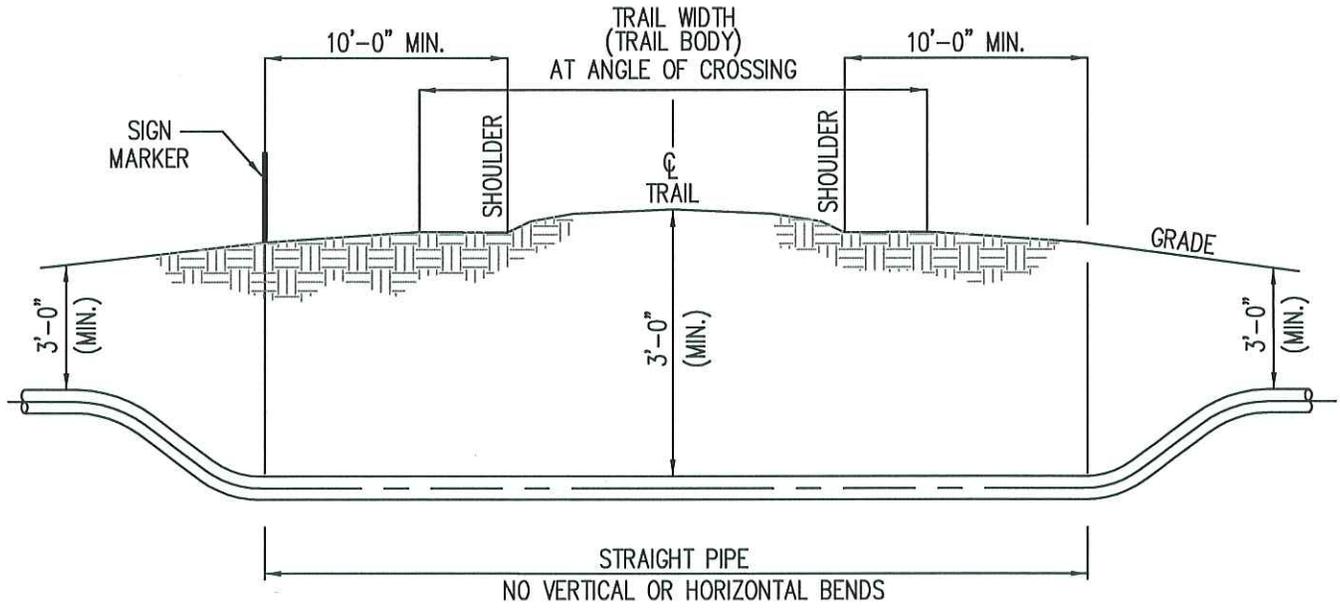
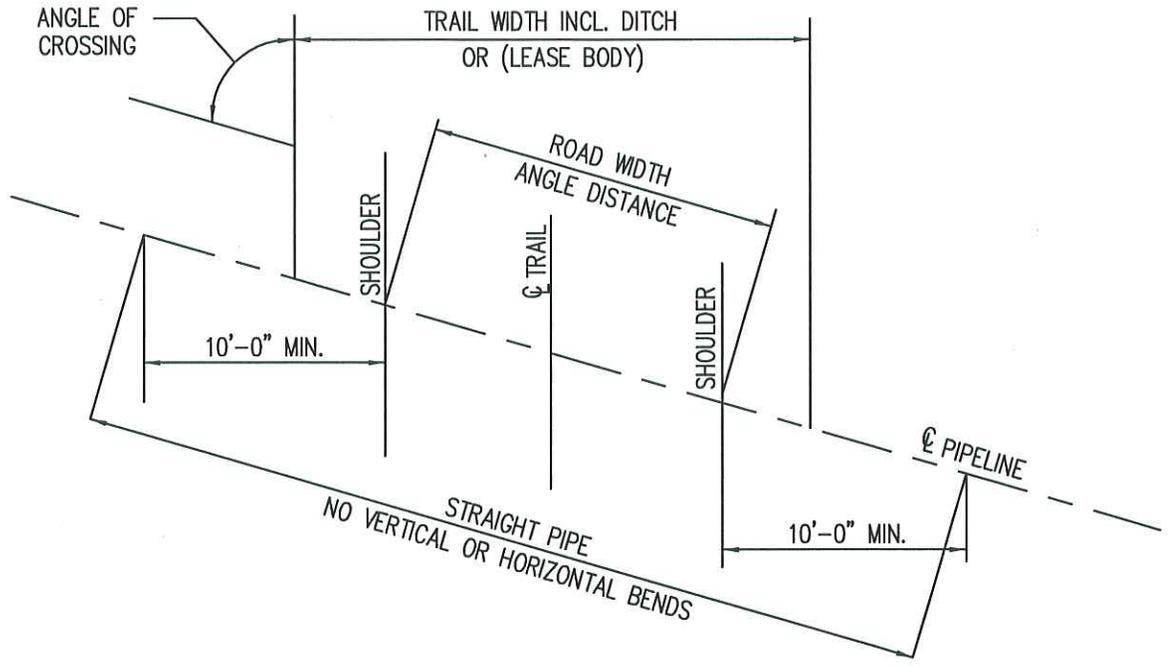
REVISIONS						DRAWN BY:	GREENCORE PUBLIC COMPANY, L.P. CH2MHILL				
△						CHECKED BY:					
△						REVIEWED BY:					
△						APPROVED BY:					
△						PROJECT MANAGER:					
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-007	REV. A
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.						



NOTES:

1. ALL MATERIALS SHALL BE SUPPLIED BY CONTRACTOR.
2. WIDTH SHALL BE INCREASED PROPORTIONAL TO SPACING INCREASE IF REQUIRED.
3. SPACING TO BE DETERMINED BY COMPANY REPRESENTATIVE.

REVISIONS						DRAWN BY:		<p style="margin: 0;">TYPICAL FOAM PILLOW PIPELINE SUPPORT</p>					
△						CHECKED BY:							
△						REVIEWED BY:							
△						APPROVED BY:							
△						PROJECT MANAGER:							
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-008	REV.	A
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.								

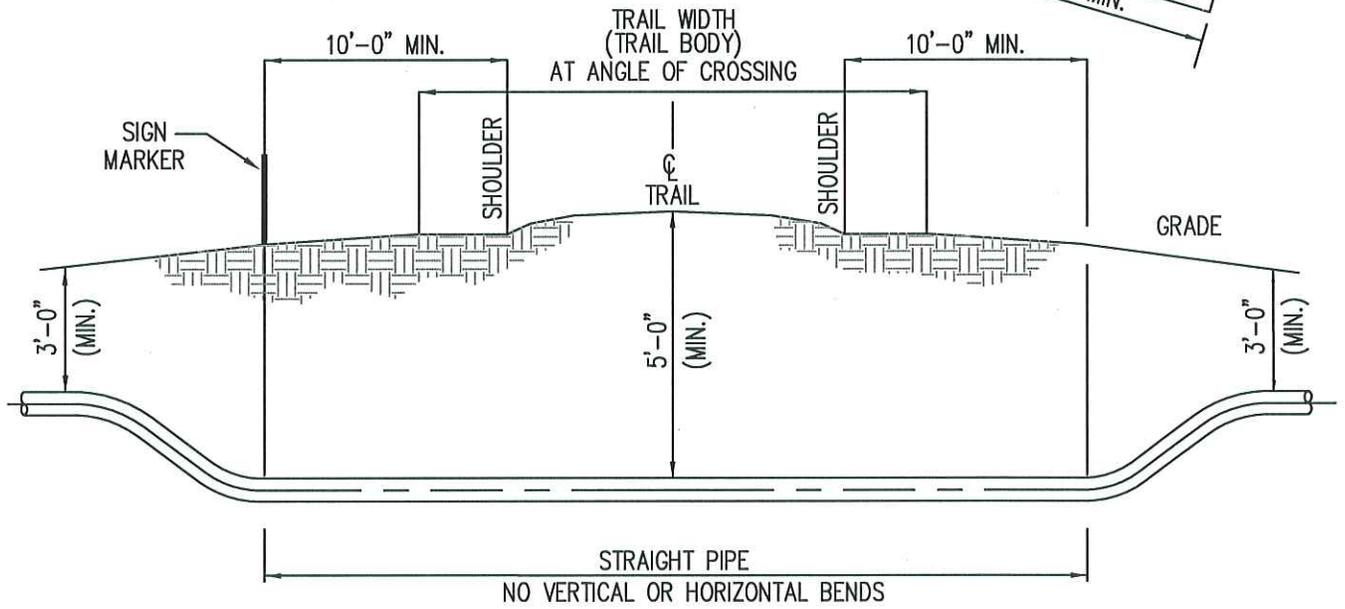
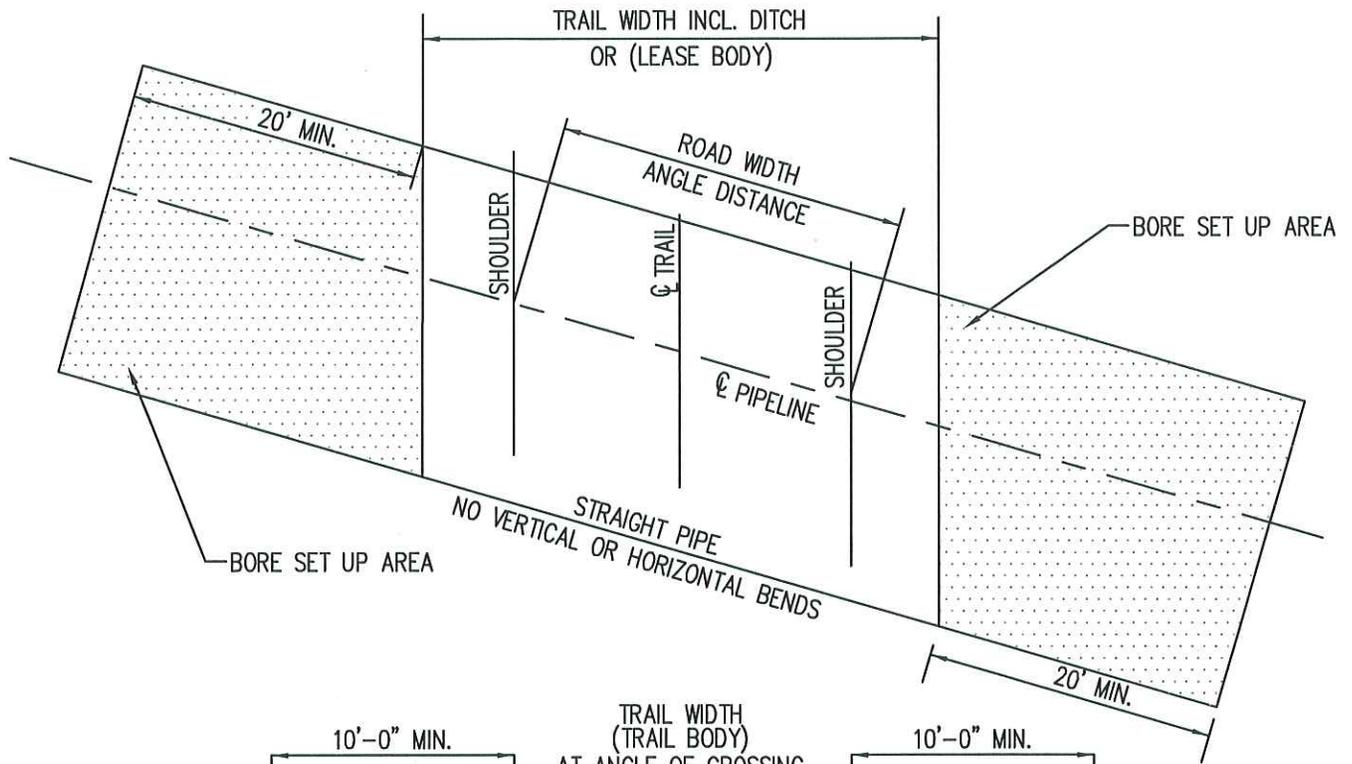


SECTION

NOTES:

1. TRAIL CROSSINGS SHALL BE CONSTRUCTED BY OPEN-CUT METHOD. UNLESS OTHERWISE SPECIFIED ON ALIGNMENT SHEET.
2. CONTRACTOR TO MINIMIZE TIME THAT THE TRAIL IS BLOCKED TO TRAFFIC.
3. MINIMUM PIPE COVER SHALL BE MAINTAINED OVER FULL WIDTH OF TRAIL.

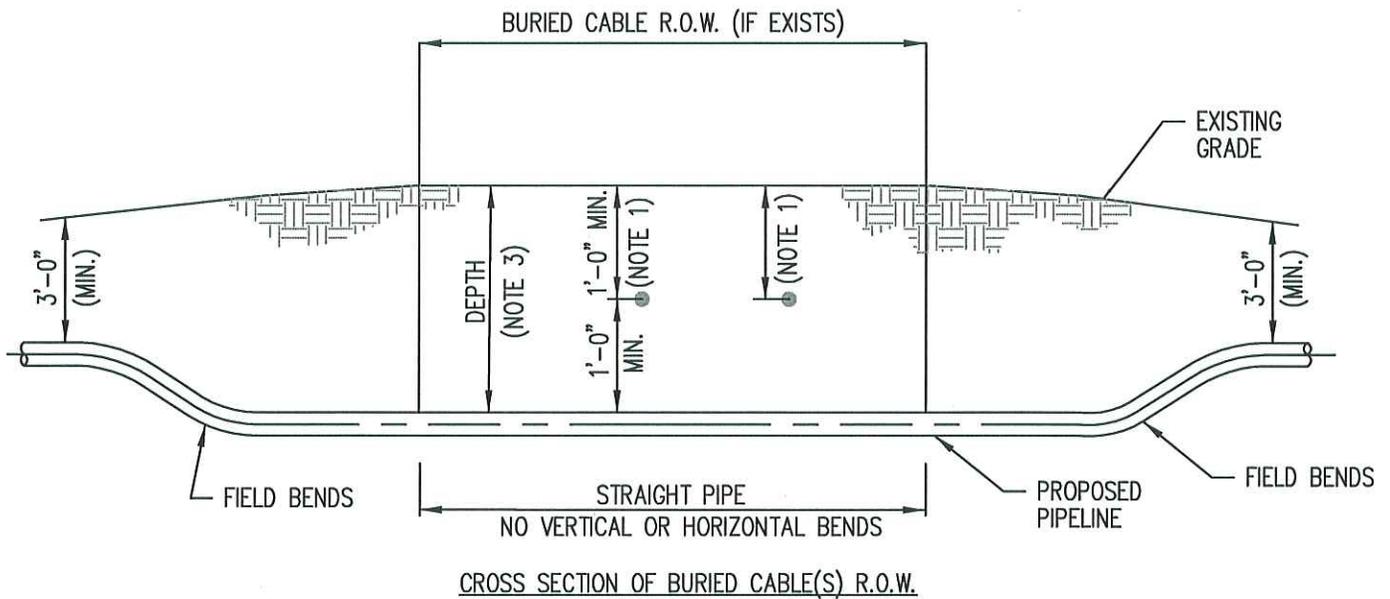
REVISIONS						DRAWN BY:		CH2MHILL TYPICAL TRAIL/TWO TRACK ROAD CROSSING			
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△						REVIEWED BY:					
△						APPROVED BY:					
△						PROJECT MANAGER:					
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE					
△	NO.	DESCRIPTION	DATE	BY	CHK.			APPR.			
						PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-009	REV.	A



SECTION

- NOTES:**
1. TRAIL CROSSINGS SHALL BE CONSTRUCTED BY BORE METHOD. UNLESS OTHERWISE SPECIFIED ON ALIGNMENT SHEET.
 2. CONTRACTOR TO MINIMIZE TIME THAT THE TRAIL IS BLOCKED TO TRAFFIC.
 3. MINIMUM PIPE COVER SHALL BE MAINTAINED OVER FULL WIDTH OF TRAIL.

REVISIONS						DRAWN BY:		  TYPICAL BORED TRAIL CROSSING		
△						CHECKED BY:				
△						REVIEWED BY:				
△						APPROVED BY:				
△						PROJECT MANAGER:				
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		PROJECT NUMBER	DRAWING NUMBER	REV.
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.	2568-01	TYP-010	A		



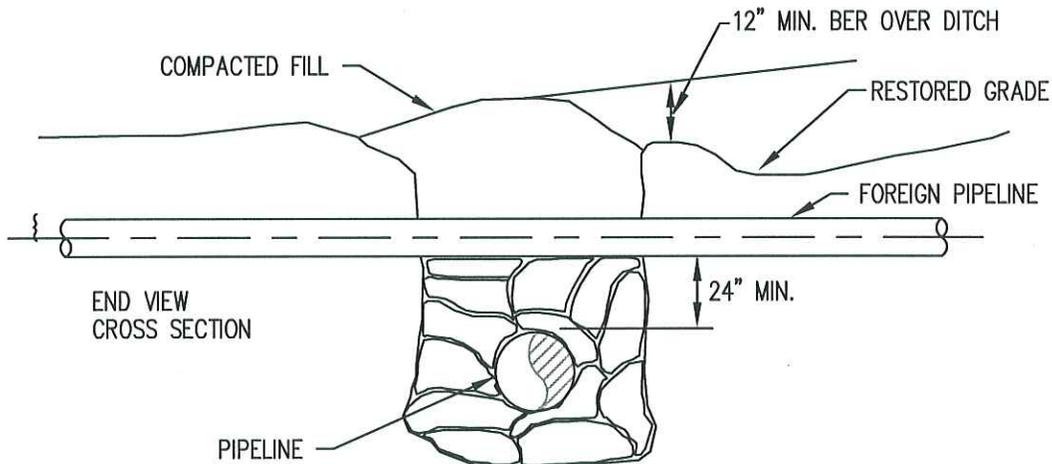
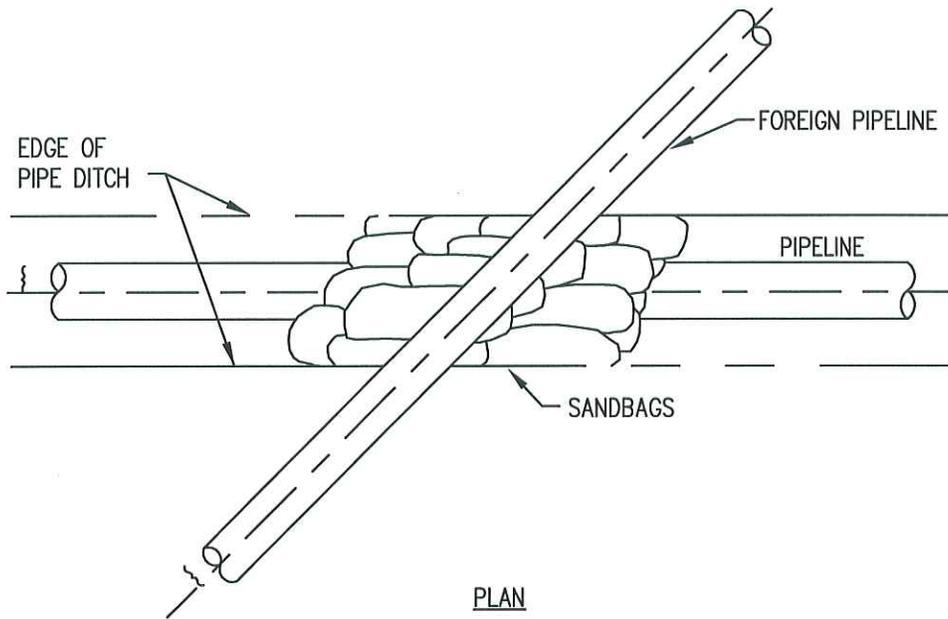
NOTES:

1. BURIED CABLE LOCATIONS & DEPTHS TO BE DETERMINED BY ELECTRONIC MEANS IN ADVANCE OF PIPELINE INSTALLATION AND CONFIRMED BY CAREFULLY EXPOSING BY HAND DIGGING OR "HYDRO VAC".
2. OWNER OF BURIED CABLE(S) SHALL BE NOTIFIED AT LEAST 48 HOURS IN ADVANCE OF EXCAVATION OF CROSSING OR AS SPECIFIED ON THE CROSSING LINE LIST. THE OWNER OR HIS REPRESENTATIVE SHALL BE REQUESTED TO BE PRESENT ON SITE WHEN THE CROSSING OPERATION IS TO TAKE PLACE.
3. DEPTH OF PIPELINE INCLUDING 12 INCH MIN. CLEARANCE SHALL BE MAINTAINED FOR THE FULL ANGULAR WIDTH OF BURIED CABLE R.O.W.
4. PROPOSED PIPELINE MAY ONLY CROSS ABOVE BURIED CABLE(S) WHERE REQUESTED OR approved IN WRITING BY BURIED CABLE OWNER.
5. CROSSING SHALL BE UNDERTAKEN USING OPEN-TRENCH METHOD, EXCEPT WHERE THE CABLE IS LOCATED IN THE BAR DITCH OF AN EXISTING ROAD.
6. SUPPORT CABLE AS REQUIRED BY THE CABLE OWNER. IF CABLE OWNER HAS NO SPECIFIC REQUIREMENTS, THEN ANGLE IRON 3 INCH X 3 INCH X 1/4 INCH MAY BE USED.
7. ALL BACKFILL WITHIN 10 FEET OF THE CABLE CROSSING TO BE DEPOSITED IN LIFTS NOT EXCEEDING 6 INCHES AND COMPACTED TO 85% STANDARD PROCTOR DENSITY.

REVISIONS						DRAWN BY:							
△						CHECKED BY:							
△						REVIEWED BY:							
△						APPROVED BY:							
△						PROJECT MANAGER:							
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-011	REV.	A
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.								



TYPICAL
BURIED CABLE CROSSING

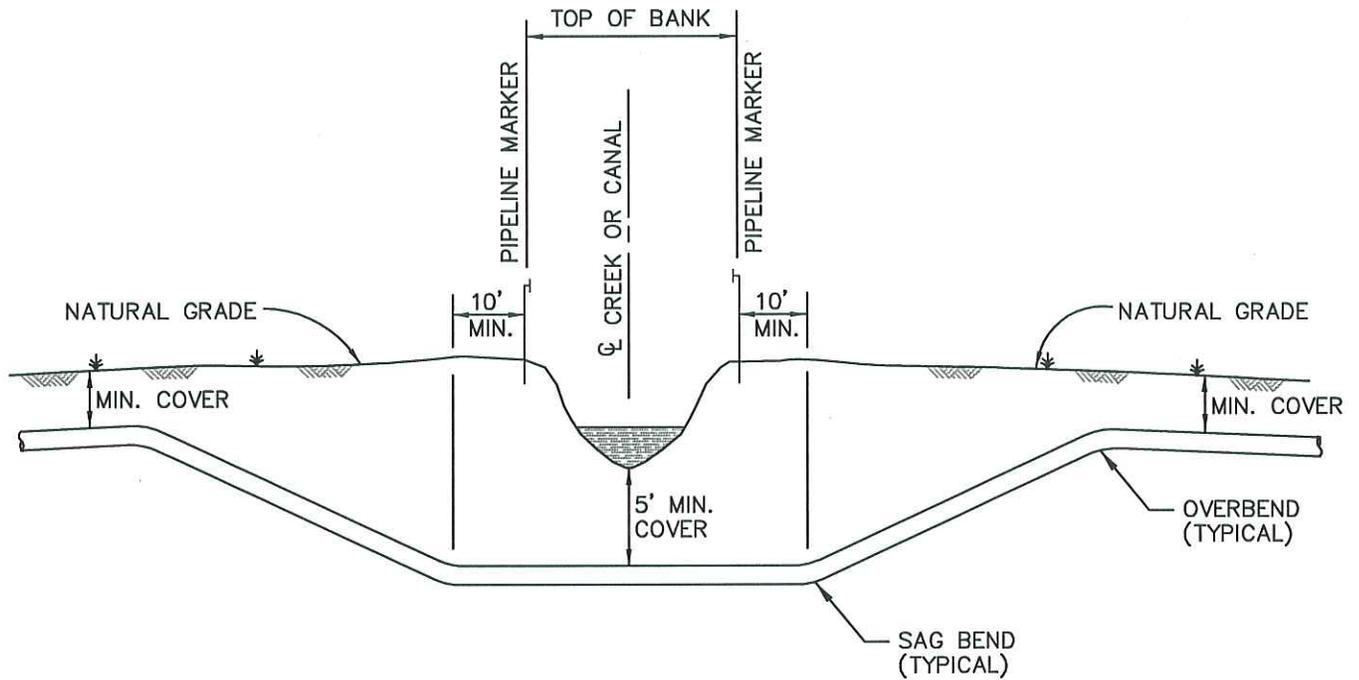


ELEVATION

NOTES:

1. BURIED PIPELINE(S) LOCATIONS & DEPTHS TO BE DETERMINED BY ELECTRONIC MEANS IN ADVANCE OF PIPELINE INSTALLATION AND CONFIRMED BY CAREFULLY EXPOSING BY HAND DIGGING OR "HYDRO VAC".
2. OWNER OF BURIED PIPELINE(S) SHALL BE NOTIFIED AT LEAST 48 HOURS IN ADVANCE OF EXCAVATION OF CROSSING, OR AS SPECIFIED ON THE CROSSING LINE LIST. THE OWNER OR HIS REPRESENTATIVE SHALL BE REQUESTED TO BE PRESENT ON SITE WHEN THE CROSSING OPERATION IS TO TAKE PLACE.
3. PIPELINE CROSSINGS SHALL BE CONSTRUCTED ACCORDING TO THIS DETAIL, OR A SPECIFIC CROSSING PERMIT OR DRAWING IF MORE STRINGENT.

REVISIONS						DRAWN BY:		  TYPICAL FOREIGN PIPELINE CROSSING		
△						CHECKED BY:				
△						REVIEWED BY:				
△						APPROVED BY:				
△						PROJECT MANAGER:				
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		PROJECT NUMBER	DRAWING NUMBER	REV.
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.			2568-01	TYP-012	A

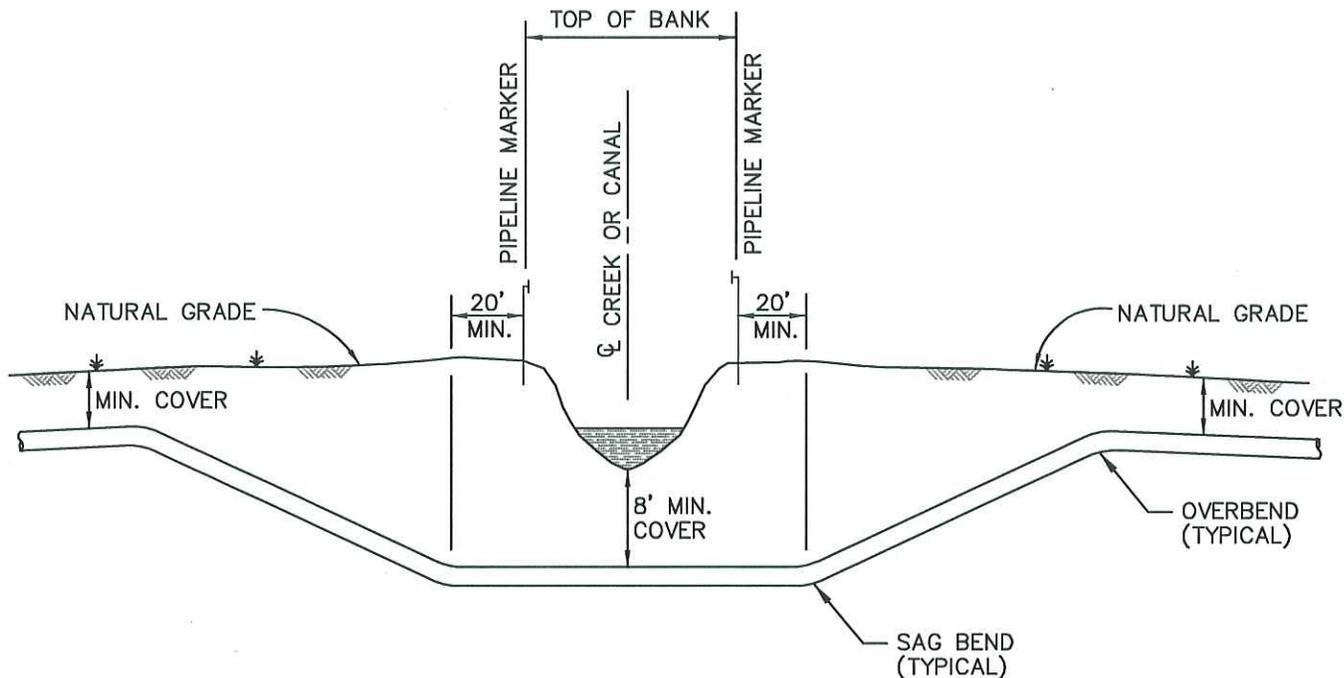


PROFILE
N.T.S.

NOTES:

1. PIPE TO BE STRAIGHT FOR A MINIMUM DISTANCE OF 10' FT. BEYOND TOP OF EACH BANK, MEASURED AT RIGHT ANGLES TO CREEK OR CANAL.
2. TOP OF PIPE TO BE MAINTAINED 5 FT. BELOW WATERBODY CHANNEL ELEVATION.
3. NORMAL FLOW OF DRAINAGE NOT TO BE OBSTRUCTED DURING PIPELINE CONSTRUCTION OPERATIONS.
4. CONSTRUCT ALL CROSSINGS IN ACCORDANCE WITH ENVIRONMENTAL PERMIT REQUIREMENTS AND CONDITIONS.
5. CARRIER PIPE TO BE EXTERNALLY COATED FOR CORROSION CONTROL.
6. PIPELINE TO BE CATHODICALLY PROTECTED PIPELINE DESIGN AS PER REQUIREMENTS OF PART 195 OF THE CODE OF FEDERAL REGULATIONS (LATEST EDITION).
7. TRAFFIC TO BE MAINTAINED DURING INSTALLATION.
8. PIPELINE TO BE INSTALLED BY OPEN-CUT METHOD.

REVISIONS						DRAWN BY:		 CH2MHILL TYPICAL SMALL DITCH/CREEK CROSSING								
△						CHECKED BY:						PROJECT NUMBER		DRAWING NUMBER		REV.
△						REVIEWED BY:						2568-01		TYP-013		A
△						APPROVED BY:										
△						PROJECT MANAGER:										
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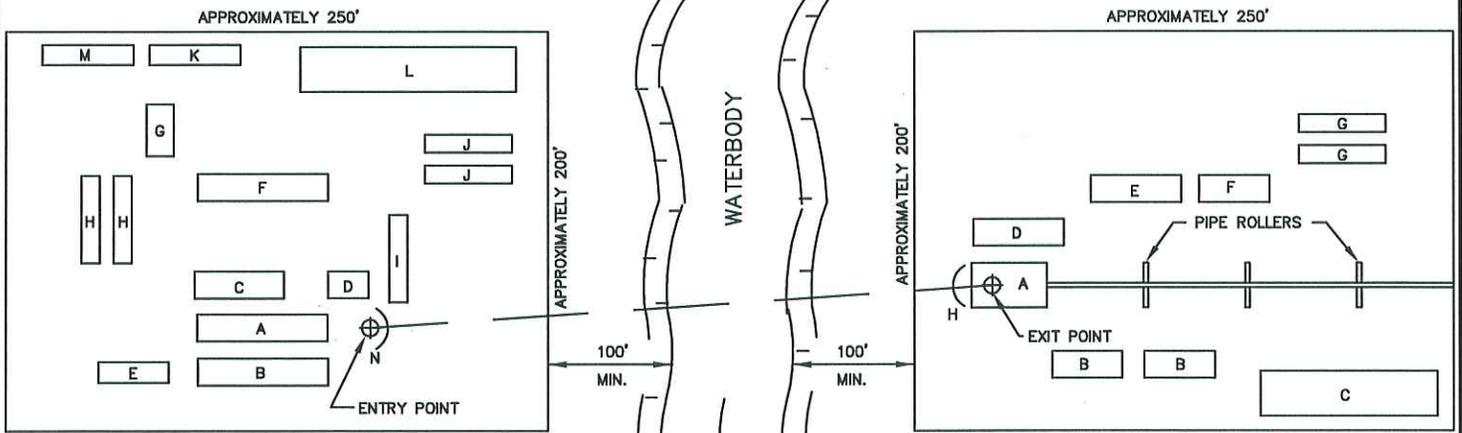


PROFILE
N.T.S.

NOTES:

1. PIPE TO BE STRAIGHT FOR A MINIMUM DISTANCE OF 10' FT. BEYOND TOP OF EACH BANK, MEASURED AT RIGHT ANGLES TO CREEK OR CANAL.
2. TOP OF PIPE TO BE MAINTAINED 8 FT. BELOW WATERBODY CHANNEL ELEVATION.
3. NORMAL FLOW OF DRAINAGE NOT TO BE OBSTRUCTED DURING PIPELINE CONSTRUCTION OPERATIONS.
4. CONSTRUCT ALL CROSSINGS IN ACCORDANCE WITH ENVIRONMENTAL PERMIT REQUIREMENTS AND CONDITIONS.
5. CARRIER PIPE TO BE EXTERNALLY COATED FOR CORROSION CONTROL.
6. PIPELINE TO BE CATHODICALLY PROTECTED PIPELINE DESIGN AS PER REQUIREMENTS OF PART 195 OF THE CODE OF FEDERAL REGULATIONS (LATEST EDITION).
7. TRAFFIC TO BE MAINTAINED DURING INSTALLATION.
8. PIPELINE TO BE INSTALLED BY OPEN-CUT METHOD.

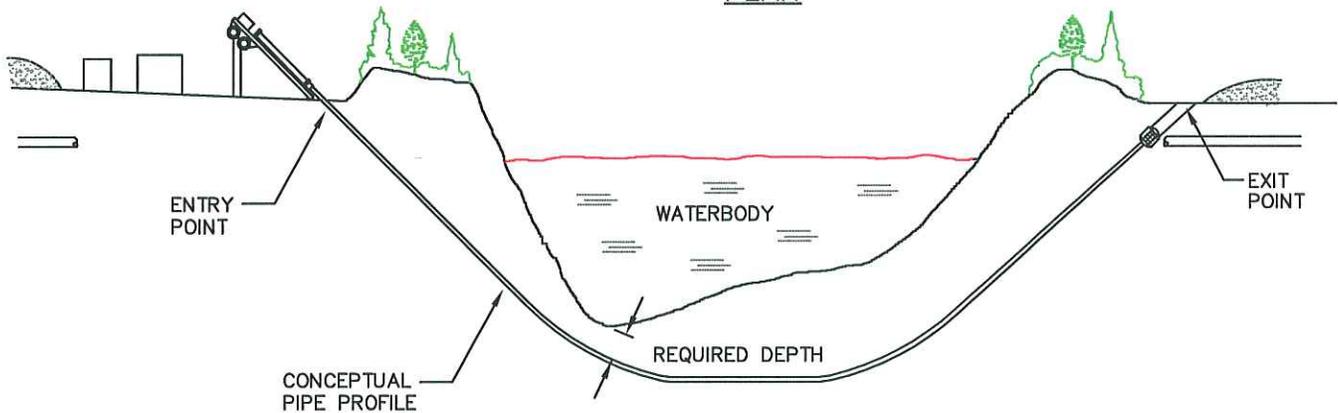
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△						PROJECT MANAGER:		
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		
NO.	DESCRIPTION	DATE	BY	CHK	APPR.	PROJECT NUMBER	DRAWING NUMBER	REV.
						2568-01	TYP-014	A



- A A DRILL RIG
- B A DRILLER'S CONSOLE GENERATOR
- C A DRILL PIPE
- D A CRANE
- E A PARTS VAN
- F A MUD CLEANING UNIT
- G A MUD MIXING TANK
- H A MUD PUMPS
- I A MUD PIT
- J A FRAC TANKS
- K A DRILLING MUD (PALLETES)
- L A PARKING
- M A OFFICE TRAILER
- N A CONTAINMENT BERM

- A A EXIT PIT
- B A LIFT EQUIPMENT
- C A WELDING AREA
- D A MUD PIT
- E A MUD CLEANING
- F A GENERATOR
- G A FRAC TANKS
- H A CONTAINMENT BERM

PLAN

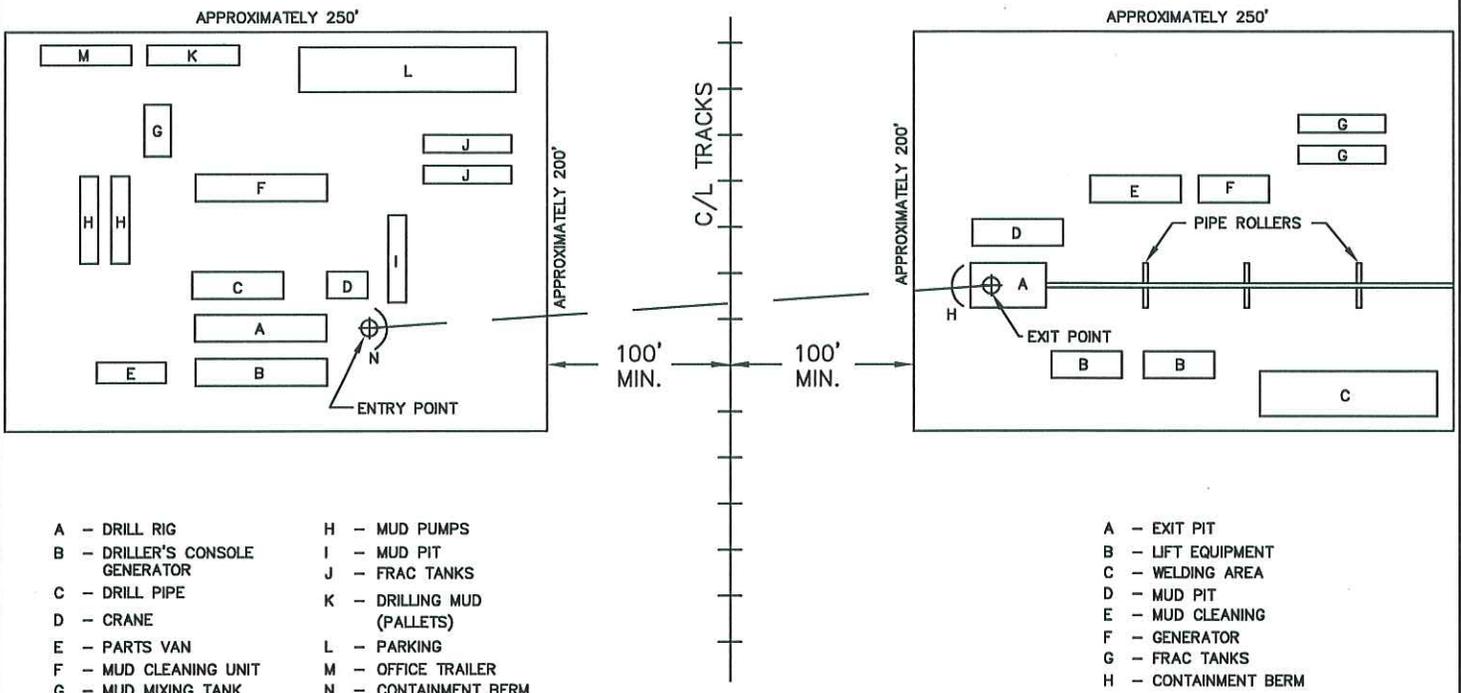


PROFILE

NOTES:

1. SET UP DRILLING EQUIPMENT A MINIMUM OF 100 FEET FROM THE EDGE OF THE WATERBODY. DO NOT CLEAR OR GRADE WITHIN THE 100 FOOT ZONE.
2. ENSURE THAT ONLY BENTONITE BASED DRILLING MUD IS USED. DO NOT ALLOW THE USE OF ANY ADDITIVES TO THE DRILLING MUD WITHOUT THE APPROVAL OF COMPANY'S INSPECTOR.
3. INSTALL SUITABLE DRILLING MUD TANKS OR SUMPS TO PREVENT CONTAMINATION OF WATERBODY.
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.

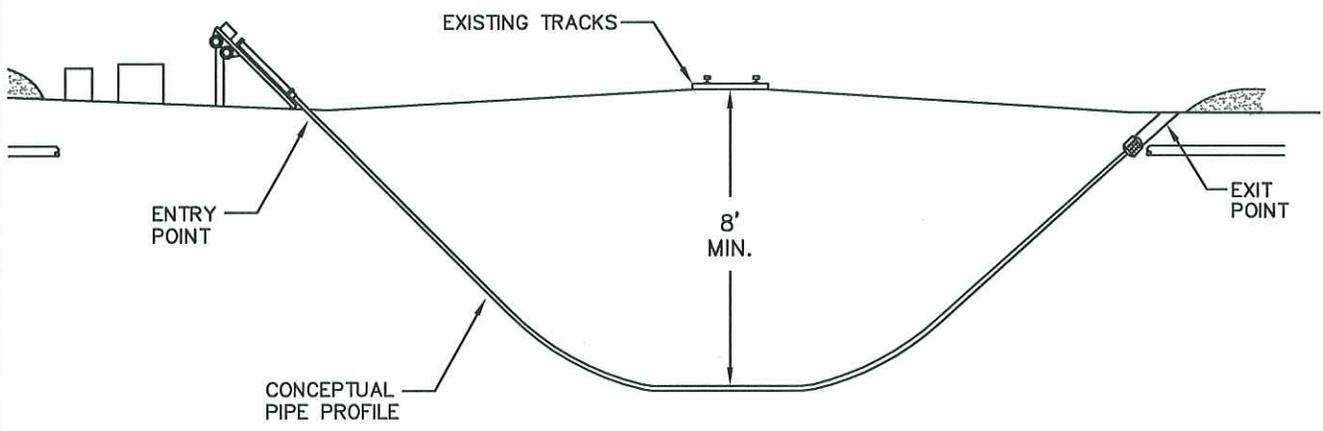
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△						REVIEWED BY:							
△						APPROVED BY:							
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NO.	DESCRIPTION	DATE	BY	CHK.	APPR.								



- A - DRILL RIG
- B - DRILLER'S CONSOLE GENERATOR
- C - DRILL PIPE
- D - CRANE
- E - PARTS VAN
- F - MUD CLEANING TANK
- G - MUD MIXING TANK
- H - MUD PUMPS
- I - MUD PIT
- J - FRAC TANKS
- K - DRILLING MUD (PALLETS)
- L - PARKING
- M - OFFICE TRAILER
- N - CONTAINMENT BERM

- A - EXIT PIT
- B - LIFT EQUIPMENT
- C - WELDING AREA
- D - MUD PIT
- E - MUD CLEANING
- F - GENERATOR
- G - FRAC TANKS
- H - CONTAINMENT BERM

PLAN

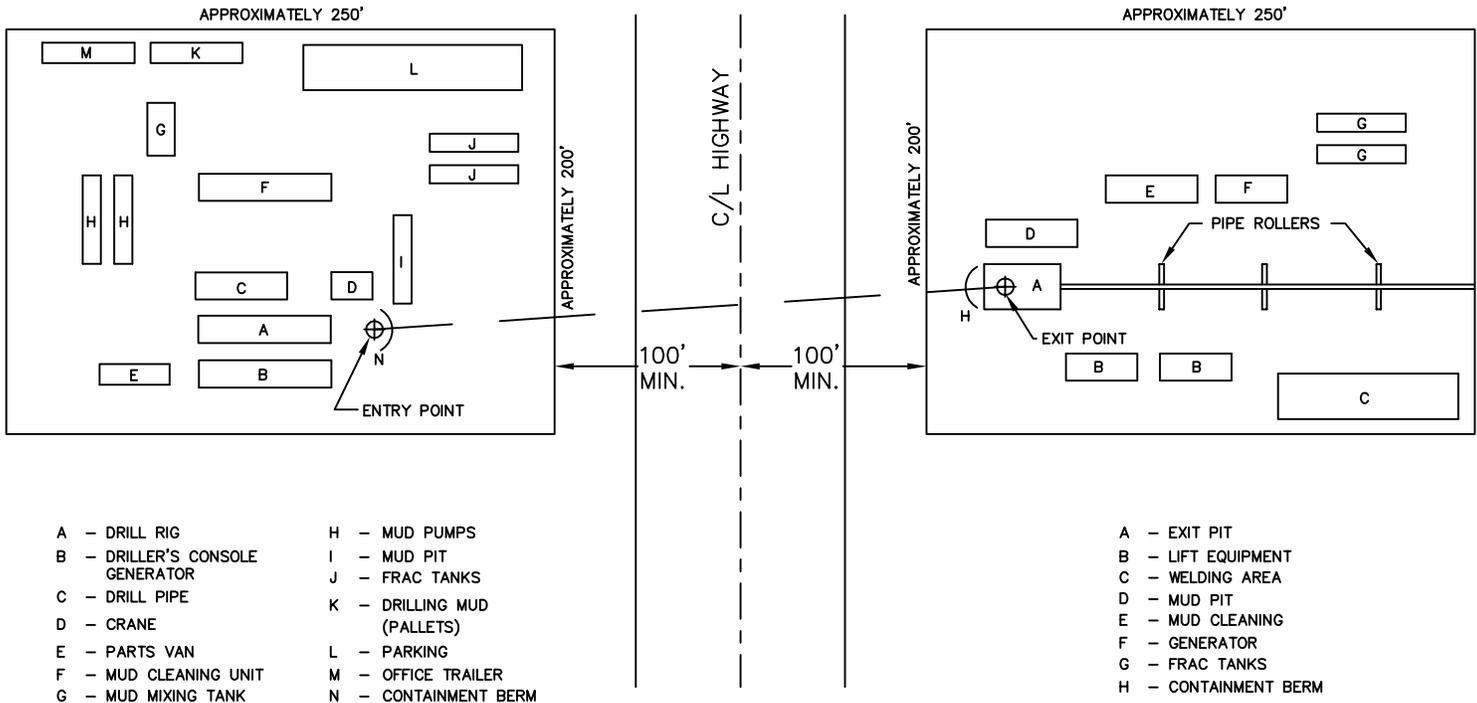


PROFILE

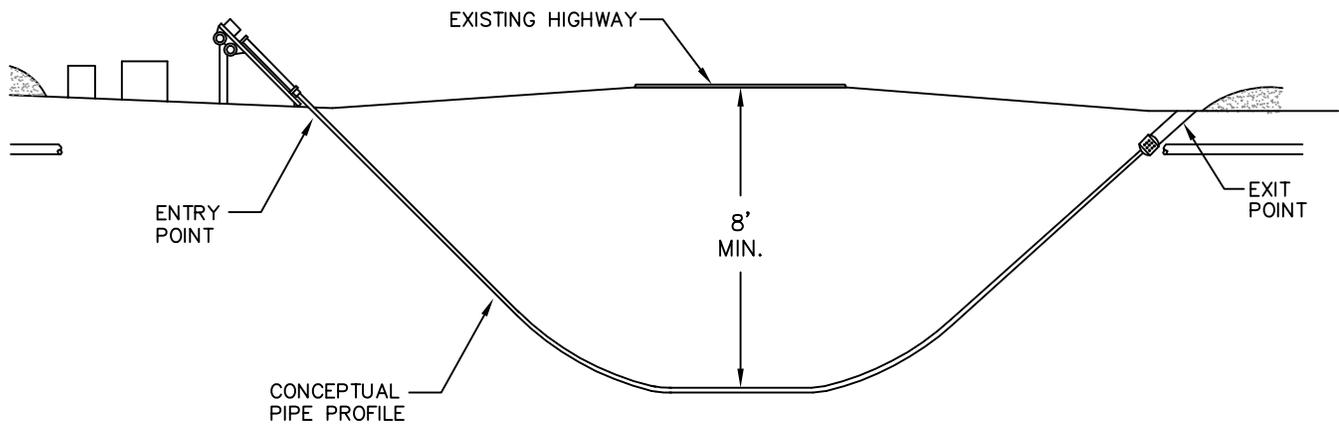
NOTES:

1. SET UP DRILLING EQUIPMENT A MINIMUM OF 100 FEET FROM THE CENTERLINE OF TRACKS. DO NOT CLEAR OR GRADE WITHIN THE 100 FOOT ZONE.
2. ENSURE THAT ONLY BENTONITE BASED DRILLING MUD IS USED. DO NOT ALLOW THE USE OF ANY ADDITIVES TO THE DRILLING MUD WITHOUT THE APPROVAL OF COMPANY'S INSPECTOR.

REVISIONS						DRAWN BY:		  TYPICAL RAILROAD CROSSING H.D.D.					
△						CHECKED BY:							
△						REVIEWED BY:							
△						APPROVED BY:							
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△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-015A	REV.	A



PLAN

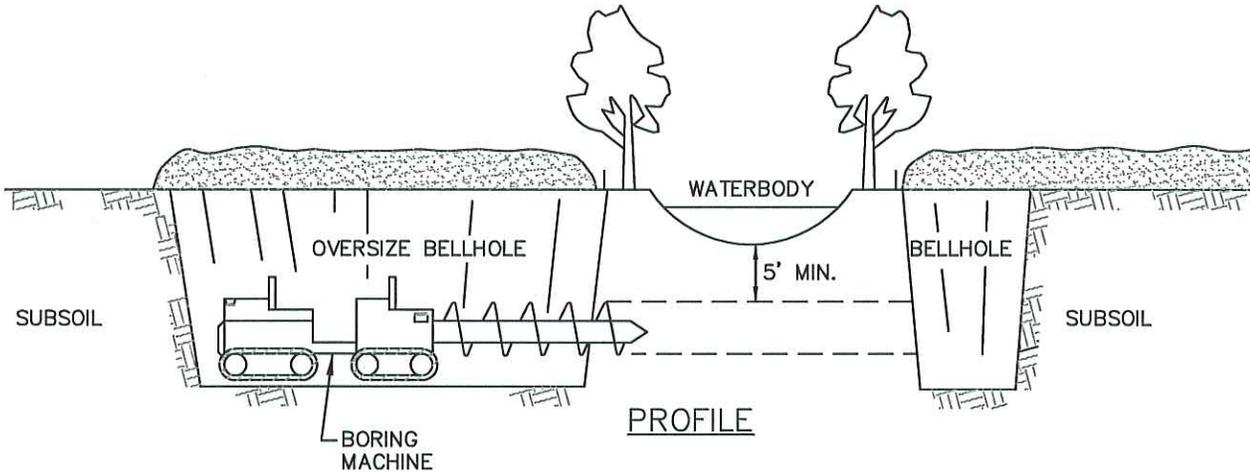
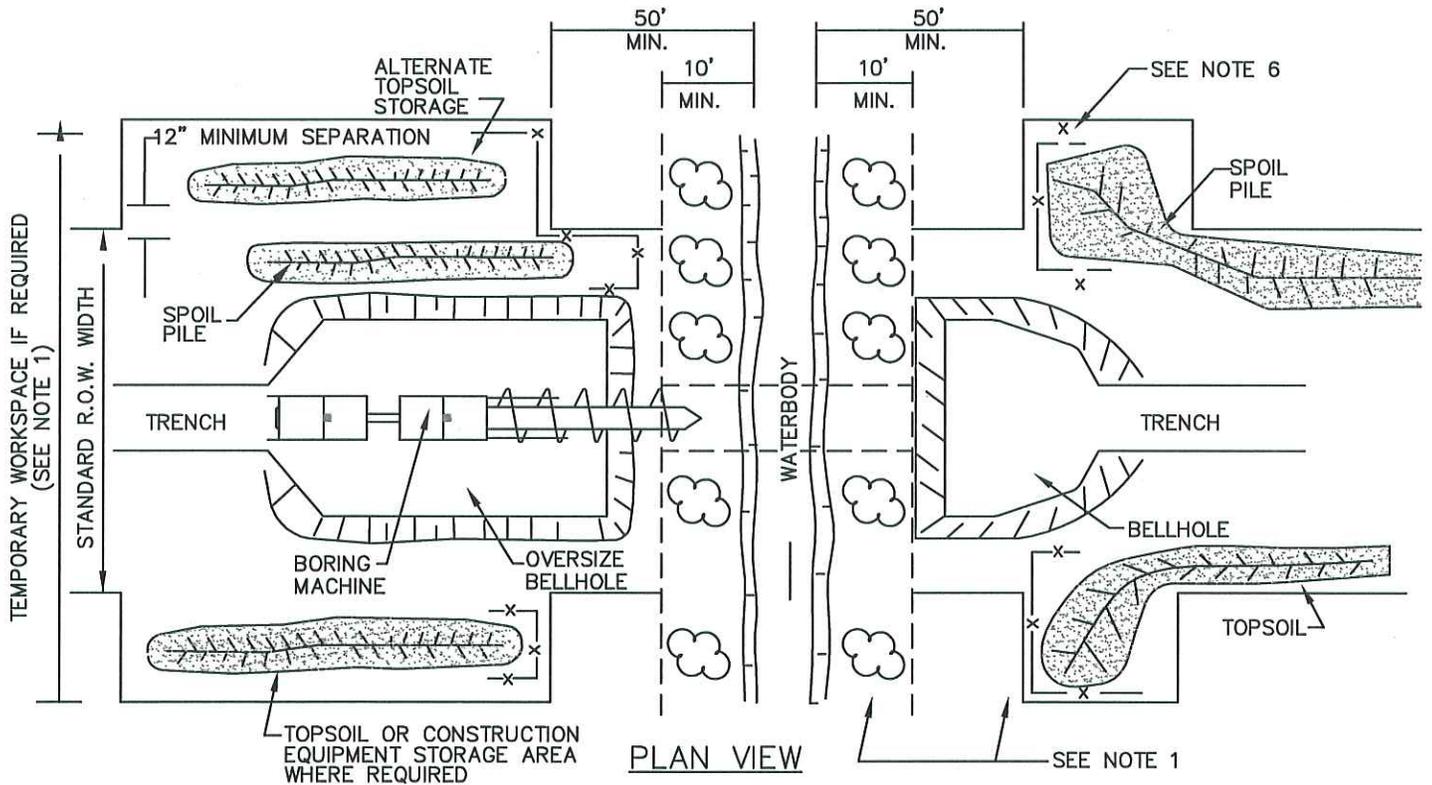


PROFILE

NOTES:

1. SET UP DRILLING EQUIPMENT A MINIMUM OF 100 FEET FROM THE CENTERLINE OF HIGHWAY. DO NOT CLEAR OR GRADE WITHIN THE 100 FOOT ZONE.
2. ENSURE THAT ONLY BENTONITE BASED DRILLING MUD IS USED. DO NOT ALLOW THE USE OF ANY ADDITIVES TO THE DRILLING MUD WITHOUT THE APPROVAL OF COMPANY'S INSPECTOR.

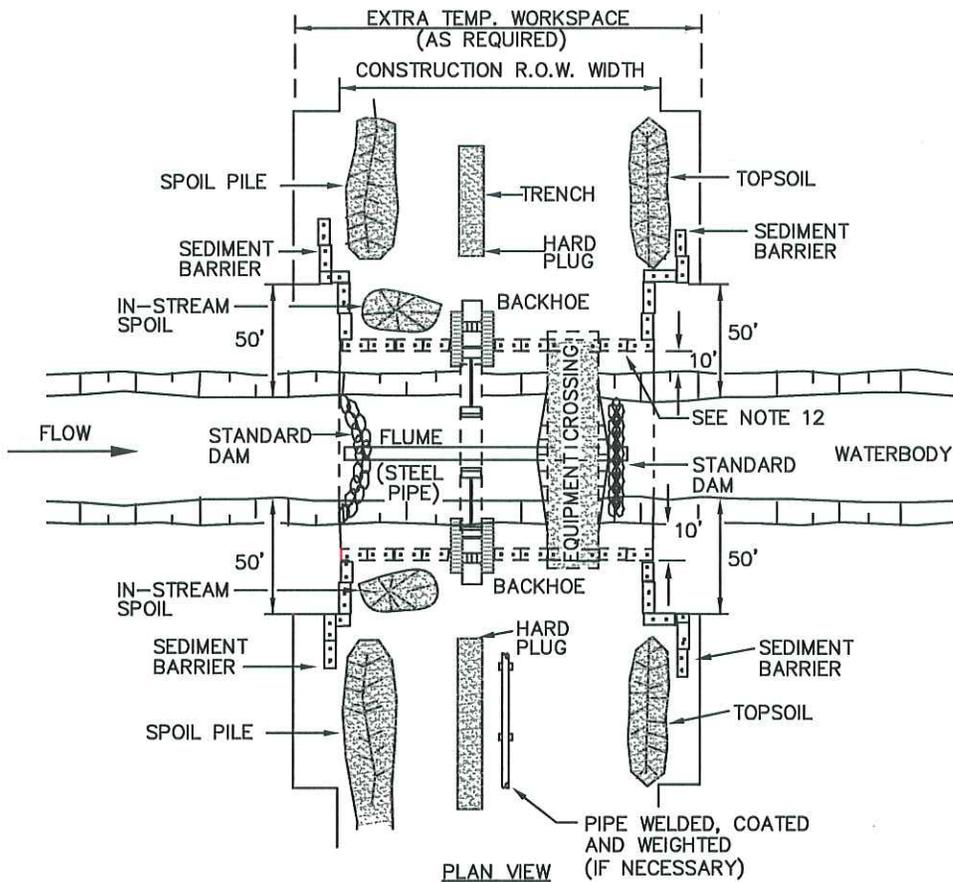
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△	ISSUED FOR REVIEW	11/2/10	JTS	CLJ	RA	SCALE: NONE		PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-015B	REV.	A



NOTES:

1. MAINTAIN A MINIMUM 10 FEET VEGETATIVE BUFFER ALONG BOTH SIDES OF THE WATERBODY. EXTRA TEMPORARY WORKSPACE MUST BE A MINIMUM OF 50' FROM THE WATER'S EDGE.
2. INSTALL TEMPORARY BRIDGE, IF REQUIRED.
3. THE SIDES OF THE BORE PITS SHALL BE SLOPED BACK TO STABLE CONFIGURATION UNLESS SUPPORTED BY SHEET PILING OR OTHER SHORING MEANS. INSTALL SAFETY FENCE AROUND BORE PITS AS NECESSARY.
4. INSTALL TEMPORARY EROSION CONTROL PROCEDURES AS SPECIFIED IN CONSTRUCTION SPECIFICATIONS OR AS DETERMINED BY THE BY THE COMPANY INSPECTOR.
5. DEWATER BORE PIT TO CONTROL SEEPAGE WATER FLOW. DEWATER INTO AN APPROPRIATE DEWATERING STRUCTURE TO PREVENT ENTRY OF SILT LADEN WATER INTO THE WATERBODY.
6. UPON COMPLETION OF PIPE INSTALLATION AND TIE-INS, BACKFILL BORE PIT SPOIL. MINIMIZE POST CONSTRUCTION SETTLEMENT BY COMPACTING BACKFILL USING STANDARD PIPELINE CONSTRUCTION EQUIPMENT AVAILABLE AT SITE. COMPACT EACH LIFT. LEAVE A CROWN TO ALLOW FOR SUBSIDENCE OF THE BACKFILL. RESPREAD SALVAGED TOPSOIL.

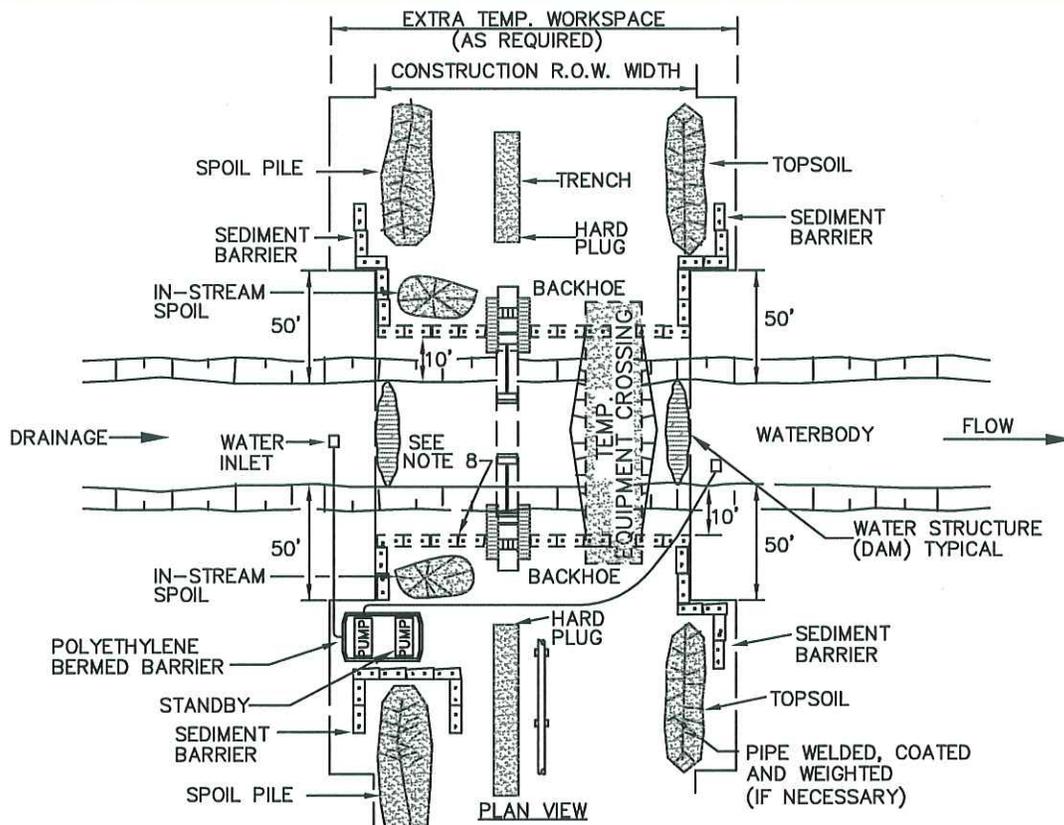
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△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-016	REV.	A



NOTES:

1. METHOD APPLIES TO WATERBODIES WHERE DOWNSTREAM SILTATION MUST BE AVOIDED. FLUMES ARE GENERALLY NOT RECOMMENDED FOR USE ON WATERBODIES WITH A BROAD UNCONFINED CHANNEL, PERMEABLE SUBSTRATE, EXCESSIVE DISCHARGE, OR WHERE A SIGNIFICANT AMOUNT OF BED OR BANK ALTERATION IS REQUIRED TO INSTALL FLUMES OR DAMS.
2. SCHEDULE CROSSING DURING LOW FLOW PERIOD IF POSSIBLE.
3. COMPLETE ALL WATERBODY ACTIVITIES AS EXPEDITIOUSLY AS POSSIBLE.
4. NO REFUELING OF MOBILE EQUIPMENT OR CONCRETE COATING ACTIVITIES WITHIN 100 FEET OF WATERBODY OR WETLAND. REFUEL STATIONARY EQUIPMENT AS PER THE SPCC PLAN. NO STORAGE OF HAZARDOUS MATERIALS WITHIN 100 FEET OF ANY WATERBODY OR WETLAND.
5. INSTALL TEMPORARY EQUIPMENT CROSSING.
6. IN AGRICULTURAL LAND, STRIP TOPSOIL FROM SPOIL STORAGE AREA.
7. IN-STREAM SPOIL TO BE STORED OUT OF THE STREAM CHANNEL A MINIMUM OF 10 FEET FROM THE WATER'S EDGE WITHIN THE CONSTRUCTION R.O.W. UNLESS DEPICTED OTHERWISE IN SITE SPECIFIC CROSSING PLANS. EXTRA TEMPORARY WORKSPACE MUST BE A MINIMUM OF 50' FROM THE WATER'S EDGE.
8. LEAVE HARD PLUGS AT THE STREAM BANK EDGE UNTIL JUST PRIOR TO PIPE INSTALLATION.
9. SIZE FLUME TO HANDLE 150% ANTICIPATED FLOWS. INSTALL FLUME IN WATERBODY AND MAINTAIN CORRECT ALIGNMENT UNTIL REMOVED.
10. CONSTRUCT UPSTREAM DAM FOLLOWED BY DOWNSTREAM DAM. INSTALL A FLANGE ON UPSTREAM END OF FLUME AND SEAL TO SUBSTRATE WITH SANDBAGS AND POLYETHYLENE LINER WHERE NECESSARY TO ENSURE A WATERTIGHT BARRIER. "KEY" DAMS INTO BANKS OR CONSTRUCT SECONDARY DAM, IF NECESSARY.
11. PUMP STREAM CHANNEL BETWEEN DAMS, IF NECESSARY. DISCHARGE WATER THROUGH A DEWATERING STRUCTURE AND ONTO A STABLE WELL VEGETATED AREA TO PREVENT EROSION AND SEDIMENTATION. NO HEAVILY SILT-LADEN WATER MAY BE DISCHARGED IN THE STREAM.
12. CONSTRUCT SEDIMENT BARRIERS (STRAW BALES AND/OR SILT FENCE) TO PREVENT SILT LADEN WATER AND SPOIL FROM FLOWING BACK INTO WATERBODY. CONSTRUCTED SEDIMENT BARRIERS SHALL EXTEND ALONG THE SIDES OF THE STOCKPILES AND THE ENDS OF DAMS. BARRIERS MAY BE TEMPORARILY REMOVED TO ALLOW CONSTRUCTION ACTIVITIES BUT MUST BE REPLACED BY THE END OF EACH WORK DAY.
13. COMPLETE PREFABRICATION OF IN-STREAM PIPE SECTION AND WEIGHT PIPE AS NECESSARY PRIOR TO COMMENCEMENT OF IN-STREAM ACTIVITY.
14. TRENCH THROUGH WATERBODY. INSTALL TEMPORARY (SOFT) PLUGS, IF NECESSARY, TO CONTROL WATER FLOW AND TRENCH SLOUGHING.
15. MAINTAIN STREAM FLOW, IF PRESENT, THROUGH FLUME THROUGHOUT CROSSING CONSTRUCTION.
16. LOWER-IN PIPE, INSTALL TRENCH PLUG AND BACKFILL IMMEDIATELY.
17. BACKFILL WITH NATIVE MATERIAL.
18. RESTORE WATERBODY CHANNEL TO APPROXIMATE PRE-CONSTRUCTION PROFILE AND SUBSTRATE.
19. RESTORE STREAM BANKS TO APPROXIMATE ORIGINAL CONDITION. STABILIZE WATERBODY BANKS AND INSTALL TEMPORARY SEDIMENT BARRIERS WITHIN 24 HOURS OF COMPLETING THE CROSSING.

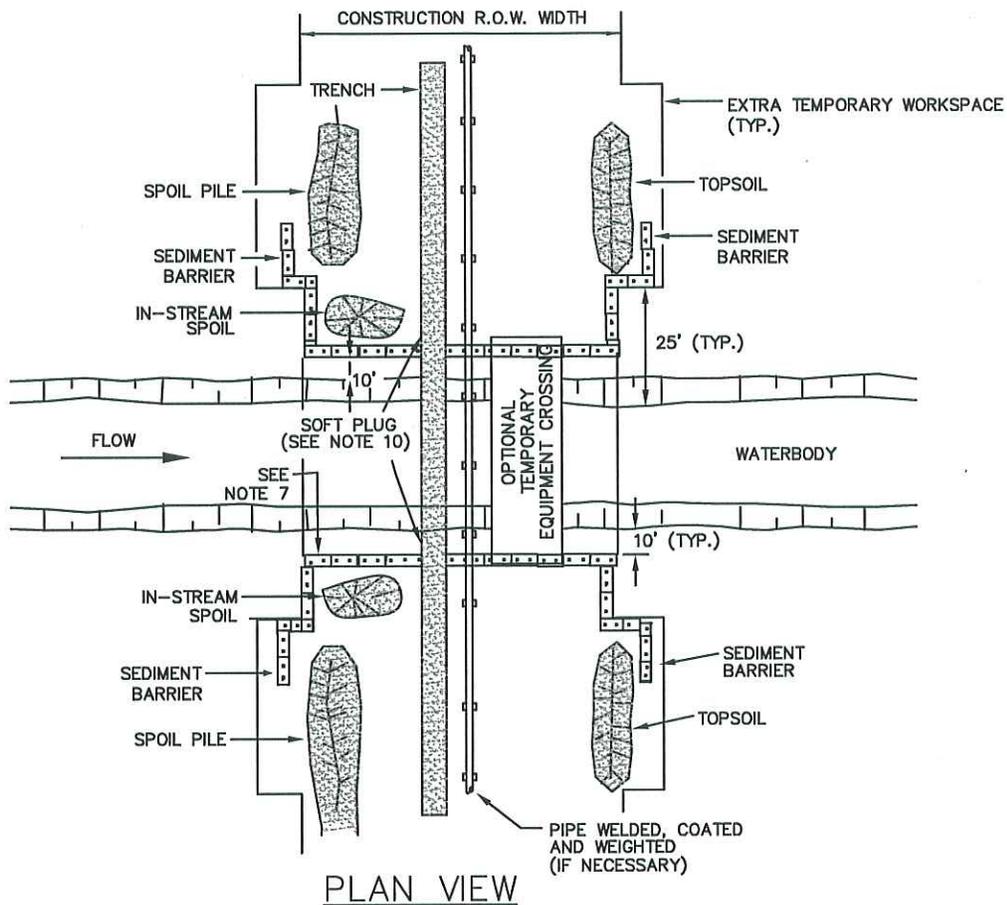
REVISIONS						DRAWN BY:		  TYPICAL WATERBODY CROSSING OPEN-CUT DRY FLUME		
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△						REVIEWED BY:				
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△						PROJECT MANAGER:				
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		PROJECT NUMBER: 2568-01	DRAWING NUMBER: TYP-016A	REV. A



NOTES:

1. UTILIZATION OF THIS METHOD REQUIRES APPROVAL OF COMPANY REPRESENTATIVE PRIOR TO CONSTRUCTION.
2. THIS METHOD APPLIES TO SWALES, DRAINS, SMALL STREAMS OR CREEKS WITH LIMITED FLOW AT TIME OF CONSTRUCTION WHERE DOWNSTREAM SILTATION MUST BE AVOIDED AND THE CROSSING WIDTH IS NOT PROHIBITIVE.
3. SCHEDULE CROSSING DURING LOW FLOW PERIOD IF POSSIBLE.
4. COMPLETE ALL IN-STREAM ACTIVITIES AS EXPEDIENTLY AS POSSIBLE.
5. NO REFUELING OF MOBILE EQUIPMENT WITHIN 100 FEET OF WATERBODY OR WETLAND. REFUEL STATIONARY EQUIPMENT AS PER THE SPCC PLAN.
6. INSTALL TEMPORARY VEHICLE CROSSING, IF REQUIRED. NO STORAGE OF HAZARDOUS WASTE WITHIN 100 FEET OF ANY WATERBODY OR WETLAND.
7. STRIP TOPSOIL FROM SPOIL STORAGE AREA.
8. IN-STREAM SPOIL TO BE STORED OUT OF THE STREAM CHANNEL A MINIMUM OF 10 FEET FROM THE WATERS EDGE WITHIN THE CONSTRUCTION R.O.W. UNLESS DEPICTED OTHERWISE IN THE SITE SPECIFIC CROSSING PLANS. EXTRA TEMPORARY WORKSPACE MUST BE A MINIMUM OF 50' FROM THE WATERS EDGE.
9. CONSTRUCT SEDIMENT BARRIERS TO PREVENT SILT LADEN WATER AND SPOIL FROM FLOWING INTO WATERBODY. CONSTRUCTED SEDIMENT BARRIERS SHALL EXTEND ALONG THE SIDES OF THE SPOIL AND TOPSOIL STOCKPILES AND ACROSS THE ENTIRE CONSTRUCTION R.O.W. BARRIERS MAY BE TEMPORARILY REMOVED TO ALLOW CONSTRUCTION ACTIVITIES BUT MUST BE REPLACED BY THE END OF EACH WORK DAY.
10. CONSTRUCT UPSTREAM STRUCTURE (DAM) FOLLOWED BY DOWNSTREAM STRUCTURE (DAM). WATER STRUCTURES' (AQUA DAM, JERSEY BARRIERS, SAND BAGS, STEEL PLATE, POLYETHYLENE LINER, ETC.) FINAL LOCATION WILL BE APPROVED BY THE COMPANY INSPECTOR.
11. SIZE PUMPS FOR DIVERSION OF ENTIRE STREAM FLOW. CONTRACTOR SHALL MAINTAIN 100% SPARE PUMPING CAPACITY ON SITE. PUMPS SHALL BE INSTALLED ON POLYETHYLENE BARRIERS FOR FUEL/OIL SPILL CONTAINMENT. PUMP INTAKES WILL BE SCREENED TO PREVENT ENTRAPMENT OF FISH. CONTRACTOR SHALL MONITOR PUMPS AND WATER STRUCTURES ON A 24 HOUR BASIS UNTIL THE CROSSING INSTALLATION IS COMPLETE. SHOULD LEAKAGE AT THE DAM STRUCTURES OCCUR, CONTRACTOR SHALL DEWATER BETWEEN THE STRUCTURES THROUGH AN APPROPRIATE FILTER AND ONTO A WELL VEGETATED UPLAND AREA. NO HEAVILY SILT-LADEN WATER SHALL BE DISCHARGED INTO THE STREAM.
12. LEAVE HARD PLUGS AT STREAM BANK EDGE UNTIL JUST PRIOR TO PIPE INSTALLATION.
13. COMPLETE CONSTRUCTION OF IN-STREAM PIPE SECTION. WEIGHT PIPE AS NECESSARY PRIOR TO COMMENCEMENT OF IN-STREAM ACTIVITY.
14. TRENCH THROUGH WATERBODY AS EXPEDIENTLY AS PRACTICAL. INSTALL TEMPORARY (SOFT) PLUGS, IF NECESSARY, TO CONTROL WATER FLOW AND TRENCH SLOUGHING.
15. MAINTAIN STREAM FLOW THROUGHOUT CROSSING CONSTRUCTION.
16. LOWER-IN PIPE, INSTALL TRENCH PLUG AND BACKFILL IMMEDIATELY.
17. RESTORE WATERBODY CHANNEL TO APPROXIMATE PRE-CONSTRUCTION PROFILE AND SUBSTRATE.
18. DISMANTLE DOWNSTREAM WATER STRUCTURE (DAM) AND UPSTREAM WATER STRUCTURE (DAM) AFTER TRENCH BACKFILL.
19. RESTORE STREAM BANKS TO APPROXIMATE ORIGINAL CONDITION. STABILIZE WATERBODY BANKS AND INSTALL TEMPORARY BARRIERS WITHIN 24 HOURS OF COMPLETING THE CROSSING.

REVISIONS					DRAWN BY:	  TYPICAL WATERBODY CROSSING OPEN-CUT DAM AND PUMP
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△					REVIEWED BY:	
△					APPROVED BY:	
△					PROJECT MANAGER:	
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE
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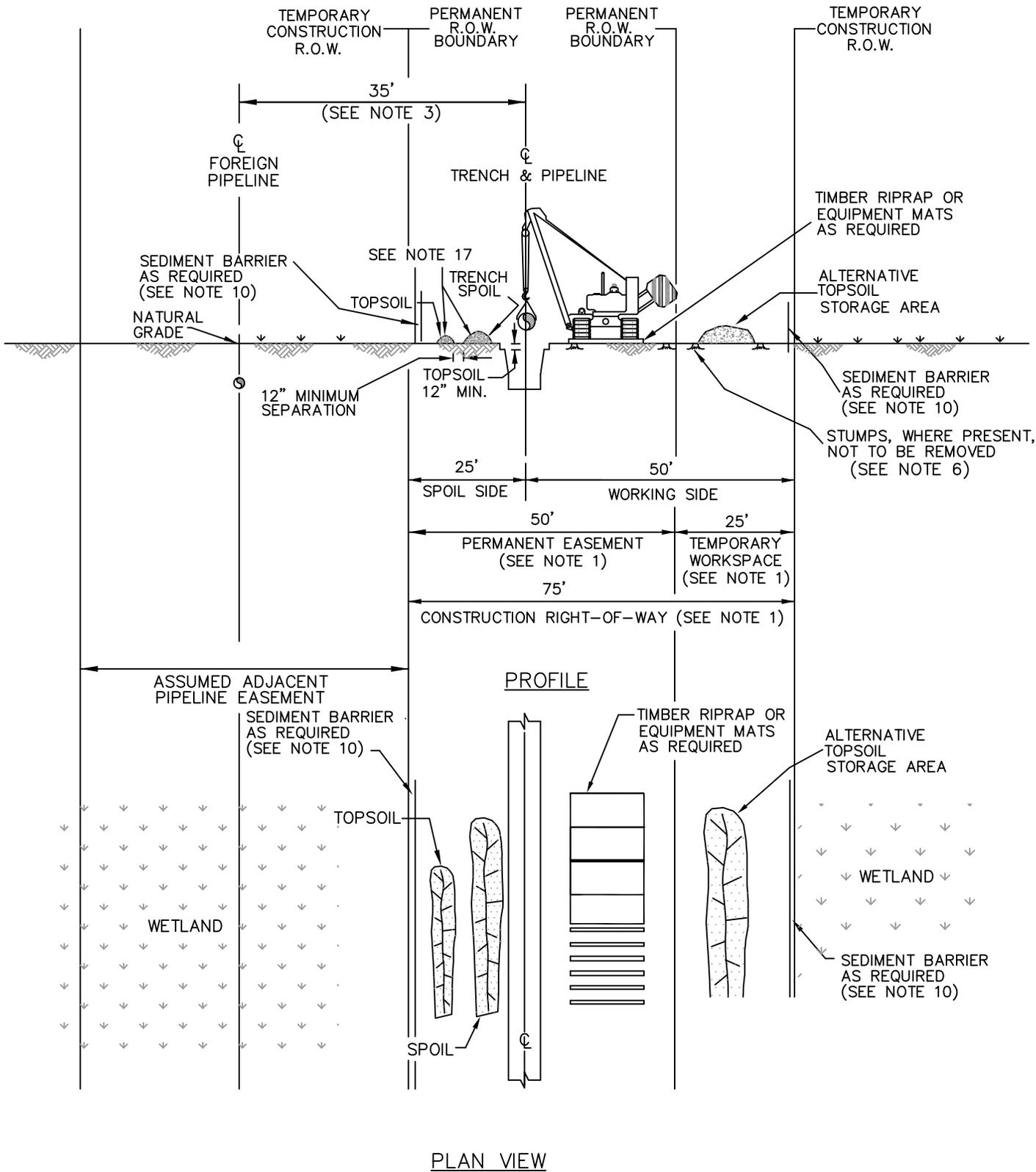


PLAN VIEW

NOTES:

1. METHOD APPLIES TO WATERBODIES THAT ARE NOT STATE-DESIGNATED FISHERIES WHERE FLUME CROSSINGS ARE NOT REQUIRED. IF TOPOGRAPHY PERMITS TEMPORARY EQUIPMENT BRIDGE INSTALLATION, THE CONTRACTOR SHALL TRENCH, STRING, WELD, COAT, WEIGHT (IF NECESSARY), LOWER IN AND BACKFILL UTILIZING THE MAIN LINE CREW TRAVELING OVER THE BRIDGE. IF TOPOGRAPHY PROHIBITS INSTALLATION OF A TEMPORARY EQUIPMENT BRIDGE, CONTRACTOR SHALL TRENCH UP TO BOTH SIDES OF CROSSING; STRING, WELD, COAT AND WEIGHT (IF NECESSARY) USING THE MAINLINE CREW. IN STREAM EXCAVATION, LOWER IN, AND BACKFILL WILL UTILIZES A CLAM OR HOES WORKING FROM THE BANKS.
2. SCHEDULE CROSSING DURING LOW FLOW PERIOD IF POSSIBLE.
3. COMPLETE ALL IN-STREAM ACTIVITIES WITHIN 24 HOURS IF FEASIBLE.
4. NO REFUELING OF MOBILE EQUIPMENT WITHIN 100 FEET OF WATERBODY.
5. INSTALLATION OF TEMPORARY EQUIPMENT CROSSING WHERE REQUIRED BY PERMITS OR AGENCIES; OPTIONAL AT THE DISCRETION OF THE COMPANY'S INSPECTOR AT ALL OTHER CROSSINGS.
6. IN AGRICULTURAL LAND, STRIP TOPSOIL FROM SPOIL STORAGE AREA.
7. CONSTRUCT SEDIMENT BARRIERS ALONG THE SIDES OF STOCKPILES AND ACROSS THE ENTIRE CONSTRUCTION R.O.W. TO PREVENT SILT LADEN WATER AND SPOIL FROM FLOWING BACK INTO WATERBODY. BARRIERS MAY BE TEMPORARILY REMOVED TO ALLOW CONSTRUCTION ACTIVITIES BUT MUST BE REPLACED BY THE END OF EACH WORK DAY.
8. IN-STREAM SPOIL TO BE STORED OUT OF THE STREAM CHANNEL A MINIMUM OF 10 FEET FROM THE TOP OF BANK.
9. TRENCH THROUGH WATERBODY USING MAINLINE EXCAVATION EQUIPMENT WHERE PRACTICAL.
10. INSTALL TEMPORARY (SOFT) PLUGS AT THE EDGE OF STREAM BANKS UNTIL JUST PRIOR TO PIPE INSTALLATION TO CONTROL WATER FLOW & TRENCH SLOUGHING.
11. MAINTAIN STREAM FLOW THROUGHOUT CROSSING CONSTRUCTION.
12. BACKFILL WITH NATIVE MATERIAL.
13. RESTORE WATERBODY CHANNEL TO APPROXIMATE PRE-CONSTRUCTION PROFILE AND SUBSTRATE.
14. RESTORE STREAM BANKS TO APPROXIMATE ORIGINAL CONDITION AND STABILIZE, AS REQUIRED.
15. ALL DIMENSIONS INDICATED SHALL BE DETERMINED BY ACTUAL CONSTRUCTION CONDITIONS.

REVISIONS						DRAWN BY:		  TYPICAL FLOWING WATERBODY CROSSING OPEN-CUT					
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GREENCORE
PIPELINE SERVICES, LLC



CH2MHILL

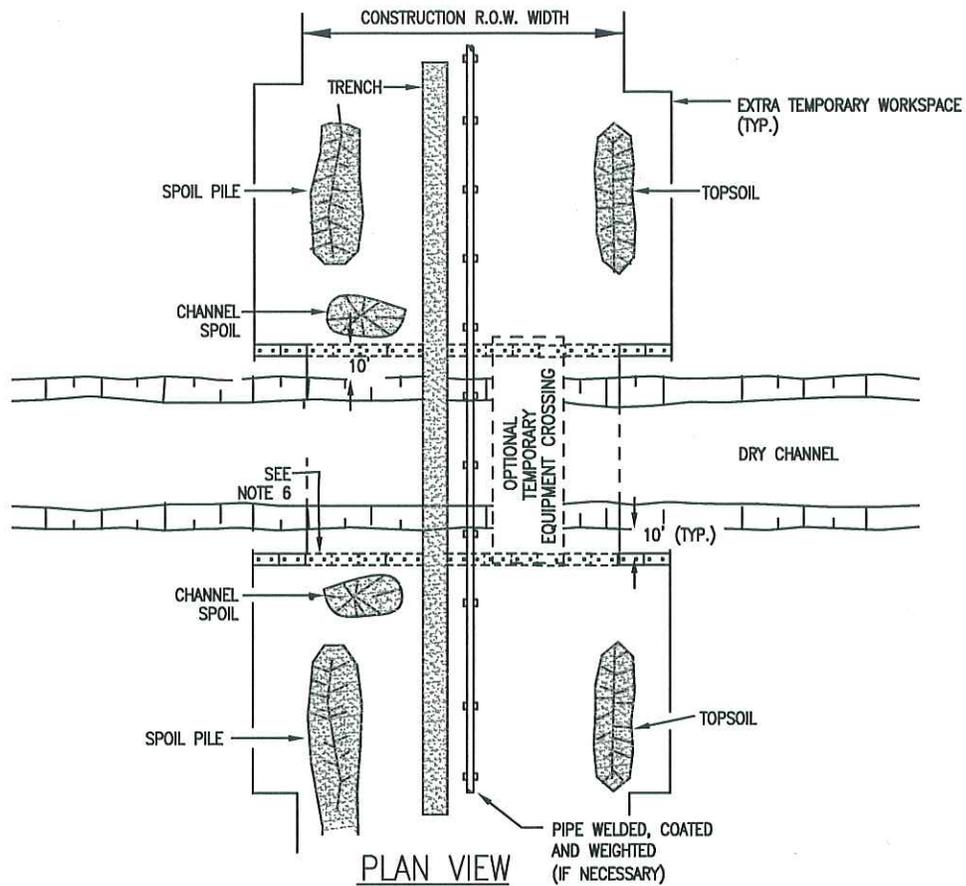
TYPICAL
WETLAND CROSSING PROCEDURE

PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-019	REV. A
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NOTES:

1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 75 FEET WIDE CONSISTING OF 50 FEET OF PERMANENT EASEMENT AND 25 FEET OF TEMPORARY WORKSPACE.
2. THE SAME LAYOUT APPLIES WHETHER CONSTRUCTION R.O.W. DOES OR DOES NOT ABUT A FOREIGN R.O.W.
3. IF OFFSET FROM A FOREIGN PIPELINE, THE OFFSET WILL BE 35 FEET FOR MOST WETLANDS, BUT MAY BE INCREASED OR DECREASED DEPENDING ON THE SITE SPECIFIC CONSTRUCTION REQUIREMENTS.
4. LOCATE ANY ADDITIONAL TEMPORARY WORK SPACE AREAS AT LEAST 50 FEET FROM EDGE OF WETLAND UNLESS OTHERWISE SPECIFIED IN A SITE-SPECIFIC PLAN.
5. CLEARING OF VEGETATION AND TREES IS PROHIBITED BETWEEN TEMPORARY EXTRA WORK SPACE AND THE EDGE OF THE WETLAND.
6. CUT VEGETATION AND TREES OFF AT GROUND LEVEL, LEAVING EXISTING ROOT SYSTEMS IN PLACE AND REMOVE CUTTINGS FROM THE WETLAND FOR DISPOSAL.
7. LIMIT CONSTRUCTION EQUIPMENT TO ONE PASS THROUGH WETLANDS TO THE EXTENT PRACTICABLE.
8. NO REFUELING OF EQUIPMENT OR CONCRETE COATING ACTIVITIES WITHIN 100 FEET OF WETLAND EXCEPT IN ACCORDANCE WITH THE SPCC PLAN. NO STORAGE OF HAZARDOUS MATERIALS WITHIN 100 FEET OF ANY WETLAND.
9. IF SATURATED AT TIME OF CONSTRUCTION, REDUCE SOIL COMPACTION BY UTILIZING WIDE-TRACK OR BALLOON TIRE CONSTRUCTION EQUIPMENT OR NORMAL EQUIPMENT OPERATED ON TIMBER RIPRAP OR EQUIPMENT MATS.
10. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS IMMEDIATELY AFTER INITIAL GROUND DISTURBANCE ACROSS THE ENTIRE CONSTRUCTION R.O.W. IMMEDIATELY UPSLOPE OF THE WETLAND BOUNDARY AND AT THE EDGE OF THE CONSTRUCTION R.O.W. ALONG THE WETLAND AS DIRECTED BY THE COMPANY INSPECTOR.
11. SEGREGATE THE TOP 1 FOOT OF TOPSOIL FROM THE AREA DISTURBED BY TRENCHING, EXCEPT IN AREAS WHERE STANDING WATER OR SATURATED SOILS ARE PRESENT. MAINTAIN 12" SEPARATION BETWEEN TOPSOIL AND TRENCH SPOIL.
12. LEAVE GAPS IN TOPSOIL AND SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH UPLAND SOILS INTO CREEKS OR WETLANDS. DO NOT USE TOPSOIL FOR PADDING. AVOID SCALPING VEGETATED GROUND SURFACE WHEN BACKFILLING SPOIL PILE.
13. IF SATURATED AT TIME OF CONSTRUCTION, LEAVE HARD PLUGS AT THE EDGE OF WETLAND UNTIL JUST PRIOR TO LOWERING IN.
14. LOWER-IN PIPE, INSTALL TRENCH BREAKERS AT WETLAND EDGES AS DIRECTED BY THE COMPANY INSPECTOR. BACKFILL IMMEDIATELY ON COMPLETION OF CONSTRUCTION.
15. REMOVE ANY TIMBER RIPRAP OR EQUIPMENT MATS FROM WETLANDS UPON COMPLETION OF CONSTRUCTION.
16. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY AND REPLACE TOPSOIL, WHERE SALVAGED, WITHOUT A CROWN OVER THE TRENCH.
17. TOPSOIL AND TRENCH SPOIL RELATIVE POSITIONS CAN, AS DIRECTED BY THE COMPANY INSPECTOR, BE ADJUSTED TO FIT SITE CONDITIONS.

REVISIONS						DRAWN BY:	 CH2MHILL TYPICAL WETLAND CROSSING PROCEDURE							
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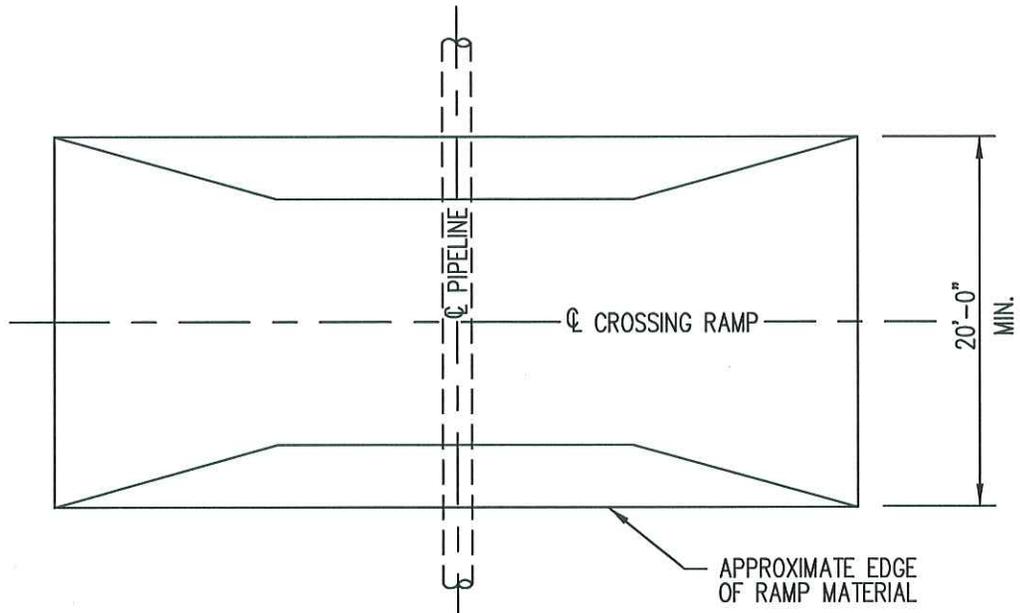


PLAN VIEW

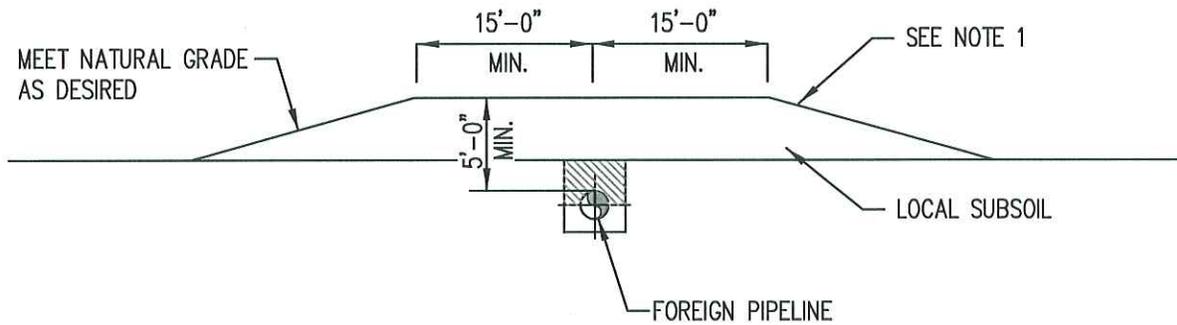
NOTES:

1. METHOD APPLIES TO CROSSINGS WHERE NO FLOWING WATER IS PRESENT AT THE TIME OF CROSSING.
2. CONTRACTOR MAY "MAINLINE THROUGH" THE CROSSING OR UP TO BOTH SIDES OF THE CROSSING; STRING, WELD, COAT, AND WEIGHT (IF NECESSARY), USING THE MAINLINE CREW WITH THE PIPE SKIDDED OVER THE CROSSING.
3. NO REFUELING OF MOBILE EQUIPMENT WITHIN 100 FEET OF DRY CHANNEL. REFUEL STATIONARY EQUIPMENT AS PER THE SPCC PLAN.
4. INSTALLATION OF TEMPORARY EQUIPMENT CROSSING IS OPTIONAL AT THE DISCRETION OF THE COMPANY'S REPRESENTATIVE.
5. IN AGRICULTURAL LAND, STRIP TOPSOIL FROM SPOIL STORAGE AREA. STOCKPILE TOPSOIL AND SPOIL SEPARATELY. TOPSOIL AND SPOIL WILL NOT BE STOCKPILED IN THE CROSSING CHANNEL AND WILL BE PLACED A MINIMUM OF 10 FEET FROM CROSSING BANKS WITHIN THE CONSTRUCTION R.O.W.
6. CONSTRUCT SEDIMENT BARRIERS ACROSS THE ENTIRE CONSTRUCTION R.O.W. FOLLOWING CLEARING AND GRADING AND MAINTAIN UNTIL CONSTRUCTION OF THE CROSSING. EROSION CONTROL MEASURES SHALL BE REINSTALLED IMMEDIATELY FOLLOWING BACKFILLING OF TRENCH AND STABILIZATION OF BANKS. BARRIERS MAY BE TEMPORARILY REMOVED TO ALLOW CONSTRUCTION ACTIVITIES BUT MUST BE REPLACED BY THE END OF EACH WORK DAY.
7. IN-STREAM SPOIL TO BE STORED OUT OF THE STREAM CHANNEL A MINIMUM OF 10 FEET FROM HIGH BANK AND WITHIN THE CONSTRUCTION R.O.W. UNLESS DEPICTED OTHERWISE IN SITE SPECIFIC CROSSING PLANS.
8. BACKFILL WITH NATIVE MATERIAL.
9. RESTORE CROSSING CHANNEL TO APPROXIMATE PRE-CONSTRUCTION PROFILE AND SUBSTRATE.
10. RESTORE CROSSING BANKS TO APPROXIMATE ORIGINAL CONDITION AND STABILIZE, AS REQUIRED.
11. ALL DIMENSIONS INDICATED SHALL BE DETERMINED BY ACTUAL CONSTRUCTION CONDITIONS.

REVISIONS						DRAWN BY:		  TYPICAL NON-FLOWING WATERBODY CROSSING OPEN-CUT					
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PLAN

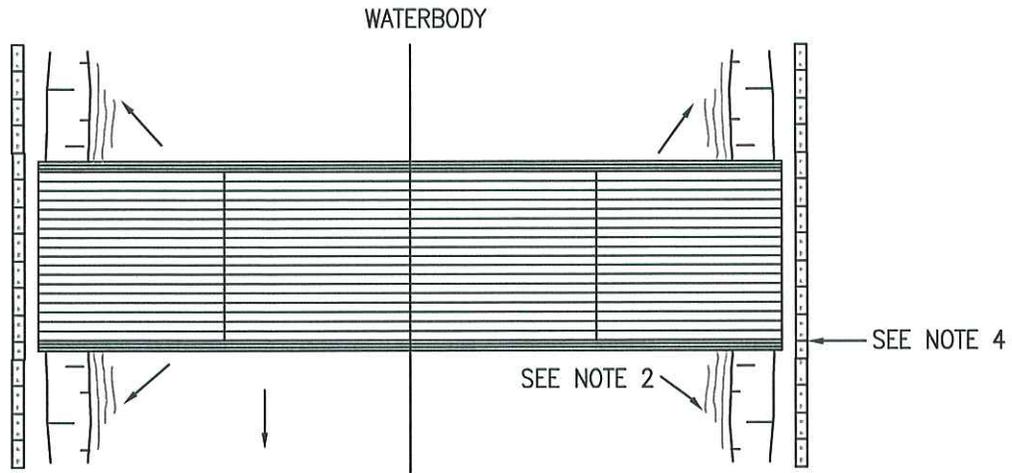


PROFILE

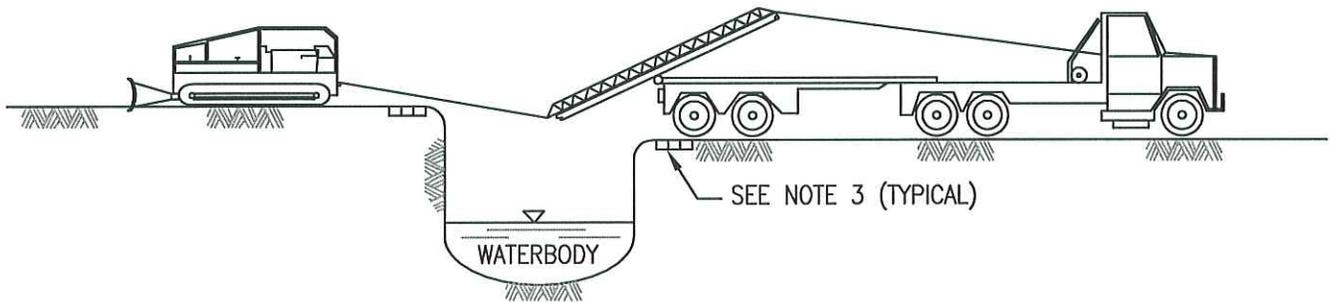
NOTES:

1. LENGTH OF RAMP SHALL VARY IN ACCORDANCE WITH CROSSING ANGLE. MINIMUM CROSSING ANGLE TO BE 45 DEGREES.
2. VEHICLES OR EQUIPMENT USING CROSSING SHALL PROCEED SLOWLY AND WITH CAUTION TO MINIMIZE IMPACT LOADING.
3. ON COMPLETION OF CONSTRUCTION, CONTRACTOR SHALL REMOVE RAMP AND RESTORE AREA TO THE SATISFACTION OF THE COMPANY REPRESENTATIVE.
4. GEOTEXTILE FABRIC (AND GEOTEXTILE GRID WHERE REQUIRED) SHALL BE INSTALLED TO PROTECT NATIVE TOPSOIL AS DIRECTED BY THE COMPANY INSPECTOR WHEN IMPORTED GRANULAR FILL OR NATIVE SUBSOIL FILL MATERIAL IS UTILIZED. GEOTEXTILE FABRIC, IF INSTALLED, SHALL EXTEND A MINIMUM OF 12" PAST THE FILL MATERIAL ON ALL FOUR SIDES OF THE RAMP. IMPORTED GRANULAR FILL MATERIAL OR NATIVE SUBSOIL FILL MATERIAL TO BE REMOVED AND DISPOSED OF AS DIRECTED BY THE COMPANY INSPECTOR.

REVISIONS						DRAWN BY:		  TYPICAL TEMPORARY CROSSING RAMP OVER FOREIGN PIPELINE					
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PLAN



PROFILE

NOTES:

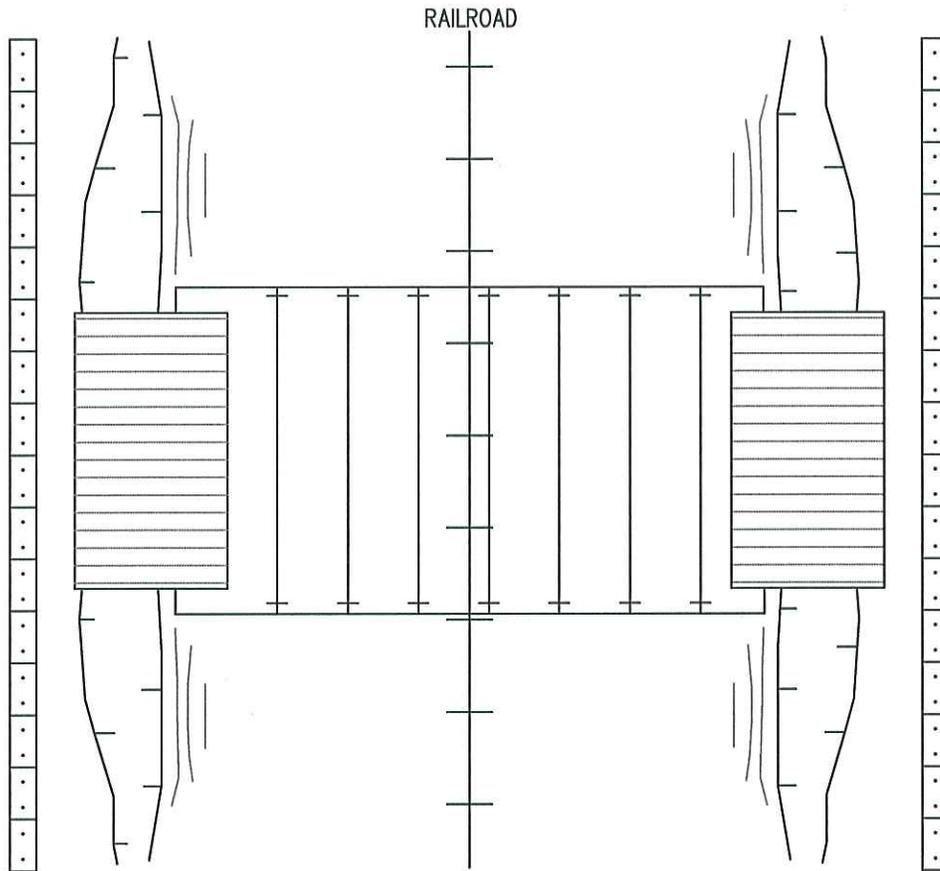
1. THIS TYPE OF BRIDGE IS GENERALLY USED ON NARR.O.W., DEEP CROSSINGS.
2. BRIDGE IS ANCHORED AND/OR TIED OFF TO ANCHOR BLOCKS FOR STABILITY.
3. UTILIZE APPROACH FILLS OF CLEAN GRANULAR MATERIAL, SWAMP MATS, SKIDS OR OTHER SUITABLE MATERIALS TO AVOID CUTTING THE BANKS WHEREVER FEASIBLE. ENSURE ADEQUATE FREEBOARD. AS REQUIRED, ENSURE THAT FILL MATERIAL USED DOES NOT SPILL INTO WATERBODY.
4. CONSTRUCT SEDIMENT BARRIERS ACROSS THE ENTIRE CONSTRUCTION R.O.W. TO PREVENT SILT LADEN WATER AND SPOIL FROM FLOWING BACK INTO WATERBODY. BARRIERS MAY BE TEMPORARILY REMOVED TO ALLOW CONSTRUCTION ACTIVITIES BUT MUST BE REPLACED BY THE END OF EACH WORK DAY. SILT FENCE, HAY BALES OR SANDBAGS MAY BE USED INTERCHANGEABLY.
5. REMOVE PORTABLE BRIDGES AS SOON AS POSSIBLE AFTER PERMANENT SEEDING UNLESS OTHERWISE DIRECTED BY COMPANY REPRESENTATIVE. THE STRUCTURE IS TO BE REMOVED IF THERE IS MORE THAN ONE MONTH BETWEEN FINAL GRADING AND SEEDING, AND ALTERNATIVE ACCESS TO THE CONSTRUCTION R.O.W. IS AVAILABLE.
6. DISPOSE OF ANY ROCK AS DIRECTED BY THE COMPANY REPRESENTATIVE.
7. RESTORE AND STABILIZE BED AND BANKS TO APPROXIMATE PRE-CONSTRUCTION CONDITIONS.

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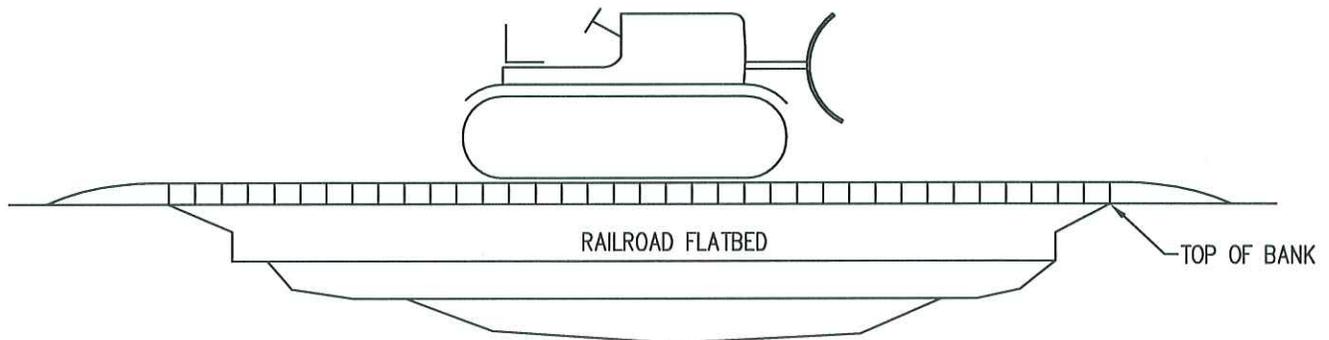


TYPICAL
PORTABLE WATERBODY BRIDGE

PLAN VIEW
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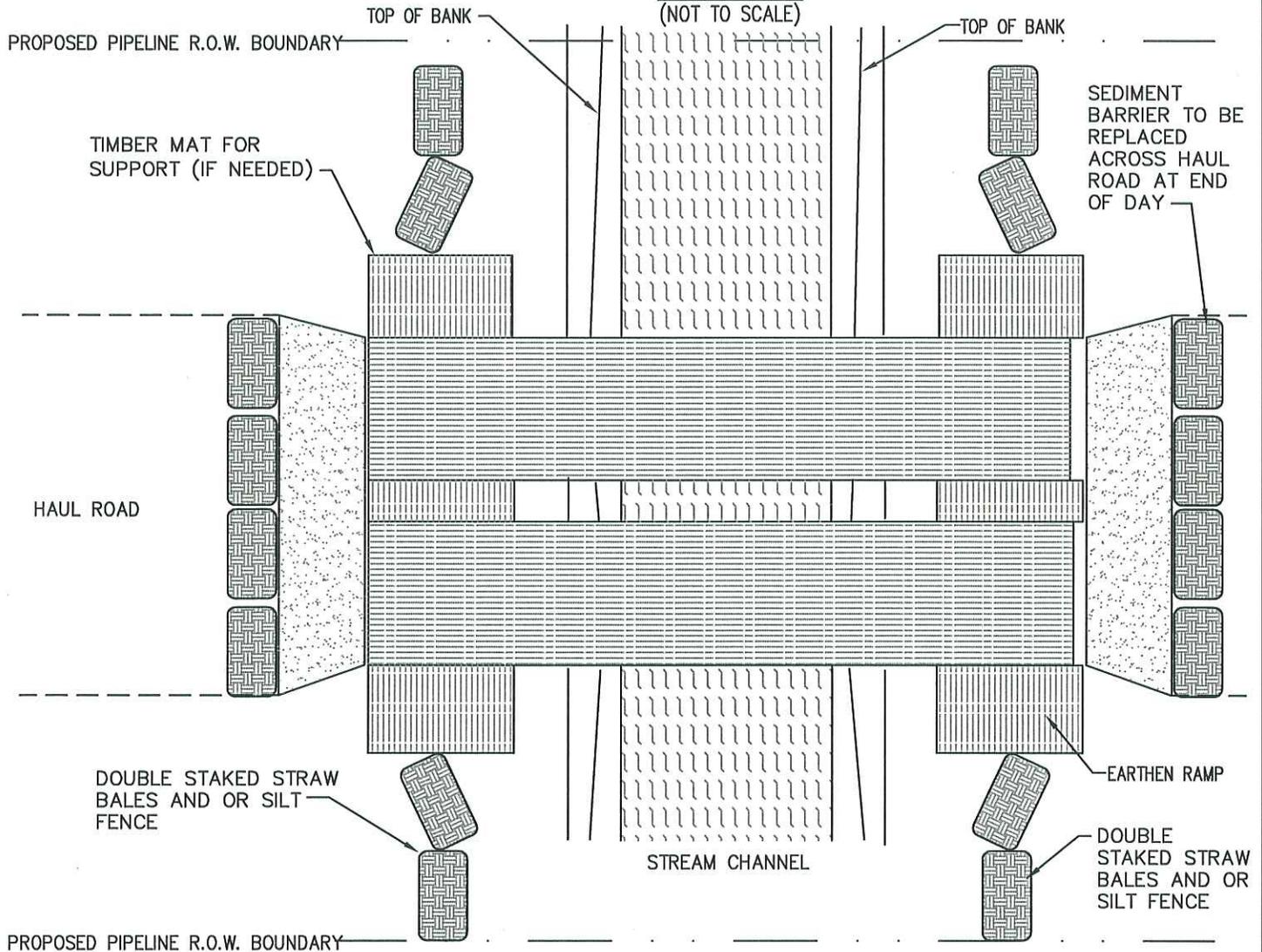


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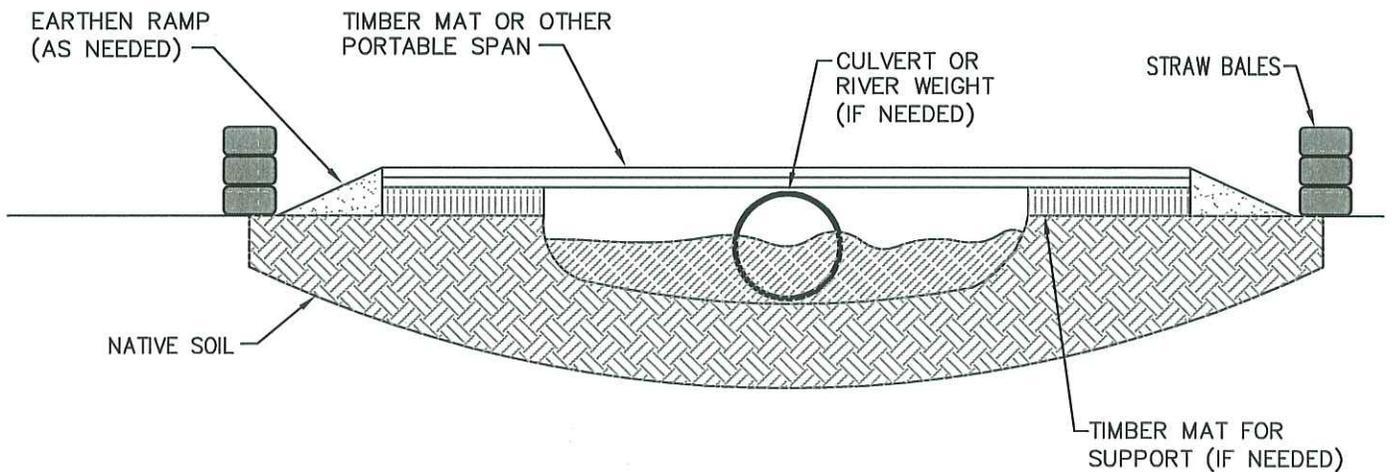


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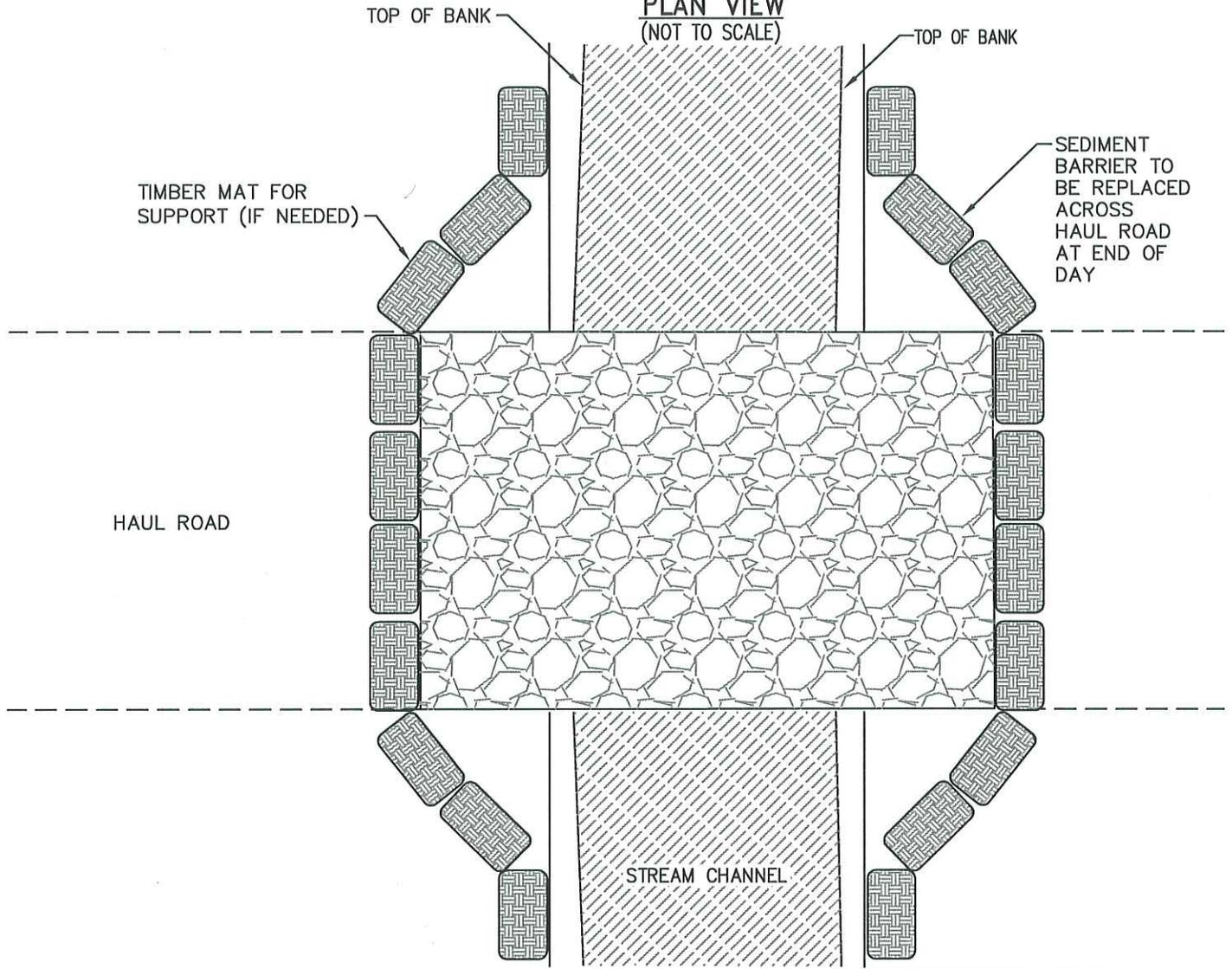


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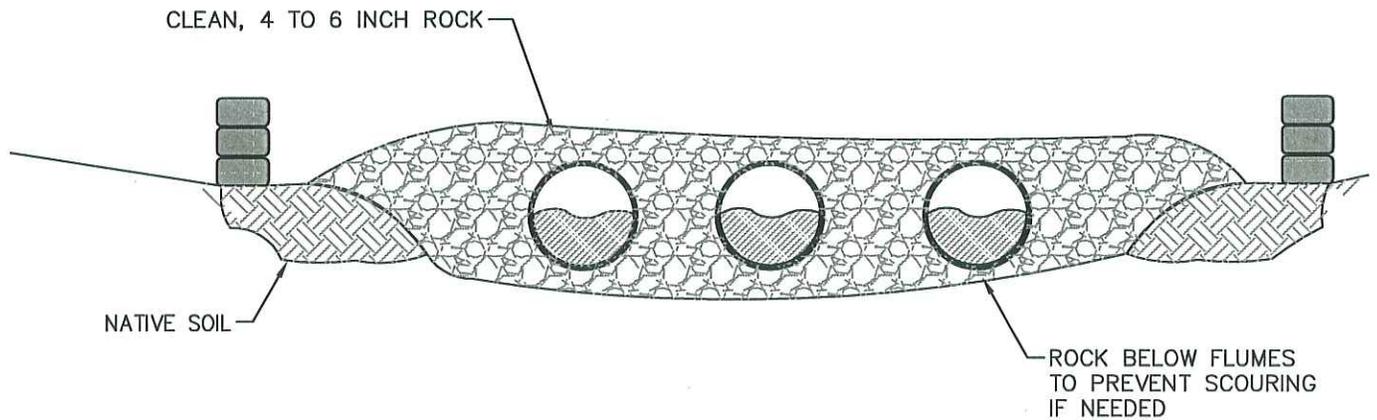


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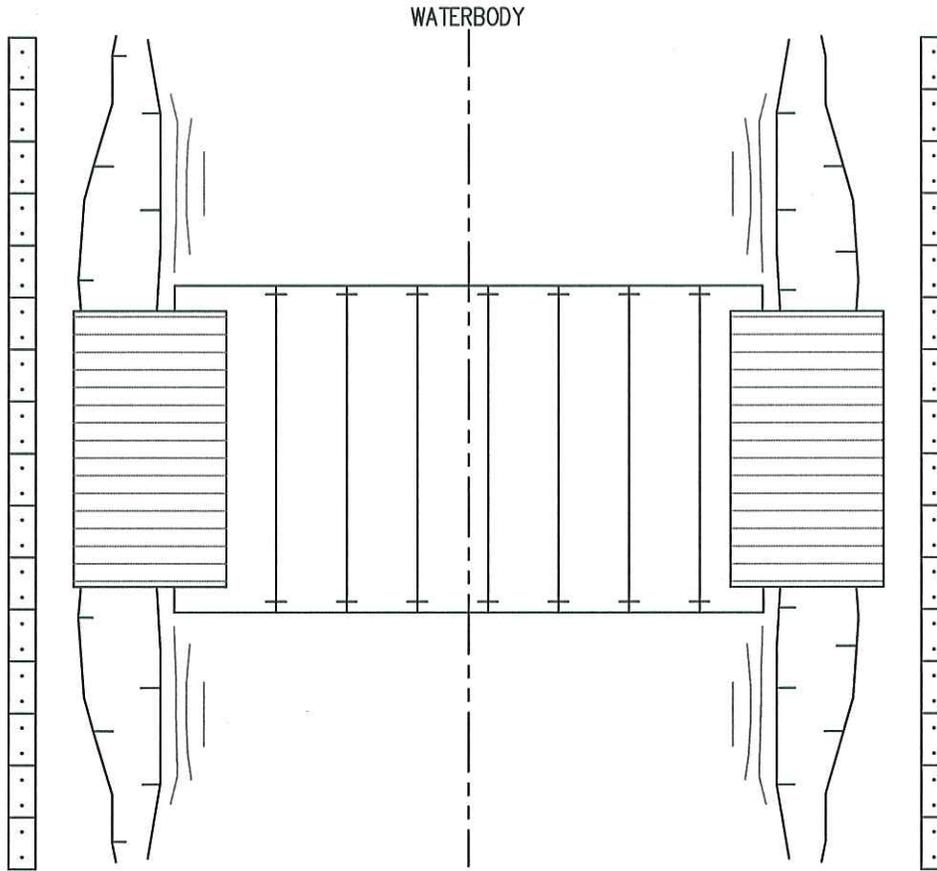


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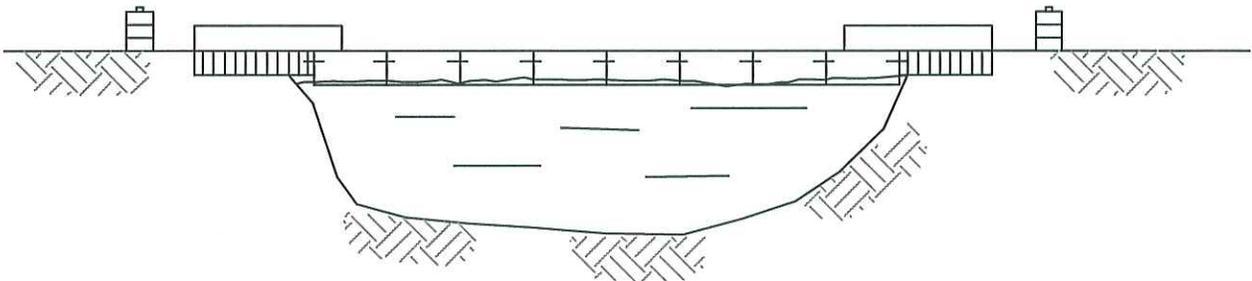


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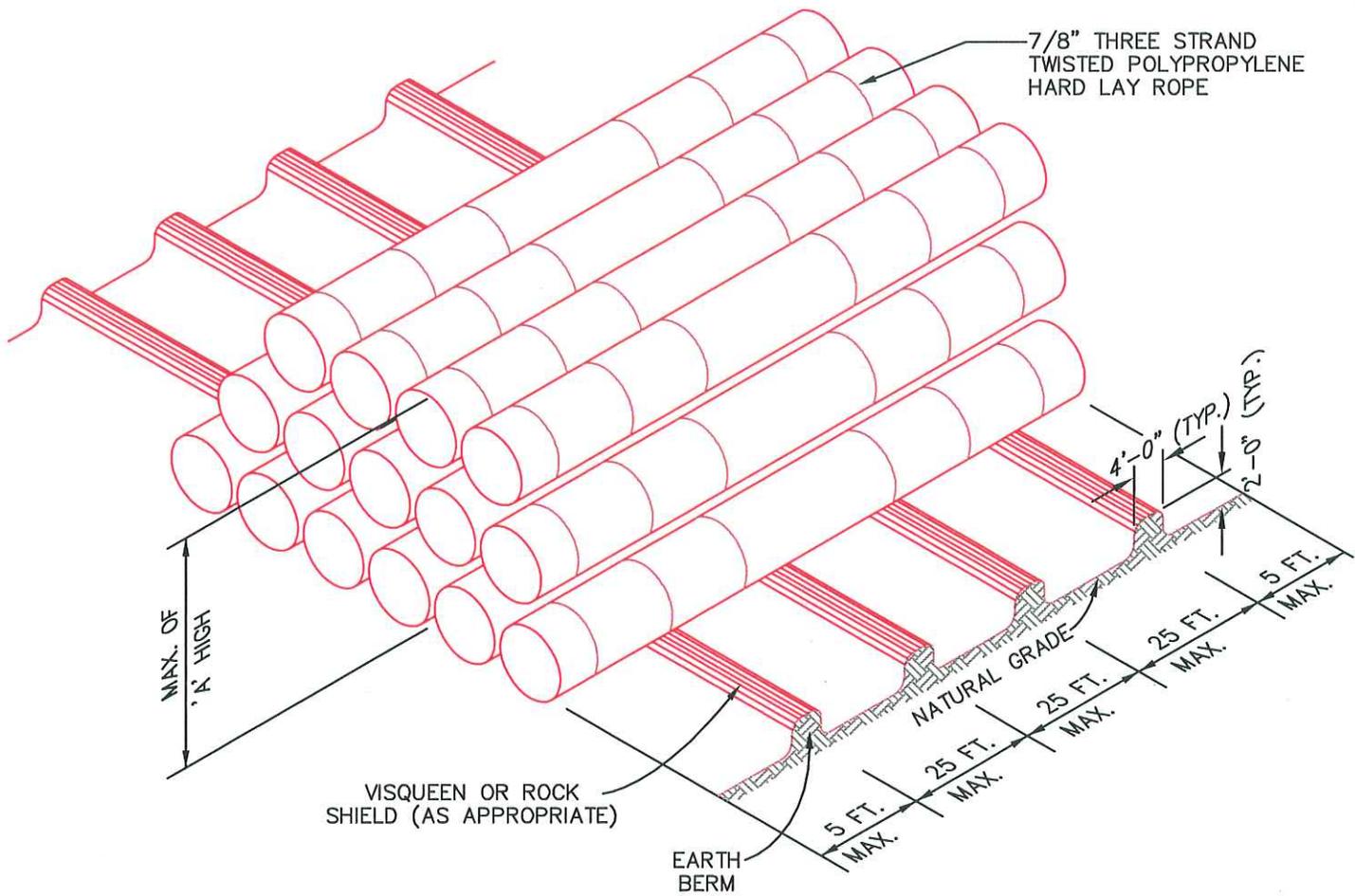


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BRIDGE DETAIL NOTES:

1. ONLY CLEARING EQUIPMENT MAY CROSS WATERBODIES BEFORE INSTALLATION OF THE EQUIPMENT BRIDGE.
2. DESIGN AND MAINTAIN BRIDGE TO WITHSTAND AND PASS THE HIGHEST ANTICIPATED FLOW THAT MAY OCCUR WHILE THE BRIDGE IS IN PLACE. CULVERTS MUST BE ALIGNED TO PREVENT BANK EROSION OR STREAM BED SCOUR. IF NECESSARY, INSTALL ENERGY DISSIPATING DEVICES DOWNSTREAM OF THE CULVERTS.
3. INSPECT BRIDGE ELEVATION SO BRIDGE REMAINS SUPPORTED ABOVE HIGH BANK, AND DOES NOT SINK INTO BANK. ADDITIONAL SUPPORT MUST BE ADDED ON TOP OF BANK AND UNDER SPAN IF INITIAL SUPPORT STARTS TO SETTLE. ALL BRIDGES MUST BE ANCHORED FOR STABILITY.
4. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED IN ACCORDANCE WITH COMPANY'S UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN. CONSTRUCT SEDIMENT BARRIERS ACROSS THE ENTIRE CONSTRUCTION R.O.W. TO PREVENT SILT LADEN WATER AND SPOIL FROM FLOWING BACK INTO WATERBODY. BARRIERS MAY BE TEMPORARILY REMOVED TO ALLOW CONSTRUCTION ACTIVITIES BUT MUST BE REPLACED BY THE END OF EACH WORK DAY. SILT FENCE, HAY BALES OR SANDBAGS MAY BE USED INTERCHANGEABLY.
5. BRIDGE DECKS WILL BE KEPT FREE OF SOIL.
6. EQUIPMENT BRIDGES WILL CONSIST OF ONE OF THE FOLLOWING: CLEAN ROCK PLACED OVER FLUME PIPES; PREFABRICATED CONSTRUCTION MATS; RAIL FLAT CARS PLACED OVER THE WATERBODY WITH OR WITHOUT A CULVERT; OR FLEX-FLOAT OR OTHER TEMPORARY BRIDGING, SUCH AS BAILEY BRIDGES.
7. REMOVE EQUIPMENT BRIDGES AND ASSOCIATED MATERIAL AS SOON AS POSSIBLE FOLLOWING PERMANENT SEEDING AND FINAL RESTORATION OF THE R.O.W.. RESTORE AND STABILIZE BED AND BANKS TO APPROXIMATE PRE-CONSTRUCTION CONDITIONS.
8. DISPOSE OF ANY ROCK AS DIRECTED BY COMPANY REPRESENTATIVE.
9. CONTRACTOR SHALL COMPLY WITH ALL CONDITIONS AS REQUIRED BY APPLICABLE PERMITS.
10. BRIDGES ARE NOT REQUIRED ON DRY WASHES.

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ROPE INSTALLATION

1. ROPE SPACING SHOULD BE A MAXIMUM OF 6.0 FEET FROM THE PIPE ENDS AND A MAXIMUM OF 6.0 FEET FROM GIRTH WELDS.
2. THE INTERVALS BETWEEN RINGS SHOULD BE BETWEEN 10.0 FEET AND 20.0 FEET WITH A MINIMUM OF SIX LOOPS SPACED OVER A STANDARD DOUBLE JOINT LENGTH (80 FEET).
3. THE INTERVALS MUST BE ADJUSTED TO INSURE THERE IS NO PIPE TO PIPE CONTACT. ROPE ENDS SHALL BE FUSED WITH A BLOW TORCH PRIOR TO SLIPPING THE LOOP OVER THE PIPE.

NOTES:

1. THE USE OF ALTERNATE METHODS FOR STOCKPIILING PIPE AND/OR THE USE OF ALTERNATE MATERIALS FOR PREVENTING PIPE TO PIPE CONTACT SHALL REQUIRE WRITTEN APPROVAL OF THE COMPANY.
2. PIPE SHALL BE STOCKPIILED AND SECURED (AS NECESSARY) TO PRECLUDE MOVEMENT OF PIPE.
3. ALL MATERIALS SHALL BE FURNISHED BY THE CONTRACTOR.

PIPE SIZE	'A' (NO. OF R.O.W.S)	PIPE SIZE	'A' (NO. OF R.O.W.S)	PIPE SIZE	'A' (NO. OF R.O.W.S)
4"	10	18"	4	34"	3
6"	8	20"	4	36"	3
8"	6	22"	3	42"	3
10"	6	24"	3	48"	2
12"	5	28"	3		
16"	4	30"	3		

REVISIONS						DRAWN BY:	
△						CHECKED BY:	
△						REVIEWED BY:	
△						APPROVED BY:	
△						PROJECT MANAGER:	
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE	
NO.	DESCRIPTION	DATE	BY	CHK	APPR.		



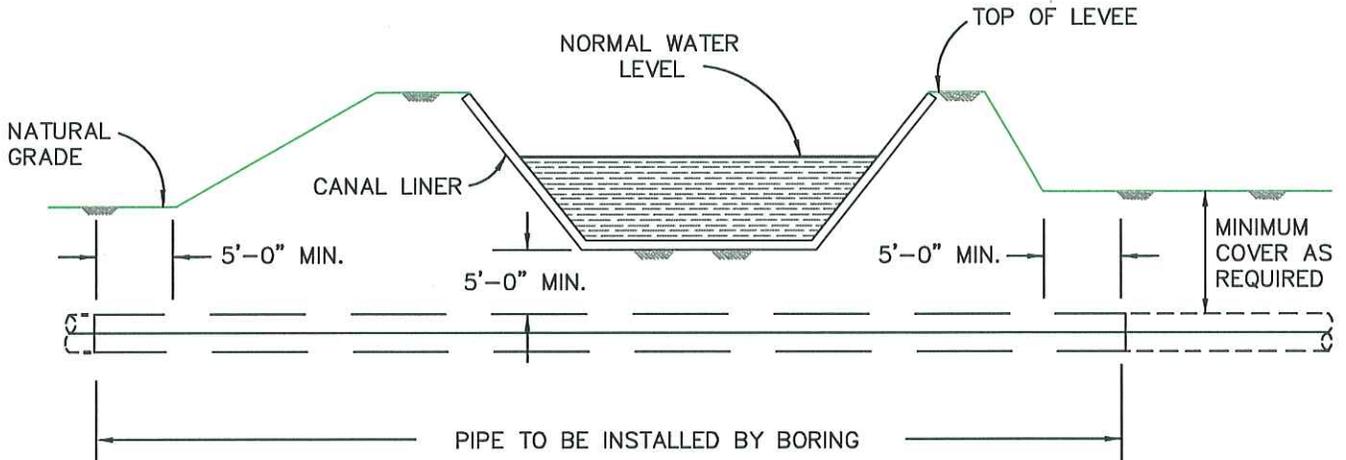
GREENCORE
PAPERLESS CONSTRUCTION



CH2MHILL

TYPICAL
TEMPORARY PIPE STOCK PILES

PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-028	REV.	A
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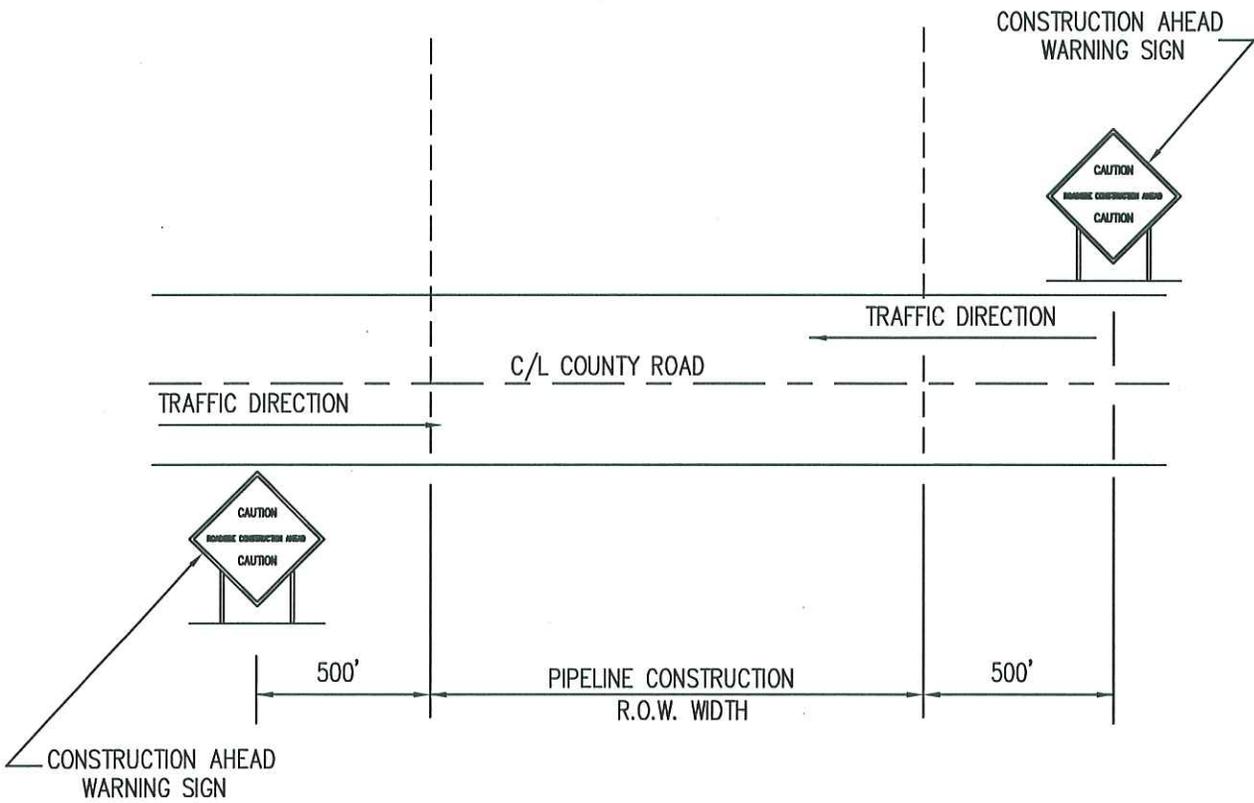


ELEVATION

NOTES:

1. LIMITS OF BORING TO EXTEND A MINIMUM OF 5'-0" BEYOND TOE OF SLOPE ON EACH SIDE OF CANAL.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO CANAL & LEVEES AND SHALL REPAIR ANY DAMAGE TO THE SATISFACTION OF THE CANAL OWNER, OR GOVERNING AUTHORITY.
3. CONTRACTOR TO INSTALL TEMPORARY BRIDGE ACROSS CANAL FOR EQUIPMENT ACCESS OR USE THE NEAREST PUBLIC BRIDGE IF AVAILABLE.
4. CONTRACTOR TO NOTIFY RESPONSIBLE LAND OWNER OR PERMITTING AUTHORITY PRIOR TO INSTALLATION.
5. CONSTRUCT ALL CROSSINGS IN ACCORDANCE WITH ENVIRONMENTAL PERMIT REQUIREMENTS AND CONDITIONS.
6. CARRIER PIPE TO BE EXTERNALLY COATED FOR CORROSION CONTROL.
7. PIPELINE TO BE CATHODICALLY PROTECTED PIPELINE DESIGN AS PER REQUIREMENTS OF PART 195 OF THE CODE OF FEDERAL REGULATIONS (LATEST EDITION).
8. TRAFFIC TO BE MAINTAINED DURING INSTALLATION.
9. PIPELINE TO BE INSTALLED BY BORING.

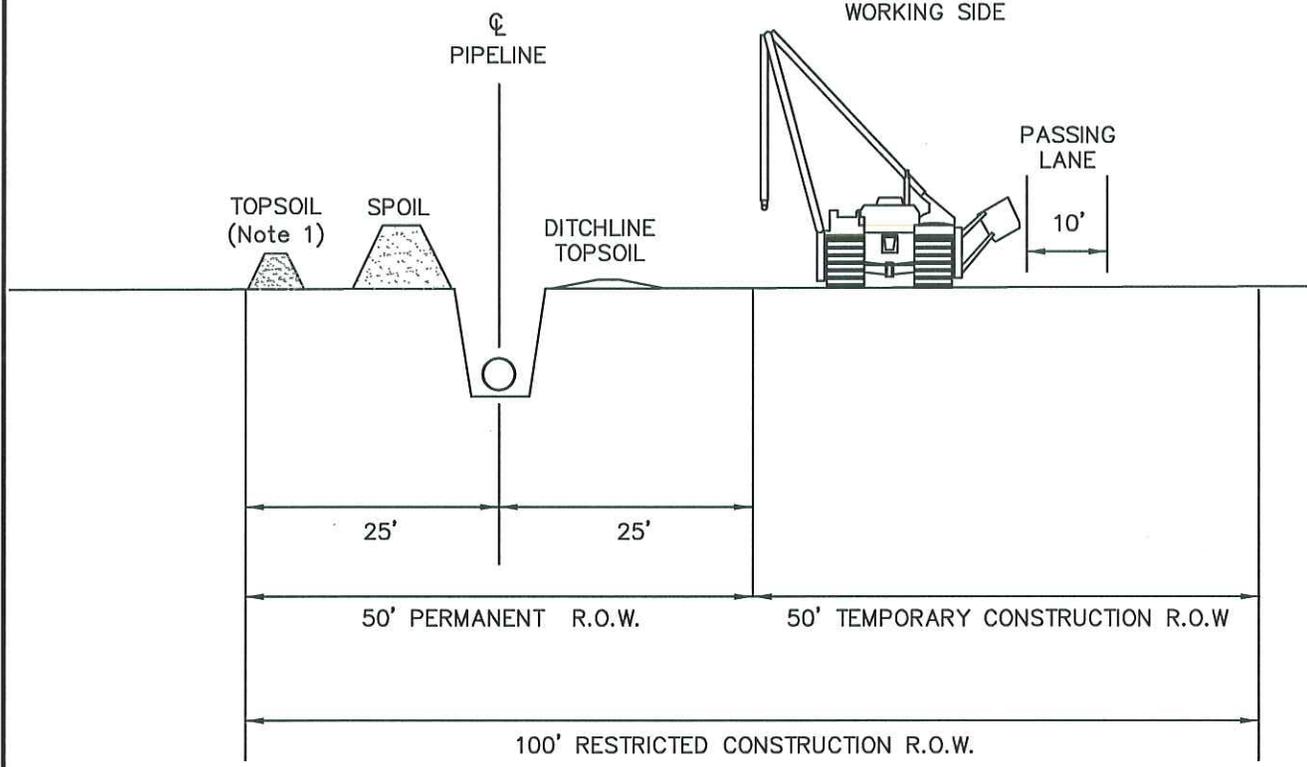
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△						APPROVED BY:						
△						PROJECT MANAGER:						
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-030	REV.	A
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.							



NOTES:

1. CONTRACTOR IS TO CONTACT APPROPRIATE COUNTY AGENCIES TO IDENTIFY TRAFFIC CONTROL REQUIREMENTS.
2. CONTRACTOR IS TO SUPPLY ALL REQUIRED MATERIAL, AND LABOR FOR ABOVE TRAFFIC PLAN.

REVISIONS						DRAWN BY:		 CH2MHILL TYPICAL TRAFFIC CONTROL PLAN								
△						CHECKED BY:						PROJECT NUMBER		DRAWING NUMBER		REV.
△						REVIEWED BY:						2568-01		TYP-031		A
△						APPROVED BY:										
△						PROJECT MANAGER:										
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NO.	DESCRIPTION	DATE	BY	CHK.	APPR.											



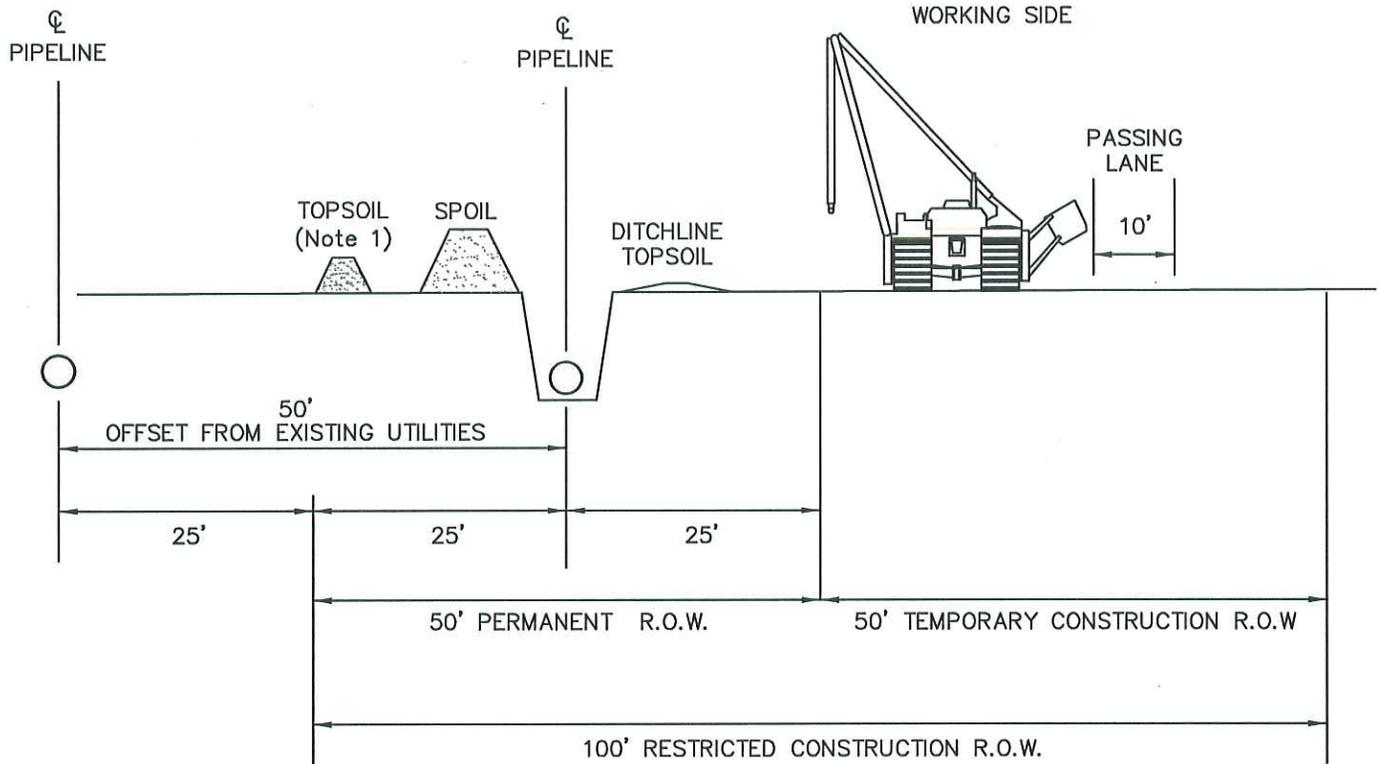
NOTES:

1. THIS IS AN ALTERNATE TOPSOIL LOCATION FOR THE DITCH LINE TOPSOIL DEPENDING UPON THE CONDITIONS ENCOUNTERED IN THE FIELD DURING CONSTRUCTION.

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△						REVIEWED BY:	
△						APPROVED BY:	
△						PROJECT MANAGER:	
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE	
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.	PROJECT NUMBER	2568-01
						DRAWING NUMBER	TYP-032
						REV.	A



TYPICAL
CONSTRUCTION R.O.W. PROFILE: GREENFIELD



NOTES:

1. THIS IS AN ALTERNATE TOPSOIL LOCATION FOR THE DITCH LINE TOPSOIL DEPENDING UPON THE CONDITIONS ENCOUNTERED IN THE FIELD DURING CONSTRUCTION.

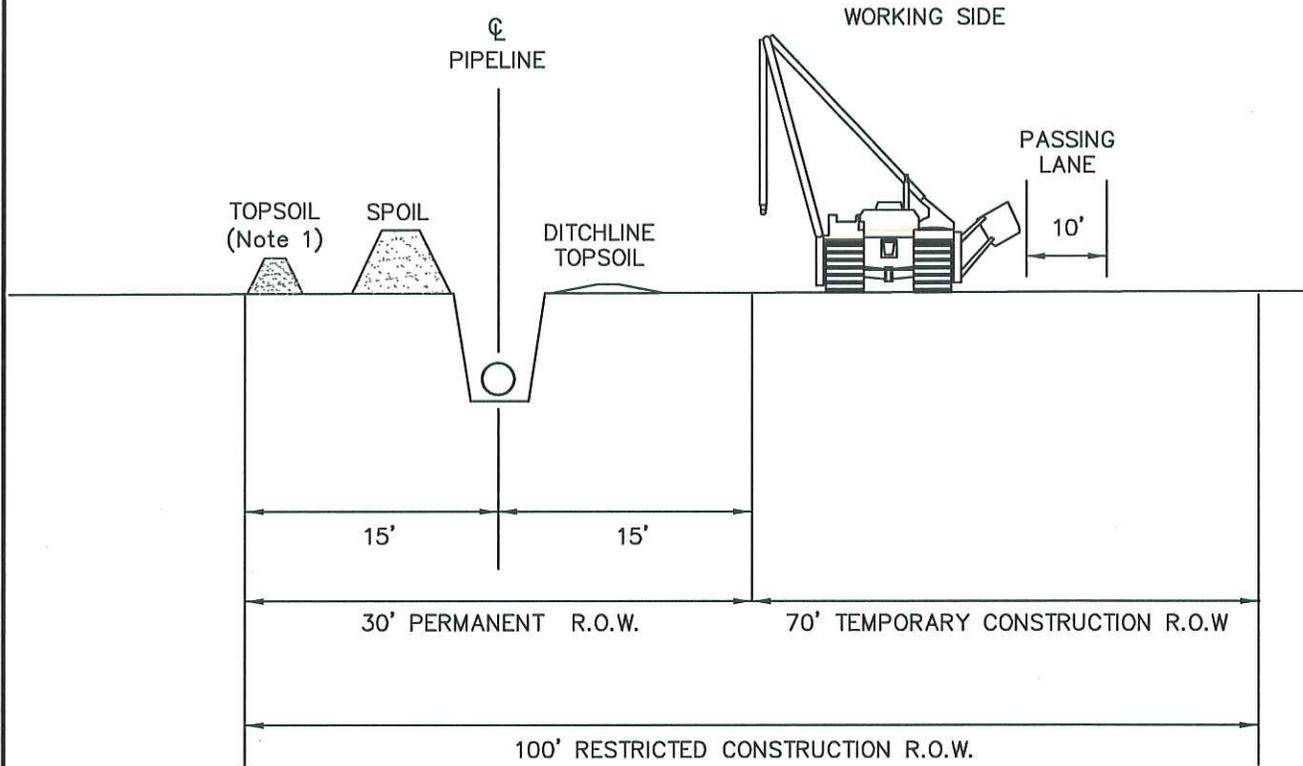
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NO.	DESCRIPTION	DATE	BY	CHK	APPR.	PROJECT NUMBER	DRAWING NUMBER
						2568-01	TYP-032A





 TYPICAL
 CONSTRUCTION R.O.W. PROFILE: SHARED CORRIDOR

PROJECT NUMBER	DRAWING NUMBER	REV.
2568-01	TYP-032A	A



NOTES:

1. THIS IS AN ALTERNATE TOPSOIL LOCATION FOR THE DITCH LINE TOPSOIL DEPENDING UPON THE CONDITIONS ENCOUNTERED IN THE FIELD DURING CONSTRUCTION.

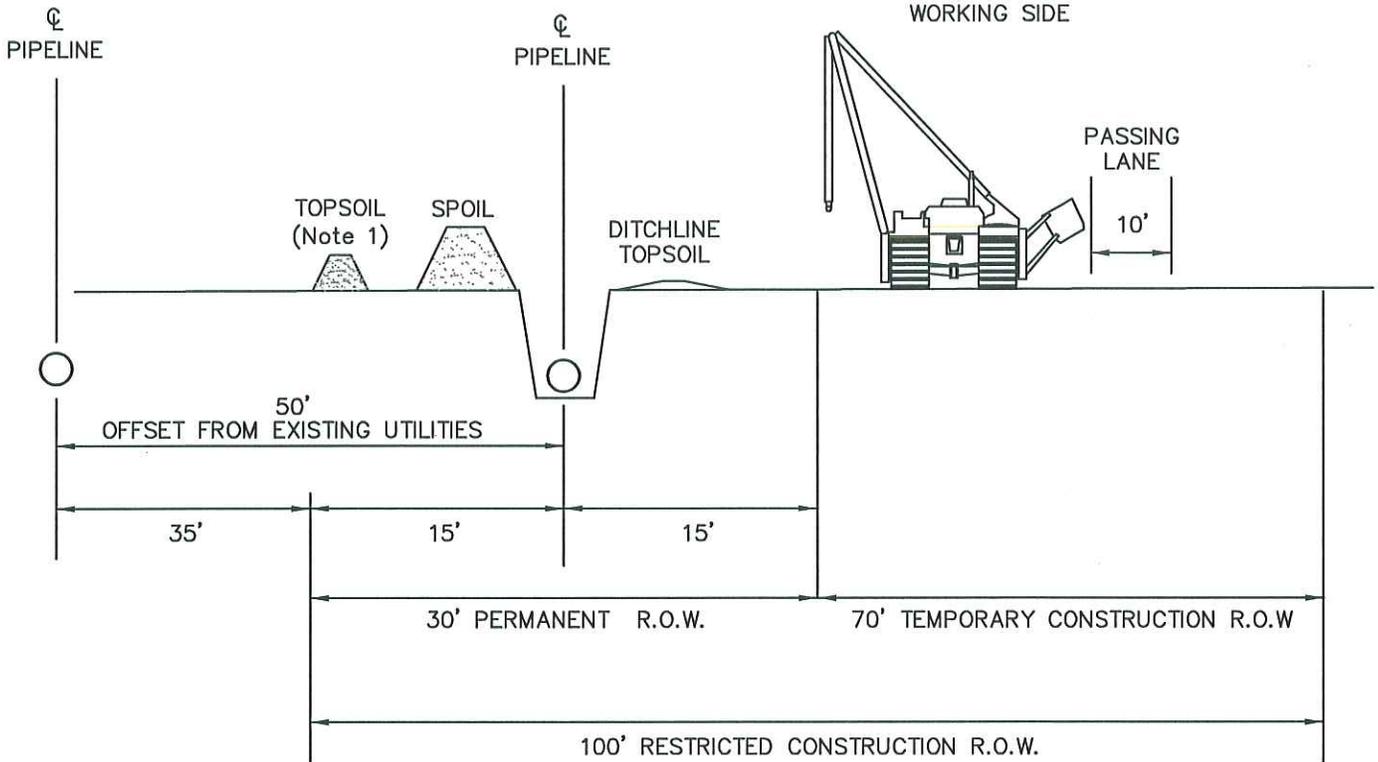
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NO.	DESCRIPTION	DATE	BY	CHK.	APPR.	PROJECT NUMBER	DRAWING NUMBER
						2568-01	TYP-032B



TYPICAL

CONSTRUCTION R.O.W. PROFILE: GREENFIELD STATE PROPERTY

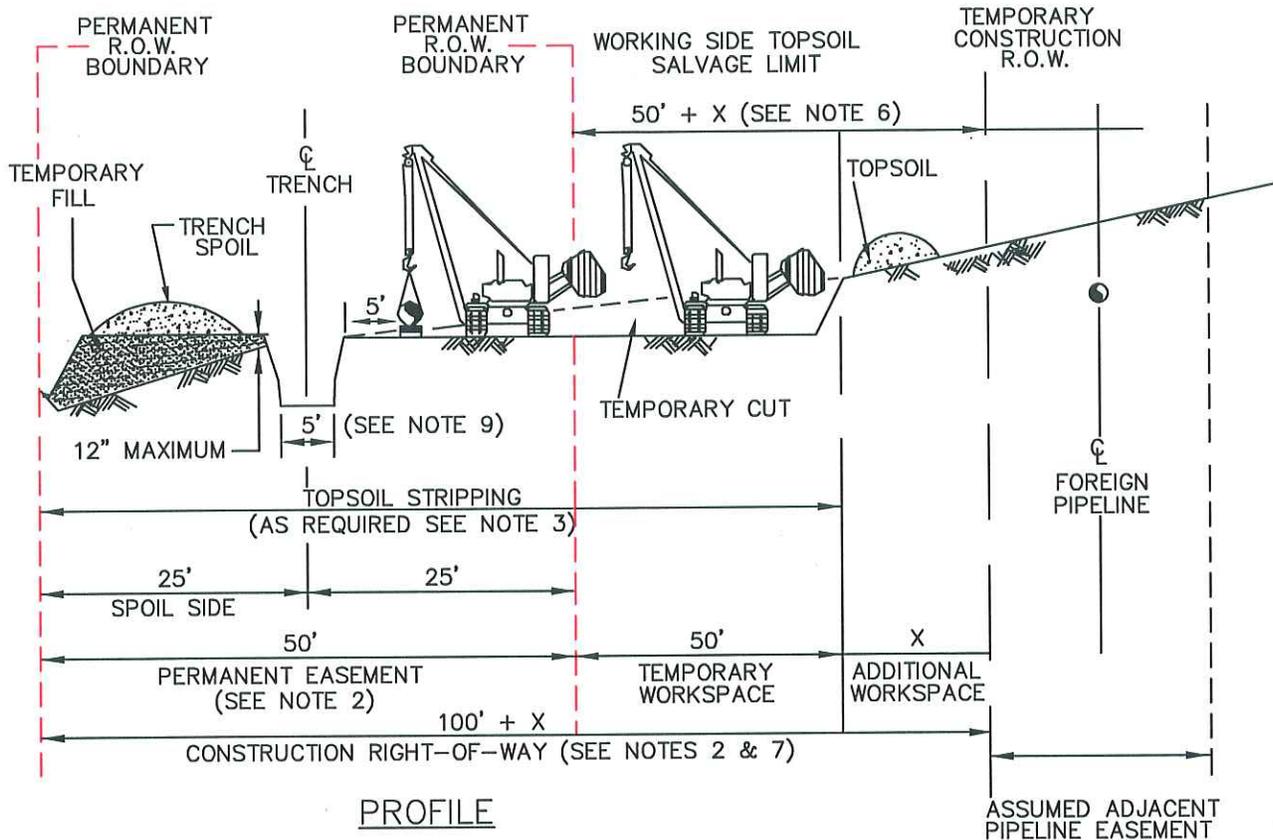
REV. A



NOTES:

1. THIS IS AN ALTERNATE TOPSOIL LOCATION FOR THE DITCH LINE TOPSOIL DEPENDING UPON THE CONDITIONS ENCOUNTERED IN THE FIELD DURING CONSTRUCTION.

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△						REVIEWED BY:							
△						APPROVED BY:							
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NO.	DESCRIPTION	DATE	BY	CHK.	APPR.								

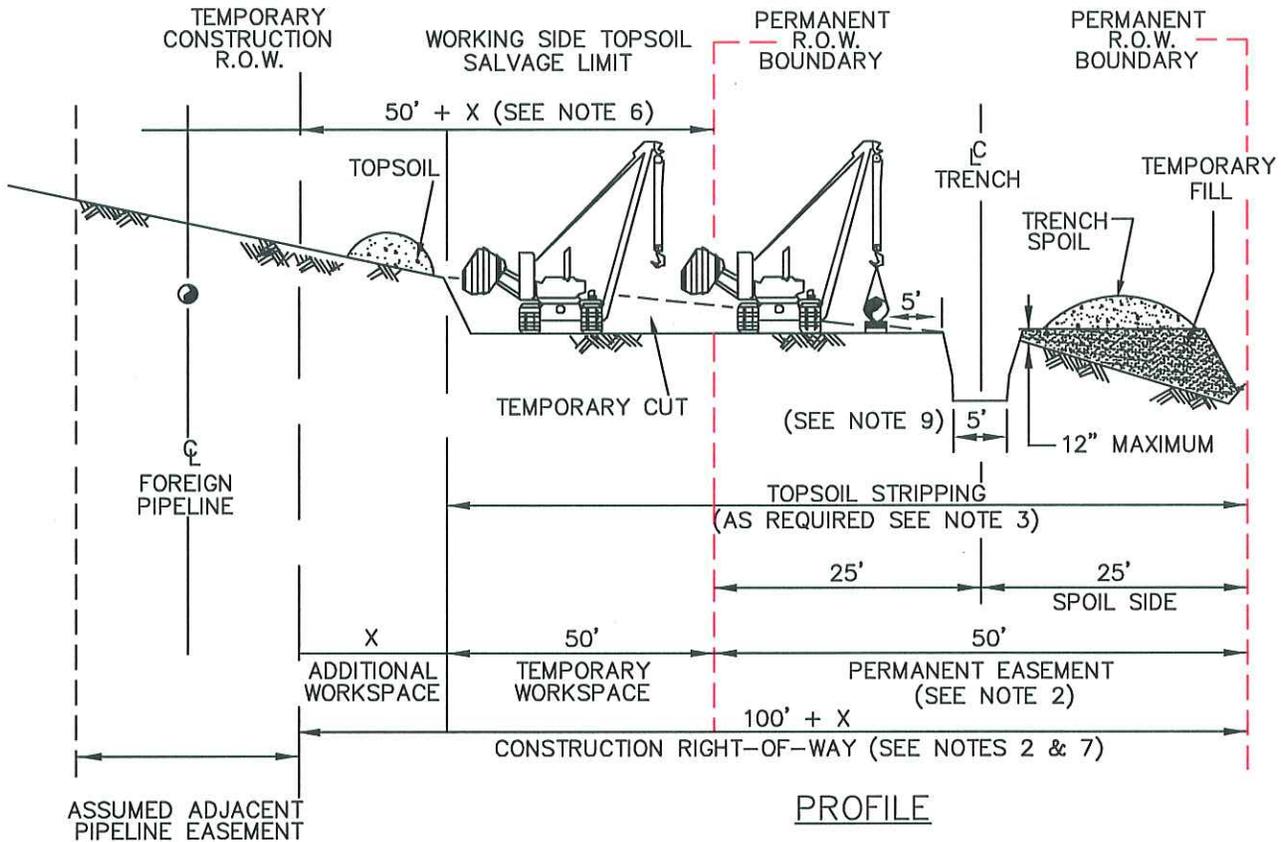


PROFILE

NOTES:

1. SIDE HILL CONSTRUCTION CUT AND FILL SHALL BE ALLOWED WHENEVER, IN THE OPINION OF THE CONTRACTOR, STEEP SIDE HILL CONSTRUCTION IS WARRANTED FOR PERSONNEL AND/OR EQUIPMENT SAFETY CONSIDERATIONS.
2. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 100 FEET PLUS X (TEMPORARY WORKSPACE), CONSISTING OF 50 FEET OF PERMANENT EASEMENT AND 50 FEET PLUS X OF TEMPORARY WORKSPACE. X TEMPORARY WORKSPACE DIMENSION WILL VARY WITH THE GRADE OF THE HILL AND / OR SIDE SLOPE.
3. THIS DRAWING REFLECTS "TRENCH, SPOIL, AND WORKING SIDE" TOPSOIL STRIPPING PROCEDURE AS NEEDED FOR HILLSIDE LEVELING. SALVAGE TOPSOIL OVER TRENCH, UNDER THE SPOIL PILE, AND FROM TEMPORARY CUT AND FILL AREAS AT LOCATIONS IDENTIFIED ON THE CONSTRUCTION ALIGNMENT SHEETS OR AS DIRECTED BY THE COMPANY INSPECTOR. DEPTH OF TOPSOIL STRIPPING NOT TO EXCEED 12 INCHES.
4. STOCKPILE TOPSOIL AS SHOWN OR IN ANY CONFIGURATION APPROVED BY THE COMPANY INSPECTOR. KEEP TOPSOIL AND SPOIL PILES CLEAN OF ALL CONSTRUCTION DEBRIS. MAINTAIN A MINIMUM 12 INCHES OF SEPARATION BETWEEN TOPSOIL AND TRENCH SPOIL PILES.
5. LEAVE GAPS IN TOPSOIL AND SPOIL PILES AT OBVIOUS DRAINAGE. DO NOT PUSH UPLAND SOILS INTO CREEKS OR WETLANDS. DO NOT USE TOPSOIL FOR PADDING. AVOID SCALPING VEGETATED GROUND SURFACE WHEN BACKFILLING TOPSOIL PILE.
6. THE OFFSET FROM A FOREIGN PIPELINE, WHERE APPLICABLE, WILL BE 50 FEET PLUS X (TEMPORARY WORKSPACE), X TEMPORARY WORKSPACE DIMENSION WILL VARY WITH THE GRADE OF THE HILL AND / OR SIDE SLOPE.
7. SAME LAYOUT APPLIES WHERE CONSTRUCTION R.O.W. DOES NOT ABUT EXISTING R.O.W.
8. TEMPORARILY SUSPEND TOPSOIL HANDLING OPERATIONS DURING INORDINATELY WINDY CONDITIONS UNTIL MITIGATIVE MEASURES TO MINIMIZE WIND EROSION CAN BE IMPLEMENTED.
9. BOTTOM OF TRENCH WIDTH WILL BE AN AVERAGE OF 2' (TYPICAL) HOWEVER, UNDER CERTAIN CIRCUMSTANCES, THE TRENCH MAY BE A MAXIMUM OF 5' WIDE.

REVISIONS						DRAWN BY:		 TYPICAL CONSTRUCTION R.O.W. PROFILE: SIDE HILL CONSTRUCTION (RIGHT SIDE)		
△						CHECKED BY:				
△						REVIEWED BY:				
△						APPROVED BY:				
△						PROJECT MANAGER:				
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		PROJECT NUMBER	DRAWING NUMBER	REV.
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.			2568-01	TYP-032D	A

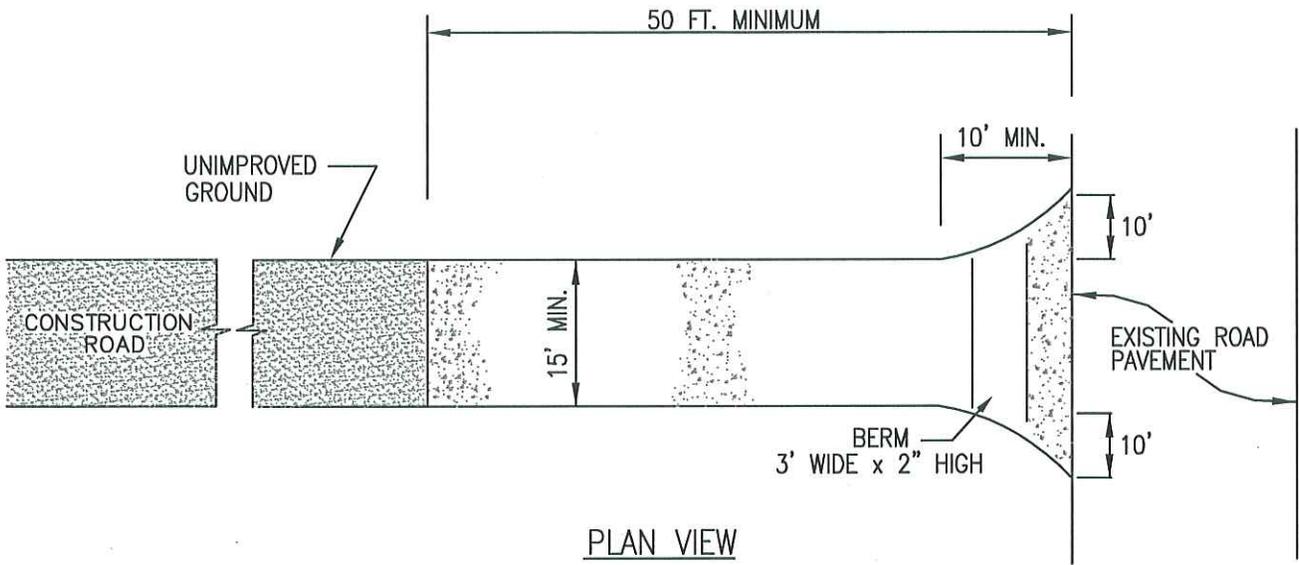


PROFILE

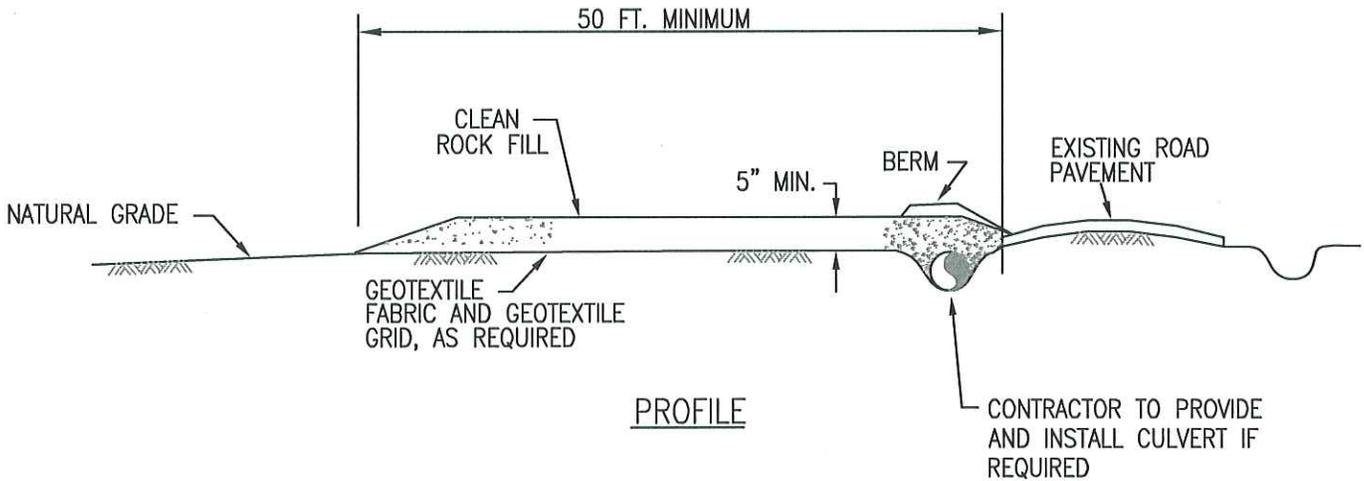
NOTES:

1. SIDE HILL CONSTRUCTION CUT AND FILL SHALL BE ALLOWED WHENEVER, IN THE OPINION OF THE CONTRACTOR, STEEP SIDE HILL CONSTRUCTION IS WARRANTED FOR PERSONNEL AND/OR EQUIPMENT SAFETY CONSIDERATIONS.
2. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 100 FEET PLUS X (TEMPORARY WORKSPACE), CONSISTING OF 50 FEET OF PERMANENT EASEMENT AND 50 FEET PLUS X OF TEMPORARY WORKSPACE. X TEMPORARY WORKSPACE DIMENSION WILL VARY WITH THE GRADE OF THE HILL AND / OR SIDE SLOPE.
3. THIS DRAWING REFLECTS "TRENCH, SPOIL, AND WORKING SIDE" TOPSOIL STRIPPING PROCEDURE AS NEEDED FOR HILLSIDE LEVELING. SALVAGE TOPSOIL OVER TRENCH, UNDER THE SPOIL PILE, AND FROM TEMPORARY CUT AND FILL AREAS AT LOCATIONS IDENTIFIED ON THE CONSTRUCTION ALIGNMENT SHEETS OR AS DIRECTED BY THE COMPANY INSPECTOR. DEPTH OF TOPSOIL STRIPPING NOT TO EXCEED 12 INCHES.
4. STOCKPILE TOPSOIL AS SHOWN OR IN ANY CONFIGURATION APPROVED BY THE COMPANY INSPECTOR. KEEP TOPSOIL AND SPOIL PILES CLEAN OF ALL CONSTRUCTION DEBRIS. MAINTAIN A MINIMUM 12 INCHES OF SEPARATION BETWEEN TOPSOIL AND TRENCH SPOIL PILES.
5. LEAVE GAPS IN TOPSOIL AND SPOIL PILES AT OBVIOUS DRAINAGE. DO NOT PUSH UPLAND SOILS INTO CREEKS OR WETLANDS. DO NOT USE TOPSOIL FOR PADDING. AVOID SCALPING VEGETATED GROUND SURFACE WHEN BACKFILLING TOPSOIL PILE.
6. THE OFFSET FROM A FOREIGN PIPELINE, WHERE APPLICABLE, WILL BE 50 FEET PLUS X (TEMPORARY WORKSPACE), X TEMPORARY WORKSPACE DIMENSION WILL VARY WITH THE GRADE OF THE HILL AND / OR SIDE SLOPE.
7. SAME LAYOUT APPLIES WHERE CONSTRUCTION R.O.W. DOES NOT ABUT EXISTING R.O.W.
8. TEMPORARILY SUSPEND TOPSOIL HANDLING OPERATIONS DURING INORDINATELY WINDY CONDITIONS UNTIL MITIGATIVE MEASURES TO MINIMIZE WIND EROSION CAN BE IMPLEMENTED.
9. BOTTOM OF TRENCH WIDTH WILL BE AN AVERAGE OF 2' (TYPICAL) HOWEVER, UNDER CERTAIN CIRCUMSTANCES, THE TRENCH MAY BE A MAXIMUM OF 5' WIDE.

REVISIONS						DRAWN BY:		  TYPICAL CONSTRUCTION R.O.W. PROFILE: SIDE HILL CONSTRUCTION (LEFT SIDE)					
△						CHECKED BY:							
△						REVIEWED BY:							
△						APPROVED BY:							
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NO.	DESCRIPTION	DATE	BY	CHK.	APPR.								



PLAN VIEW

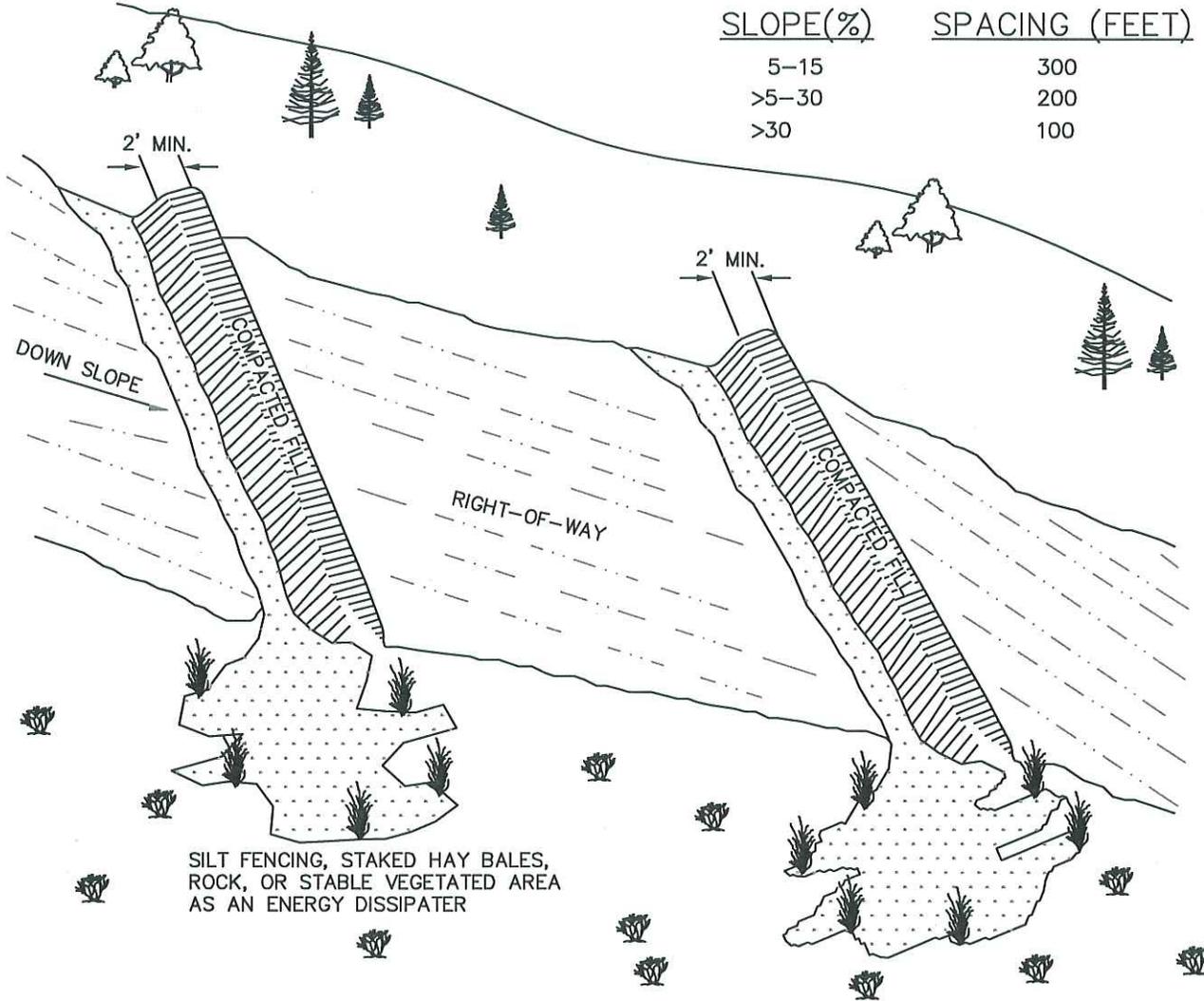


PROFILE

NOTES:

1. ACCESS PADS, AS ILLUSTRATED ABOVE, ARE TO BE INSTALLED ADJACENT TO EXISTING PAVED ROADS AT LOCATIONS IDENTIFIED ON THE CONSTRUCTION DRAWINGS OR AS DIRECTED BY THE COMPANY'S INSPECTOR.
2. IF USED IN AGRICULTURAL LAND, ROCK SHALL BE PLACED ON A GEOTEXTILE FABRIC TO FACILITATE ROCK REMOVAL.
3. SHOULD THE ROCK PAD BECOME INEFFECTIVE FOR REDUCING THE BUILDUP OF MUD AND DIRT AND MINIMIZING TRACKING ONTO THE PAVED ROAD, THE CONTRACTOR SHALL WASH THE EXISTING ROCK FILL SURFACE OR ADD A ROCK FILL LAYER TO THE ACCESS PAD.
4. CONTRACTOR SHALL KEEP PAVED ROAD SURFACES CLEAR OF MUD AND DEBRIS.
5. PRIOR TO PERMANENT SEEDING, CONTRACTOR SHALL REMOVE ALL IMPORTED ROCK FILL MATERIAL, GEOTEXTILE FABRIC AND CULVERT (IF INSTALLED) AND RESTORE THE GROUND TO NATURAL CONTOURS UNLESS OTHERWISE DIRECTED BY COMPANY'S INSPECTOR.

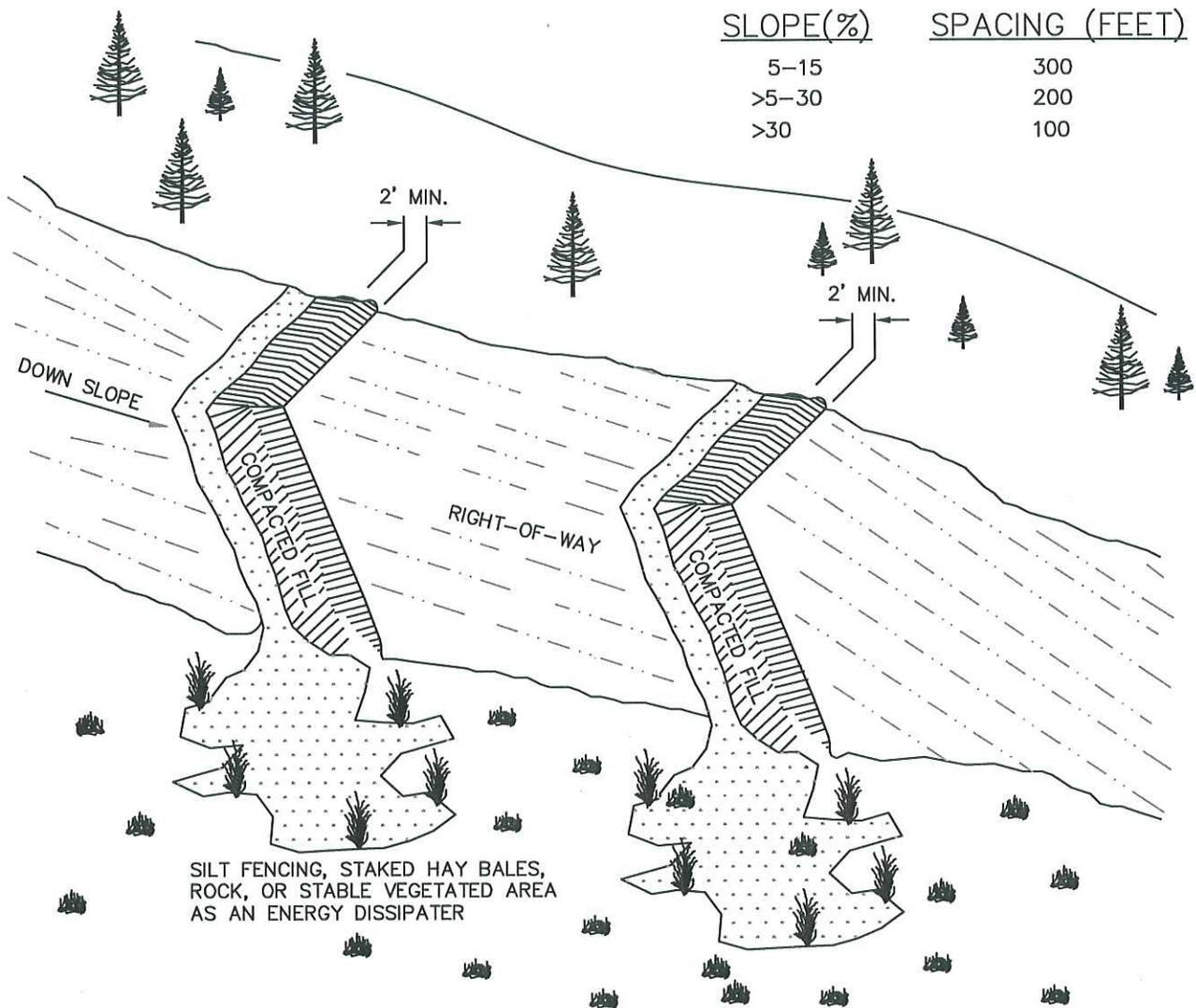
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NO.	DESCRIPTION	DATE	BY	CHK.	APPR.	PROJECT NUMBER	DRAWING NUMBER	REV.	
						2568-01	TYP-033	A	



SLOPE BREAKER NOTES:

1. SLOPE BREAKERS SHALL BE CONSTRUCTED OF COMPACTED NATIVE SOIL AND INSTALLED AT LOCATIONS AS SHOWN ON THE CONSTRUCTION DRAWINGS OR AS DIRECTED BY THE COMPANY INSPECTOR.
2. SLOPE BREAKER SHALL BE ORIENTED AS SHOWN OR OTHER PATTERN AS DIRECTED BY THE COMPANY INSPECTOR TO DIRECT THE WATER OFF THE R.O.W.
3. SLOPE BREAKERS SHALL BE CONSTRUCTED AT A 2-8% GRADIENT ACROSS THE SLOPE.
4. THE SLOPE BREAKERS SHALL BE 18" DEEP (AS MEASURED FROM THE TROUGH TO THE TOP OF THE SLOPE BREAKER). THE TROUGH WILL BE A MINIMUM OF 5' WIDE ACROSS THE WIDTH OF THE RIGHT-OF-WAY.
5. THE OUTLET OF THE SLOPE BREAKER MUST FREELY DISCHARGE ALL RUNOFF OFF THE DISTURBED R.O.W. INTO A STABLE, WELL VEGETATED AREA OR INTO AN ENERGY DISSIPATER.
6. WHERE SLOPE BREAKERS EXTEND BEYOND THE EDGE OF THE CONSTRUCTION R.O.W. TO DIRECT RUNOFF INTO STABLE, WELL VEGETATED AREAS, THESE LOCATIONS MUST BE APPROVED BY THE COMPANY INSPECTOR.
7. INSTALL A TRENCH BREAKER (SEE DETAIL 505 OR 501) AT EVERY SLOPE BREAKER.

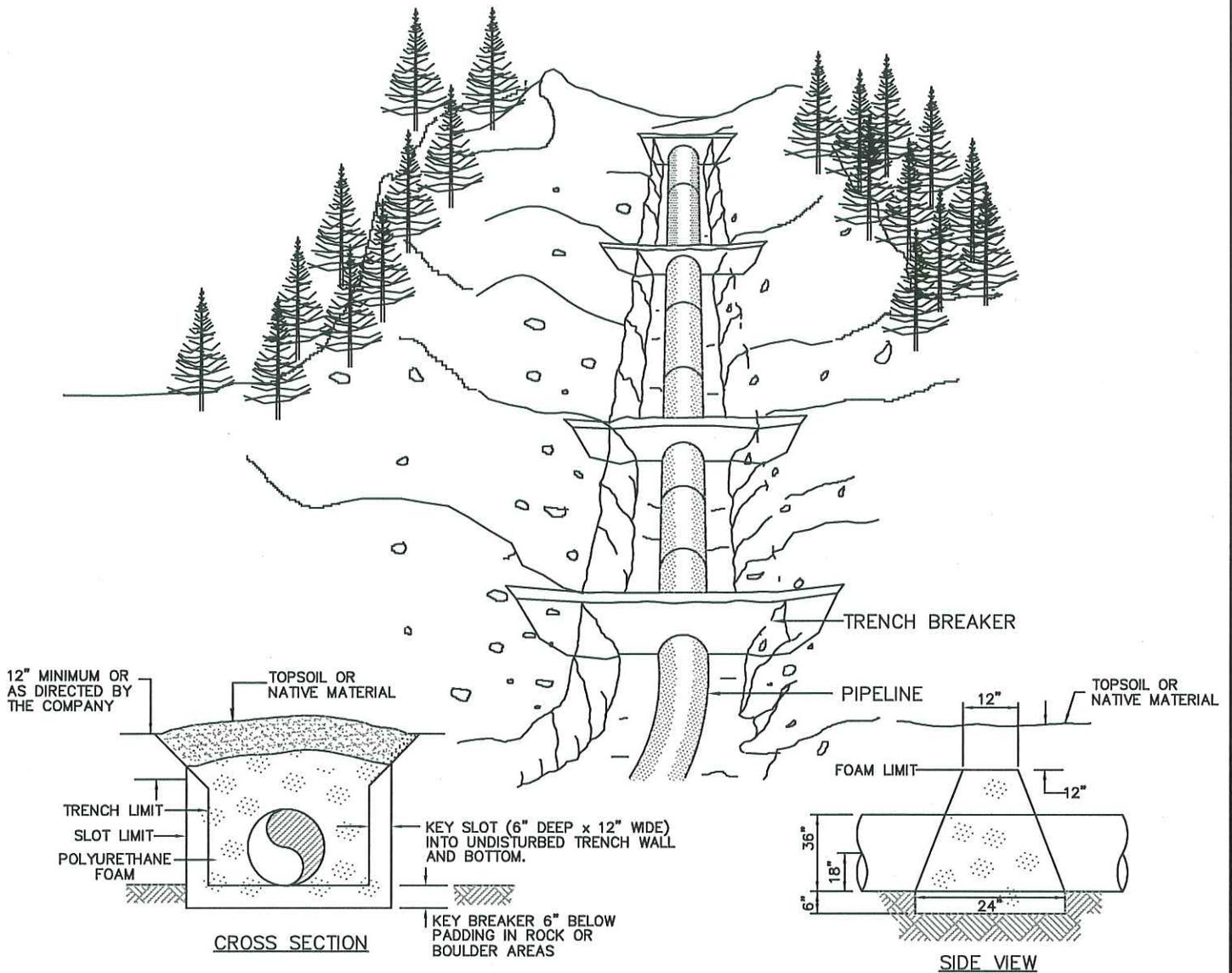
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NO.	DESCRIPTION	DATE	BY	CHK.	APPR.	PROJECT NUMBER	DRAWING NUMBER	REV.
						2568-01	TYP-034	A



SLOPE BREAKER NOTES:

1. SEE DETAIL 500A FOR SLOPE BREAKER DETAIL AND NOTES.
2. INSTALL A TRENCH BREAKER (SEE TYP-049 OR TYP-050) AT EVERY SLOPE BREAKER.
3. IF SLOPE BREAKERS EXIST AND THE SPACING BETWEEN SLOPE BREAKERS IS LESS THAN THE SPACING SHOWN ON TYP-048A, THEN MATCH THE EXISTING SPACING.

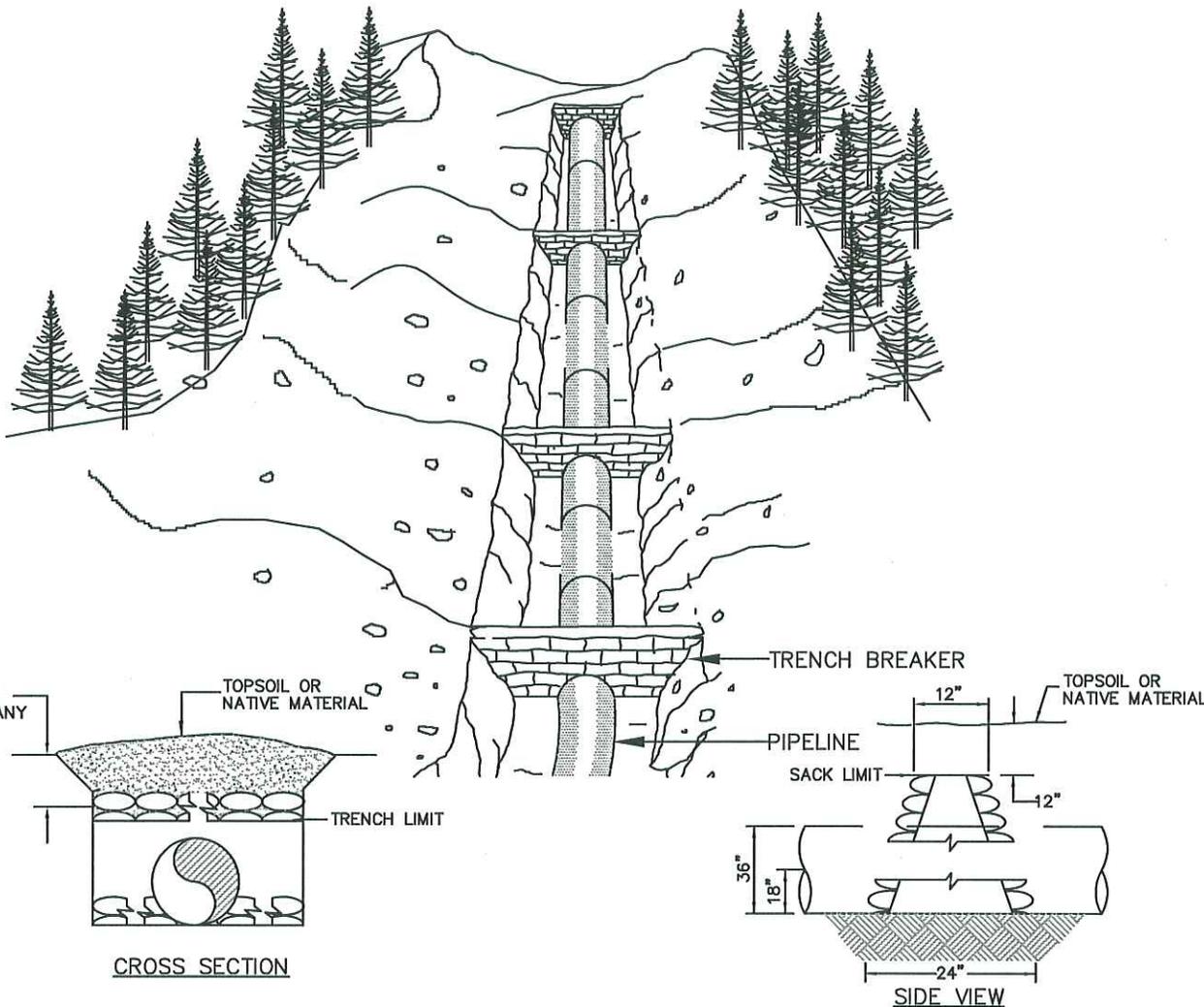
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NO.	DESCRIPTION	DATE	BY	CHK.	APPR.	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-034B	REV.	A



NOTES:

1. POLYURETHANE FOAM SHALL CONFORM TO ALL APPLICABLE ENVIRONMENTAL REGULATIONS CONCERNING CHEMICAL COMPOSITION.
2. FOAM WITH 2 LB./CU.FT. DENSITY AND 30 P.S.I. MINIMUM COMPRESSIVE STRENGTH SHALL BE USED.
3. IF FORMING REQUIRED, STYROFOAM BOARD MAY BE USED.
4. TRENCH BREAKERS SHALL BE INSTALLED:
 - ON SLOPES ALONG THE TRENCH LINE WHERE THE NATURAL DRAINAGE PATTERN, PROFILE, AND TYPE OF BACKFILL MATERIAL MAY RESULT IN LOSS OF BACKFILL MATERIAL OR ALTERATION OF THE NATURAL PATTERN;
 - AT THE BASE OF SLOPES ADJACENT TO WATERBODIES AND WETLANDS;
 - WHERE NEEDED TO AVOID DRAINING A WETLAND;
 - ON UPLAND SLOPES, AT THE SAME SPACING AS SLOPE BREAKERS AND UP SLOPE OF SLOPE BREAKERS;
 - IN CULTIVATED LAND AND RESIDENTIAL AREAS WHERE PERMANENT SLOPE BREAKERS ARE NOT TYP. INSTALLED, AT THE SAME SPACING AS IF PERMANENT SLOPE BREAKERS WERE REQUIRED.
5. BREAKER SPACING AND CONFIGURATION MAY CHANGE AS DETERMINED BY COMPANY OR SIMILARLY QUALIFIED PROFESSIONAL.
6. ALL MATERIALS SHALL BE SUPPLIED BY CONTRACTOR.
7. INSTALL ONE TRENCH BREAKER UNDER EVERY SLOPE BREAKER.

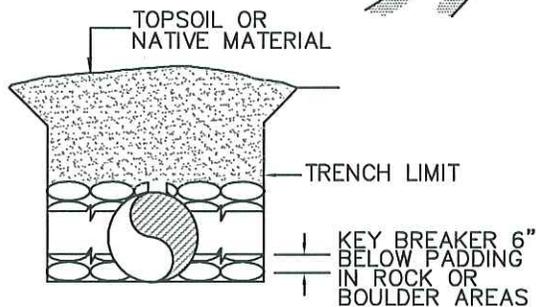
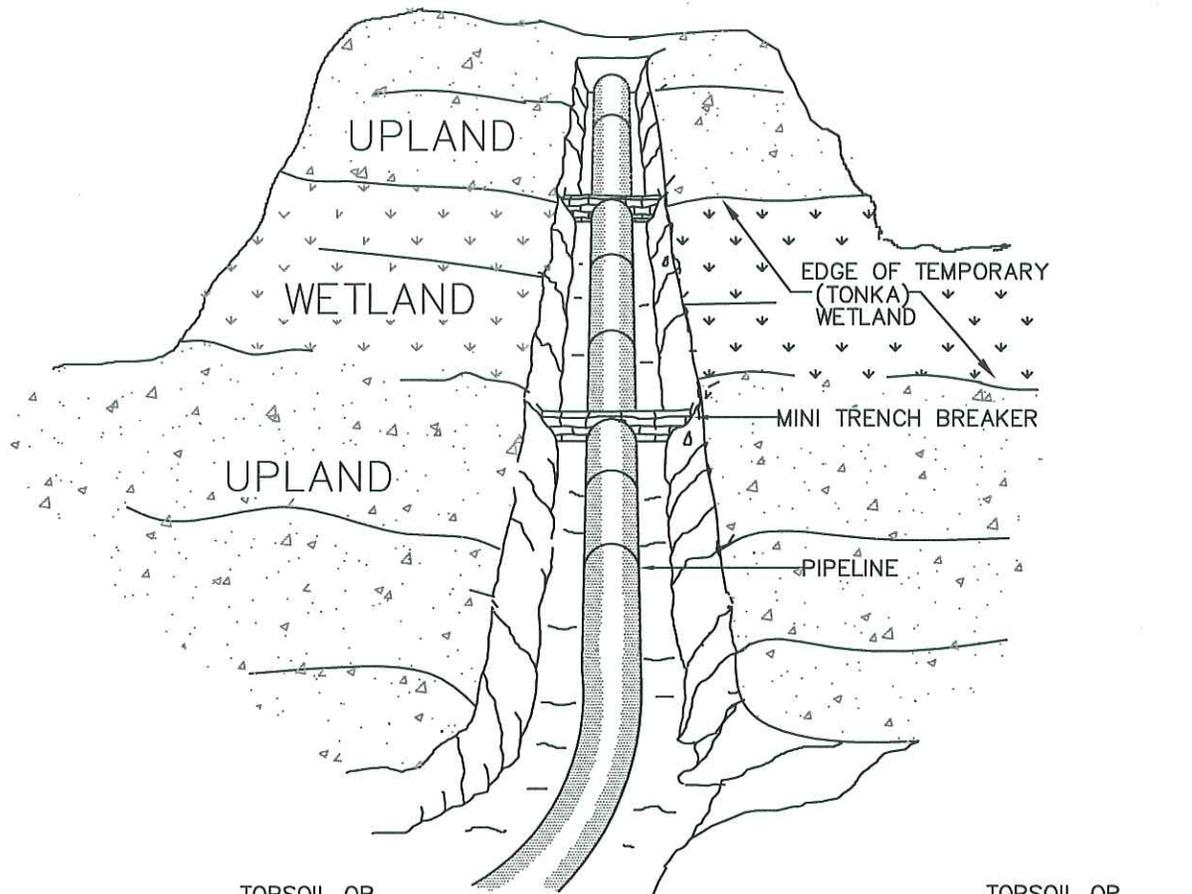
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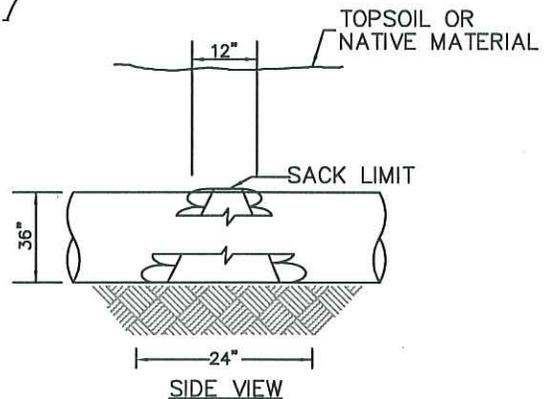
NOTES:

1. TRENCH BREAKERS SHALL BE INSTALLED:
 - ON SLOPES ALONG THE TRENCH LINE WHERE THE NATURAL DRAINAGE PATTERN, PROFILE, AND TYPE OF BACKFILL MATERIAL MAY RESULT IN LOSS OF BACKFILL MATERIAL OR ALTERATION OF THE NATURAL PATTERN
 - AT THE BASE OF SLOPES ADJACENT TO WATERBODIES AND WETLANDS
 - WHERE NEEDED TO AVOID DRAINING A WETLAND
 - ON UPLAND SLOPES, AT THE SAME SPACING AS SLOPE BREAKERS AND UP SLOPE OF SLOPE BREAKERS
 - IN AGRICULTURAL \geq 5 PERCENT LAND AND RESIDENTIAL AREAS WHERE PERMANENT SLOPE BREAKERS ARE NOT TYPICALLY INSTALLED, AT THE SAME SPACING AS IF PERMANENT SLOPE BREAKERS WERE REQUIRED.
2. OPEN WEAVE HEMP OR JUTE SACKS SHALL BE FILLED WITH A MINIMUM OF 55lbs IN A MIXTURE OF SAND & SUBSOIL.
3. BREAKER SPACING AND CONFIGURATION, INCLUDING THE NEED TO KEY THE BREAKER INTO THE UNDISTURBED SOIL AT THE SIDES AND BOTTOM OF THE TRENCH, MAY CHANGE AS DETERMINED BY COMPANY ENGINEER OR SIMILARLY QUALIFIED PROFESSIONAL.
4. ALL MATERIALS SHALL BE SUPPLIED BY CONTRACTOR.
5. INSTALL ONE TRENCH BREAKER UNDER EVERY SLOPE BREAKER.

REVISIONS						DRAWN BY:		  TYPICAL TRENCH BREAKER REQUIREMENTS			
△						CHECKED BY:					
△						REVIEWED BY:					
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NO.	DESCRIPTION	DATE	BY	CHK	APPR.			DRAWING NUMBER TYP-036			
								REV. A			



CROSS SECTION

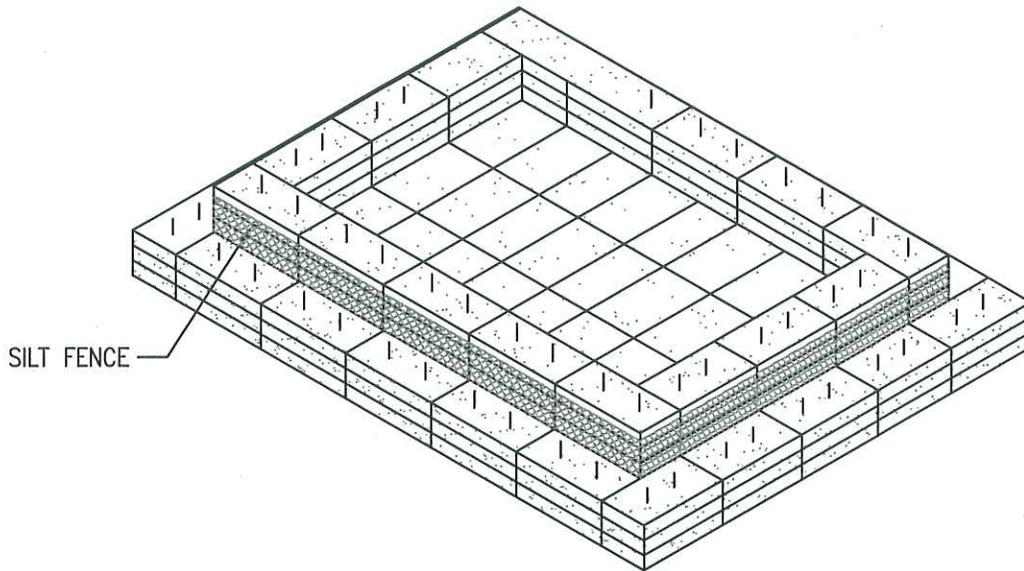


SIDE VIEW

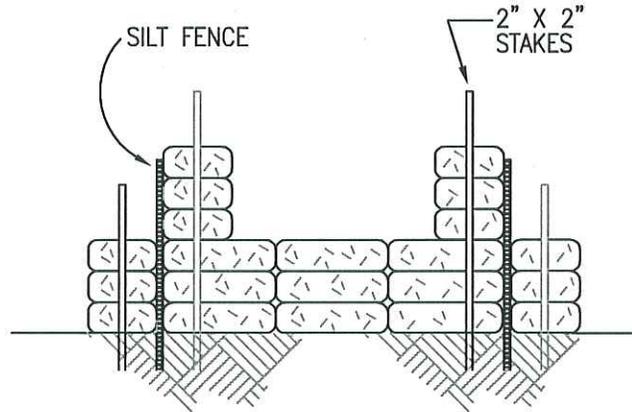
NOTES:

1. MINI-TRENCH BREAKERS SHALL BE INSTALLED AT EDGE OF EACH TEMPORARY (TONKA) WETLAND.
2. OPEN WEAVE HEMP OR JUTE SACKS SHALL BE FILLED WITH A MINIMUM OF 55lbs. OF SAND OR SUBSOIL.
3. BREAKER CONFIGURATION MAY BE CHANGED AS DETERMINED BY COMPANY ENGINEER OR SIMILARLY QUALIFIED PROFESSIONAL.

REVISIONS						DRAWN BY:		  TYPICAL MINI-TRENCH BREAKER					
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PERSPECTIVE VIEW

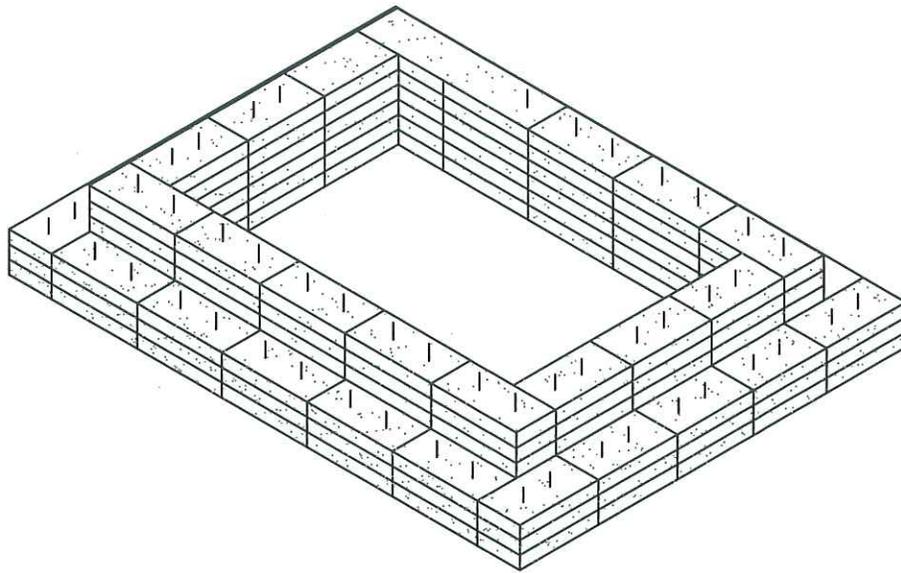


OPTION 1

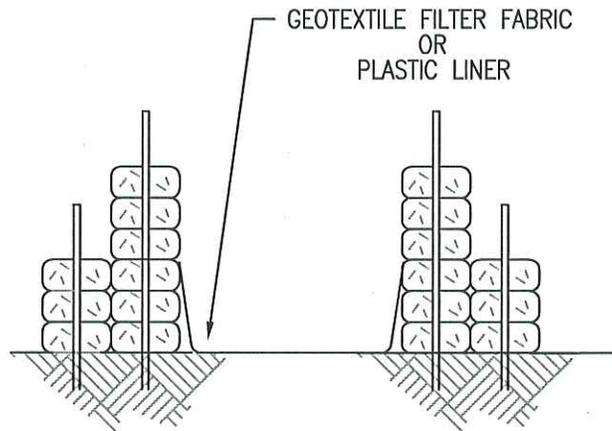
NOTES:

1. INSTALL A STRAW BALE DEWATERING STRUCTURE WHEREVER IT IS NECESSARY AND AS DIRECTED BY THE COMPANY'S INSPECTOR TO PREVENT THE FLOW OF HEAVILY SILT LADEN WATER INTO WATER BODIES OR WETLANDS.
2. DISCHARGE SITE SHALL BE WELL VEGETATED AND THE TOPOGRAPHY OF THE SITE SUCH THAT WATER WILL FLOW AWAY FROM ANY WORK AREAS. THE AREA DOWN SLOPE FROM THE DEWATERING SITE MUST BE REASONABLY PLANE OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.
3. IN AREAS OF HIGHLY ERODIBLE SOILS, LINE ENTIRE STRUCTURE WITH GEOTEXTILE FILTER FABRIC, PLASTIC SHEETING, OR STRAW.
4. THE DIMENSIONS OF THE STRUCTURE SHALL BE DETERMINED IN THE FIELD BASED UPON SITE CONDITIONS.
5. DISCHARGE RATES SHALL BE SUCH THAT WATER WILL NOT OVERFLOW THE TOP OF THE STRUCTURE.
6. INSTALL A SPLASH PUP IF THE DISCHARGE VELOCITY IS EXCESSIVE. (TYP-064)

REVISIONS						DRAWN BY:		  TYPICAL STRAW BALE DEWATERING STRUCTURE LARGE VOLUME - OPTION 1 (SHT. 1 OF 2)			
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△						APPROVED BY:					
△						PROJECT MANAGER:					
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△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-038	REV.	A
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PERSPECTIVE VIEW



OPTION 2

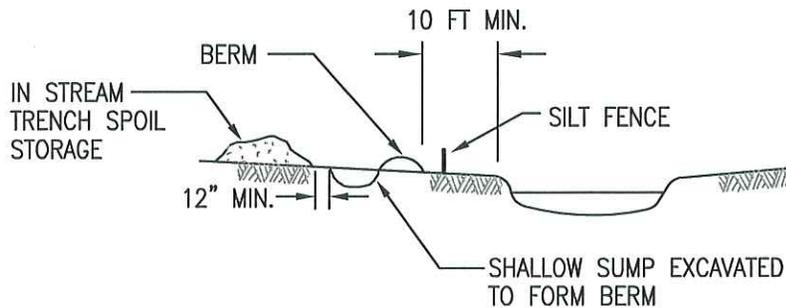
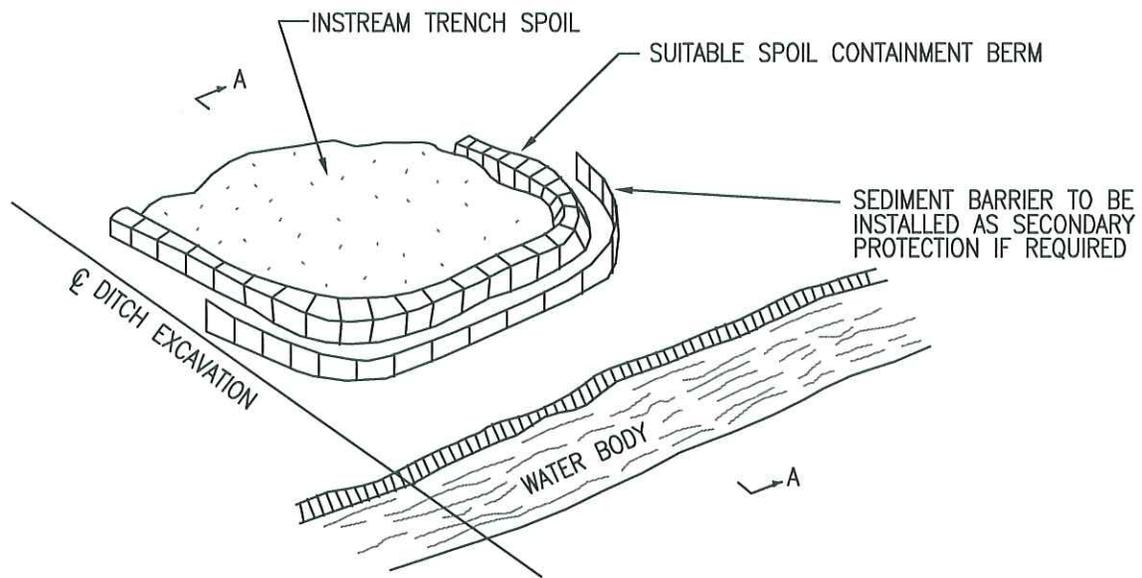
NOTES:

1. INSTALL A STRAW BALE DEWATERING STRUCTURE WHEREVER IT IS NECESSARY AND AS DIRECTED BY THE COMPANY'S INSPECTOR TO PREVENT THE FLOW OF HEAVILY SILT LADEN WATER INTO WATER BODIES OR WETLANDS.
2. DISCHARGE SITE SHALL BE WELL VEGETATED AND THE TOPOGRAPHY OF THE SITE SUCH THAT WATER WILL FLOW AWAY FROM ANY WORK AREAS. THE AREA DOWN SLOPE FROM THE DEWATERING SITE MUST BE REASONABLY PLANE OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.
3. IN AREAS OF HIGHLY ERODIBLE SOILS, LINE ENTIRE STRUCTURE WITH GEOTEXTILE FILTER FABRIC, PLASTIC SHEETING, OR STRAW.
4. THE DIMENSIONS OF THE STRUCTURE SHALL BE DETERMINED IN THE FIELD BASED UPON SITE CONDITIONS.
5. DISCHARGE RATES SHALL BE SUCH THAT WATER WILL NOT OVERFLOW THE TOP OF THE STRUCTURE.
6. INSTALL A SPLASH PUP IF THE DISCHARGE VELOCITY IS EXCESSIVE. (TYP-064)

REVISIONS						DRAWN BY:					
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TYPICAL STRAW BALE DEWATERING STRUCTURE
LARGE VOLUME - OPTION 2 (SHT. 2 OF 2)

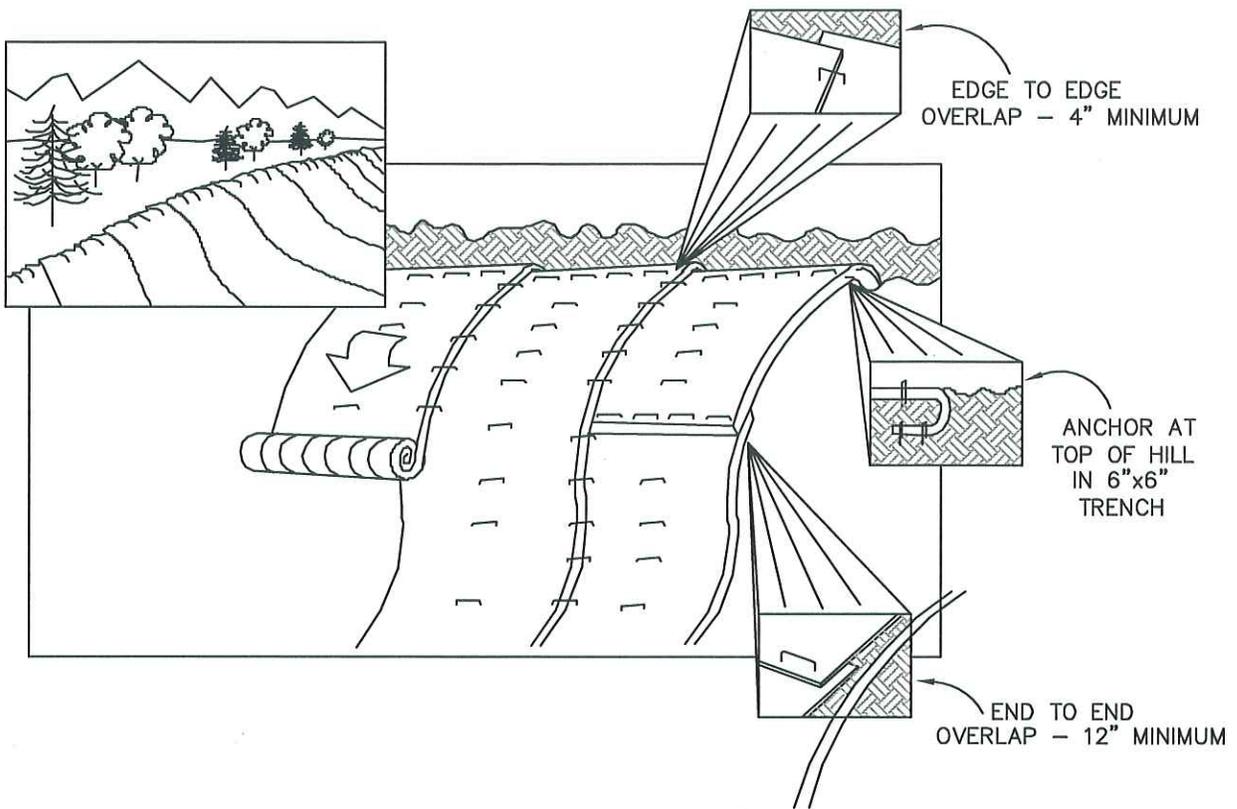


SECTION A-A

NOTE:

1. SOIL CONTAINMENT BERMS ARE TO BE USED WHERE INSTREAM TRENCH SPOIL COULD REENTER THE WATERBODY DIRECTLY OR INDIRECTLY AND WITH SIMULTANEOUS UTILIZATION OF SEDIMENT BARRIERS IF REQUIRED.
2. MATERIAL USED FOR THE CONTAINMENT BERM SHOULD BE A MINIMUM OF 10 FT. FROM THE WATERS EDGE. IT SHOULD BE KEPT TO A HEIGHT WHICH REMAINS STABLE DURING THE CONSTRUCTION PERIOD.
3. CARE SHOULD BE TAKEN THAT THE SPOIL PILE DOES NOT OVERTOP THE CONTAINMENT BERM.
4. THE CONTAINMENT BERM SHOULD BE DISMANTLED AND THE SITE RESTORED TO THE ORIGINAL CONDITION UPON COMPLETION OF THE WATER CROSSING.
5. WHERE POSSIBLE, RIPARIAN VEGETATION SHALL BE LEFT IN PLACE.
6. STAGED MOVEMENT OF INSTREAM SPOIL MAY BE REQUIRED IF QUANTITIES ARE EXCESSIVE.
7. CARE AND ATTENTION MUST BE TAKEN TO ENSURE SPOIL CONTAINMENT BERMS ARE MAINTAINED.
8. FULL CONSIDERATION FOR OVERALL SLOPE STABILITY IS REQUIRED WHEN SELECTING A SPOIL CONTAINMENT LOCATION.

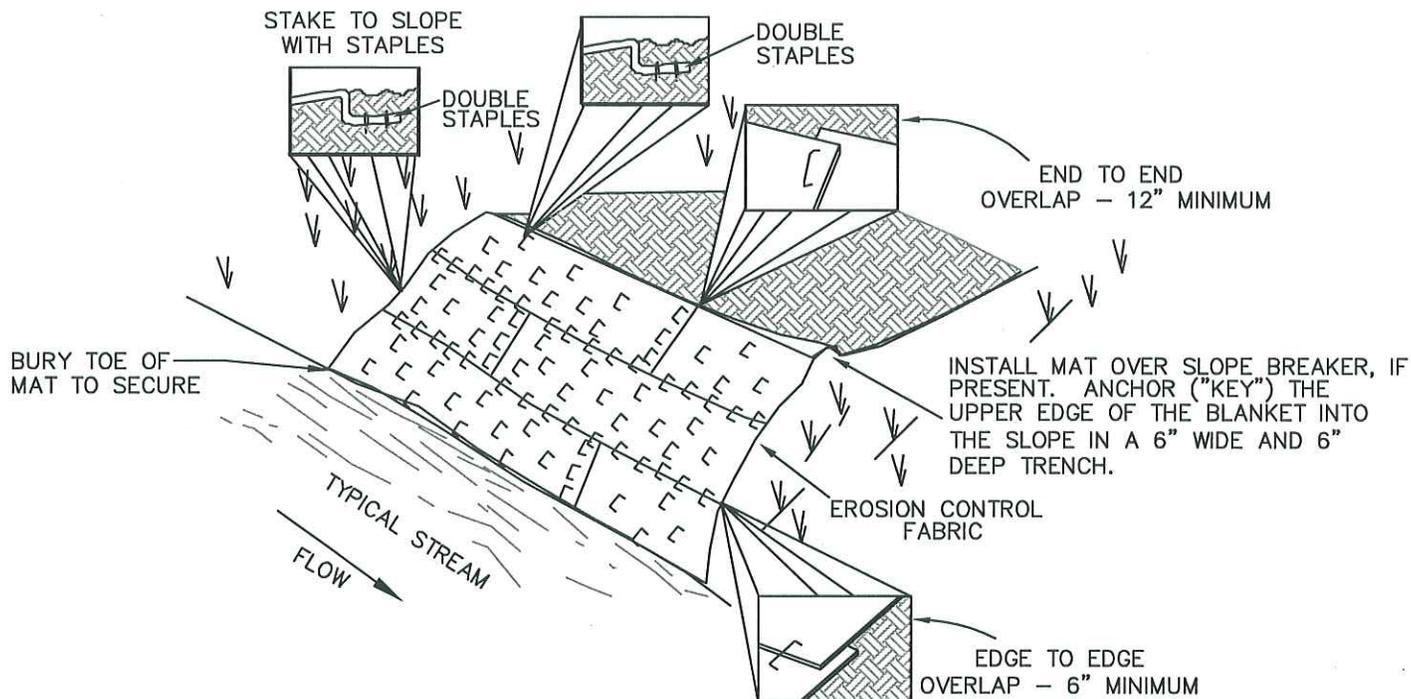
REVISIONS						DRAWN BY:		 CH2MHILL TYPICAL TEMPORARY SOIL CONTAINMENT BERM					
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NOTES:

1. EROSION CONTROL MATTING (BLANKETS) SHALL BE USED AT THE FOLLOWING LOCATIONS:
 - ALL SLOPES OVER 33%.
 - AS DIRECTED BY THE COMPANY INSPECTOR.
2. THE EROSION CONTROL MAT SHALL BE MADE OF BIODEGRADABLE NATURAL FIBER, UNLESS OTHERWISE APPROVED BY THE COMPANY INSPECTOR. EROSION CONTROL MATS SHALL BE FURNISHED IN CONTINUOUS ROLLS OF 30' OR GREATER WITH A MINIMUM WIDTH OF 4'.
3. THE EROSION CONTROL MAT SHALL BE BON TERRA CS2 OR NORTH AMERICAN GREEN SC150 OR SC150BN OR A COMPANY APPROVED EQUIVALENT WITH THESE SPECIFICATIONS:
 - 70% STRAW AND 30% COCONUT (COIR) FABRIC
 - WEIGHT OF 0.5 LBS/YD
 - UNDERLAIN WITH PHOTODEGRADABLE PLASTIC NETTING OR NATURAL FIBER NET AND OVERLAIN WITH UV STABILIZED PLASTIC
 - NETTING OR NATURAL FIBER NET. SHALL BE DRIVEN INTO THE
4. STAPLES SHALL BE MADE OF 11 GAUGE WIRE, U-SHAPED WITH 6" LEGS AND A 1" CROWN AND GROUND FOR THE FULL LENGTH OF THE STAPLE LEGS. LONGER STAPLES MAY BE REQUIRED IN LOOSE OR SANDY SOILS.
5. MATTING SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR AS STATED BELOW:
 - THE TOP OF THE BLANKET SHALL EXTEND 3' PAST THE UPPER EDGE OF THE SLOPE.
 - ANCHOR ("KEY") THE UPPER EDGE OF THE BLANKET INTO THE SLOPE IN A 6" WIDE BY 6" DEEP TRENCH.
 - BLANKET ROLL SHALL BE ON UPHILL SIDE OF TRENCH. DOUBLE STAPLE EVERY 12" BEFORE BACKFILLING AND COMPACTING TRENCH.
 - BRING MAT ROLL BACK OVER THE TOP OF THE TRENCH AND CONTINUE TO ROLL DOWN SLOPE. STAPLE EVERY 12" WHERE MAT EXITS THE TRENCH AT TOP OF SLOPE.
 - THE EDGES OF PARALLEL BLANKETS SHALL BE OVERLAPPED A MIN. OF 4" AND STAPLED EVERY 12" THE LENGTH OF THE EDGE.
 - WHEN BLANKETS ARE SPLICED DOWN SLOPE TO ADJOINING MATS, THE UPPER BLANKET SHALL BE PLACED OVER THE LOWER MAT (SHINGLE STYLE) WITH APPROXIMATELY 12" OF OVERLAP. STAPLE THROUGH THE OVERLAPPED AREA EVERY 12".
 - STAPLE DOWN THE CENTER OF THE BLANKET(S). TWO STAPLES IN EVERY SQUARE YARD.
 - STAPLE ACROSS THE BOTTOM OF THE EROSION CONTROL MATTING EVERY 12".
6. THE EROSION CONTROL MATTING SHALL MAKE UNIFORM CONTACT WITH THE SOIL UNDERNEATH WITH NO BRIDGING OF RILLS OR GULLIES.
7. MONITOR FOR WASHOUTS, STAPLE INTEGRITY OR MAT MOVEMENT. PRIOR TO COMPLETION OF CONSTRUCTION, REPLACE OR REPAIR AS NECESSARY.

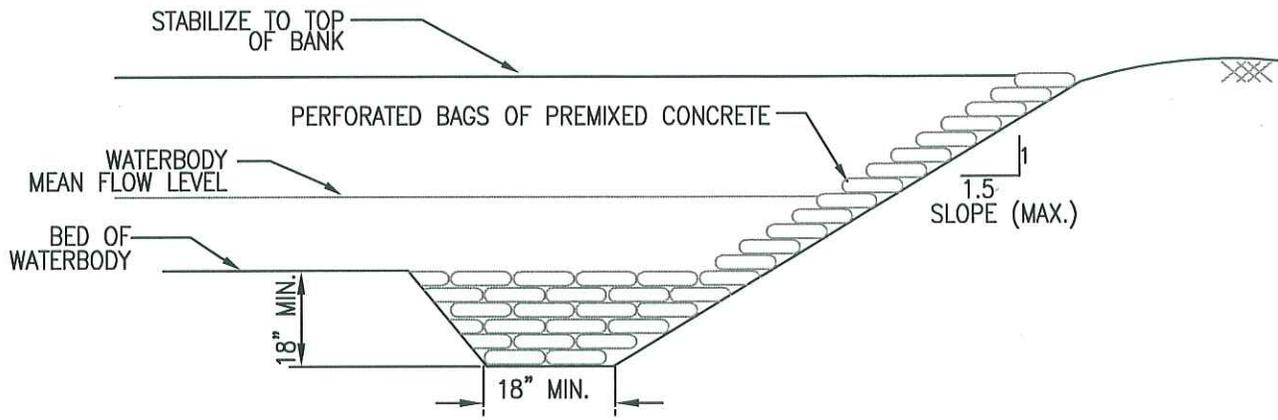
REVISIONS						DRAWN BY:		GREENCORE <small>PERFORMANCE CONTRACTORS, LLC</small> CH2MHILL TYPICAL EROSION CONTROL MATTING UPLAND SLOPES					
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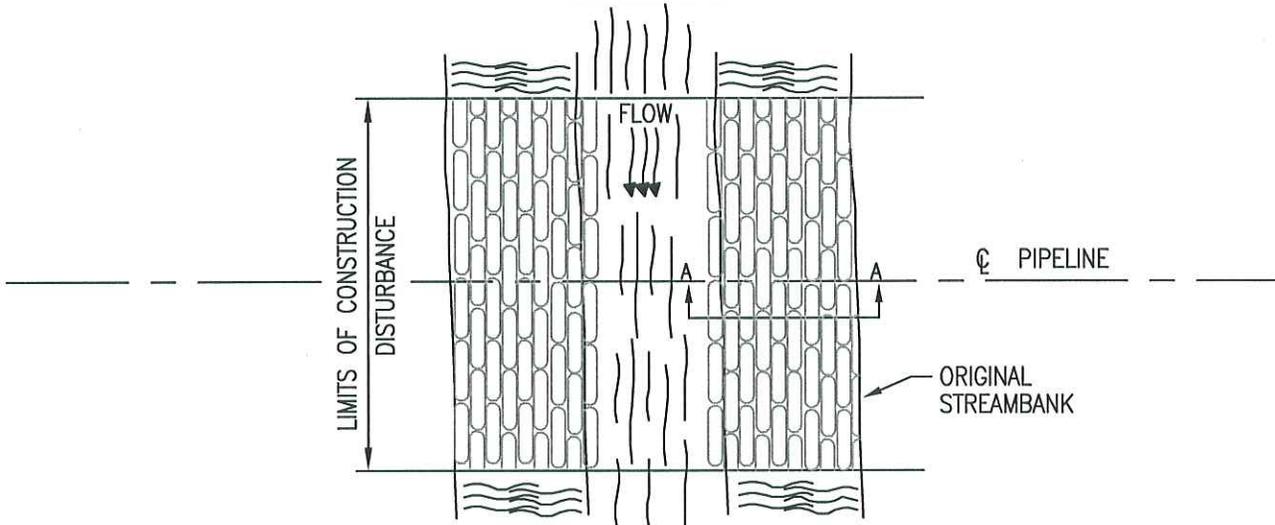
NOTES:

1. EROSION CONTROL MATTING (BLANKETS) SHALL BE PLACED ON THE BANKS OF ALL WATERBODIES WHERE VEGETATION HAS BEEN REMOVED AND/OR AS DIRECTED BY THE COMPANY INSPECTOR.
2. THE TYPE OF EROSION CONTROL MAT SHALL BE MADE OF BIODEGRADABLE NATURAL FIBERS, UNLESS OTHERWISE APPROVED BY THE COMPANY INSPECTOR. EROSION CONTROL MATS SHALL BE FURNISHED IN CONTINUOUS ROLLS OF 30' OR GREATER WITH A MINIMUM WIDTH OF 4'.
3. THE EROSION CONTROL MAT SHALL BE BON TERRA CF7 OR A COMPANY APPROVED EQUIVALENT WITH THESE SPECIFICATIONS:
 - 100% WOVEN COCONUT (COIR) FABRIC.
 - WEIGHT OF 1.2 LBS/YD.
 - 50% OPEN AREA.
4. STAPLES SHALL BE MADE OF 11 GAUGE WIRE, U-SHAPED WITH 6" LEGS AND A 1" CROWN. STAPLES SHALL BE DRIVEN INTO THE GROUND FOR THE FULL LENGTH OF THE STAPLE LEGS. LONGER STAPLES MAY BE REQUIRED IN LOOSE OR SANDY SOILS.
5. MATTING SHALL BE INSTALLED ACCORDING TO MANUFACTURE SPECIFICATIONS OR AS STATED BELOW:
 - THE TOP OF THE BLANKET SHALL EXTEND A MINIMUM OF 2' PAST THE UPPER EDGE OF THE ORDINARY HIGH WATER MARK. IF A SLOPE BREAKER IS PRESENT ON THE APPROACH SLOPE, THE BLANKET SHALL EXTEND OVER THE CREST AND THE THROUGH OF THE SLOPE BREAKER.
 - INSTALL BLANKET(S) ACROSS THE SLOPE IN THE DIRECTION OF WATER FLOW.
 - ANCHOR ("KEY") THE UPSTREAM EDGE OF THE BLANKET(S) INTO THE SLOPE USING A 6" WIDE BY 6" DEEP TRENCH. DOUBLE STAPLE EVERY 12" BEFORE BACKFILLING AND COMPACTING TRENCH.
 - ANCHOR ("KEY") THE UPPER EDGE OF THE BLANKET INTO THE SLOPE IN A 6" WIDE BY 6" DEEP TRENCH. DOUBLE STAPLE EVERY 12" BEFORE BACKFILLING AND COMPACTING TRENCH.
 - THE EDGES OF PARALLEL BLANKETS SHALL BE OVERLAPPED A MINIMUM OF 6". THE UPPER BLANKET SHALL BE PLACED OVER THE LOWER BLANKET (SHINGLE STYLE) AND STAPLED EVERY 12" THE LENGTH OF THE EDGE.
 - WHEN BLANKET ENDS, THE UPSTREAM BLANKET SHALL BE PLACED OVER THE DOWNSTREAM BLANKET (SHINGLE STYLE) WITH AT LEAST 12" OF OVERLAP. STAPLE THROUGH THE OVERLAPPED AREA EVERY 12"
 - STAPLE DOWN THE CENTER OF THE BLANKET(S) WITH THREE STAPLES IN EVERY SQUARE YARD.
 - STAPLE ACROSS THE BOTTOM OF THE EROSION CONTROL MATTING EVERY 12".
6. THE EROSION CONTROL MATTING SHALL MAKE UNIFORM CONTACT WITH THE SOIL UNDERNEATH WITH NO BRIDGING OF RILLS OR GULLIES.
7. MONITOR FOR WASHOUTS, STAPLE INTEGRITY OR MAT MOVEMENT PRIOR TO COMPLETION OF CONSTRUCTION. REPLACE OR REPAIR AS NECESSARY.

REVISIONS						DRAWN BY:	TYPICAL EROSION CONTROL MATTING STREAMBANKS					
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SECTION A-A



PLAN VIEW

NOTES:

1. STREAM BANK CONCRETE STRUCTURES SHALL CONSIST OF ALTERNATIVE ROWS OF PERFORATED SACK OF PREMIXED CONCRETE.
2. THE USE OF CONCRETE BANK STRUCTURES SHALL BE LIMITED TO AREAS WHERE FLOWING CONDITIONS PREVENT EFFECTIVE VEGETATIVE STABILIZATION TECHNIQUES.
3. WATERBODY CONCRETE STRUCTURES SHALL BE CONSTRUCTED AS FOLLOWS:
 - CONSTRUCT CONCRETE STRUCTURE BOUNDARIES IN A MANNER SUCH THAT THEY SHALL NOT BE UNDERMINED FROM THE SIDE.
 - REMOVE ALL STUMPS, ORGANIC MATTER AND WORK MATERIAL.
 - GRADE THE BANK TO A MAXIMUM SLOPE OF 1.5:1.
 - CUT THE SUBGRADE SUFFICIENTLY DEEP FOR THE FINISHED GRADE OF THE CONCRETE BAGS TO BE AT THE SAME ELEVATION AS SURROUNDING AREA.
 - COMPACT THE SUBGRADE TO A DENSITY APPROXIMATELY EQUAL TO THE SURROUNDING SOILS.
 - CONSTRUCT TOE OF TRENCH TO "KEY" IN BOTTOM OF ARMOR PROTECTION. THE TRENCH SHALL BE A MINIMUM OF 18" WIDE AND 18" DEEP.
 - PLACE CONCRETE BAGS ON SLOPE TO BE PROTECTED. INSTALL BAGS TO A DEPTH APPROXIMATELY 1.5 TO 2 TIMES THE WIDTH OF THE BAG OR AT LEAST 12" THICK ON THE SLOPE AND THICKER AT BASE.

REVISIONS						DRAWN BY:		 CH2MHILL TYPICAL CONCRETE STRUCTURE AT WATERBODY BANKS					
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NO.	DESCRIPTION	DATE	BY	CHK.	APPR.								

NOTES:

APPLICATIONS AND LOCATIONS

1. HYDRO-MULCH WITH TACKIFIER SHALL BE USED AT LOCATIONS IDENTIFIED IN THE GEOTECHNICAL PLAN, RECLAMATION PLAN, AND/OR AS DIRECTED BY THE COMPANY INSPECTOR TO PROTECT SOIL AGAINST EROSION.
2. THE CONTRACTOR SHALL BE REQUIRED TO USE EXTENSION HOSES TO REACH INACCESSIBLE AREAS. WHERE THE USE OF EXTENSION HOSES IS NOT SUFFICIENT TO REACH AREAS, EROSION CONTROL MATTING CAN BE SUBSTITUTED.
3. HYDRO-MULCH AND TACKIFIER SHALL BE APPLIED AT A RATE OF 3000 LBS/ACRE RESPECTIVELY, IN A SINGLE APPLICATION. HYDRO-MULCH AND TACKIFIER SHALL PRODUCE A UNIFORM, MAT-LIKE COVERING ON THE GROUND.
4. WHEN DIRECTED BY THE COMPANY INSPECTOR, TOPSOIL STOCKPILES SHALL BE EITHER WET WITH WATER OR TACKIFIER TO PROVIDE AN UNERODABLE CRUST OR TO CONTROL WIND EROSION.

HYDRO-MULCH MATERIAL

5. THE HYDRO-MULCH MATERIAL SHALL CONSIST OF WOOD FIBERS MEETING THE FOLLOWING PHYSICAL AND CHEMICAL PROPERTIES:

- MOISTURE CONTENT 12% ± 3%
- ORGANIC MATTER (OVEN-DRIED BASIS) 99.2% ± 0.2%
- ASH CONTENT 0.7% ± 0.2%
- WATER HOLDING CAPACITY 100 GRAMS MINIMUM

NOTE: WATER HOLDING CAPACITY – 1000 GRAMS OF OVEN-DRIED MULCH SATURATED, DRAINED AND WEIGHED.

6. THE HYDRO-MULCH MATERIAL SHALL MEET THE FOLLOWING ADDITIONAL REQUIREMENTS:
 - THE FIBERS SHALL NOT CONTAIN ANY GROWTH OR GERMINATION INHIBITING FACTORS.
 - THE FIBERS SHALL NOT BE PRODUCED FROM RECYCLED MATERIAL SUCH AS SAWDUST, PAPER, CARDBOARD, OR PULP AND PAPER PLANT RESIDUE.
 - THE FIBERS SHALL BE DYED TO FACILITATE VISUAL METERING DURING APPLICATION.
7. HYDRO-MULCH SHALL BE SUPPLIED IN 50 POUND NET WEIGHT BAGS. EACH PACKAGE SHALL BE MARKED BY THE MANUFACTURE TO SHOW THE AIR-DRY WEIGHT CONTENT.
8. THE HYDRO-MULCH MATERIAL SHALL BE OF SUCH A CONSISTENCY THAT AFTER BEING COMBINED IN A SLURRY TANK WITH WATER AND APPROVED TACKIFIER, THE FIBERS IN THE MATERIAL SHALL BE UNIFORMLY SUSPENDED TO FORM A HOMOGENOUS SLURRY.
9. MULCH WHICH HAS BEEN DAMAGED BY MOISTURE OR OTHER MEANS SHALL NOT BE ACCEPTED.
10. IF REQUESTED, THE CONTRACTOR SHALL SUBMIT A MINIMUM 1-POUND BAG OF THE PRODUCT PROPOSED FOR USE ON THE PROJECT TO THE COMPANY FOR TESTING. OR, IF REQUESTED, THE CONTRACTOR SHALL SUBMIT A SIGNED STATEMENT CERTIFYING THAT THE MATERIAL FURNISHED HAS BEEN LABORATORY AND FIELD-TESTED AND THAT IS IT MEETS REQUIREMENTS FOR ITS INTENDED USE. THE COMPANY MAY ACCEPT THE HYDRO-MULCH MATERIAL FOR USE BASED ON A CERTIFICATE OF COMPLIANCE.

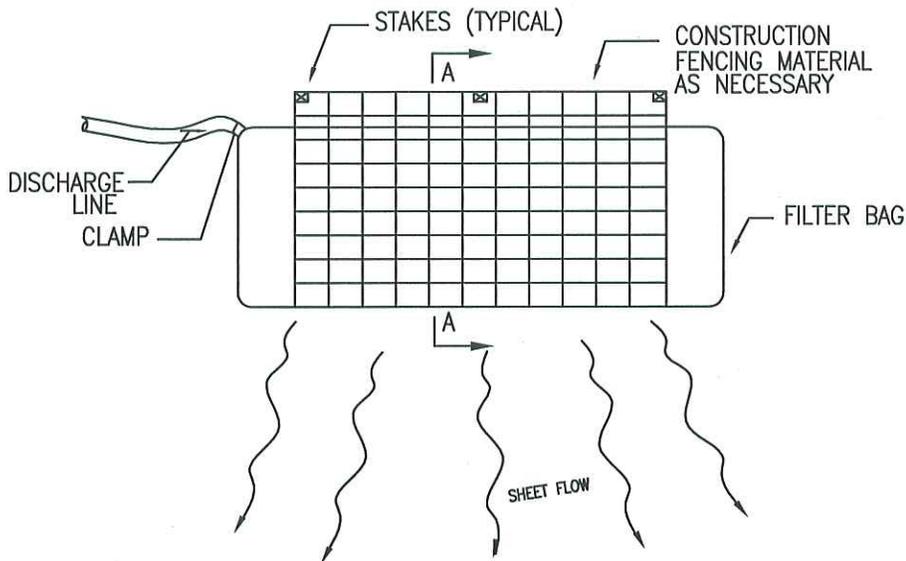
TACKIFIER MATERIAL

11. TACKIFIER SHALL MEET THE FOLLOWING REQUIREMENTS:
 - BE OF A BIODEGRADABLE ORGANIC FORMULATION. CONSIST OF SPECIFICALLY BLENDED COMPATIBLE HYDROCOLLOIDS (SOLUBLE POLYSACCHARIDES, GUM GUM OR PLANGAGE). STARCH-BASED TACKIFIERS ARE UNACCEPTABLE.
 - HAVE AN EQUILIBRIUM AIR-DRY MOISTURE CONTENT AT TIME OF MANUFACTURE OF 8% ± 2% WITH A MINIMUM WATER HOLDING CAPACITY OF 6.5 TIMES BY WEIGHT OF DRY MATERIAL BE ABLE TO HYDRATE AND UNIFORMLY DISPERSING IN CIRCULATING WATER TO FORM A HOMOGENOUS SLURRY AND REMAIN IN SUCH A STATE IN THE HYDRAULIC MIXING UNIT (USUALLY A HYDRO-MULCHER).
12. TACKIFIER SHALL BE SUPPLIED IN PACKAGES MARKED BY THE MANUFACTURE TO SHOW WEIGHT CONTENT. TACKIFIER WHICH HAS BEEN DAMAGED BY MOISTURE OR OTHER MEANS SHALL NOT BE ACCEPTED

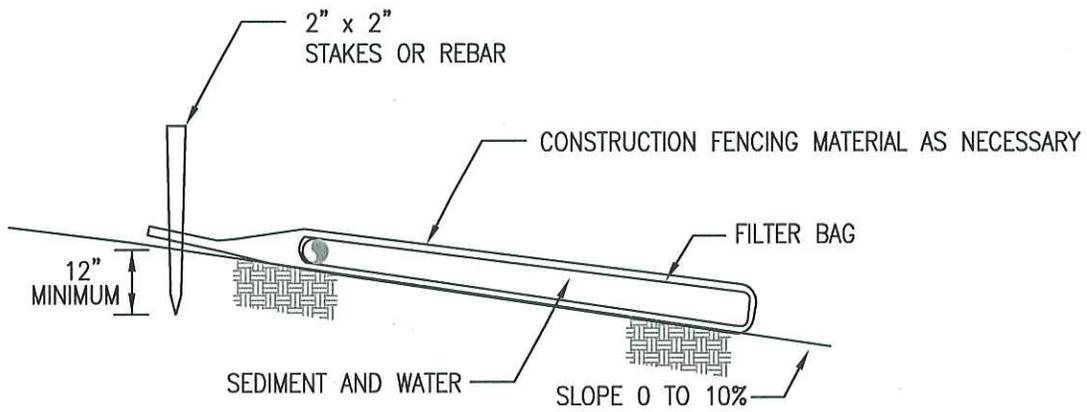
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1. HYDRAULICALLY APPLIED MULCH (HYDRO-MULCH) WITH TACKIFIER MAY BE USED IN LIMITED AREAS, IN LIEU OF MECHANICALLY ANCHORED STRAW MULCH (DETAIL 501), WHERE A MECHANICAL MULCH CRIMPER CANNOT BE SAFELY OR EFFECTIVELY OPERATED, SUCH AS SOME STEEP SLOPES OR ROCKY AREAS. LOCATIONS FOR THE USE OF HYDRO-MULCH AND TACKIFIER MUST BE APPROVED BY THE COMPANY INSPECTOR PRIOR TO APPLICATION.
2. APPLY HYD'RO-MULCH AT THE RATE OF APPROXIMATELY 3000 POUNDS OF AIR-DRIED FIBER/ACRE AS NECESSARY TO PROVIDE AT LEAST 75 PERCENT GROUND COVER. APPLY THE TACKIFIER AT THE RATE RECOMMENDED BY THE MANUFACTURER. APPLY THE HYDRO-MULCH AND TACKIFIER TO PRODUCE A UNIFORM, AT-LIKE GROUND COVER.
3. THE HYDRAULICALLY APPLIED MULCH SHALL HAVE THE FOLLOWING PROPERTIES:
 - THE MULCH SHALL CONSIST OF AIR-DRIED, 100 PERCENT VIRGIN-WOOD-FIBERS MANUFACTURED FROM WHOLE WOOD CHIPS;
 - MAXIMUM MOISTURE CONTENT OF 12 PERCENT (PLUS OR MINUS 3 PERCENT);
 - THE MULCH SHALL NOT BE PRODUCED FROM RECYCLED MATERIALS AND SHALL NOT CONTAIN ANY GROWTH OR GERMINATION INHIBITING FACTORS;
 - THE MULCH SHALL BE DYED TO FACILITATE VISUAL METERING AND EVEN APPLICATION;
 - THE MULCH SHALL BE SUPPLIED IN PACKAGES MARKED BY THE MANUFACTURER TO SHOW THE AIR-DRY WEIGHT.
4. THE TACKIFIER SHALL CONSIST OF A BIODEGRADABLE, ORGANIC, WATERSOLUBLE, NATURAL VEGETABLE GUM FORMULATION SUCH AS GUAR GUM. ASPHALT-BASED TACKIFIERS SHALL NOT BE USED.
5. APPLY HYDRO-MULCH AND TACKIFIER IMMEDIATELY FOLLOWING SEEDING.
6. AVOID FURTHER DISTURBANCE OF THE SLOPE SURFACE FOLLOWING APPLICATION OF HYDRO-MULCH AND TACKIFIER. WHERE DISTURBANCE OCCURS, RESEED IF NECESSARY, AND REAPPLY HYDRO-MULCH AND TACKIFIER.
7. DO NOT USE OR APPLY HYDRO-MULCH AND TACKIFIER WITHIN 100 FEET OF WATERBODIES OR WETLANDS.

REVISIONS						DRAWN BY:	 GREENCORE <small>PERFORMANCE PRODUCTS</small> CH2MHILL EROSION CONTROL HYDRO-MULCH AND TACKIFIER					
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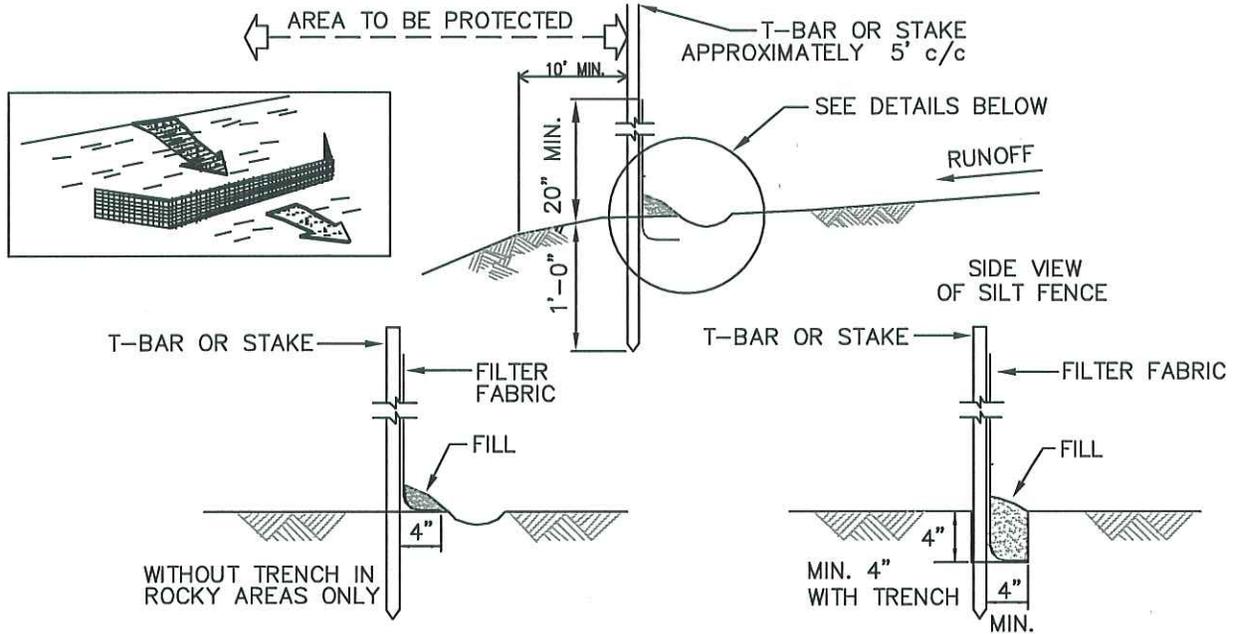


SECTION "A-A"

NOTES:

1. INSTALL A DEWATERING GEOTEXTILE FILTER BAG AS DIRECTED BY THE COMPANY'S INSPECTOR TO PREVENT THE FLOW OF HEAVILY SILT LADEN WATER INTO WATERBODIES OR WETLANDS.
2. DISCHARGE SITE SHALL BE WELL VEGETATED AND THE TOPOGRAPHY OF THE SITE SUCH THAT WATER WILL FLOW AWAY FROM ANY WORK AREAS. THE AREA DOWN SLOPE FROM THE DEWATERING SITE MUST BE REASONABLY PLANE OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.
3. TO ATTACH THE DISCHARGE HOSE, CUT A CORNER OF THE BAG, INSERT DISCHARGE HOSE, AND SECURE THE HOSE TO THE BAG.
4. A SINGLE FILTER BAG SHOULD NOT BE USED FOR FLOWS GREATER THAN 600 GALLONS PER MINUTE.
5. REPLACE FILTER BAG BEFORE IT IS COMPLETELY FILLED WITH SEDIMENT. MONITOR DISCHARGE TO AVOID OVER PRESSURING DUE TO PLUGGING, WHICH MAY RESULT IN RUPTURE.
6. DISPOSE OF USED FILTER BAG AND SEDIMENT AT A SITE APPROVED BY THE COMPANY'S INSPECTOR.

REVISIONS						DRAWN BY:		  TYPICAL GEOTEXTILE FILTER BAG FOR DEWATERING								
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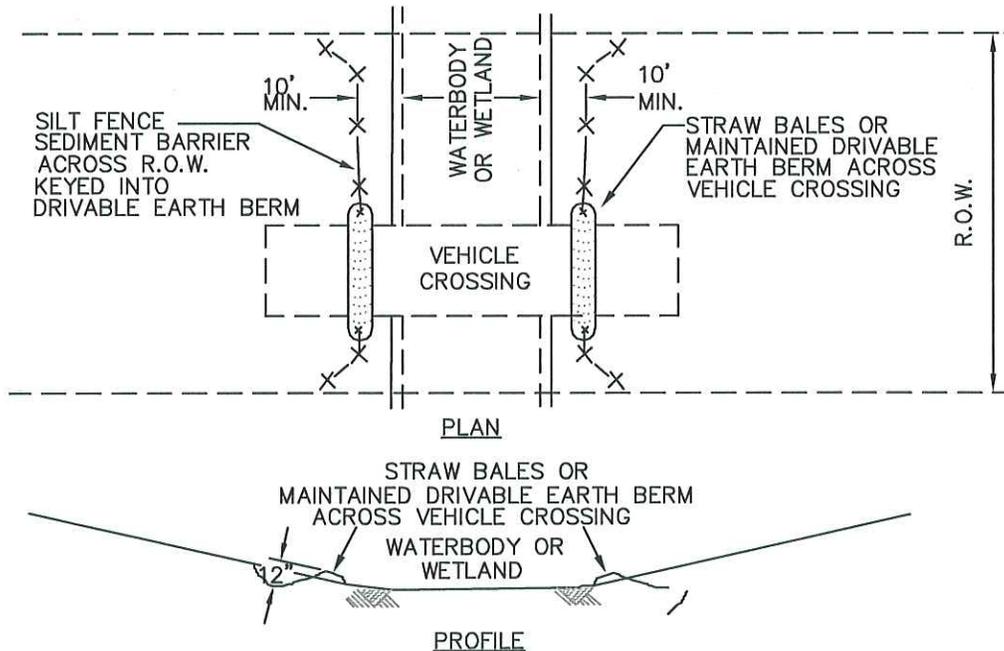
1. GENERALLY WHEN A LONG SEDIMENT BARRIER IS REQUIRED, SILT FENCE WILL BE UTILIZED RATHER THAN STRAW BALES AT:
 - * THE BASE OF ALL SLOPES ABOVE ROADS, SPRINGS, WETLANDS, IMPOUNDMENTS AND PERENNIAL AND INTERMITTENT STREAMS.
 - * THE DOWN SLOPE RIGHT-OF-WAY EDGE WHERE ANY OF THE ABOVE MENTIONED LOCATIONS ARE ADJACENT TO THE RIGHT-OF-WAY.
 - * BETWEEN TOPSOIL/SPOIL STOCKPILES AND PERENNIAL OR INTERMITTENT STREAMS OR WETLANDS WHERE BUFFER ZONE REQUIREMENTS CANNOT BE MET.
 - * ALONG R.O.W. BOUNDARIES OF WETLAND CONSTRUCTION.
 - * ACROSS CONSTRUCTION R.O.W. AT ALL WATERBODY CROSSINGS.
 - * AS SPECIFIED IN THE SPILL PREVENTION, CONTAINMENT, AND COUNTERMEASURE PLAN.
 - * AS DIRECTED BY THE COMPANY INSPECTOR.
2. THE SILT FENCE SHALL BE CONSTRUCTED AS FOLLOWS: FABRIC USED FOR THE SILT FENCE SHALL BE A "STANDARD STRENGTH" GEOTEXTILE, SUCH AS MIRAFI 100X OR AN APPROVED EQUIVALENT. THE FABRIC SHALL BE CUT FROM A CONTINUOUS FABRIC ROLL. THE HEIGHT OF THE FENCE SHALL NOT EXCEED 36". SPLICES SHALL ONLY BE DONE AT POSTS AND SHALL CONSIST OF A MINIMUM OF 6" OF OVERLAP WITH BOTH ENDS SECURED TO THE POST. POSTS SHALL BE POSITIONED A MAXIMUM OF 5' APART. POSTS SHALL CONSIST OF 2"x2" WOODEN STAKES OF SUFFICIENT LENGTH TO EXTEND A MINIMUM OF 12" INTO THE GROUND. FABRIC SHALL BE STAPLED OR WIRED TO POSTS A MAXIMUM OF EVERY 9".
3. THE SILT FENCE SHALL BE INSTALLED AS SPECIFIED BY THE MANUFACTURER OR AS FOLLOWS:
 - * A TRENCH, 4" WIDE AND 4" DEEP, SHALL BE EXCAVATED ALONG THE CONTOUR THE POST SHALL BE DRIVEN INTO THE BOTTOM OF THE TRENCH ON THE DOWNSTREAM SIDE OF THE FILTER FABRIC. THE TRENCH SHALL BE BACK FILLED AND COMPACTED, ENSURING 4" OF FENCE IS BURIED WITHIN THE TRENCH.
 - * IN AREAS WHERE THE TERRAIN IS TOO ROCKY FOR TRENCHING, A 4" GROUND FLAP WITH ROCK FILL TO HOLD IT IN PLACE SHALL BE USED.

REVISIONS						DRAWN BY:	TYPICAL SILT FENCE SEDIMENT BARRIER (SHT. 1 OF 3)					
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△						REVIEWED BY:						
△						APPROVED BY:						
△						PROJECT MANAGER:						
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-046	REV.	A
△	NO.	DESCRIPTION	DATE	BY	CHK.	APPR.						

NOTES: (CONT.)

- * SILT FENCES PLACED AT THE TOE OF A SLOPE SHALL BE SET AT LEAST 6' DOWN GRADIENT FROM THE TOE OF THE SLOPE (WHERE POSSIBLE) IN ORDER TO INCREASE PONDING.
 - * SILT FENCE PLACED AT THE TOP OF SLOPES SHALL BE AT LEAST 10' BELOW THE CREST.
 - * SILT FENCES PLACED AT THE BASE OF SPOIL OR TOPSOIL STOCKPILES SHALL EXTEND AROUND THE BASE OF THE PILES IN ORDER TO CONTAIN ANY SEDIMENTS AND/OR PREVENT FLOW-AROUND.
 - * WHEN INSTALLING SILT FENCES IN DRAINAGES, EXTEND THE FENCE UP THE CHANNEL BANKS AND TURN BOTH ENDS AT A SLIGHT ANGLE TOWARDS THE CENTER OF THE RIGHT-OF-WAY.
 - * UPON THE REQUEST OF THE COMPANY INSPECTOR, STRAW BALES SHALL BE USED IN CONJUNCTION WITH THE SILT FENCE.
4. SILT FENCES SHALL BE CHECKED AND MAINTAINED ON A REGULAR BASIS. THE DEPTH OF THE ANCHOR TRENCH SHALL BE ADJUSTED IF UNDERMINED. SHOULD INSPECTION REVEAL SEDIMENT LOADING AT OR NEAR 40% CAPACITY, THE SEDIMENT SHALL BE REMOVED AND PLACED IN AN AREA WHERE IT SHALL NOT RE-ENTER THE SILT FENCE IMPOUNDMENT OR A WATERWAY.
 5. SILT FENCE SHALL BE REMOVED ONLY AS DIRECTED BY THE COMPANY INSPECTOR.
 6. EROSION CONTROL STRUCTURES SHALL BE INSPECTED DAILY IN AREAS OF ACTIVE CONSTRUCTION. STRUCTURES SHALL BE INSPECTED WEEKLY AT INACTIVE CONSTRUCTION AREAS AND WITHIN 24 HOURS OF EACH RAINFALL EVENT WITH 0.5 INCH OR MORE. STRUCTURES SHALL BE REPAIRED AS NECESSARY.

INSTALLATIONS AT VEHICLE CROSSINGS OF WATERBODIES AND WETLANDS



1. IF REQUIRED, A 15' GAP SHALL BE LEFT IN THE SILT FENCE TO ACCOMMODATE TRAFFIC. HOWEVER, A SECTION OF SILT FENCE OR A DRIVABLE EARTH BERM TIED INTO ADJACENT SILT FENCE SHALL BE USED TO CLOSE THE GAP AT THE END OF EACH DAY. THE SILT FENCE USED TO CLOSE THE GAP MUST OVERLAP THE ENDS OF THE PERMANENT SILT FENCE FOR A MINIMUM OF 24", AND SHALL BE "KEYED" INTO THE GROUND THE SAME AS THE FILTER FABRIC ON EITHER SIDE OF THE GAP.
2. A MAINTAINED DRIVABLE EARTH BERM MAY BE INSTALLED ACROSS THE VEHICLE CROSSING IN LIEU OF SILT FENCE DURING ACTIVE CONSTRUCTION.
3. BERM MUST BE TIED INTO SILT FENCE.
4. BERM MUST BE MAINTAINED TO ENSURE SEDIMENT TRAPPING CAPACITY.
5. WHEN ACTIVE CONSTRUCTION IS COMPLETE, INSTALL SILT FENCE ACROSS ENTIRE R.O.W.

REVISIONS						DRAWN BY:	  TYPICAL SILT FENCE SEDIMENT BARRIER (SHT. 2 OF 3)		
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△						APPROVED BY:			
△						PROJECT MANAGER:			
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE	PROJECT NUMBER 2568-01	DRAWING NUMBER TYP-046A	REV. A
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.				

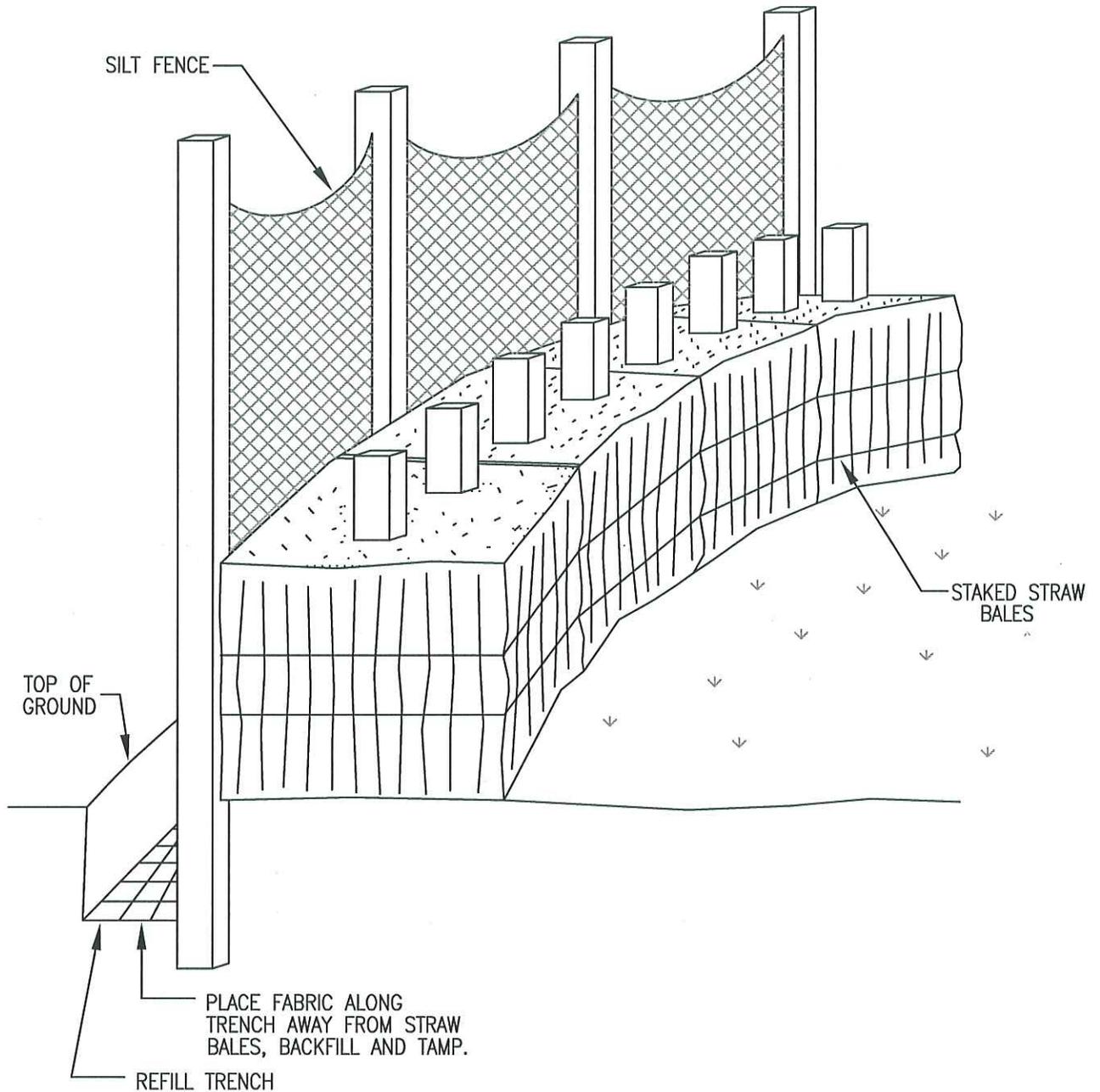
SLOPE PROTECTION

THE MAXIMUM SIZE OF THE DRAINAGE AREA SHOULD BE 0.25 ACRES PER 100 FEET OF FENCE LENGTH. THE MAXIMUM LENGTH OF SLOPE SHOULD BEHIND THE FENCE IS 100 FEET.

MAXIMUM SLOPE LENGTH ABOVE A
24" TO 30" HIGH SILT FENCE

SLOPE	LENGTH (FT)
<2%	500
2 TO 5%	200
5 TO 10%	150
10 TO 20%	100
20 TO 30%	70
30 TO 40%	40
40 TO 50%	25

REVISIONS						DRAWN BY:	 CH2MHILL TYPICAL SILT FENCE SEDIMENT BARRIER (SHT. 3 OF 3)				
△						CHECKED BY:					
△						REVIEWED BY:					
△						APPROVED BY:					
△						PROJECT MANAGER:					
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE					
NO.	DESCRIPTION	DATE	BY	CHK	APPR.	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-046B	REV.	A

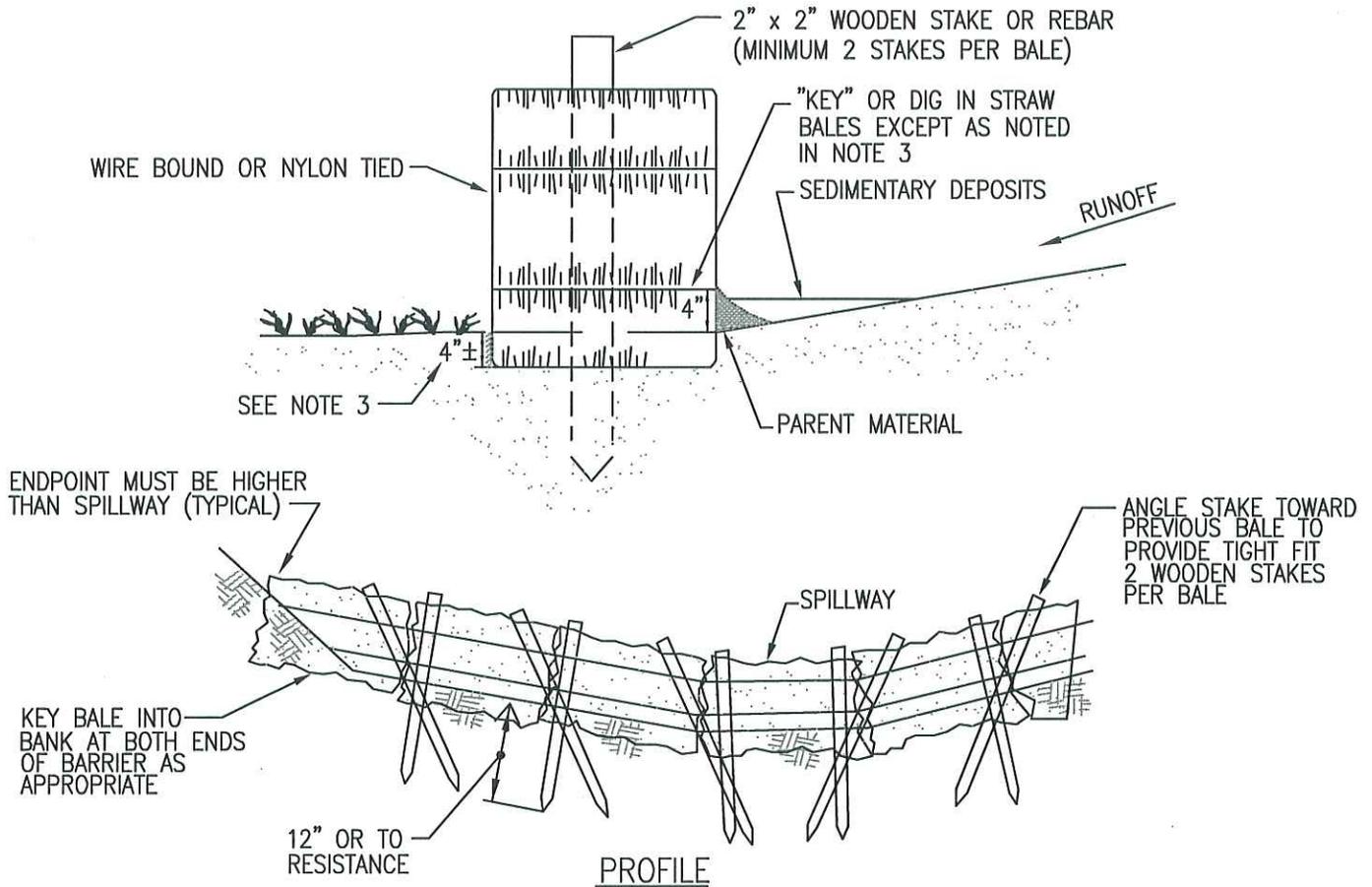


NOTE:

1. WHERE EXTREMELY ERODIBLE SOIL CONDITIONS EXIST, AT THE DIRECTION OF THE COMPANY'S INSPECTOR A COMBINED STRAW BALE AND SILT FENCE SEDIMENT CONTROL BARRIER SHALL BE INSTALLED. FOR INSTALLATION CONDITIONS AND INSTRUCTIONS SEE:

- TYP-060: SILT FENCE SEDIMENT BARRIERS
- TYP-062: STRAW BALE SEDIMENT BARRIERS

REVISIONS						DRAWN BY:		GREENCORE <small>WATER CONTROL SYSTEMS</small> CH2MHILL TYPICAL STRAW BALE AND SILT FENCE					
△						CHECKED BY:							
△						REVIEWED BY:							
△						APPROVED BY:							
△						PROJECT MANAGER:							
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		PROJECT NUMBER	XXXX-XX	DRAWING NUMBER	TYP-047	REV.	A
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.								



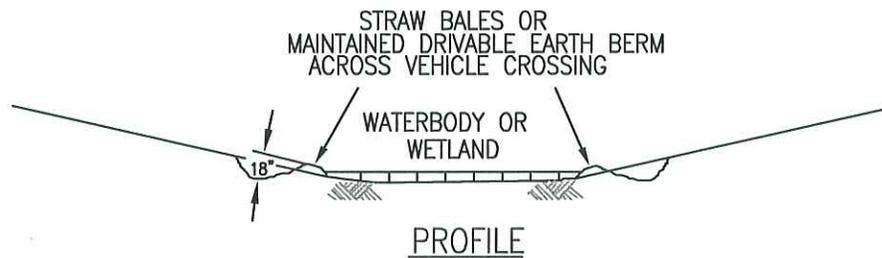
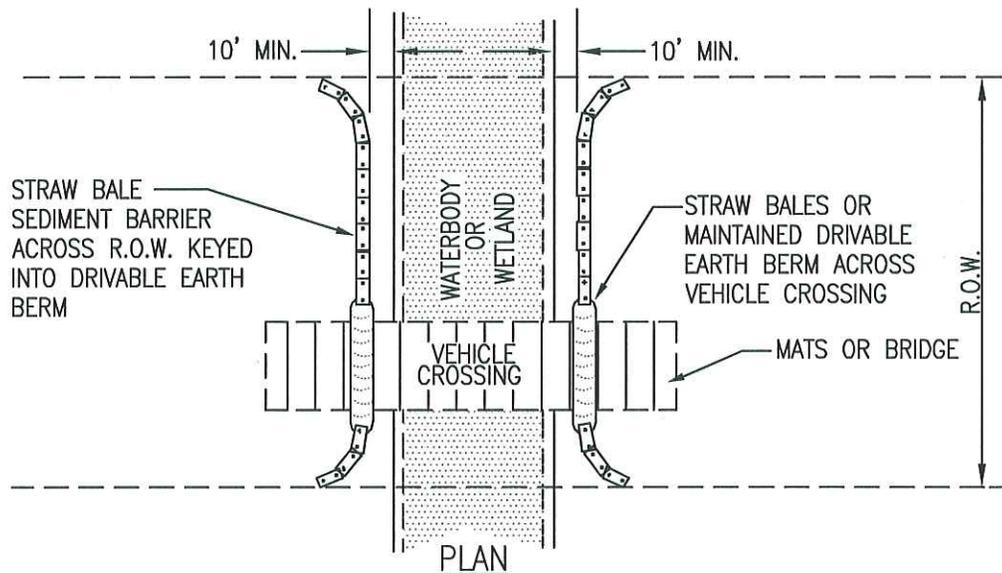
NOTES:

1. STRAW BALE SEDIMENT BARRIERS SHALL BE INSTALLED AT THE FOLLOWING LOCATIONS:
 - THE BASE OF ALL SLOPES ABOVE ROADS, SPRINGS, WETLANDS, IMPOUNDMENTS AND FLOWING STREAMS.
 - THE DOWNSLOPE RIGHT-OF-WAY EDGE WHERE ANY OF THE ABOVE-MENTIONED LOCATIONS ARE ADJACENT TO THE RIGHT-OF-WAY.
 - BETWEEN TOPSOIL/SPOIL STOCKPILES AND STREAMS OR WETLANDS AS NEEDED.
 - ALONG R.O.W. BOUNDARIES IN WETLAND CONSTRUCTION.
 - AS SPECIFIED IN THE SPILL PREVENTION, CONTAINMENT, AND COUNTERMEASURE PLAN.
 - AS DIRECTED BY THE COMPANY'S REPRESENTATIVE.
2. STRAW BALE SEDIMENT BARRIERS SHALL CONSIST OF A R.O.W. OF STRAW BALES, PLACED ON THE FIBER-CUT EDGE (TIES NOT IN CONTACT WITH THE GROUND). BALES SHALL BE TIGHTLY ABUTTED TO ONE ANOTHER. THE BARRIER SHALL BE ONE BALE HIGH. ONLY CERTIFIED "NOXIOUS WEED-FREE" STRAW SHALL BE USED WHENEVER POSSIBLE.
3. ENTRENCH ("KEY") STRAW BALES INTO THE GROUND TO A DEPTH OF 4" EXCEPT IN FROZEN, SATURATED, OR EXTREMELY ROCKY SOILS. PLACE PARENT MATERIAL ON UPSTREAM SIDE OF STRAW BALES TO PREVENT UNDERMINING.
4. WALK ON STRAW BALES TO INSURE ADEQUATE BALE-TO-SOIL CONTACT.
5. ANCHOR STRAW BALES SECURELY IN PLACE WITH TWO WOODEN OR STEEL REBAR STAKES DRIVEN THROUGH THE TOPS OF THE BALES. THE STAKES SHALL PENETRATE THE GROUND A DISTANCE OF 12" UNLESS ROCK OR AN IMPERMEABLE LAYER IS ENCOUNTERED:
 - THE FIRST, CENTER AND END BALES OF THE BARRIER SHALL HAVE STAKES DRIVEN VERTICALLY THROUGH THE BALE.
 - BALES, OTHER THAN THOSE LOCATED AT THE ENDS OR CENTER OF THE BARRIER, SHALL HAVE THE FIRST STAKE DRIVEN THROUGH THE TOP OF THE BALE AT AN ANGLE SO THAT THE STAKE PASSES THROUGH THE PREVIOUSLY PLACED BALE, IN ORDER TO PROVIDE TIGHT CONTACT BETWEEN BALES. THE SECOND STAKE SHALL BE DRIVEN VERTICALLY THROUGH THE TOP OF THE BALE.

REVISIONS						DRAWN BY:		  TYPICAL STRAW BALE SEDIMENT BARRIER (SHT. 1 OF 2)
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△						REVIEWED BY:		
△						APPROVED BY:		
△						PROJECT MANAGER:		
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		
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NOTES: (CONT.)

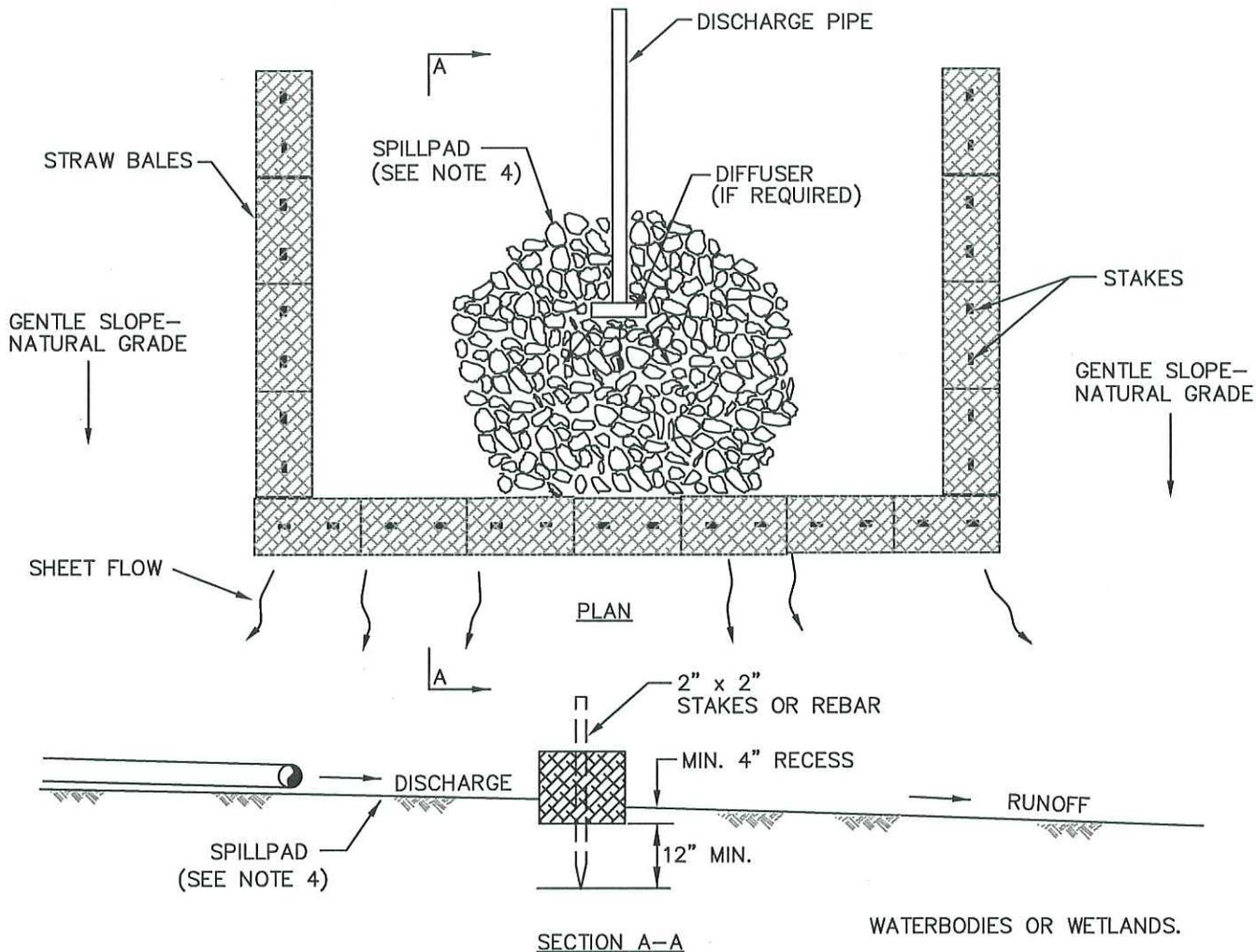
6. PLACE STRAW BALES SO THEY ARE EFFECTIVE BUT DO NOT HINDER CONSTRUCTION. IF NECESSARY A 15' GAP IN STRAW BALE BARRIERS SHALL BE PROVIDED AS NEEDED TO ACCOMMODATE TRAFFIC ON TEMPORARY CONSTRUCTION ROADS. THE GAP SHALL BE CLOSED AT THE END OF EACH WORK DAY, USING STRAW BALE BARRIERS, OR A DRIVABLE EARTH BERM TIED INTO ADJACENT STRAW BALES. THE BALES USED TO CLOSE THE GAP SHALL BE PLACED ON THE UPHILL SIDE OF THE STRAW BALE BARRIER, THE END BALES OF THE GAP SEGMENT SHALL OVERLAP A MINIMUM OF 12".
7. MONITOR FOR UNDERMINING OR FLOW-AROUND. INSPECT BALE POSITION TO ASSURE THAT THEY REMAIN CLOSE TOGETHER. MAINTAIN STRAW BALE BARRIERS BY REPLACING DAMAGED BALES AND REMOVING SEDIMENT LOAD. WHEN SEDIMENT LOAD IS GREATER THAN 60% BEHIND THE BARRIER, SEDIMENT SHALL BE REMOVED AND PLACED IN AN AREA WHERE IT SHALL NOT REENTER THE BARRIER OR A WATERWAY. IF SEDIMENT BEHIND STRAW BALE BARRIERS CANNOT BE REMOVED, A SECOND R.O.W. OF BALES SHALL BE INSTALLED UPSLOPE OF THE BARRIER.
8. WHERE STRAW BALES AND SILT FENCE ARE INSTALLED AS A UNIT, THE STRAW BALES SHALL BE INSTALLED ON THE DOWN SLOPE SIDE OF THE SILT FENCE.
9. EROSION CONTROL STRUCTURES SHALL BE INSPECTED DAILY IN AREAS OF ACTIVE CONSTRUCTION. STRUCTURES SHALL BE INSPECTED WEEKLY IN INACTIVE CONSTRUCTION AREAS AND WITHIN 24 HOURS OF EACH 0.5 INCH RAINFALL EVENT. STRUCTURES SHALL BE REPAIRED AS NECESSARY.
10. STRAW BALE BARRIERS SHALL BE REMOVED ONLY AS DIRECTED BY THE COMPANY'S REPRESENTATIVE.



DRIVABLE BERM NOTES:

1. A MAINTAINED DRIVABLE EARTH BERM MAY BE INSTALLED ACROSS VEHICLE CROSSINGS IN LIEU OF STRAW BALES.
2. BERM MUST BE TIED INTO STRAW BALES.
3. BERM MUST BE MAINTAINED TO ENSURE SEDIMENT TRAPPING CAPACITY.

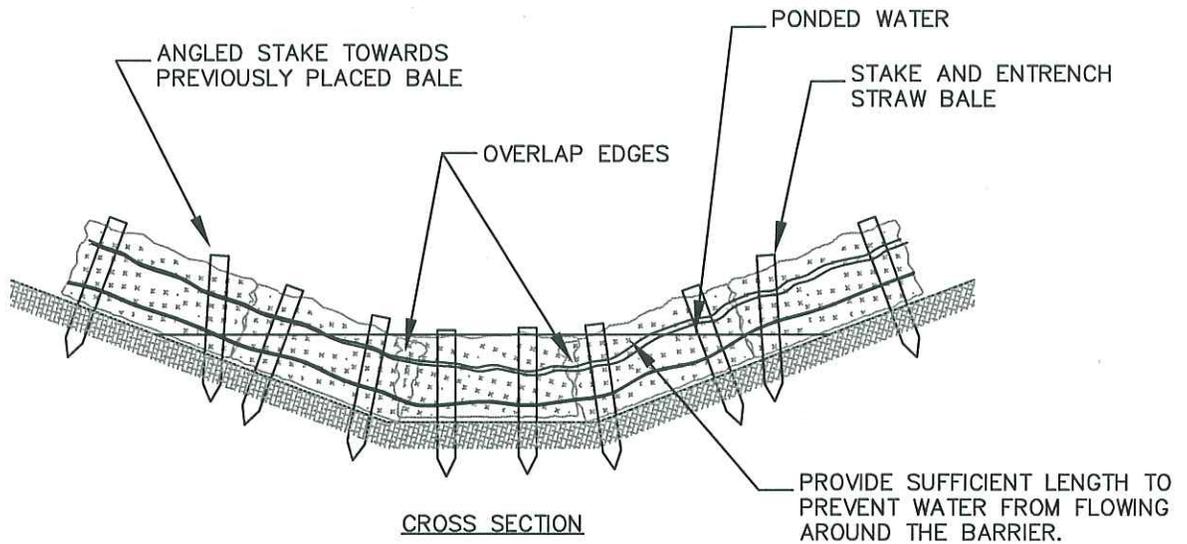
REVISIONS						DRAWN BY:		  TYPICAL STRAW BALE SEDIMENT BARRIER (SHT. 2 OF 2)					
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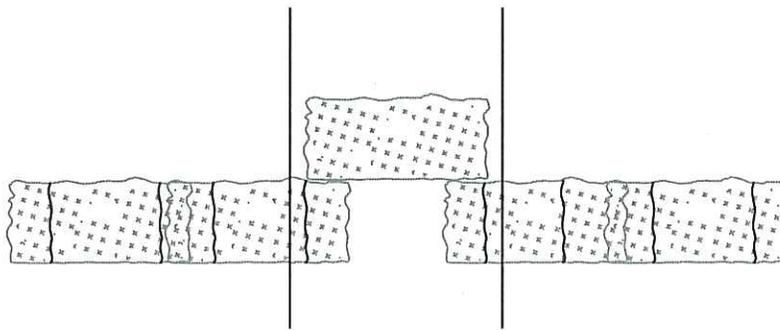
NOTES:

1. INSTALL A STRAW BALE DEWATERING STRUCTURE WHEREVER IT IS NECESSARY AND AS DIRECTED BY THE COMPANY INSPECTOR TO PREVENT THE FLOW OF SILT LADEN WATER INTO WATERBODIES OR WETLANDS.
2. DISCHARGE SITE SHALL BE WELL VEGETATED AND THE TOPOGRAPHY OF THE SITE SUCH THAT WATER WILL FLOW INTO THE DEWATERING STRUCTURE AND AWAY FROM ANY WORK AREAS. THE AREA DOWN SLOPE FROM THE DEWATERING SITE MUST BE REASONABLY PLANE OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.
3. ANCHOR STRAW BALES SECURELY IN PLACE WITH TWO WOODEN STAKES OR REBAR. ENTRENCH ("KEY") STRAW BALES INTO THE GROUND TO A DEPTH OF 4".
4. DIRECT THE PUMPED WATER ONTO A STABLE SPILL PAD CONSTRUCTED OF STRAW BALES, ROCK FILL, WEIGHTED TIMBERS, OR WOVEN GEOTEXTILE STAKED TO THE GROUND SURFACE (SUCH AS MIRAFI 600X, TERRAFIX 400W) OR AN APPROVED EQUIVALENT.
5. DISCHARGE RATES SHALL BE SUCH THAT WATER WILL NOT OVERFLOW THE TOP OF THE STRUCTURE.
6. MANUFACTURED FILTER BAGS (TYP-059) AREA SUITABLE ALTERNATIVE TO STRAW BALE STRUCTURES FOR TRENCH DEWATERING.
7. INSTALL A SPLASH PUP (TYP-064) IF THE DISCHARGE VELOCITY IS ERODING THE SOILS.

REVISIONS						DRAWN BY:		  TYPICAL STRAW BALE DEWATERING - SMALL VOLUME (SHT. 1 OF 2)
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△						REVIEWED BY:		
△						APPROVED BY:		
△						PROJECT MANAGER:		
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CROSS SECTION



PLAN VIEW

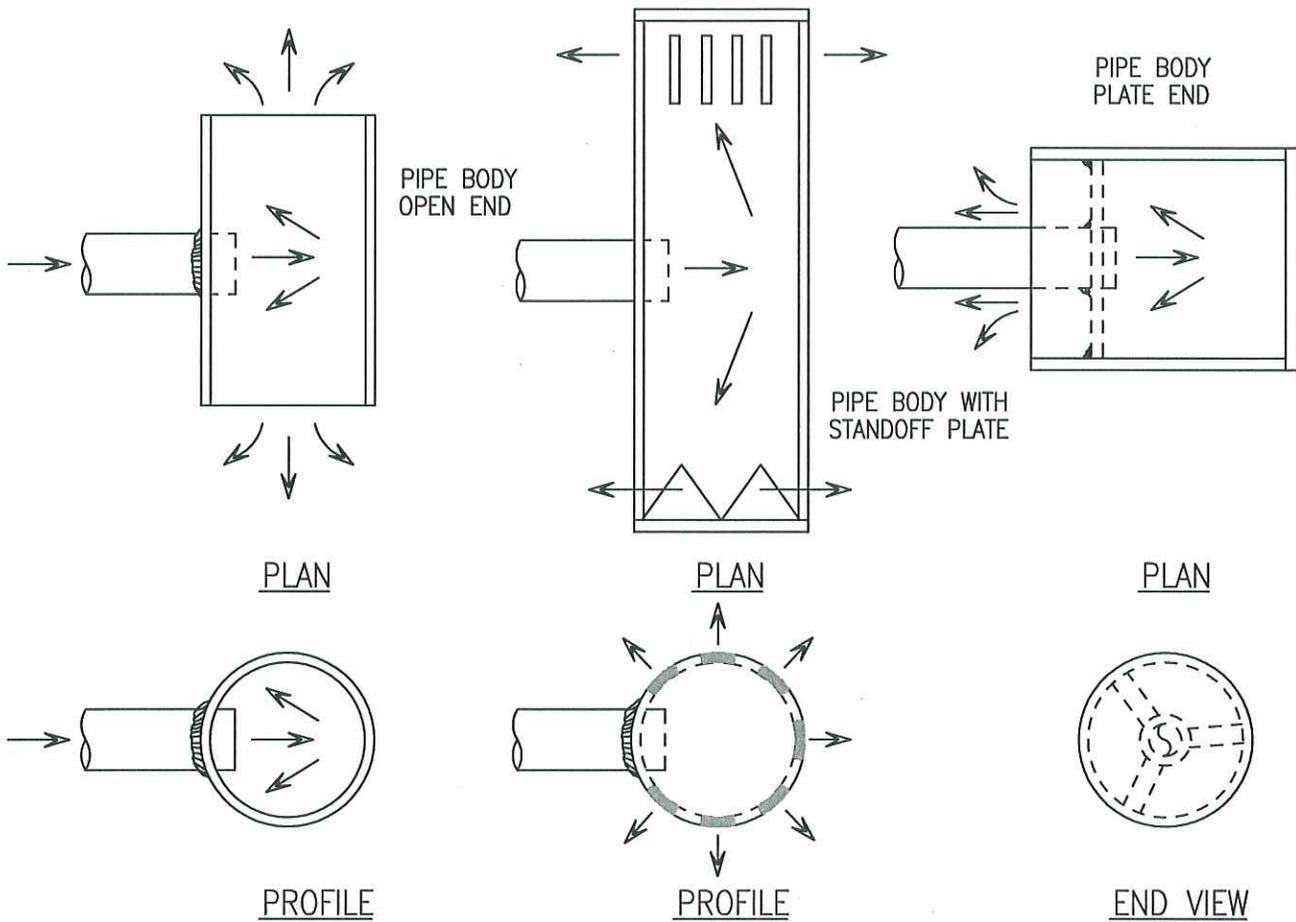
THE MAXIMUM SIZE OF THE DRAINAGE AREA SHOULD BE 0.25 ACRES PER 100 FEET OF FENCE LENGTH. SEE TABLE FOR MORE INFORMATION ABOUT HILLSIDE LENGTH.

SLOPE PROTECTION

MAXIMUM HILLSIDE LENGTH FOR GIVEN SLOPE

SLOPE	LENGTH (FT)
<2%	250
2 TO 5%	100
5 TO 10%	50
10 TO 20%	35
>20%	15

REVISIONS						DRAWN BY:	  TYPICAL STRAW BALE DEWATERING - SMALL VOLUME (SHT. 2 OF 2)					
△						CHECKED BY:						
△						REVIEWED BY:						
△						APPROVED BY:						
△						PROJECT MANAGER:						
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-049A	REV.	A
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.							



BASIC SPLASH PUP

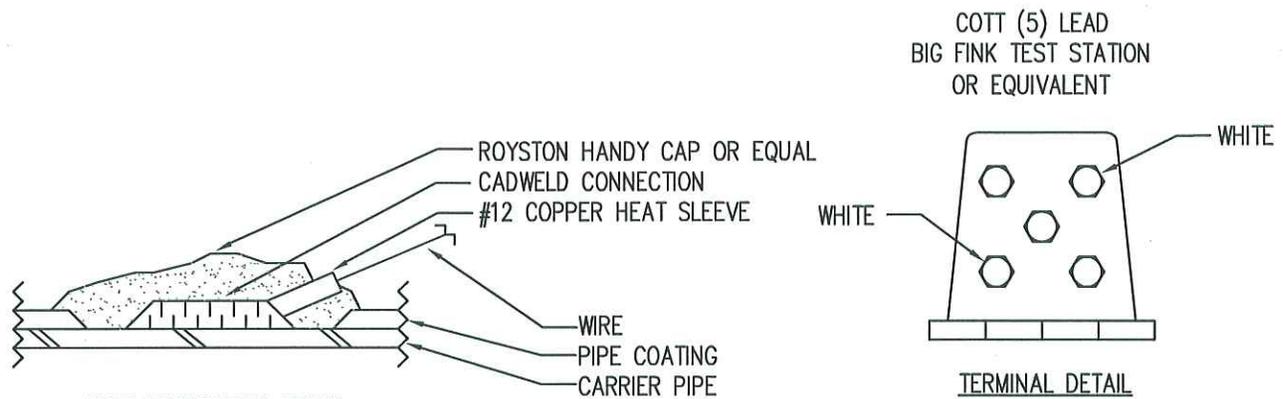
BASIC SPLASH PLATE

PLATE COMBINATION

NOTES:

1. AN ENERGY DISSIPATER SHALL BE UTILIZED WHENEVER WATER DISCHARGE VELOCITIES MAY CAUSE EROSION.
2. THE DESIGN AND EFFECTIVENESS OF THE ENERGY DISSIPATER IS THE RESPONSIBILITY OF THE CONSTRUCTION CONTRACTOR.
3. ENERGY DISSIPATERS ARE UTILIZED IN CONJUNCTION WITH A DEWATERING STRUCTURE.
4. GEOTEX FABRIC OR EQUIV. SHALL BE PLACED UNDERNEATH AND AROUND DISSIPATER DEVICE TO MIN. EROSION.

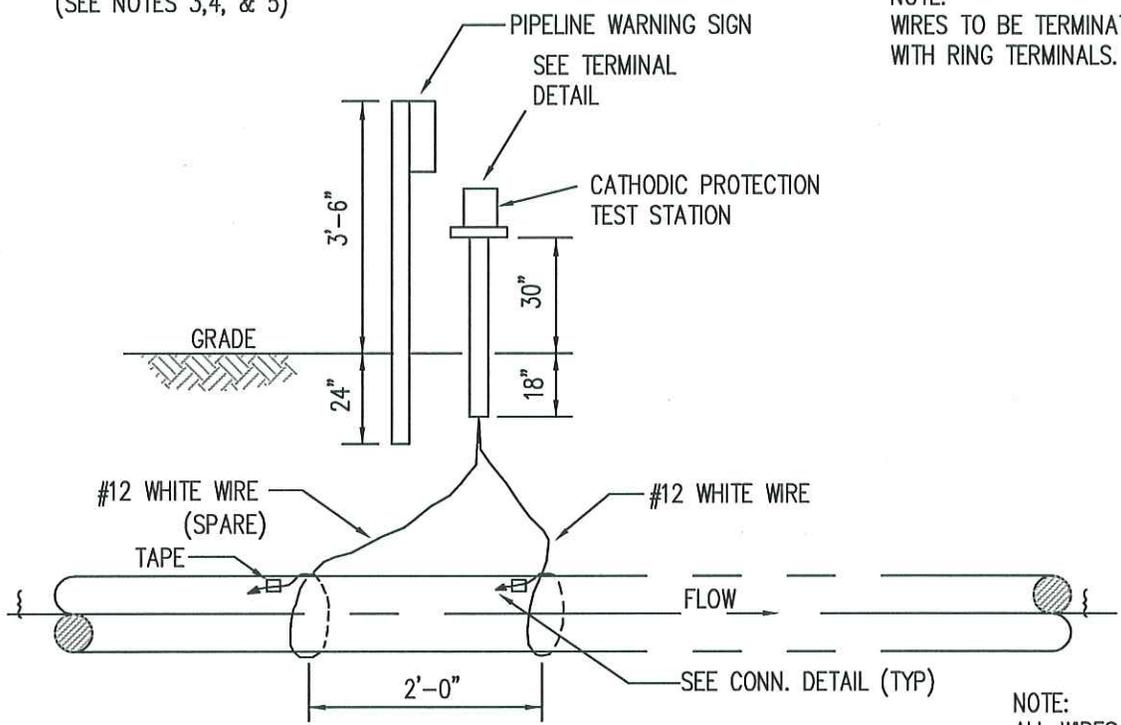
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△						APPROVED BY:							
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PIPE CONNECTION DETAIL
(SEE NOTES 3,4, & 5)

TERMINAL DETAIL

NOTE:
WIRES TO BE TERMINATED
WITH RING TERMINALS.



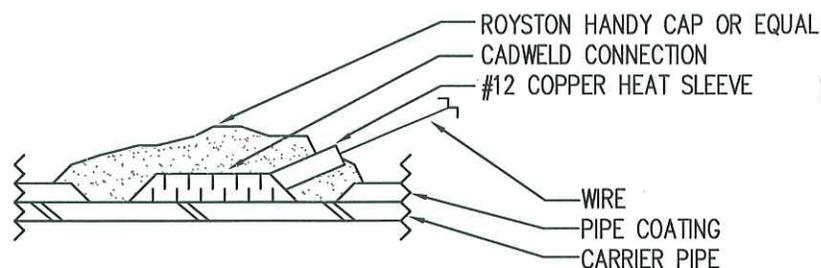
NOTE:
ALL WIRES TO MAKE A
COMPLETE LOOP AROUND
PIPE.

NOTES:

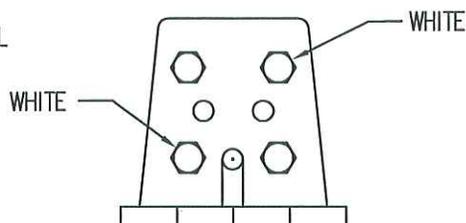
1. ALL WIRE SHALL BE INSULATED STRANDED COPPER #12 THHN. AS SHOWN ABOVE.
2. TERMINAL BLOCK SHALL BE WIRED BY CONTRACTOR AS SHOWN IN TERMINAL DETAIL ABOVE.
3. ALL WIRE CONNECTIONS TO CARRIER PIPE SHALL BE MADE AS SHOWN IN DETAIL ABOVE. WIRE SHALL BE CONNECTED TO PIPE BY CADWELD PROCESS WITH COPPER HEAT SLEEVE.
4. CADWELD WIRE CONNECTIONS SHALL BE PRIMED WITH ROYSTON SPRAY PRIMER OR EQUAL AND ALLOWED TO DRY 3 TO 4 MINUTES OR UNTIL TACKY, AND COVERED WITH ROYSTON HANDY CAP OR EQUAL.
5. WIRE INSULATION SHALL BE PROTECTED FROM DAMAGE.
6. LAY WIRES ALONGSIDE PIPE. NOT OVER OR UNDER PIPE.
7. CATHODIC PROTECTION TEST STATION AND ALL OTHER MATERIALS SHALL BE FURNISHED BY CONTRACTOR.
8. INSTALL AT ALL LOCATIONS INDICATED ON ALIGNMENT SHEETS.

REVISIONS						DRAWN BY:		<p style="margin: 0;">TYPICAL CATHODIC PROTECTION TEST STATION</p>		
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△						REVIEWED BY:				
△						APPROVED BY:				
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△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		PROJECT NUMBER 2568-01	DRAWING NUMBER TYP-051	REV. A
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.					

COTT FINK PROBE
COUPON TEST STATION
9 FT. LENGTH

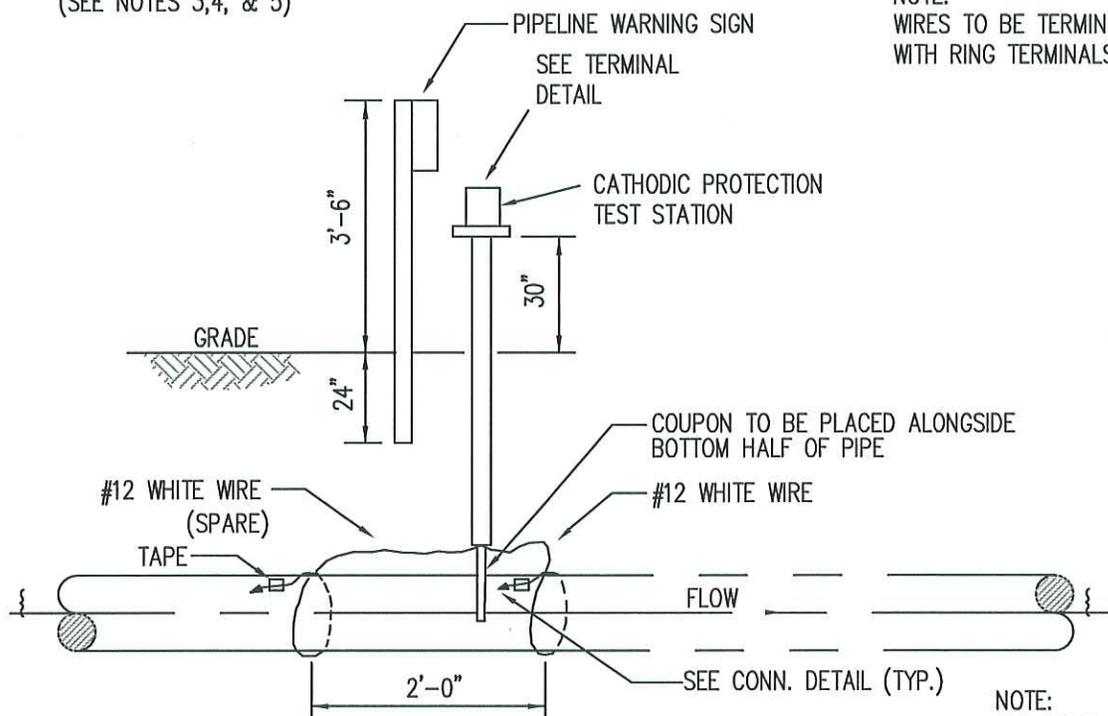


PIPE CONNECTION DETAIL
(SEE NOTES 3, 4, & 5)



TERMINAL DETAIL

NOTE:
WIRES TO BE TERMINATED
WITH RING TERMINALS.



NOTE:
ALL WIRES TO MAKE A
COMPLETE LOOP AROUND
PIPE.

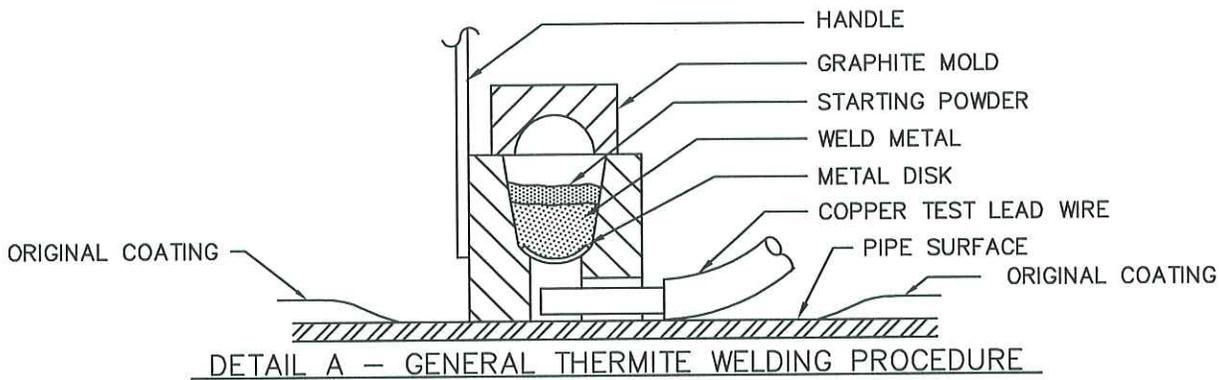
NOTES:

1. ALL WIRE SHALL BE INSULATED STRANDED COPPER #12 THHN. AS SHOWN ABOVE.
2. TERMINAL BLOCK SHALL BE WIRED BY CONTRACTOR AS SHOWN IN TERMINAL DETAIL ABOVE.
3. ALL WIRE CONNECTIONS TO CARRIER PIPE SHALL BE MADE AS SHOWN IN DETAIL ABOVE. WIRE SHALL BE CONNECTED TO PIPE BY CADWELD PROCESS WITH COPPER HEAT SLEEVE.
4. CADWELD WIRE CONNECTIONS SHALL BE PRIMED WITH ROYSTON SPRAY PRIMER OR EQUAL AND ALLOWED TO DRY 3 TO 4 MINUTES OR UNTIL TACKY, AND COVERED WITH ROYSTON HANDY CAP OR EQUAL.
5. WIRE INSULATION SHALL BE PROTECTED FROM DAMAGE.
6. LAY WIRES ALONGSIDE PIPE. NOT OVER OR UNDER PIPE.
7. CATHODIC PROTECTION TEST STATION AND ALL OTHER MATERIALS SHALL BE FURNISHED BY CONTRACTOR.
8. INSTALL AT ALL LOCATIONS INDICATED ON ALIGNMENT SHEETS.

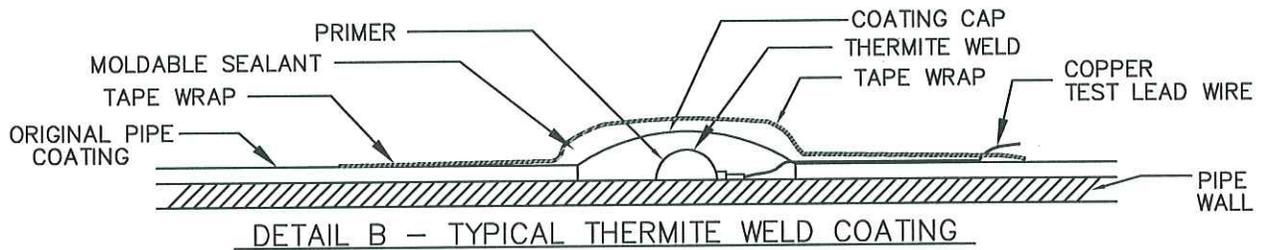
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TYPICAL
CATHODIC PROTECTION COUPON TEST STATION

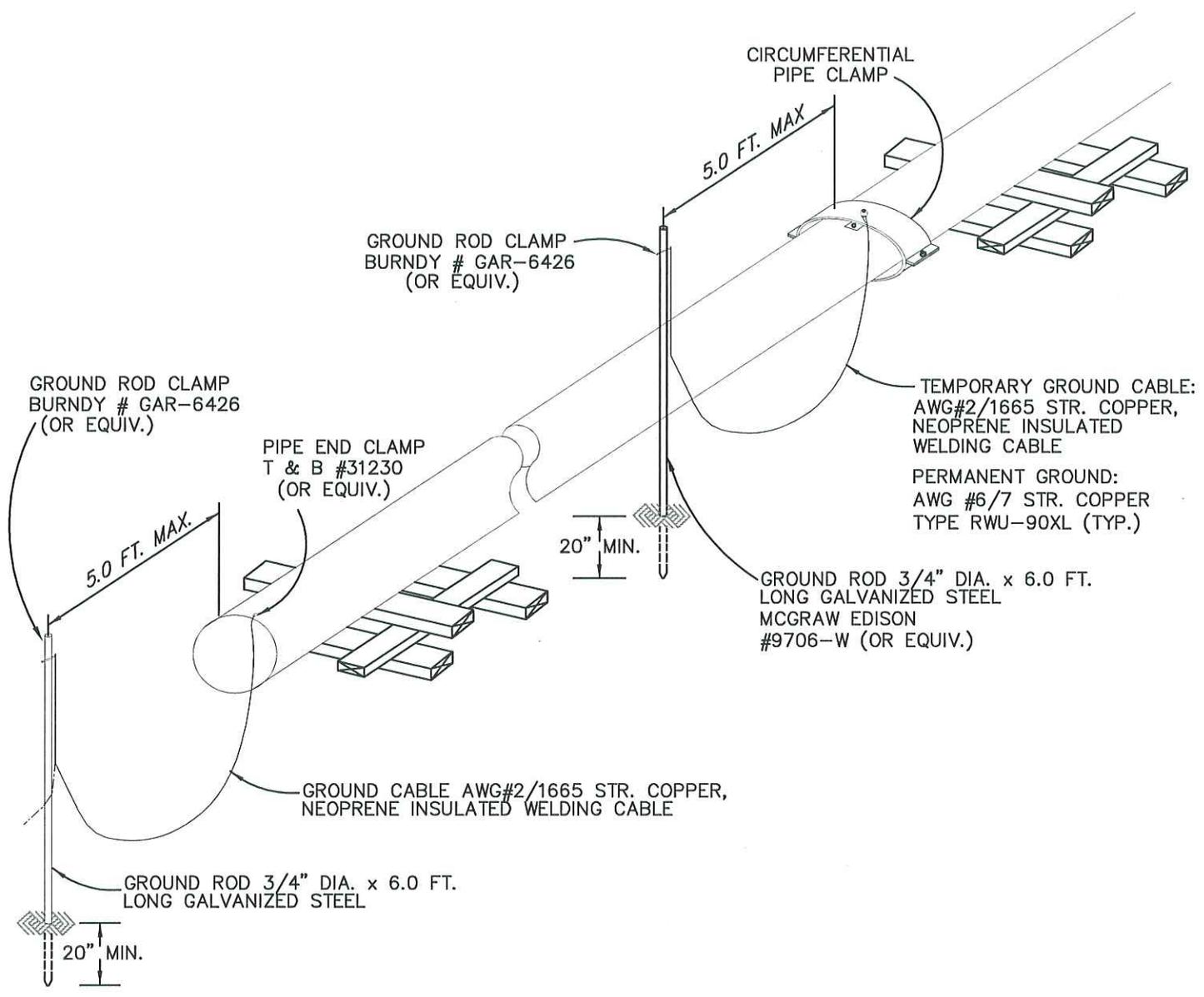


1. REMOVE 4" x 4" AREA OF COATING AT 12 O'CLOCK POSITION ON PIPE. CLEAN SURFACE TO SHINY METAL WITH A FILE, FORM A CROSS HATCHED ANCHOR PATTERN.
2. SECURE WIRE AROUND PIPE. STRIP WIRE INSULATION BACK 2" FOR No. 10 AWG WIRE AND SMALLER, SLIP ON COPPER SLEEVE AND CRIMP.
3. PLACE METAL RETAINER DISK FLAT IN MOLD. DUMP (DO NOT POUR) POWDER ONTO DISK AND CLOSE MOLD LID. MAKE SURE ALL FINE STARTING POWDER IS IN THE MOLD; IF ANY CLINGS TO BOTTOM OF CARTRIDGE, SQUEEZE OUT INTO MOLD AND BREAK UP FINE. CHARGE TO BE RESTRICTED TO THE CONTENTS OD ONE CA.15 CARTRIDGE. CADWELD CONNECTION MOLD #CA HAA-IG SHALL BE USED.
4. REPLACE EMPTY CARTRIDGE IN THE BOX GREEN END UP TO KEEP REMAINING CARTRIDGES UPRIGHT.
5. LAY WIRE ON BRIGHT PIPE SURFACE USING SPRING LOADED CHAIN CLAMP TO HOLD CRUCIBLE TIGHT. REMOVE HAND COMPLETELY AWAY FROM TOOL.
6. USE EYE PROTECTION. STANDING ON OPPOSITE SIDE OF CRUCIBLE FROM TOUCH HOLE, IGNITE POWDER WITH SPARK FROM FLINT GUN. USE CARE, POWDER WILL FLASH.
7. WHEN WELD HAS SET, REMOVE MOLD AND TEST THERMITE WELD CONNECTION BY RAPPING SHARPLY WITH HAMMER. IN THE EVENT THERE IS ANY INDICATION THAT A COMPLETE WELD HAS NOT BEEN ACHIEVED, THE WELD SHALL BE REMOVED AND ATTEMPTED A MINIMUM DISTANCE OF 24" AWAY.
8. REMOVE SLAG FROM WELD AREA WITH SLAG HAMMER AND WIRE BRUSH.
9. COAT CONNECTION AS PER DETAIL B.



1. SPECIFIC COATING PRODUCTS SHALL BE AS PER THE CONTRACT DOCUMENT AND APPLIED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. APPLY ROYSTON HANDICAP WITH ROYSTON No. 747 PRIMER TO THE THERMITE WELD AREA.
3. CAP SHALL BE PROPERLY POSITIONED OVER THE THERMITE WELD. WELD AND CAP SHALL BE SECURELY HELD IN PLACE BY TIGHTENING CABLE - TIE AROUND THE PIPE.
4. THE COMPLETED THERMITE WELD AND ANY ASSOCIATED BARE STEEL SHALL BE COATED USING A THREE STEP PROCEDURE: A. ANY BARE STEEL SHALL BE PRIMED. B. MOLDABLE SEALANT SHALL BE APPLIED OVER THE PRIMED AREA AND OVERLAPPING ORIGINAL COATING A MINIMUM OF 3 INCHES. C. FULL CIRCUMFERENTIAL WRAPS OF SHEAR RESISTANT COLD APPLIED POLYETHYLENE TAPE SHALL BE APPLIED TO THE ENTIRE AREA OVERLAPPING THE ORIGINAL COATING A MINIMUM OF 6 INCHES.
5. SPECIFIC COATING PRODUCTS SHALL BE AS PER THE CONTRACT DOCUMENT AND APPLIED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COATING DAMAGE SHALL BE PREPARED USING THE PATCHING PROCEDURE & MATERIAL AS SPECIFIED UNDER COATING SPECIFICATIONS.
6. ALL MATERIAL, EXCEPT TEST LEAD WIRE, TO BE FURNISHED BY CONTRACTOR.

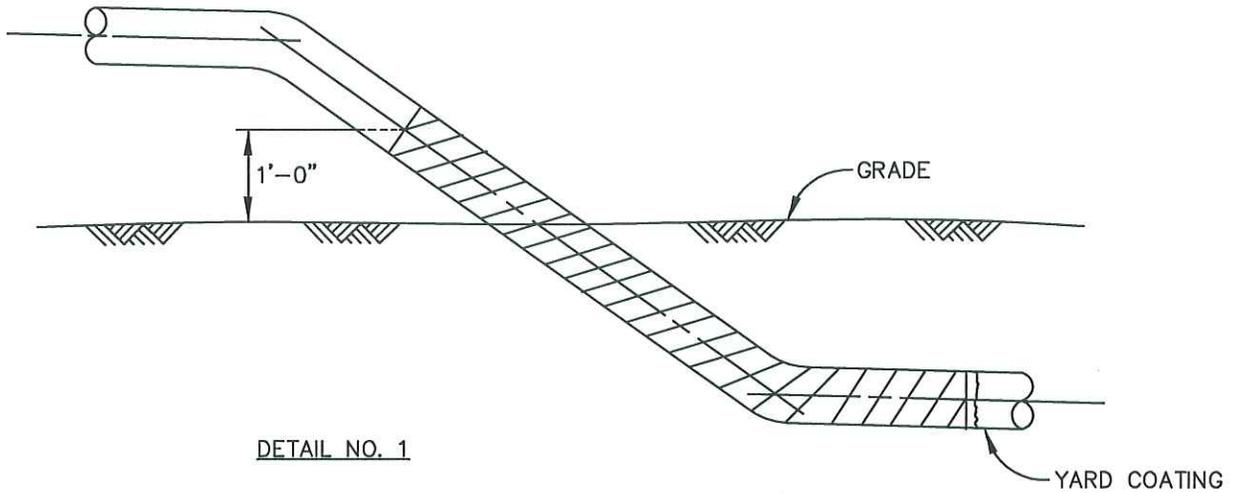
REVISIONS						DRAWN BY:		 CH2MHILL TYPICAL THERMITE WELD CONNECTION					
△						CHECKED BY:							
△						REVIEWED BY:							
△						APPROVED BY:							
△						PROJECT MANAGER:							
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-053	REV.	A
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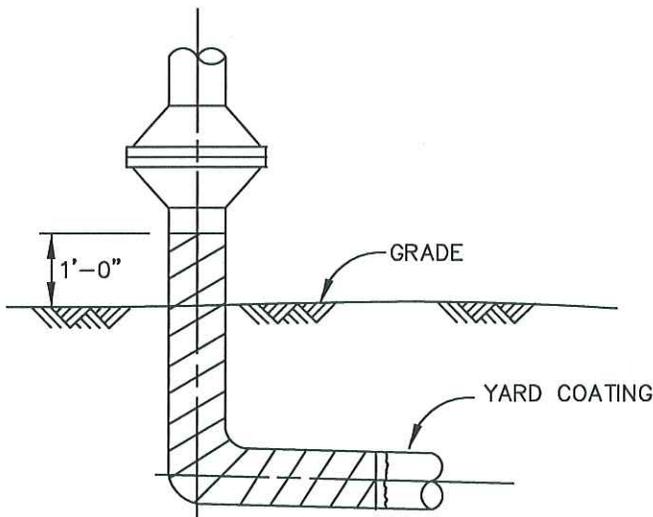
NOTE:

- 1. ALL MATERIALS SHALL BE SUPPLIED BY CONTRACTOR.

REVISIONS						DRAWN BY:		  TYPICAL PIPE GROUNDING ARRANGEMENTS				
△						CHECKED BY:					PROJECT NUMBER	
△						REVIEWED BY:					DRAWING NUMBER	
△						APPROVED BY:					2568-01	
△						PROJECT MANAGER:					TYP-054	
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		REV. A				
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.							



DETAIL NO. 1



DETAIL NO. 2

PROTECTIVE COATING APPLICATION

1. COVER ALL BELOW GRADE PIPING WITH TAPE PRIMER EXTENDING FROM YARD COATING TO A POINT 1 FOOT ABOVE THE GRADE LINE.
2. APPLY PROTECTIVE TAPE WITH A 1/2 WIDTH LAP OVER PRIMED SURFACE.
3. ALL COATING TO BE APPLIED AS PER MANUFACTURER'S RECOMMENDATION.
4. ABOVEGROUND PIPING TO BE PAINTED PER COATING SPECIFICATIONS.
5. ALL MATERIALS TO BE FURNISHED BY CONTRACTOR.

REVISIONS						DRAWN BY:
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△						APPROVED BY:
△						PROJECT MANAGER:
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE
NO.	DESCRIPTION	DATE	BY	CHK	APPR.	

 CH2MHILL			
TYPICAL PROTECTIVE COATING DETAILS			
PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-055
REV.	A		

TYPICAL CONSTRUCTION STAKING
COLOR CODE SYSTEM

FLUORESCENT COLORS

ORANGE FLAGGING WITH ORANGE PAINT



ORANGE AND BLUE FLAGGING WITH ORANGE PAINT



PINK FLAGGING



WHITE FLAGGING



WHITE AND RED FLAGGING



YELLOW FLAGGING ON CROSSED LATH



BLUE FLAGGING



GREEN FLAGGING



FEATURES

CENTERLINE STAKES

PI STAKES

SURVEY CONTROL POINTS

STANDARD R.O.W. LIMIT STAKES

T.U.A. LIMIT STAKES

STAKES AT FOREIGN LINE CROSSING

WETLANDS

ENVIRONMENTALLY SENSITIVE AREAS
& OTHER RESOURCE SITES

ENVIRONMENTALLY SENSITIVE AREAS
& OTHER RESOURCE SITES
(DO NOT ENTER)

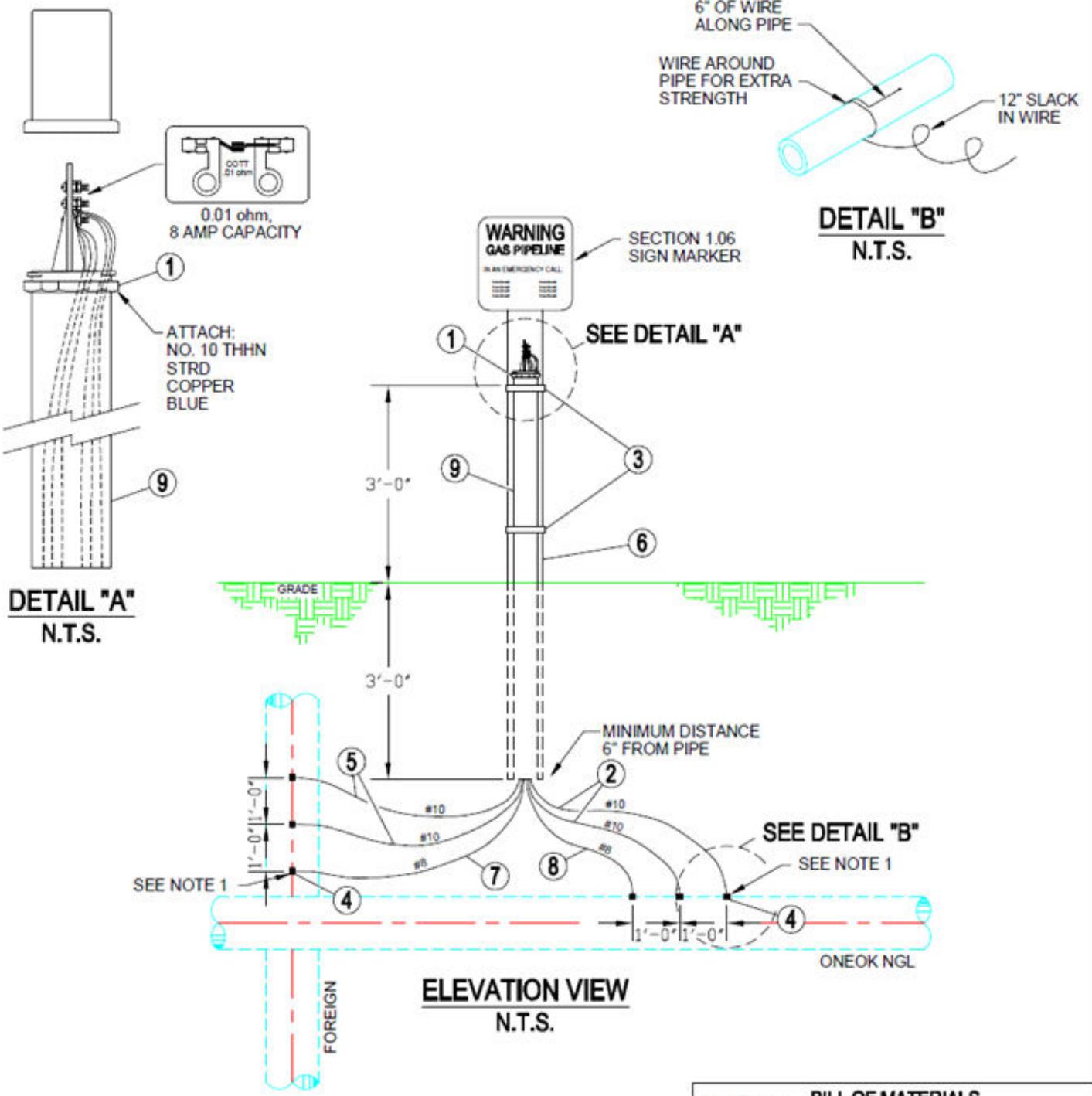
NOTES:

- STAKES USED TO LOCATE AND IDENTIFY BURIED FACILITIES SHALL BE CLEARLY MARKED WITH THE FOLLOWING INFORMATION:
 - PIPELINE/UTILITY OWNERS NAME, IF KNOWN
 - PIPELINE/UTILITY IDENTIFICATION AND SIZE IF APPLICABLE AND KNOWN
 - NOTE WHETHER IT IS THE APPROXIMATE CENTERLINE OF UTILITY

REVISIONS						DRAWN BY:							
△						CHECKED BY:							
△						REVIEWED BY:							
△						APPROVED BY:							
△						PROJECT MANAGER:							
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE		PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-056	REV.	A
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.								



TYPICAL
CONSTRUCTION STAKING COLOR CODE SYSTEM



DETAIL "A"
N.T.S.

DETAIL "B"
N.T.S.

ELEVATION VIEW
N.T.S.

Item	Qty.	Unit	DESCRIPTION
1	1	EA	300 RH5-BLUE W/01 FGHUNT
2	30'	FT	NO. 10 THHN STRD COPPER BLACK
3	2	EA	1/4" X 10" HOSE CLAMPS
4	1	EA	APPROVED COATING
5	30'	FT	NO. 10 THHN STRD COPPER WHITE
6	1x8'	EA	4"x4" TREATED WOODEN POST
7	15'	FT	NO. 8 THHN STRD COPPER WHITE
8	15'	FT	NO. 8 THHN STRD COPPER BLACK
9	1	EA	3"x8' SCH. 40 PVC WHITE

NOTES:

1. ATTACH THE #10 THHN STRD BLACK WIRE TO THE PIPELINE AS PER "999-CP-070".
2. COMPRESSION TERMINAL LUGS SHOULD BE USED TO CONNECT ALL WIRES TO THE BIG FINK FACE PLATE.
3. WHEN INSTALLING BY THE ROAD CROSSING, BIG FINK SHALL FACE THE HIGHWAY.
4. ALL WIRES TO BE LABELED AND MARKED.

REVISIONS						DRAWN BY:
△						CHECKED BY:
△						REVIEWED BY:
△						APPROVED BY:
△						PROJECT MANAGER:
△	ISSUED FOR REVIEW	10/20/10	RC	CLJ	TW	
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.	SCALE: NONE



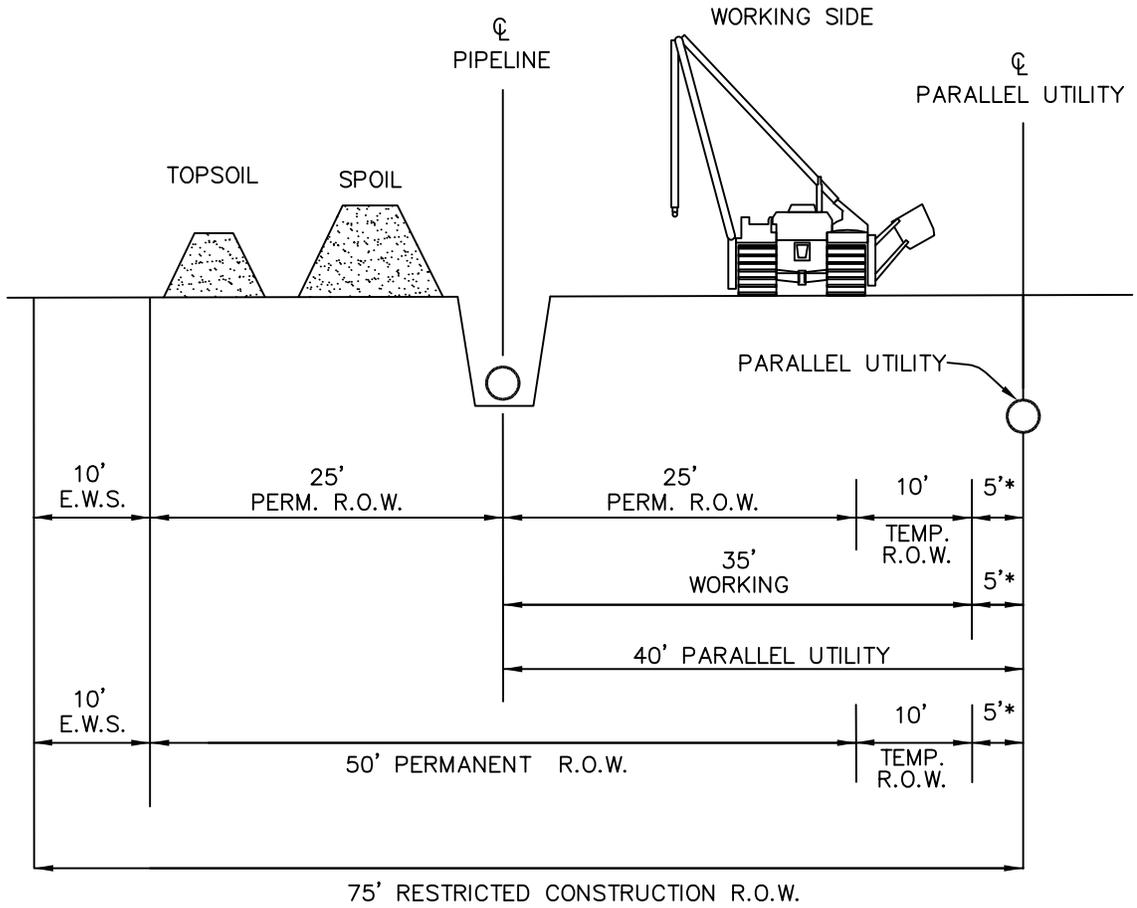
CH2MHILL

TYPICAL
DUAL TERMINAL BOX FOR FOREIGN PIPELINE CROSSING

PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-058
REV.	A		

Appendix G

Right-of-Way Configurations

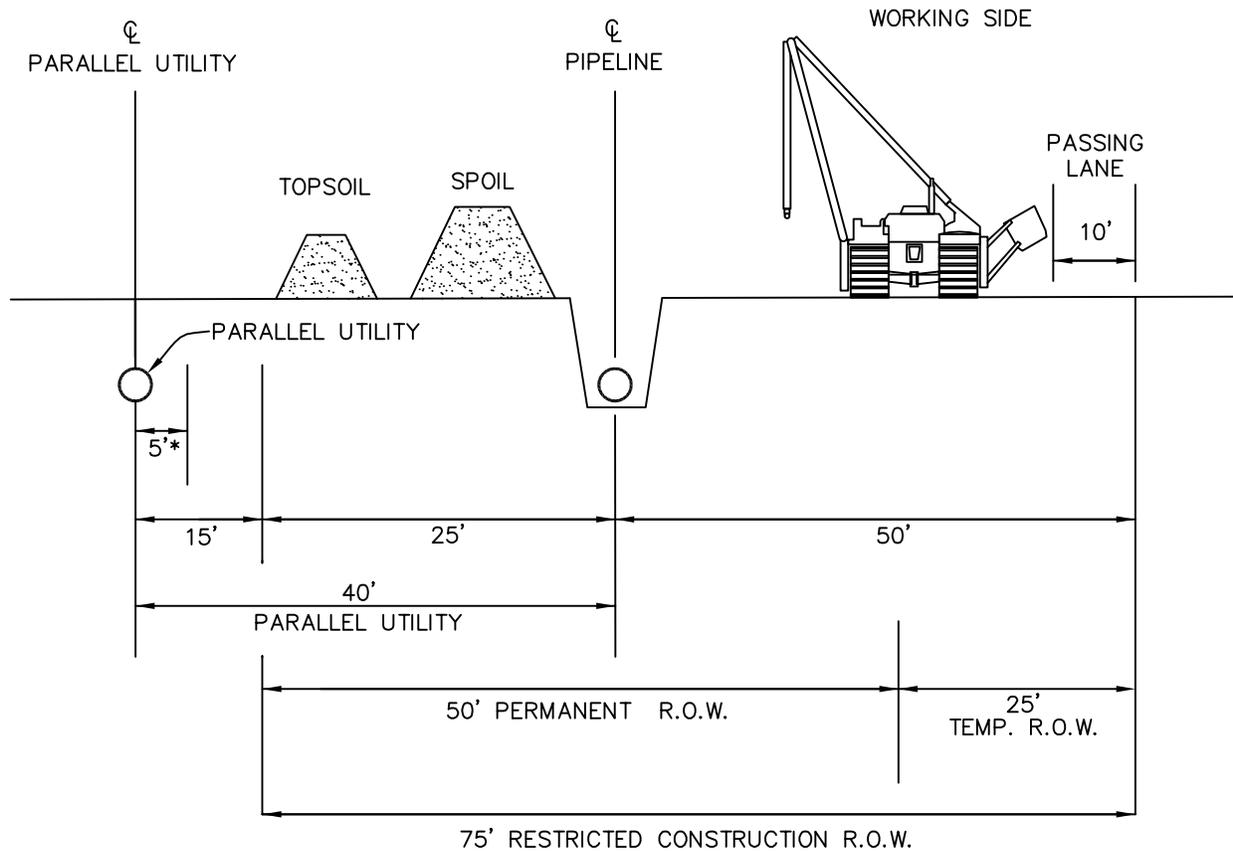


E.W.S. = EXTRA WORK SPACE
 * = MINIMUM BUFFER FOR CONSTRUCTION

NOTES:

1. 10' E.W.S. – IF NEEDED FOR TRAVEL LANE
2. TYPICAL FOR WORKING SIDE ON THE NORTH AND OR WEST SIDE OF PARALLEL UTILITY.
3. TOPSOIL ENTIRE ROW WIDTH 6" ON BLM.

REVISIONS						DRAWN BY:		CH2MHILL TYPICAL CONSTRUCTION R.O.W. PROFILE: PARALLEL UTILITY ON WORKING SIDE			
△						CHECKED BY:					
△						REVIEWED BY:					
△						APPROVED BY:					
△						PROJECT MANAGER:					
△	ISSUED FOR REVIEW	11/05/09	RC	CAM	CJ						
△						SCALE: NONE					
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-005	REV.	A

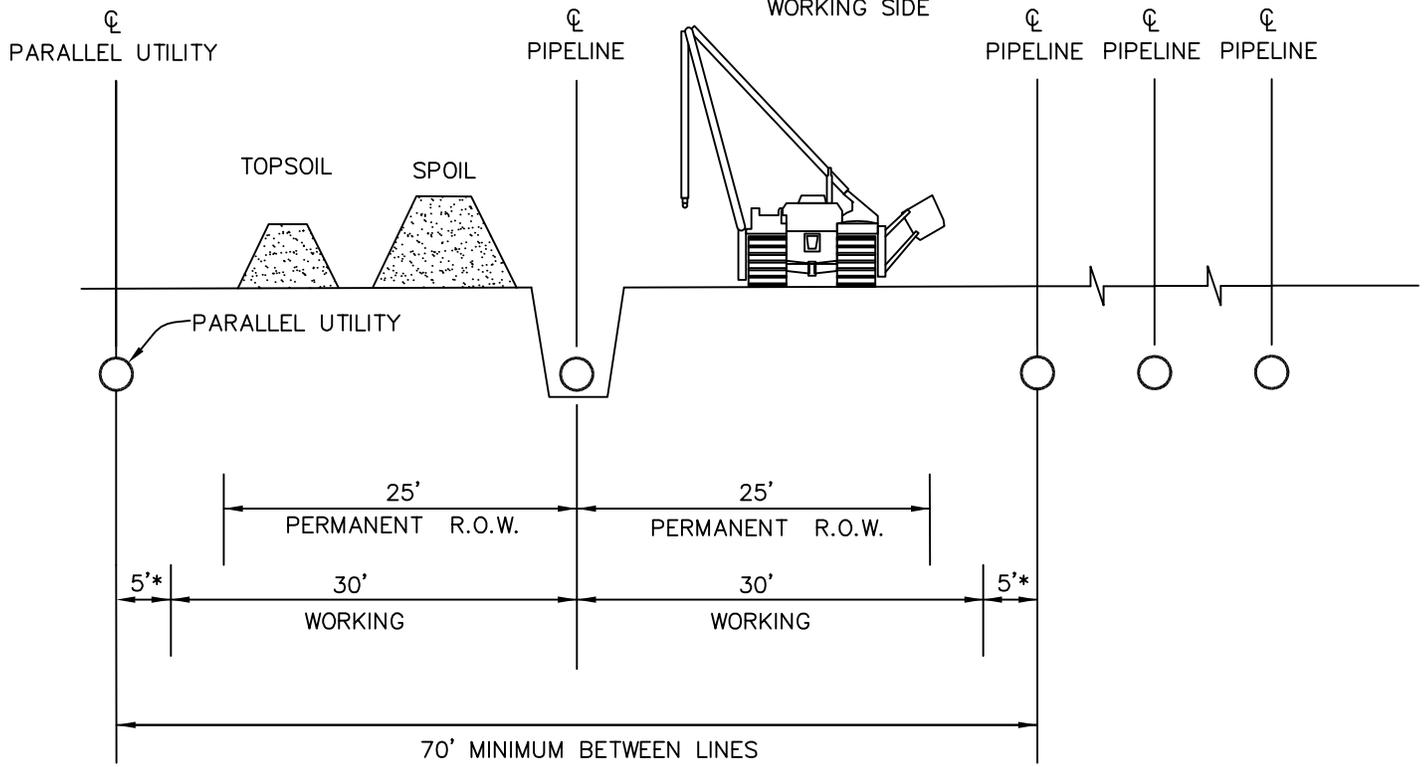


* = MINIMUM BUFFER DURING CONSTRUCTION

NOTES:

1. TYPICAL FOR WORKING SIDE ON THE SOUTH AND OR EAST SIDE OF PARALLEL UTILITY.
2. TOPSOIL ENTIRE ROW WIDTH 6" ON BLM.

REVISIONS						DRAWN BY:	 CH2MHILL TYPICAL CONSTRUCTION R.O.W. PROFILE: PARALLEL UTILITY ON NON-WORKING SIDE					
△						CHECKED BY:						
△						REVIEWED BY:						
△						APPROVED BY:						
△						PROJECT MANAGER:						
△	ISSUED FOR REVIEW	11/05/09	RC	CAM	CJ	SCALE: NONE	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-004	REV.	A

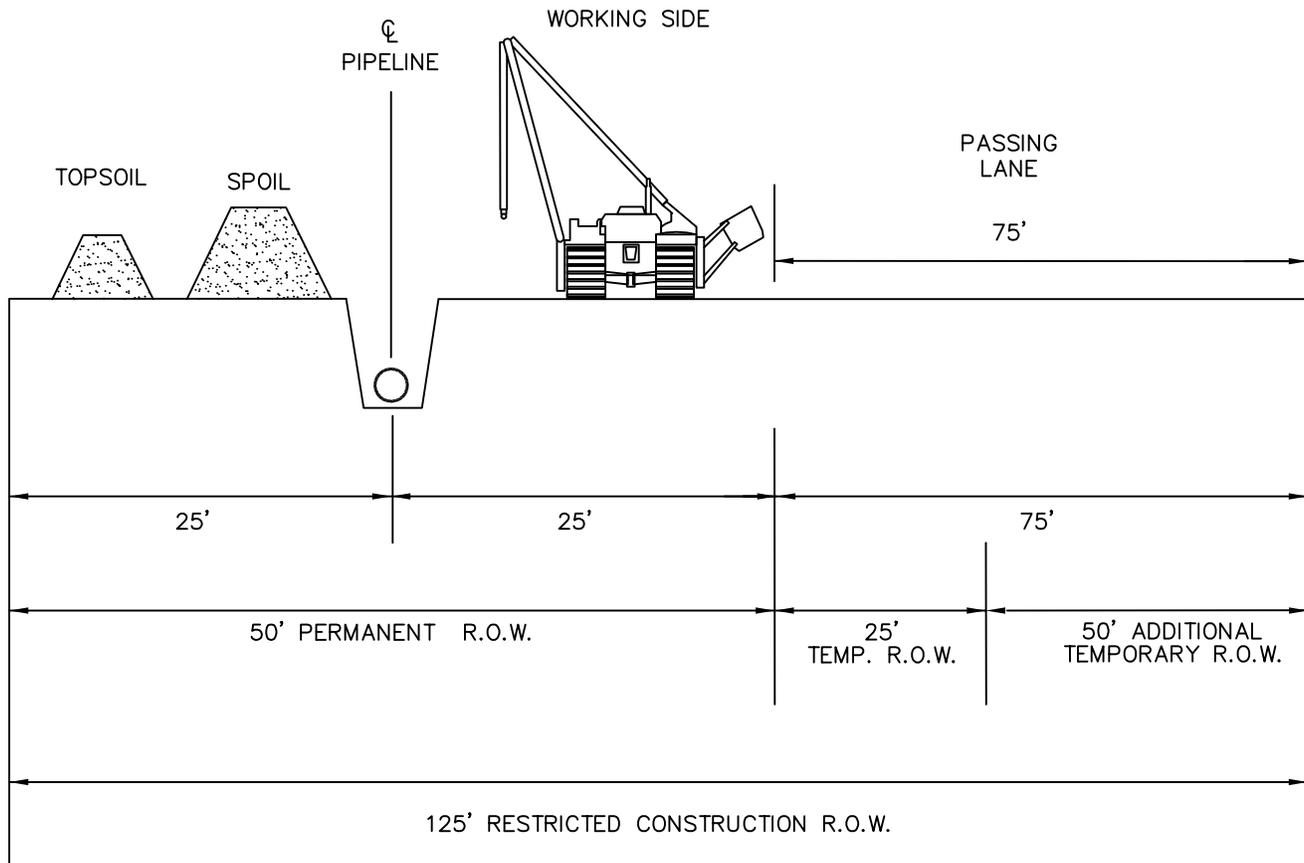


* = MINIMUM BUFFER DURING CONSTRUCTION

NOTES:

1. TOPSOIL ENTIRE ROW WIDTH 6" ON BLM.

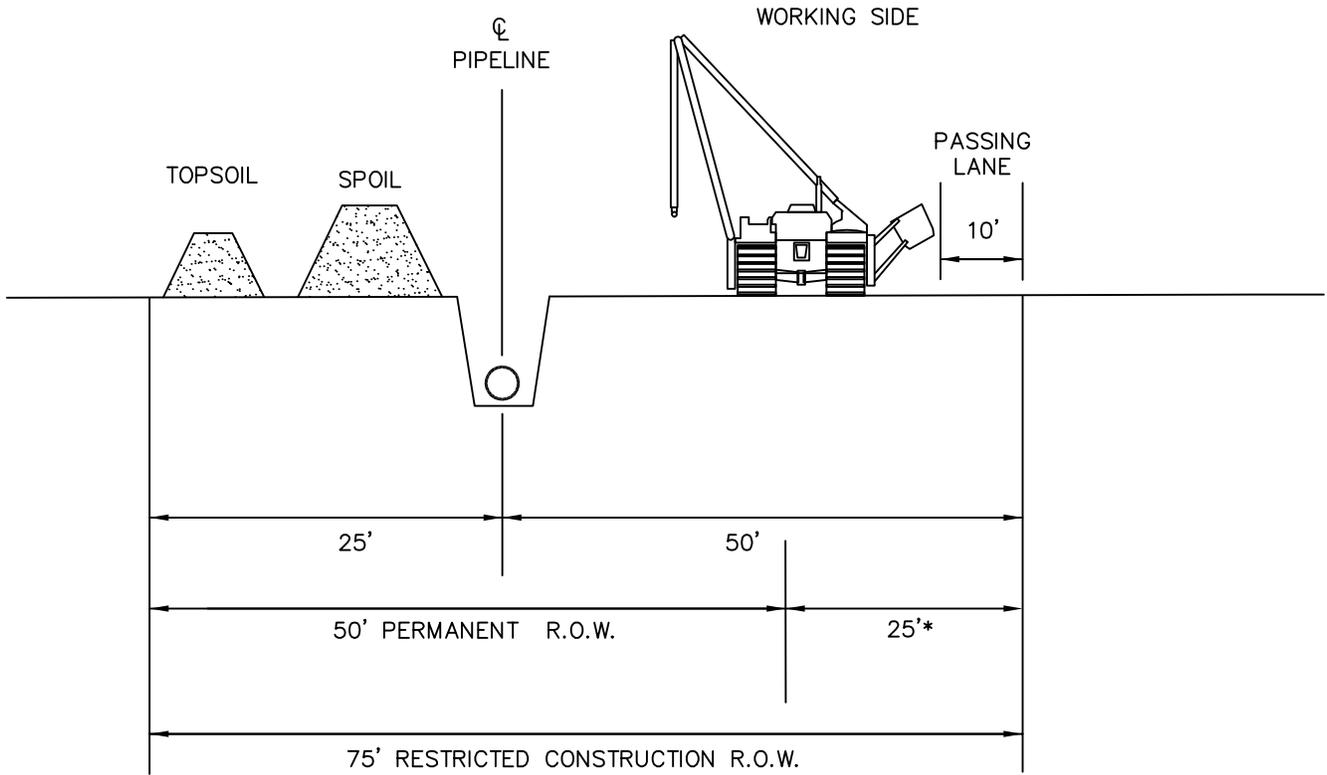
REVISIONS						DRAWN BY:		 CH2MHILL TYPICAL CONSTRUCTION R.O.W. PROFILE: BLM 368 BETWEEN UTILITIES
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△						REVIEWED BY:		
△						APPROVED BY:		
△						PROJECT MANAGER:		
△	ISSUED FOR REVIEW	11/05/09	RC	CAM	CJ	SCALE: NONE		
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.	PROJECT NUMBER	DRAWING NUMBER	REV.
						2568-01	TYP-003	A



NOTES:

1. MILEPOST 0+00 TO MILEPOST 0.80
2. TOPSOIL ENTIRE ROW WIDTH 6" ON BLM.

REVISIONS						DRAWN BY:		 CH2MHILL TYPICAL CONSTRUCTION R.O.W. PROFILE: 0+00 TO 0+80			
△						CHECKED BY:					
△						REVIEWED BY:					
△						APPROVED BY:					
△						PROJECT MANAGER:					
△	ISSUED FOR REVIEW	11/05/09	RC	CAM	CJ	SCALE: NONE					
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-001	REV.	A



* TEMP ADDITIONAL R.O.W. DURING CONSTRUCTION

NOTES:

1. TOPSOIL ENTIRE ROW WIDTH 6" ON BLM.

REVISIONS						DRAWN BY:	 CH2MHILL TYPICAL CONSTRUCTION R.O.W. PROFILE: GREENFIELD					
△						CHECKED BY:						
△						REVIEWED BY:						
△						APPROVED BY:						
△						PROJECT MANAGER:						
△	ISSUED FOR REVIEW	11/05/09	RC	CAM	CJ	SCALE: NONE	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-006	REV.	A
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.							

Appendix H

Frac-out Contingency Plan

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- 1 HDD Crossings
- 2 Estimated Water Consumption

FRAC-Out Contingency Plan

1.0 Project Description

Greencore will construct and operate approximately 231.1 miles of 20 inch-diameter CO₂ pipeline from the Conoco Philips Lost Cabin Gas Plant in Fremont County, Wyoming to a point in the Belle Creek Field oil field in Powder River County, Montana. The proposed pipeline would transport CO₂ as a dense-phase fluid for a proposed Enhanced Oil Recovery (EOR) project at the Belle Creek Field and, potentially to other delivery points when markets develop.

The HDD crossing method will be used at the crossing listed in Table 1. This method may be used at other creeks and roads depending on conditions at time of construction.

TABLE 1. HDD CROSSINGS

Name	Milepost (MP)	Footage
Lost Cabin Rd/CR 158	0.20	120 FT
Diagonal HDD Crossing of Foreign Line, Arminto Road/CR 104 and Foreign Line	25.2	780 FT
HWY 20/26	33.10	550 FT
I-25 Service Rd, I-25 North & South Bound Lanes	86.90	785 FT
I-90	149.8	1732 FT
Wild Horse Creek-Extended Wetland	160.0	1400 FT
BNSF Railroad	165.9	450 FT
Horse Creek	199.5	1300 FT
Little Powder River	203.1	100 FT
Donner Reservoir	218.3	300 FT

TABLE 2. ESTIMATED WATER CONSUMPTION

Location	MP	Pre-testing Water (Gallons)	Drilling Fluid Usage (Gallons)
Lost Cabin RD/CR 158	0.2	23487	1415
Arminto RD	25.2	139945	3795
HWY 20/26	33.1	112739	3239
I-25	86.9	187111	5510
I-90	149.8	187898	5710
Wild Horse Creek	160.0	180460	5558

Location	MP	Pre-testing Water (Gallons)	Drilling Fluid Usage (Gallons)
BNSF	165.9	199641	5950
Horse Creek	199.5	199641	5950
Little Powder River	203.1	176154	5470
Donner Reservoir	218.3	211385	6190
Subtotal		1,609,460	48,787
Grand Total			370,679

Assumptions:

1. The Pre-test water will be recycled and used for overall pipeline Hydrotest so net usage is based on a 20% loss due to leakage and filtering water between test segments
2. HDD Drill Fluid usage is based on 500 Cu. Ft return pit water refill \rate due to Inadvertent drilling fluid loss.
3. Accuracy of water usage estimate +/- 35%

1.1 Drilling Basics

Horizontal directional drilling is a technically advanced process involving skilled operators. Detection of drilling fluid seepage is dependent upon the skill and experience of the drilling crew. For this reason, Grencore will contract with firms that specialize in horizontal directional drilling. The selection and supervision of this drilling contractor will be the responsibility of Grencore.

The advantage of horizontal directional drilling is minimal surface impact, limited to the established entry (25 ft X 50 ft) and exit sites (15 ft X 20 ft) for drilling equipment which can be located outside the environmentally sensitive area. The entry and exit sites vary in size depending on the diameter of the drill and associated equipment required. No surface ground disturbance will occur between the entry and exit drill path locations. The typical minimum depth of the drill will be 25 ft or 6 ft below the stream bed whichever provides the highest margin of safety (Schematics in Appendix F, POD). Heavy wall line pipe with abrasive coating will be utilized to insure pipeline integrity for the proposed crossing.

This method of crossing will eliminate any future ground surface disturbance associated with an operating company’s required annual maintenance for bank stabilization and depth of cover control typically for an open ditch crossing. Any future maintenance of an HDD crossing if problems occur will result in the existing pipe abandonment and re-drilling the crossing which again minimizes any surface impacts.

There is a potential for drilling fluid release during installation, which can occur when pressure in the drill hole is not maintained and a loss of circulation of drilling fluids occurs. Minimal consistent loss of drilling fluid typically occurs during the drilling process when layers of loose sand, gravel, or fractured rock are encountered and drilling fluid fills voids in the material. The loss of returning drilling fluid and a reduction in drilling pressure indicates that seepage is occurring outside of the drill hole. For example, a loss of drilling fluid and an absence of subsurface material would indicate a loss of containment pressure within the hole.

2.0 Drilling Fluid and Drilling Fluid System

The directional drilling process uses drilling fluid that consists primarily of water and bentonite, naturally occurring clay. Drilling fluid removes the cuttings from the borehole, stabilizes the borehole, and acts as a coolant and lubricant during the drilling process. The water and clay mixture consists of 1 to 5 percent active clays and from 0 to 40 percent inert solids with the remainder being water.

The drilling fluid is prepared in the mixing tank using both new, recycled, and cleaned drilling fluids. The fluid is pumped at rates of 200 to 1,000 gpm through the center of the drill pipe to the cutters. Return flow is through the annulus created between the wall of the boring and the drill pipe. Cuttings are returned to the entry pit. In the entry pit, the fluid is pumped to fluid processing equipment. Typically, shaker screens, desanders, desilters, and centrifuges remove increasingly finer cuttings from the drilling fluid. The cleaned fluid is recycled to the mixing tank and pumps for reuse in the borehole. The cuttings are disposed of at an approved disposal site.

3.0 Drilling Fluid Release

3.1 Prevention

Horizontal directional drilling is a pipeline installation method typically used to avoid disturbance of sensitive surface features, including waterbodies and wetlands. There is however the potential for surface disturbance through an inadvertent drilling fluid release. Drilling fluid releases are typically caused by pressurization of the drill hole beyond the containment capability of the overburden soil material, which allows the drilling fluid to flow to the ground surface. Releases can be caused by fractures in bedrock or other voids in the geologic strata that allow the fluid to surface even if downhole pressures are low. Providing adequate depth of cover for the installation can substantially reduce the potential for inadvertent releases.

3.1.1 Suitable Material and Adequate Overburden

Prevention of a drilling fluid seepage is a major consideration in determining the profile of the horizontal directional drilled crossing. The primary factors in selecting the pipeline crossing profile include the type of soil and rock material and the depth of cover material. Cohesive soils, such as clays, dense sands, and competent rock are considered ideal materials for horizontal drilling. The depth of adequate overburden is also considered. A minimum depth of cover of 25-feet in competent soils is required to provide a margin of safety against drilling fluid seepage.

The areas that present the highest potential for drilling fluid seepage are the drill entry and exit points where the overburden depth is minimal. At the entry and exit points, a pit can be constructed to collect and provide temporary storage for the drilling fluid seepage until it can be pumped into the drilling system. These pits will be sized adequately to accommodate the maximum volume of drilling fluid that may need to be contained in the pits. Secondary containment of the pits will contain any seepage and minimize any migration of the mud from the work area. This containment system may consist of straw bales and silt fencing around the pit.

3.1.2 Pipeline Geometry

The geometry of the pipeline profile can also affect the potential for drilling fluid seepage. In a profile that forces the pipe to make compound or excessively tight radii turns, downhole pressures can build up, thereby increasing the potential for drilling fluid seepage. The profiles for the proposed crossing minimize this potential, with very smooth and gradual vertical curves. Therefore, the potential for pressure buildup caused by pipeline geometry has been minimized.

3.1.3 Responsibility of Drilling Contractor

The drilling contractor is responsible for submitting a site specific “Fracture Prevention Plan” to include execution of the directional drilling operation, and actions for detecting and controlling drilling fluid seepage. Grencore will review this plan with all respective State agencies prior to execution for approval and closely supervise the progress and actions of the drilling contractor.

3.2 Detection and Monitoring Procedures

To determine if an inadvertent release has occurred, horizontal directional drilling activities will constantly be monitored on this project, either by the Contractor, the Construction Inspector, the Environmental Inspector, or any combination of these. Monitoring and sampling procedures will include:

- Inspection along the drill path
- Continuous examination of drilling mud pressures and returns flows
- Periodic status information regarding drilling conditions during the course of drilling activities
- If a wetland release occurs inspection to determine the potential movement of released drilling mud within the wetland will be necessary
- If a wetland release occurs, drilling mud will be collected at the drill entry location for future analysis, as required.

If a wetland release occurs, monitoring of the release will be documented by the Environmental Inspector. Grencore will keep photographs of release events on record.

4.0 Notification Procedures

If an inadvertent release is discovered, procedures will be taken by Grencore to contain the release as described below in the Corrective Action section. Procedures for notification of construction management personnel and regulatory agencies are identified in this section.

If monitoring indicates a wetland release has occurred or is occurring, the Contractor, Construction Inspector, or Environmental Inspector will immediately notify Grencore’s construction management personnel.

Grencore will notify all applicable federal and state agencies immediately upon discovery by telephone and/or facsimile of an inadvertent wetland release, detailing the location and nature of the release, corrective actions being taken, and whether the release poses any threat to public health and safety.

5.0 Corrective Action

The greatest potential for drilling fluid seepage is during drill entry and exit where the overburden is minimal. To contain and control drilling fluid seepage on land, the contractor will have available equipment and materials onsite, including backhoes or small bulldozers, portable pumps, sand bags, and hay bales.

Grencore will address an inadvertent release immediately upon discovery. Containment equipment including portable pumps, hand tools, sand, hay/straw bales, silt fencing, and lumber will be readily available and stored at the drilling site. The following measures will be implemented to minimize or prevent further release, contain the release, and clean up the affected area:

5.1 Upland Release

- The Contractor will determine and implement any modifications to the drilling technique or composition of drilling fluid (e.g. thickening of mud by increasing bentonite content) to minimize or prevent further releases of drilling mud.
- Grencore will place containment structures at the affected area to prevent migration of the release.
- If the amount of the release is large enough to allow collection, the drilling mud released into containment structures will be collected. It will then be returned to the drilling operations, taken to a disposal site by hose or tanker, or filtered through bladder bags (with bags either buried on site or removed for disposal).
- If the amount of the release is not large enough to allow collection, the affected area will be diluted with fresh water and pumped into a vacuum truck or equivalent. Steps will be taken to prevent silt-laden water from flowing into a wetland or waterbody.
- If public health and safety are threatened by an inadvertent release, drilling operations will be shut down until the threat is eliminated.

5.2 Waterbody Release

- If a release occurs within the waterbody, Grencore will stop work and contact all applicable Federal and State agencies as soon as possible. Grencore will notify the applicable state representative for department of environmental quality control if there is a threat to public health and safety and explain whether or not the release can be corrected without incurring additional environmental impact. If necessary, drilling operations will be reduced or suspended to assess the extent of the release and to implement corrective actions.
- If public health and safety are threatened, drilling fluid circulation pumps will be turned off. This measure will be taken as a last resort because of the potential for drill hole collapse resulting from loss of down-hole pressure.
- If monitoring indicates that the intake water quality at downstream user locations is impacted to the extent that it is no longer suitable for treatment, alternative water sources (i.e. trucked or bottled water) will be provided to impacted users.

5.3 Wetland/Riparian Area Release

- The Contractor will determine and implement any modifications to the drilling technique or composition of drilling fluid (e.g., thickening of mud by increasing bentonite content) to minimize or prevent further releases of drilling mud.
- If a release occurs within the wetland, reasonable measures, within the limitation of directional drilling technology and Contractor's capability, will be taken to re-establish drilling mud circulation.
- Grencore will evaluate the release to determine if containment structures are warranted and can effectively contain the release. When making this determination, Grencore will also consider if placement of containment structures will cause additional adverse environmental impact.
- Upon completion of the drilling operations, Grencore will consult with applicable regulatory agencies to determine any final clean-up requirements for the inadvertent release.
- If public health and safety are threatened by an inadvertent release, drilling operations will be shut down until corrective actions can eliminate the threat. If corrective actions do not prevent the threat, Grencore may opt to re-drill the hole along a different alignment after receiving appropriate regulatory approvals. In this case, the following procedures will be implemented to abandon the previous drill hole: To seal the abandoned drill hole, thickened drilling mud will be pumped into the hole as the drill assembly is extracted. At the surface (within approximately 5 feet of the surface) Grencore will fill the drill end points with soil and grade the location to the original contour.

5.4 Follow-up

After a drilling fluid seepage has been contained, the drilling contractor and Grencore will make every effort to determine the cause of the seepage. After the cause has been determined, measures will be implemented to control the factors causing the seepage and to minimize the chance of recurrence. Developing the corrective measure will be a joint effort of Grencore and the drilling contractor and will be site and problem specific. In some cases, the corrective measure may involve a determination that the existing hole encountered a void, which could be bypassed with a slight change in the profile. In other cases, it may be determined that the existing hole encountered a zone of unsatisfactory soil material and the hole may have to be abandoned. If the hole is abandoned, it will be filled with cuttings and drilling fluid.

6.0 Response Equipment

Containment equipment and materials, including lumber for temporary shoring, sandbags, portable pumps, hand tools, silt fence, and hay bales, will be stored within the drilling sites. The drilling contractor will also have heavy equipment such as backhoes that can be utilized to control and clean up drilling fluid seepage. The drilling contractor will be responsible for correctly implementing these devices as soon as an incident is detected.

Appendix I

Hydrotest Plan

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- 1.0 Introduction 1
- 1.1 Purpose..... 1
- 2.0 Hydrostatic Testing Procedures..... 1
- 2.1 Water Discharge and Use Regulations 2
- 2.2 Water Sources 2
- 2.3 Discharge Locations..... 3
- 2.4 Pumps 3
- 2.5 Safety Measures..... 3
- 2.6 Test Sections and Pressures 4
- 2.7 Cleaning the Pipeline 4
- 2.8 Filling the Pipeline 4
- 2.9 Testing the Pipeline 5
- 2.10 Depressurizing the Pipeline 5
- 2.11 Dewatering the Pipeline..... 5
- 2.12 Drying the Pipeline..... 5
- 3.0 Records 5

List of Attachments

- 1 Discharge Dissipation Devices
- 2 Hydrostatic Pressure Summary

Hydrostatic Test Plan

1.0 Introduction

This Hydrostatic Test Plan (Plan) identifies measures to be taken by Greencore and its Contractors to ensure pipeline integrity and conform to regulatory requirements. The Plan will be carried out in accordance with the following agency regulations:

- United States Department of Transportation (DOT), 49 CFR Part 195, Subpart E - Pressure Testing
- Wyoming Department of Environmental Quality (DEQ)
- Wyoming State Engineers Office
- Montana Department of Natural Resources
- Montana Department of Environmental Quality (DEQ)

Measures identified in this Plan apply to work within the project area defined as the right-of-way and other areas used during hydrostatic pressure testing of the pipeline and facilities.

Greencore and Contractor personnel are to be thoroughly familiar with this Plan and its contents prior to initiating hydro-testing operations on the project.

1.1 Purpose

The purpose of this Plan is to define the necessary measures that are to be implemented during pipeline integrity testing to ensure the safety of pipeline construction personnel and the general public. This Plan describes safety standards and practices that will be implemented during construction of the project to minimize health, safety, and environmental (particularly water quality) concerns related to hydro-testing procedures throughout the project. Permit regulations for obtaining and discharging test water are also included in Appendix A of the Plan of Development (POD).

2.0 Hydrostatic Testing Procedures

The following procedures would be implemented by the Contractor during hydrostatic testing operations. This section of the Plan describes pre-testing requirements, the typical sequence of activities associated with the hydrostatic testing operations, and notifications required by Greencore and the Contractor.

Greencore would be responsible for securing the necessary permits and approvals from the governing authorities for the use of and disposal of test water. Greencore would also comply with the rules and regulations from the agencies listed in Section 1.0. Greencore would provide Contractor with a copy of the withdrawal/discharge permits and Contractor would keep copies onsite at all times during the testing operations.

2.1 Water Discharge and Use Regulations

The discharge locations for this project have been selected to avoid direct discharge into wetland or waterways. If this becomes unavoidable, the federal Clean Water Act provides that the discharge of any pollutants from a point source into surface water of the United States must be regulated under the Wyoming Department of Environmental Quality (DEQ) Pollutant Discharge Elimination System (WYPDES) Program. Through this program, operators of a point source discharge are required to receive coverage under a WYPDES discharge permit. The permits contain limitations and conditions that will assure that the state's surface water quality standards are protected. Montana DEQ covers this discharge in the Disinfected Water General Permit. Discharge devices must be used as described in Section 2.11.

If discharge will be made into streams, ephemeral drainages, or wetlands, Greencore's Environmental Inspector (EI) will be responsible for ensuring any water sampling follows the corresponding state DEQ regulations for water quality sampling procedures. Greencore's EI will be notified at least 72 hours prior to obtaining water and/or discharging water and the Contractor will provide the EI access for sampling. If water sampling is required, sample bottles will be obtained from a certified testing laboratory. Analysis of the samples would be in accordance with permit requirements. Each bottle would be marked with:

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

If test water is taken from a natural source (stream, river, or pond) then the appropriate permit would be obtained from the state. In Wyoming, a Temporary Water Use Permit would be obtained from the State Engineers Office and in Montana a Water Right Permit would be obtained from the Department of Natural Resources.

2.2 Water Sources

The pipeline will be constructed in two (2) phases: Phase 1 will include 114 miles (MP 65 to MP 180) to be constructed in 2011; and Phase 2 includes the remaining 118 miles to be constructed in 2012. Each phase will include two pipeline spreads. The Phase 1, 2011 construction segment will be pressure tested in four (4) segments. The Phase 2, 2012 construction will be tested in five (5) segments. Water will be obtained as close as possible to each segment. A commercial water source has been identified in Gillette, WY that would also include water hauling to the test segments. A water source has also been identified in Belle Creek, MT (pipeline terminus) and access to a natural water source (Little Powder River) has been identified at MP 126. Water sources will be further refined as the project develops.

If surface water is used at MP 126, Greencore will utilize screens on the intake hoses to prevent the entrainment of fish or other aquatic species. Common industry practice is to cover the end of the intake hose with ¼ - inch mesh hardware cloth, secured with a pipe clamp to prevent uptake of debris. Greencore would also monitor the appropriate rate of withdraw to ensure that an adequate downstream flow is maintained to support aquatic life.

2.3 Discharge Locations

Phase 1, 2011 construction will be pressure tested in four (4) pipeline segments. Phase 2, 2012 will be tested in five (5) pipeline segments. The discharge locations are listed below by mile post and year.

Year	Segment	Discharge Location
2011	1	MP 64.6 MLV 6
	2	MP 113.0
	3	MP 158.5 MLV 14
	4	MP 158.5 MLV 14
2012	1	MP 0.0 MLV 1
	2	MP 45.1 MLV 5
	3	MP 64.6 MLV 6
	4	MP 178.9 MLV 16
	5	MP 231 MLV 20

2.4 Pumps

If pumps for hydrostatic testing are to be used within 100 feet of any waterbody or wetland, secondary containment measures (such as bermed depressions lined with visquene plastic, plastic troughs, or other containment structure) would be implemented to prevent any spilled fuels or oils from reaching the waterbody or wetland.

2.5 Safety Measures

The Contractor would provide for the safety of pipeline construction personnel and the general public during hydrostatic test. The Contractor would:

- Develop a site specific test plan for each test section and address the following safety measures
- Place warning signs in or near populated areas.
- Restrict access to the area involving the hydrostatic test (i.e. test shelter, manifolds, pressure pumps, instruments, etc.) to only those personnel engaged in the testing operations.
- Prohibit major pipeline work not directly associated with the test operations around the pipeline sections being tested. While the pipeline facilities are being pressurized and during the test, personnel not required for direct operations (checking for leaks, tightening gaskets, checking valve status, operating pumps, recording data, etc.) will be restricted from the area where the pipeline is being tested.
- Provide and maintain a reliable transportation and communication system during the test operations whereby personnel directly involved in the test will be able to communicate test status or problems that develop during the test.

- Check hoses, fittings, connectors, and valves for proper pressure rating.
- Restrain and secure fill and discharge lines/hoses.

2.6 Test Sections and Pressures

Each pipeline section will be pressure tested to prove its integrity and substantiate the Maximum Operating Pressure (MOP). All pressure tests will meet the requirements of 49 CFR 195, Subpart E. Test pressure summary is included in Attachment 2.

2.7 Cleaning the Pipeline

Upon completion of the pipe lowering and backfilling operations and prior to filling the pipeline for a hydrostatic test, each section of the pipe to be tested would be cleaned.

The Contractor cleans the pipeline by air pressurized wire brush type pig(s) through the interior of the line a sufficient number of times to clean any rust, scale, slag, dirt or other debris which may be in the pipeline. Next, the pipeline would be cleaned using a compressed air-propelled reinforced poly type pig. The cleaning pig will be run through each test section until each section has been cleaned before filling the pipeline with water for testing. Greencore's Hydrotest Inspector will be present at a minimum for the first and last brush pig run to compare their respective conditions and will be present to approve the cleanliness of the line.

2.8 Filling the Pipeline

Prior to filling a test section with water, the Contractor would make a final check to verify the following:

- valve body drain plugs have been removed, carefully cleaned, taped (Teflon) and replaced;
- all mainline valve assembly cross-overs are in open position (valves are isolated) (*Do not test through mainline valves*);
- valves have been greased, stroked, and the packing tightened; valve stops are properly set; all pipe and bolt connections are tight;
- test manifolds are properly fabricated and tested;
- pumps and compressors are in good working condition;
- instruments are ready for use (proper charts installed, clocks wound, instrument calibration records validated, etc.); and pigs are properly installed.

A pipeline pig would be placed ahead of the water to separate the remaining air in the line from the hydrostatic test water. The 2011 tests would require approximately 9 MM gallons and the 2012 tests would require approximately 9.3 MM gallons of water.

After completion of the filling operation, the pipeline water temperature and turbulence would be allowed to stabilize. The Contractor would check the pressure on each end of the test section and compare with calculated pressures to confirm the specified test pressure for the section.

2.9 Testing the Pipeline

The duration of the test will be not less than 8 hours, with the pressure maintained at or above the minimum test pressure at all points in the pipeline section. The test will be accepted upon proof of no leakage.

In the event of a leak during testing, the leak would be repaired as directed by Greencore's Hydrotest Inspector and the above test repeated until a satisfactory test is obtained on the section.

2.10 Depressurizing the Pipeline

After the test has been presented by the Contractor as a successful test and accepted by Greencore's Hydrotest Inspector, the pipeline would be depressurized as soon as practical.

2.11 Dewatering the Pipeline

Discharge points have been selected to avoid waterways and wetlands. Landowners or land management agency will also be consulted when finalizing discharge points. All discharge points would utilize discharge dispersion devices. The devices are designed to capture discharge water to limit erosion, scour, and filter contaminants. These devices are typically constructed of geotextile fabric, silt fence/filter cloth and straw bales (Attachment 2). The rate of discharge will be monitored to prevent the device from being ineffective or overwhelmed by the volume of water. Discharge lines would be sufficient in strength and would be securely supported and constrained at the discharge end to prevent whipping during the dewatering operation.

If discharging into waterways or wetlands is unavoidable, the discharge dispersion devices would still be used and all permit identified in Section 2.1 would be followed.

2.12 Drying the Pipeline

Following the dewatering of individual pipeline sections, these sections would be cleaned of loosely adhered mill scale, rust, dirt, and other debris by the use of air propelled pigs. To facilitate drying, several sections of pipeline may be welded together, cleaned, and dried in one continuous section. For the Phase 1 construction, nitrogen will also be injected into each pipeline segment and isolated to maintain pipeline dryness and ensure integrity until Phase 2 construction is completed.

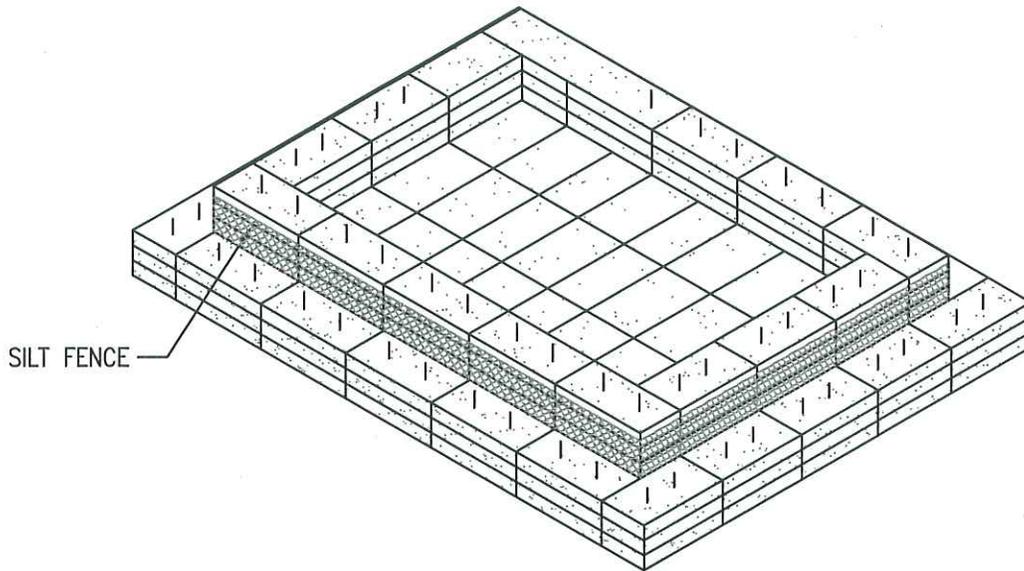
3.0 Records

In accordance with applicable regulations, the Contractor will maintain complete and comprehensive records of all hydrostatic tests and of related activities such as filling, pressuring, stabilizing, dewatering, etc. Records will be clearly identified with respect to the specific piping systems to which they apply and records will be accurately dated. In addition to the general requirements above, such forms will at a minimum include:

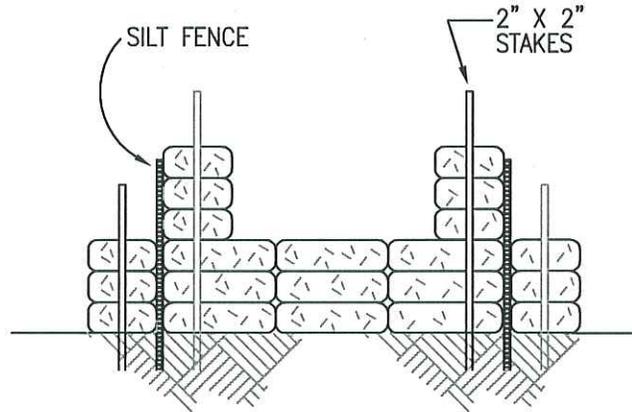
- date and time of test,
- identification of piping system,
- test medium, pressure and duration,
- automatic 24 hour pressure-time and temperature-time recording chart, including manual recording of pressure gauge readings at each additional station,
- test medium temperature at definite time intervals,

- a summary of leaks and repair methods, and
- the names and company affiliation of persons recording the test data;
- pressure and temperature recorder charts showing the date and time stop and start of recording;
- weather conditions during testing;
- elevation variations, whenever significant for the particular test (over 100' for liquids line);
- calibration certificates for dead weight gauges and records of field calibrations of pressure and temperature instruments;
- make, style number, and condition of pigs used in filling and dewatering; and
- any remarks pertinent to any phase of the test.
- Results of the hydrotest will be provided to the BLM upon request at the conclusion of the project.

Attachment 1—Discharge Dissipation Devices



PERSPECTIVE VIEW

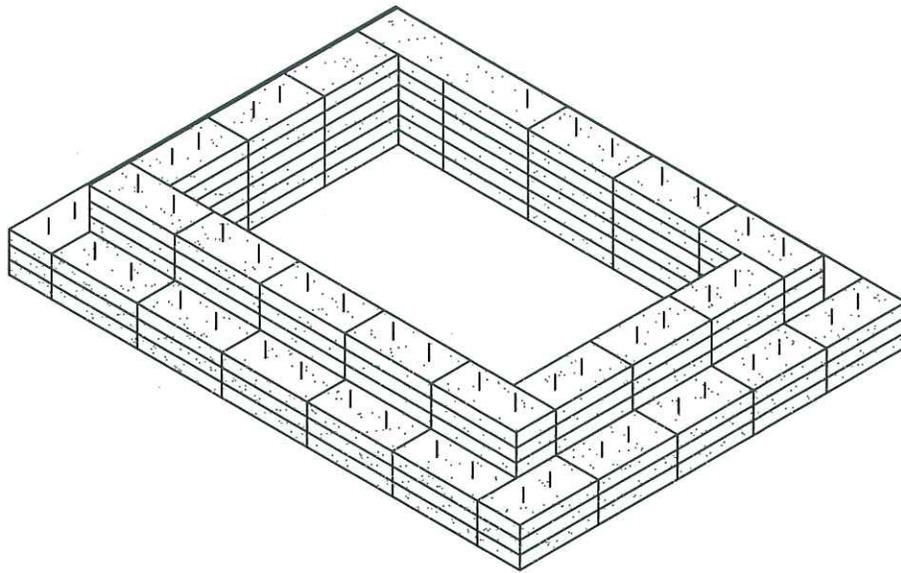


OPTION 1

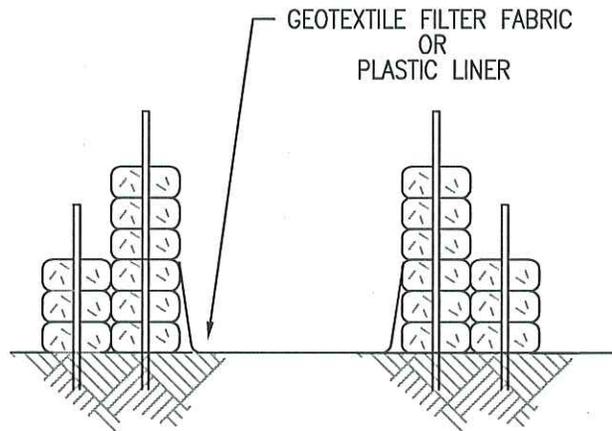
NOTES:

1. INSTALL A STRAW BALE DEWATERING STRUCTURE WHEREVER IT IS NECESSARY AND AS DIRECTED BY THE COMPANY'S INSPECTOR TO PREVENT THE FLOW OF HEAVILY SILT LADEN WATER INTO WATER BODIES OR WETLANDS.
2. DISCHARGE SITE SHALL BE WELL VEGETATED AND THE TOPOGRAPHY OF THE SITE SUCH THAT WATER WILL FLOW AWAY FROM ANY WORK AREAS. THE AREA DOWN SLOPE FROM THE DEWATERING SITE MUST BE REASONABLY PLANE OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.
3. IN AREAS OF HIGHLY ERODIBLE SOILS, LINE ENTIRE STRUCTURE WITH GEOTEXTILE FILTER FABRIC, PLASTIC SHEETING, OR STRAW.
4. THE DIMENSIONS OF THE STRUCTURE SHALL BE DETERMINED IN THE FIELD BASED UPON SITE CONDITIONS.
5. DISCHARGE RATES SHALL BE SUCH THAT WATER WILL NOT OVERFLOW THE TOP OF THE STRUCTURE.
6. INSTALL A SPLASH PUP IF THE DISCHARGE VELOCITY IS EXCESSIVE. (TYP-064)

REVISIONS						DRAWN BY:		  TYPICAL STRAW BALE DEWATERING STRUCTURE LARGE VOLUME - OPTION 1 (SHT. 1 OF 2)			
△						CHECKED BY:					
△						REVIEWED BY:					
△						APPROVED BY:					
△						PROJECT MANAGER:					
△						SCALE: NONE					
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-038	REV.	A
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.						



PERSPECTIVE VIEW



OPTION 2

NOTES:

1. INSTALL A STRAW BALE DEWATERING STRUCTURE WHEREVER IT IS NECESSARY AND AS DIRECTED BY THE COMPANY'S INSPECTOR TO PREVENT THE FLOW OF HEAVILY SILT LADEN WATER INTO WATER BODIES OR WETLANDS.
2. DISCHARGE SITE SHALL BE WELL VEGETATED AND THE TOPOGRAPHY OF THE SITE SUCH THAT WATER WILL FLOW AWAY FROM ANY WORK AREAS. THE AREA DOWN SLOPE FROM THE DEWATERING SITE MUST BE REASONABLY PLANE OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.
3. IN AREAS OF HIGHLY ERODIBLE SOILS, LINE ENTIRE STRUCTURE WITH GEOTEXTILE FILTER FABRIC, PLASTIC SHEETING, OR STRAW.
4. THE DIMENSIONS OF THE STRUCTURE SHALL BE DETERMINED IN THE FIELD BASED UPON SITE CONDITIONS.
5. DISCHARGE RATES SHALL BE SUCH THAT WATER WILL NOT OVERFLOW THE TOP OF THE STRUCTURE.
6. INSTALL A SPLASH PUP IF THE DISCHARGE VELOCITY IS EXCESSIVE. (TYP-064)

REVISIONS						DRAWN BY:					
△						CHECKED BY:					
△						REVIEWED BY:					
△						APPROVED BY:					
△						PROJECT MANAGER:					
△	ISSUED FOR REVIEW	10/21/09	AWM	CAM	TW	SCALE: NONE					
NO.	DESCRIPTION	DATE	BY	CHK.	APPR.	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-038A	REV.	A



TYPICAL STRAW BALE DEWATERING STRUCTURE
LARGE VOLUME - OPTION 2 (SHT. 2 OF 2)

Attachment 2—Hydrostatic Pressure Summary

Greencore CO2 Pipeline Project

20"

HYDROSTATIC TEST PRESSURE SUMMARY

Rev. A

22-Oct-10

Pipeline Design

20" Pipeline

MOP	2,220 psig
Pipe Diameter	20 inches
Wall Thickness (DF=0.72)	0.441 inches
Wall Thickness (DF=0.60)	0.529 inches
Grade/SMYS	70,000 psi

Pipeline Test Information

Test Pressures (FOR LIQUIDS PIPELINES)

100 % SMYS Pressure =	3,087 psig
Max. Test Press. (100% SMYS or ANSI 1500 limit)	3,087 psig
Code Min. Test Press. (1.25 x MAOP) =	2,775 psig
Min.-Max. Pressure Delta =	312 psig

Elevation/Head Considerations

Hydrostatic Press. Change = 0.433 psig/ft of elevation

Allowable Elevation Change =	720 feet/test section
------------------------------	-----------------------

Water Volume

Pipeline X-Section Area (Nominal Pipe Only)	287.06 sq. in.	1.99 sq. ft.
Pipeline Unit Volume (Nominal Pipe Only)	14.91 gal/ft	

Greencore CO2 Pipeline Project

20" Above Ground

HYDROSTATIC TEST PRESSURE SUMMARY

Rev. A 22-Oct-10

Pipeline Design

MOP	2,220 psig
Pipe Diameter	20 inches
Wall Thickness (DF=0.72)	0.441 inches
Wall Thickness (DF=0.60)	0.529 inches
Grade/SMYS	70,000 psi

20" Pipeline

Pipeline Test Information

Test Pressures (FOR LIQUIDS PIPELINES)

100 % SMYS Pressure =	3,703 psig
Max. Test Press. (100% SMYS or ANSI 1500 limit)	3,703 psig
Code Min. Test Press. (1.25 x MAOP) =	2,775 psig
Min.-Max. Pressure Delta =	928 psig

Elevation/Head Considerations

Hydrostatic Press. Change = 0.433 psig/ft of elevation

Allowable Elevation Change =	2,143 feet/test section
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Water Volume

Pipeline X-Section Area (Nominal Pipe Only)	281.80 sq. in.	1.96 sq. ft.
Pipeline Unit Volume (Nominal Pipe Only)	14.64 gal/ft	

Greencore Pipeline Hydrostatic Test Summary

SECTION 2012-1

Start Milepost	0.0
End Milepost	19.7
Length	19.7 miles
Low Elevation	5,517 ft
High Elevation	6,161 ft
Elevation Difference	644 ft
Pressure Differential	279 psi
Water Volume	1,550,977 gallons

SECTION 2012-2

Start Milepost	19.7
End Milepost	45.1
Length	25.4 miles
Low Elevation	5,629 ft
High Elevation	6,329 ft
Elevation Difference	699 ft
Pressure Differential	303 psi
Water Volume	1,999,865 gallons

SECTION 2012-3

Start Milepost	45.1
End Milepost	64.6
Length	19.5 miles
Low Elevation	5,510 ft
High Elevation	5,828 ft
Elevation Difference	318 ft
Pressure Differential	138 psi
Water Volume	1,536,064 gallons

Greencore Pipeline Hydrostatic Test Summary

SECTION 2011-1

Start Milepost	64.6
End Milepost	83.0
Length	18.4 miles
Low Elevation	4,910 ft
High Elevation	5,524 ft
Elevation Difference	614 ft
Pressure Differential	266 psi
Water Volume	1,448,075 gallons

SECTION 2011-2

Start Milepost	83.0
End Milepost	113.0
Length	30.0 miles
Low Elevation	4,470 ft
High Elevation	5,093 ft
Elevation Difference	623 ft
Pressure Differential	270 psi
Water Volume	2,362,257 gallons

SECTION 2011-3

Start Milepost	113.0
End Milepost	158.5
Length	45.5 miles
Low Elevation	4,159 ft
High Elevation	4,825 ft
Elevation Difference	665 ft
Pressure Differential	288 psi
Water Volume	3,583,651 gallons

SECTION 2011-4

Start Milepost	158.5
End Milepost	178.9
Length	20.4 miles
Low Elevation	4,107 ft
High Elevation	4,754 ft
Elevation Difference	647 ft
Pressure Differential	280 psi
Water Volume	1,606,156 gallons

Greencore Pipeline Hydrostatic Test Summary

SECTION 2012-4

Start Milepost	178.9
End Milepost	200.4
Length	21.5 miles
Low Elevation	3,630 ft
High Elevation	4,335 ft
Elevation Difference	706 ft
Pressure Differential	305 psi
Water Volume	1,692,653 gallons

SECTION 2012-5

Start Milepost	200.4
End Milepost	231.0
Length	30.6 miles
Low Elevation	3,545 ft
High Elevation	4,104 ft
Elevation Difference	558 ft
Pressure Differential	242 psi
Water Volume	2,406,455 gallons

Appendix J

Reclamation Plan

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Reclamation Plan

1.0 Introduction

Greencore will construct and operate approximately 231.1 miles of 20 inch-diameter CO₂ pipeline from the Conoco Philips Lost Cabin Gas Plant in Fremont County, Wyoming to a point in the Belle Creek Field oil field in Powder River County, Montana. The proposed pipeline would transport CO₂ as a dense-phase fluid for a proposed Enhanced Oil Recovery (EOR) project at the Belle Creek Field and, potentially to other delivery points when markets develop.

The pipeline will be federally regulated by the Department of Transportation under 49 Code of Federal Regulations Part 195: Transportation of Hazardous Liquid by Pipeline. It will be designed in accordance with the applicable requirements of DOT 195 and will incorporate pig launching and receiving facilities, mainline block valves, meter station, cathodic protection, and supervisory control field equipment.

The project would start at a point in Township 38 North (T38N), Range 90 West (R90W), Section 11 at the Lost Cabin Gas Plant to a point in the Belle Creek Field, T8S, R54E, Section 27. The alignment sheets (included separately) contain detail location information.

1.1 Purpose of Plan

This Reclamation Plan (Plan) describes measures to be taken by Greencore and its contractors to promote the successful reclamation of the disturbed areas. Measures identified in this Plan apply to work within the defined project right-of-way, access roads, temporary use areas, and other areas used during construction of the project.

This Plan prescribes methods to protect and replace topsoil, control and minimize soil erosion, protect water resources, and encourage revegetation which would limit the spread of noxious weeds and limit erosion. This Plan should be used in conjunction with the reclamation measures described in the Wyoming BLM Reclamation Policy (Section 6.0).

The Environmental Assessment (EA), Plan of Development (POD), and Stormwater Pollution Prevention Plan (SWPPP) also contain mitigation measures, permit stipulations, and describe standard reclamation practices. This Plan was developed as the implementing document for reclamation measures.

2.0 Roles and Responsibilities

2.1 Greencore

Greencore will be responsible for ensuring that this Plan and other permit stipulations for project reclamation are distributed to the contractor and Environmental Inspector (EI) and ensure the roles and responsibilities are understood by field personnel. Greencore will also ensure that environmental oversight of the project includes pre-construction marking and flagging of waterbodies and wetlands. Additionally, Greencore will be responsible for meeting long-term reclamation and soil stabilization standards after the project is completed.

2.2 Contractors

The construction contractor will be responsible for ordering and maintaining an inventory of environmental control supplies and materials sufficient to meet daily construction requirements and for use in emergency situations. The construction contractor will be responsible for the installation and maintenance of all Best Management Practices (BMPs) during the construction phases.

The reclamation contractor will be responsible for reclamation after the construction contractor has installed the pipe and associated facilities and cleared the right-of-way of construction debris and equipment. The reclamation contractor will be responsible for seedbed preparation, seeding, mulching, and rebuilding or installing long term BMPs such as water bars, diversion berms, rock check dams, etc. BMPs are described in detail in the SWPPP (Appendix E, POD). Both construction and reclamation contractors will coordinate closely with the Environmental Inspector (EI).

2.3 Environmental Inspector

Greencore's EI will have the responsibility to ensure field activities by the construction contractor and reclamation contractor are performed in accordance with this Plan and other permit stipulations and plans. The EI will have the authority to make site-specific field changes to BMPs and reclamation procedures within the guidelines of this Plan and after consultation with the fee-landowner or Bureau of Land Management (BLM), if necessary. The EI will also be responsible for the coordination and timing of reclamation activities between the construction contractor and the reclamation contractor. The EI will keep daily logs of reclamation procedures and coordinate closely with the contractors to ensure proper installation and maintenance of BMPs and reclamation procedures.

3.0 Construction Procedures to Aid Reclamation

3.1 Clearing and Grading

Reclamation begins with preserving as much vegetation as possible while keeping a safe and functional construction area. In some cases, the existing vegetation can be mowed using a brush-hog or hydro-axe and full grading may not be needed if the terrain is level enough for safe construction. Trees will be felled inside the approved right-of-way boundaries. Tree limbs and brush will be windrowed for use in final reclamation. Stumps will be left in place except over the trench line or removed as necessary to create a safe and level workspace. The EI will coordinate with the appropriate agency or landowner to locate areas for stump disposal. Greencore will acquire the appropriate timber sale agreement/permits from BLM prior to cutting or removing trees. Grading will not occur over historic trails, drainages, or wetlands. These areas should be flagged/staked prior to clearing and grading. Additional Temporary Workspace (ATWS) would not be graded.

3.2 Topsoiling

Where grading is needed to create a safe, level, working area, approximately 4" – 6" of topsoil will be stripped from the full construction right-of-way prior to cut fill or grading operations. There may be some areas where the contractor would not need to grade and topsoil. For example, level fields or pastures may not need to be graded for construction. In these cases, the contractor can avoid topsoiling, except over the trench line, which would preserve the root system and increase

reclamation success. Available topsoil and consistency will vary across the project. No matter the amount of topsoil removed, topsoil will be stockpiled separately from subsoil and will not be used to pad the trench or construct trench breakers. Topsoil will be used as the final layer of soil during the reclamation process.

In wetlands, only the topsoil on the trench line would be removed (dug) and segregated before digging and removing the subsoil (double-ditching method). The wetland boundaries will be flagged prior to construction. Topsoil removal in wetlands can range between 12-18 inches. In floodplains, the topsoil depth can range from 6-12 inches. Dry drainages or washes that cross the right-of-way will not be blocked with topsoil piles. Topsoil will be placed on the banks of the drainage so natural flows are not impeded and topsoil is not washed away.

4.0 Reclamation Procedures

After the final installation of the pipeline, disturbed portions of the construction workspace (including the right-of-way, travel lane, and temporary use areas) will be returned to pre-construction grades and contours as close as possible. Topsoil will then be replaced over the right-of-way from the approximate area in which it was stripped. Reseeding and mulching will usually be completed as soon as possible, but may be dependent upon permit stipulations, weather conditions, and guidance from the agencies and fee-landowners. Revegetation will be the primary method to stabilize soils and ensure permanent erosion control over the long term. BMPs as described in the SWPPP (Appendix E of the POD) will be utilized throughout the project to protect soil and limit sediment transport. The following sections outline the reclamation procedures for the various situations on the project.

4.1 Agricultural Fields

Irrigation ditches, cattle guards, fences, and artificial and natural livestock and wildlife water sources impacted by construction will be repaired as close as possible pre-construction conditions or as negotiated with the landowner. Topsoil removal will be limited to the trench line wherever possible. Seeding and mulch will not be applied in agricultural fields unless previously negotiated by the land owner. In some cases, special seeding requirements may apply as negotiated with the landowner. Negotiated terms should be identified before reclamation.

4.2 Wetlands and Waterbodies

All work in wetlands and waterbodies will be conducted per the Army Corps of Engineer permit stipulations included in Appendix A of the POD. BMPs will be installed as stipulated in the SWPPP (Appendix E, POD).

These areas should be reclaimed as soon as possible to protect water quality. Any material that has accumulated in an intermittent/ephemeral stream will be removed and all drainages will be returned as close as possible to pre-construction form. Unless otherwise required by permit, wetlands will not be reseeded. Seed will come from the wetland topsoil that has been segregated for reclamation. However, stream banks that contain upland vegetation shall be reseeded. Certified weed free mulch can be applied to wetlands that are temporarily dry. Stream banks and slopes leading directly to waterbodies and wetlands will be reseeded and natural ground matting will be installed if the slopes are steep to limit erosion and promote seed germination. The EI will determine the appropriate reclamation measures and BMP installation based on site characteristics.

4.3 Rock Disposal

Excess rock is defined as rock that cannot be returned to the existing rock profile in the trench or graded cuts and is not needed to restore the right-of-way surface to a condition comparable to that found adjacent to the right-of-way. Excess rock will be randomly distributed across the right-of-way to present a natural look. Rock can also be piled to create wildlife habitat or spread in a fashion to block illegal access by ATVs and other motorized vehicles, especially at road crossings. The disposal of excess rock in agricultural fields will be negotiated with individual landowners.

4.4 Trees and Shrubs

Trees and shrubs removed during clearing shall be utilized for reclamation. The spreading of this material will help limit erosion and promote revegetation. These materials should also be utilized for wildlife habitat and can be arranged to deter illegal use of ATVs and other motorized vehicles on the right-of-way.

4.5 Seeding Procedures

The reclamation contractor will be responsible for the final seeding the right-of-way, temporary use areas, and off-right-of-way ancillary sites. Seed will be applied at the appropriate rate described in Table 1. The EI will coordinate closely with the contractor during these phases and collect seed bag labels and document when and where seeding takes place.

4.5.1 Seed Mixes

Seed mixes will be purchased from commercial seed vendors and must be state-certified weed-free mixtures. Seed bag tags will be collected and submitted to the BLM to confirm that the seed was purchased from a commercial seed vendor and was tested and certified. Seeding rate will be listed as pounds per acre of pure live seed (PLS).

Unless otherwise requested by private landowner or the BLM, the following seed mix has been recommended based on three major soil types (Table 1). Distribution of the different seed types will be indicated on drawings provided to the reclamation contractor. The EI will coordinate with the reclamation contractor to ensure the correct seed mix is used in the correct area.

TABLE 1—SEED MIXES

Loam Soils Seed Mix		
Name	Common Name	Rate
Elymus Trachycaulus SSP. Trachycaulus VAR. Pryor	Slender wheatgrass	5
Oryzopsis Hymenoides VAR.	Indian Ricegrass	3
Pascopyrum Smithii VAR. Rosanna	Western Wheatgrass	5
Pseudoroegneria Spicata SSP. Spicata VAR. Goldar	Bluebunch Wheatgrass	1.5
Stipa Viridula VAR. Lodorm	Green Needlegrass	1.5

Sandy Soils Seed Mix		
Name	Common Name	Rate
Elymus Lanceolatus SSP. Dasustachyum VAR. Critana, Bannock	Thickspike Wheatgrass	2.5
Elymus Trachycaulus SSP. Trachycaulus VAR. Pryor	Slender Wheatgrass	2.5
Oryzopsis Hymenoides VAR. Nezpar	Indian Ricegrass	3
Pascopyrum Smithii VAR. Rosanna	Western Wheatgrass	5
Stipa Comata	Needle-and-Thread	3
Alkaline / Saline Soil Mix		
Name	Common Name	Rate
Elmus Elymoides	Bottlebrush Squirreltail	2.5
Elymus Lanceolatus SSP. Dasustachyum VAR. Critana, Bannock	Thickspike Wheatgrass	2
Leymus Cinereus VAR. Trailhead	Great Basin Wildrye	2
Oryzopsis Hymenoides VAR. Nezpar	Indian Ricegrass	3
Pascopyrum Smithii VAR. Rosanna	Western Wheatgrass	5
Sporobolus Airoides VAR. Salado	Alkali Sacaton	0.5
Artemisia tridentata	Big Sagebrush	0.5
Atriplex Gardneri	Gardner Saltbush	0.5

4.5.2 Seedbed Preparation

Final compaction of disturbed areas will be returned to approximate pre-construction conditions. Any heavily compacted areas, such as the travel lane, will be de-compacted with a disc, ripper, or similar implement prior to topsoil replacement and seeding. After compacted areas are prepared, the topsoil should be spread back over the impacted areas. The topsoil should not be graded smooth. Those sites where seedbed preparation is not practical (e.g., steep slopes, rocky areas, etc.) will be left with adequate roughness following topsoil replacement to create micro-environments for seed germination and growth, and to reduce the potential for soil movement.

Final BMPs as described in the SWPPP and indicated on the alignment sheets should be installed at this time. Examples of final BMPs that would be installed during this phase would include water-bars and berms. They should be constructed in way that they can still be driven over by a tractor and seeder where this seeding method will be employed.

4.5.3 Seed Application Rate and Viability

All disturbed areas will be reseeded unless they are designated access roads or parking areas at a facility. Seeding rates indicated in Table 1 are approximate and can be adjusted. Broadcast seeding rates will be twice the drill rate. Wetlands will not be seeded. Successful revegetation by wetland species is generally related to effective topsoil salvage methods and sources of seed and rhizomes in adjacent areas.

4.5.4 Seeding Methods and Timing

The seeding schedule will be determined in coordination with Greencore’s EI, the BLM, and fee-landowners. Ideally, seeding would take place immediately after construction. However, if freezing conditions or snow cover exists after the construction phase is completed, the right-of-

way may be temporarily stabilized and some or all of the final seeding and reclamation may be postponed to the following fall to increase seeding success. Stabilizing the right-of-way until final seeding may include measures such as seeding with an annual rye and applying straw mulch to areas prone to erosion. BMPs would be maintained and inspected during this interim as described in the SWPPP (Appendix E, POD).

Drill Seeding

Drill seeding is the preferred seeding method and will be employed wherever soil characteristics and terrain allow effective and safe operation of a rangeland seed drill. Seed will be placed in direct contact with the soil at an average depth of 0.5 inches, covered with soil, and firmed to eliminate air pockets around the seeds. Seed will be applied using a rangeland seed drill with a seed release and agitation mechanism sufficient to allow seeds of various sizes and densities to be planted at the proper seeding depth.

Broadcast Seeding

Broadcast seeding will be employed only in areas where drill seeding is unsafe or physically impossible. Seed will be applied using manually operated cyclone-bucket spreaders, mechanical spreaders, or blowers. Seed will be uniformly broadcast over disturbed areas. Broadcast application rates will be twice that of drill rates. Immediately after broadcasting, the seed will be uniformly raked, chained, dragged, or cultipacked to incorporate seed to a sufficient seeding depth.

4.5.5 Mulching

The primary mulch will be certified weed-free straw. This will be applied directly after seeding. In accessible areas, this would be applied with a straw sprayer and then crimped with a tractor pulled implement. On steep slopes where a straw sprayer can not reach, the straw will be spread out by hand and crimped by hand. Mulch will be applied everywhere that has been seeded. This may not include agricultural fields (Section 4.1). Where ground matting has been installed, for example stream banks, straw will not be applied because the matting material provides the mulch. In certain conditions, a hydro mulch may be utilized with a tackifier. This spray on mulch could be utilized on very steep slopes and around sensitive areas with high wind erosion potentials. These areas will be designated by the EI and the BLM representative.

4.5.6 Slash and Debris

The Contractor will randomly distribute any windrowed trees, slash, and natural debris over the right-of-way after the area has been mulched. When at all possible, this should be done by hand to limit impact to seeded areas. The spreading on this material will provide additional mulch, help deter motorized traffic, provide a more natural appearance, and help prevent straw from being blown away.

4.5.7 Erosion Control

Seeding and mulching is the primary method for controlling long term erosion. Final BMPs as described in the SWPPP (Appendix E, POD) and alignment sheets should be inspected during this reclamation phase to ensure proper working order. Slash, rocks, and other natural debris should also be utilized in drainages and steep slopes to slow runoff and trap sediment. The EI should be consulted for proper placement and location.

4.5.8 OHV Deterrence

The illegal use of ATVs and other motorized vehicles on the right-of-way is one of the primary reasons for increased erosion. Tires ruts destroy vegetation and provide channels for erosion. Spreading natural debris including trees and rocks across the right-of-way, especially at road crossings, will help deter motorized traffic. In some cases, the installment of sign and/or fences may be required. The devices will be installed as required by the BLM or as negotiated with the private landowner.

4.5.9 Grazing

Grencore will inform grazing allotment permittees on Federal lands and private land ranchers of the construction schedule to allow ample time to move livestock away from construction. Deferring grazing until grass has become established is vital for reclamation and in limiting the spread of noxious weeds. Temporary fencing may be authorized by the BLM to protect Federal grazing allotments until approximately 80% of the pre-disturbed basal cover has returned (Appendix X, Casper Resource Management Plan, Dec. 2007). In sensitive areas, such as wetlands, the right-of-way may also be temporarily fenced until revegetation is deemed successful.

5.0 Monitoring and Documentation

As described in Roles and Responsibilities (Section 2.0) the construction and reclamation contractor will install BMPs and perform the reclamation procedures and the Grencore EI will ensure implementation is consistent with this plan and the Wyoming BLM Reclamation Policy (Section 6.0). Monitoring during construction and reclamation will be performed daily by the EI and the EI will keep daily reports on when/where BMPs were implemented and when/where reclamation was implemented. The EI will coordinate with the construction or reclamation contractor to ensure all measures are implemented correctly.

Post reclamation monitoring will be conducted as described in the SWPPP. Grencore will designate a qualified SWPPP inspector and this inspector will follow the monitoring and reporting requirements as described in the SWPPP (Appendix E, POD). These inspections will focus on the following:

- percent total adjacent herbaceous cover (seeded species plus desirable volunteers),
- new or expanded populations of noxious weeds,
- areas with erosion issues, and
- areas impacted by OHV use.

The SWPPP inspector will identify areas that require maintenance or additional reclamation efforts and appropriate remedial measures will be undertaken. The reclamation contractor will be responsible for remediating any problem areas identified by the SWPPP inspector and Grencore for the first growing season following reclamation. Thereafter, Grencore will be responsible for obtaining a reclamation contractor to perform any necessary work. Reclamation success will be based on the revegetation to 70% of the background cover as stipulated in the SWPPP and the construction discharge permits obtained from the Wyoming and Montana DEQs. After these permit stipulations are satisfied and the permits are terminated, Grencore will continue to monitor the project and address issues as they arise.

6.0 WY BLM Reclamation Policy

1. Manage all waste materials.
 - a. Segregate, treat, and/or bio-remediate contaminated soil material.
 - b. Bury only authorized waste materials on site. Buried material must be covered with a minimum of three feet of suitable material or meet other program standards.
 - c. Ensure all waste materials moved off-site are transported to an authorized disposal facility.
2. Ensure subsurface integrity, and eliminate sources of ground and surface water contamination.
 - a. Properly plug all drill holes and other subsurface openings (mine shafts, adits etc.).
 - b. Stabilize, properly back fill, cap, and/or restrict from entry all open shafts, underground workings, and other openings.
 - c. Control sources of contamination and implement best management practices to protect surface and ground water quality.
3. Re-establish slope stability, surface stability, and desired topographic diversity.
 - a. Reconstruct the landscape to the approximate original contour or consistent with the land use plan.
 - b. Maximize geomorphic stability and topographic diversity of the reclaimed topography.
 - c. Eliminate highwalls, cut slopes, and/or topographic depressions on site, unless otherwise approved.
 - d. Minimize sheet and rill erosion on/or adjacent to the reclaimed area. There shall be no evidence of mass wasting, head cutting, large rills or gullies, down cutting in drainages, or overall slope instability on/or adjacent to the reclaimed area.
4. Reconstruct and stabilize water courses and drainage features.
 - a. Reconstruct drainage basins and reclaim impoundments to maintain the drainage pattern, profile, and dimension to approximate the natural features found in nearby naturally functioning basins.
 - b. Reconstruct and stabilize stream channels, drainages, and impoundments to exhibit similar hydrologic characteristics found in stable naturally functioning systems.
5. Maintain the biological, chemical, and physical integrity of the topsoil and subsoil (where appropriate).
 - a. Identify, delineate, and segregate all salvaged topsoil and subsoil based on a site specific soil evaluation, including depth, chemical, and physical characteristics.
 - b. Protect all stored soil material from erosion, degradation, and contamination.
 - c. Incorporate stored soil material into the disturbed landscape.
 - d. Seed soils to be stored beyond one growing season, with desired vegetation.
 - e. Identify stockpiles with appropriate signage.

6. Prepare site for revegetation.
 - a. Redistribute soil materials in a manner similar to the original vertical profile.
 - b. Reduce compaction to an appropriate depth (generally below the root zone) prior to redistribution of topsoil, to accommodate desired plant species.
 - c. Provide suitable surface and subsurface physical, chemical, and biological properties to support the long term establishment and viability of the desired plant community.
 - d. Protect seed and seedling establishment (e.g. erosion control matting, mulching, hydro-seeding, surface roughening, fencing, etc.)
7. Establish a desired self-perpetuating native plant community.
 - a. Establish species composition, diversity, structure, and total ground cover appropriate for the desired plant community.
 - b. Enhance critical resource values (e.g. wildlife, range, recreation, etc.), where appropriate, by augmenting plant community composition, diversity, and/or structure.
 - c. Select genetically appropriate and locally adapted native plant materials based on the site characteristics and ecological setting.
 - d. Select non-native plants only as an approved short term and non-persistent alternative to native plant materials. Ensure the non-natives will not hybridize, displace, or offer long-term competition to the endemic plants, and are designed to aid in the re-establishment of native plant communities.
8. Reestablish complementary visual composition
 - a. Ensure the reclaimed landscape features blend into the adjacent area and conform to the land use plan decisions.
 - b. Ensure the reclaimed landscape does not result in a long term change to the scenic quality of the area.
9. Manage Invasive Plants
 - a. Assess for invasive plants before initiating surface disturbing activities.
 - b. Develop an invasive plant management plan.
 - c. Control invasive plants utilizing an integrated pest management approach.
 - d. Monitor invasive plant treatments.
10. Develop and implement a reclamation monitoring and reporting strategy.
 - a. Conduct compliance and effectiveness monitoring in accordance with a BLM (or other surface management agency) approved monitoring protocol.
 - b. Evaluate monitoring data for compliance with the reclamation plan.
 - c. Document and report monitoring data and recommend revised reclamation strategies.
 - d. Implement revised reclamation strategies as needed.

- e. Repeat the process of monitoring, evaluating, documenting/reporting, and implementing, until reclamation goals are achieved.

Appendix K

Noxious Weed Management Plan

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Noxious Weed Plan

1.0 Introduction

Noxious weed control practices for the proposed Greencore CO₂ Pipeline Project (Project), as described in this plan, have been developed from the following sources: 1) coordination with BLM technical staff and local Weed Control District Supervisors, 2) existing Noxious Weed Management Plans, and 3) experience gained from other noxious weed control programs in Colorado, Nebraska, Montana, South Dakota, North Dakota, Utah, and Wyoming.

1.1 Summary of Contacts

Weed Control District Supervisors in Wyoming and Montana were contacted to discuss issues related to noxious weed mitigation in their counties (Refer to Appendix A for correspondence summaries). Information gathered during these conversations has been used to write this mitigation plan. A brief description of meetings and conversations that have taken place regarding noxious weed mitigation for the proposed Project is as follows:

- 9/14/10 telephone conversations were held with Weed Coordinators for Campbell County, Wyoming (Quade Schmelzle);
- 9/15/10 telephone conversations were held with Weed Coordinators for Fremont County, Wyoming (Lars Baker);
- 9/17/10 telephone conversations were held with Weed Coordinators for Johnson County, Wyoming (Rod Litzel);
- 10/28/10 telephone conversations were held with Weed Coordinators for Natrona County, Wyoming (Brian Connely);
- 11/1/2010 conversations were held with Weed Coordinators for Powder River County, Montana (Mary Rumph);
- 4/30/2010 telephone conversations were held with Weed Coordinators for Natrona County, Wyoming (Brian Connely).

1.2 Plan Purpose

The purpose of the plan is to prescribe methods to prevent and control the spread of noxious weeds during and following construction of the Project on Federal, State, and private lands. Greencore Pipeline Company, LLC (Greencore), a wholly owned subsidiary of Denbury Resources, Inc. (Denbury), based in Plano, Texas, and their contractors would be responsible for carrying out the methods described in this plan.

This plan is applicable to the construction of the right-of-way (ROW), as well as any areas where new ground disturbing activities would occur due to construction of the project.

1.3 Goals and Objectives

The goals of weed control are to implement preventative measures to eliminate the spread of noxious weeds during construction of the pipeline system. Monitoring and treatment both prior to construction and during the operational phase, as applicable, would ensure that goals are achieved.

2.0 Noxious Weed Inventory

Noxious weeds that are known to occur in the Project area, as identified by the local Weed Districts and BLM offices, are presented in Table 1. In 2009-2010, field surveys were conducted by field biologists from AECOM and Hayden Wing Associates for noxious weed populations located along the entire proposed Project ROW. The surveys identified existing noxious weed infestations located within the 200-foot-wide pipeline survey corridor and along proposed access roads where vegetation clearing may be required. Weed locations were identified and documented via Trimble GeoXH (submeter accuracy) Global Positioning System (GPS) devices. Results of these ground surveys have been incorporated into the Noxious Weed Plan and have been summarized in **Table 1**. Additional field surveys for weeds would be conducted for any new areas of disturbance and/or where surveys weren't completed in 2009-2010 (e.g. previously denied access tracts, new reroutes, additional access roads, etc.). Information collected during future noxious weed surveys (including species identified, proximity to the Project area, locations of infestations, and extent of infestations) would be submitted to the jurisdictional BLM offices and local Weed Districts. Early identification of existing infestations would help to minimize the spread of noxious weeds with the implementation of preventative measures.

Natrona County Weed and Pest added cheatgrass to the county list noxious weeds due to its pervasive nature and to encourage ranchers and private landowners (through financial/resource incentives) to manage populations. However, the Project would not be required to survey or document cheatgrass occurrence as agreed to by Natrona County Weed and Pest supervisor Brian Connelly.

3.0 Noxious Weed Management

Weeds are spread by a variety of means including vehicles, construction equipment, livestock, and wildlife. Implementation of preventative measures to control the spread of noxious weeds is the most cost-effective management approach. Noxious weed controls would be included in each phase of the Project development and would be implemented within the 110-foot-wide construction ROW and ancillary facilities associated with the Project

3.1 Preventative Measures

The following preventative measures would be used to prevent the spread of noxious weeds where ground disturbing activities might occur during construction:

- All construction vehicles and equipment would arrive at the work site clean and weed free. Prior to being allowed access to the ROW or ancillary facilities, the Environmental Inspector (EI) would ensure that vehicles and equipment are free of soil and debris capable of transporting noxious weed seeds, roots, or rhizomes.

- Noxious weed wash stations or any other preventative measures on private lands would be discussed with individual landowners.
- Wash stations would be designed and constructed adhering to the specifications outlined in Appendix C.
- The pipeline ROW and ancillary facilities would be inspected for noxious weeds by the EI, Weed and Pest District, or a qualified botanist, prior to the clearing of vegetation on the ROW and ancillary facilities. Any infestation would be recorded via GPS for pre-treatment and post-construction monitoring purposes.
- Greencore would be responsible for the treatment and eradication of any weed infestation within the 110-foot-wide construction ROW. The BLM, County Weed and Pest Districts, and associated landowners would be responsible for controlling weed infestations outside of the 110-foot-wide construction ROW.
- Chemical pre-treatment would be used prior to ground clearing activities, as appropriate. Pretreatment methods are discussed in Section 3.2 of this plan.
- Selective vegetation clearing and soil stripping methods would be used to minimize the transport of noxious weed seeds, rhizomes, or roots from infested areas into areas where weeds are not present. The contractor would clear vegetation from the 110-foot-wide construction ROW in all vegetation communities, with the exception of forested areas, shelterbelts, and saturated wetlands, where the ROW may be reduced to less than 110 feet.
- In areas that have been pre-treated for noxious weeds the stripped topsoil would be segregated from topsoil that is weed-free. The EI would decide where to place topsoil that has noxious weeds so it can remain separated from the rest of the weed-free topsoil. The topsoil containing noxious weeds would be placed back in the same location it was excavated from.
- During the Reclamation phase of the Project all areas disturbed by construction would be reseeded. The ROW would be with reseeded with an approved seed mix within the proper growing season to ensure appropriate vegetative cover/species would be established to further reduce the establishment of noxious weeds. Seed mixes used during Reclamation may vary due to requests from landowners, BLM, and other agencies.
- Greencore would verify that all straw hay bales and seed shall be certified noxious weed free before being used on the Project.
- All gravel and fill material imported on-site must be source-identified Greencore to ensure that the originating site is noxious weed free.

3.2 Treatment Methods

Methods used to reduce the spread and establishment of noxious weeds would be discussed with the BLM, landowners and county weed districts. Chemical treatments would be based on species-specific and site-specific (e.g., proximity to water or wetlands, time of year) conditions and would be coordinated with the local BLM offices, landowners and County Weed and Pest Districts. .

Cheatgrass in Natrona County would be controlled through proper reclamation procedures and techniques (e.g., adequate reclamation seed mixture, seed application rate and timing, topsoil

stockpiling, and equipment/vehicle cleaning procedures, etc). During post-construction monitoring, if cheatgrass infestations are identified within Natrona County, consultation with Natrona County Weed and Pest would be conducted to develop additional control measures.

3.2.1 Herbicide Pre-treatment

Prior to construction activities that disturb soil and vegetation, noxious weeds would be treated with chemical herbicides at the appropriate time (spring, summer, or fall spraying) dependant on the targeted weed species. The use of herbicides that break down and de-toxify relatively rapidly is necessary to prevent adverse effects on germination and growth of reseeded species. Only approved, short-lived herbicides would be used for pre-treatment of noxious weeds. Only approved herbicides would be used to control noxious weeds near water, wetlands, and riparian areas.

Pre-spraying would be conducted prior to any clearing to reduce the spread of noxious weeds by equipment used during clearing. All treatment methods would vary due to site-specific conditions and the type of species that are encountered. Methods used to reduce the spread and establishment of noxious weeds would be discussed with landowners and county weed districts.

Prior to the initial application of chemical herbicides on public land, a three year Pesticide Use Proposal (PUP) would be prepared and submitted to the BLM Authorized Officer. Following herbicide application, a Pesticide Application Record (PAR) would be submitted to the BLM and the County Weed and Pest District supervisor.

TABLE 1 DESIGNATED NOXIOUS WEED SPECIES AND KNOWN POPULATIONS WITHIN THE PROJECT AREA

Common Name	Scientific Name	Species Designations					Known Populations within the Project Area ⁴ (20100720 CL)
		Montana ¹	Wyoming ²	Fremont County, Wyoming ³	Natrona County, Wyoming ³	Johnson County, Wyoming ³	
Quackgrass	<i>Agropyron repens</i>	N/A	x	N/A	N/A	N/A	N/A
Common burdock	<i>Arctium minus</i>	N/A	x	N/A	N/A	N/A	Two (2) populations: MP 190.02-190.04; 194.94-194.97
Showy milkweed	<i>Asclepias speciosa</i>	N/A	N/A	N/A	x	N/A	N/A
Hoary alyssum	<i>Berteroa incana</i>	x (Category 1)	N/A	N/A	N/A	N/A	N/A
Cheatgrass or downy brome	<i>Bromus tectorum</i>	N/A	N/A	N/A	x	N/A	N/A
Flowering rush	<i>Butomus umbellatus</i>	x (Category 3)	N/A	N/A	N/A	N/A	N/A
Whitetop or hoary cress	<i>Cardaria draba</i>	x (Category 1)	x	N/A	N/A	N/A	N/A
Plumeless thistle	<i>Carduus acanthoides</i>	N/A	x	N/A	N/A	N/A	N/A
Musk thistle	<i>Carduus nutans</i>	N/A	x	N/A	N/A	N/A	Four (4) populations: MP 154.42-154.44; 158.22; 189.70-189.78; 189.87-189.99
Diffuse knapweed	<i>Centaurea diffusa</i>	x (Category 1)	x	N/A	N/A	N/A	N/A
Spotted knapweed	<i>Centaurea maculosa</i>	x (Category 1)	x	N/A	N/A	N/A	N/A
Russian knapweed	<i>Centaurea repens</i>	x (Category 1)	x	N/A	N/A	N/A	N/A
Yellow starthistle	<i>Centaurea solstitialis</i>	x (Category 3)	N/A	N/A	N/A	N/A	N/A
Rush skeletonweed	<i>Chondrilla juncea</i>	x (Category 2)	N/A	N/A	N/A	N/A	N/A
Oxeye-daisy	<i>Chrysanthemum leucanthemum</i>	x (Category 1)	x	N/A	N/A	N/A	N/A

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Canada thistle	<i>Cirsium arvense</i>	x (Category 1)	x	N/A	N/A	N/A	Six (6) populations: MP 44.71-44.86; 44.92-44.98; 95.32-95.67; 96.63; 98.14-98.17; 158.34
Field bindweed	<i>Convolvulus arvensis</i>	x (Category 1)	x	N/A	N/A	N/A	N/A
Common crupina	<i>Crupina vulgaris</i>	x (Category 3)	N/A	N/A	N/A	N/A	N/A
Houndstongue	<i>Cynoglossum officinal</i>	x (Category 1)	x	N/A	N/A	N/A	N/A
Scotch broom	<i>Cytisus scoparius</i>	x (Category 4)	N/A	N/A	N/A	N/A	N/A
Tall larkspur	<i>Delphinium occidentale</i>	N/A	N/A	N/A	N/A	x	N/A
Blueweed	<i>Echium vulgare</i>	x (Category 2)	N/A	N/A	N/A	N/A	N/A
Russian olive	<i>Elaeagnus angustifolia</i>	N/A	N/A	x	N/A	N/A	N/A
Leafy spurge	<i>Euphorbia esula</i>	x (Category 1)	x	N/A	N/A	N/A	N/A
Skeletonleaf bursage	<i>Franseria discolor</i>	N/A	x	N/A	N/A	N/A	N/A
Wild licorice	<i>Glycyrrhiza lepidota</i>	N/A	N/A	N/A	x	x	Two (2) populations: MP 36.71-36.74; 36.97-36.99
Curlycup gumweed	<i>Grindelia squarrosa</i>	N/A	N/A	N/A	x	N/A	One (1) population: MP 28.43-28.48
Halogeton	<i>Halogeton glomerata</i>	N/A	N/A	N/A	x	N/A	Three (3) populations: MP 69.72-70.65; 72.05-72.17; 75.24-75.37
Orange hawkweed	<i>Hieracium aurantiacu</i>	x (Category 2)	N/A	N/A	N/A	N/A	N/A
Meadow hawkweed	<i>Hieracium pratense</i> , <i>H. floribundum</i> , <i>H. piloselloides</i>	x (Category 2)	N/A	N/A	N/A	N/A	N/A
Black henbane	<i>Hyoscyamus niger</i>	N/A	N/A	N/A	x	N/A	N/A

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		Montana ¹	Wyoming ²	Fremont County, Wyoming ³	Natrona County, Wyoming ³	Johnson County, Wyoming ³	
St. Johnswort	<i>Hypericum perforatum</i>	x (Category 1)	x	N/A	N/A	N/A	N/A
Yellowflag iris	<i>Iris pseudacorus</i>	x (Category 2)	N/A	N/A	N/A	N/A	N/A
Dyer's woad	<i>Isatis tinctoria</i>	x (Category 3)	x	N/A	N/A	N/A	N/A
Perennial pepperweed	<i>Lepidium latifolium</i>	x (Category 2)	x	N/A	N/A	N/A	Three (3) populations: MP 160.04; 183.05-183.08; 202.20-202.95
Dalmatian toadflax	<i>Linaria dalmatica</i>	x (Category 1)	x	N/A	N/A	N/A	N/A
Yellow toadflax	<i>Linaria vulgaris</i>	x (Category 1)	x	N/A	N/A	N/A	N/A
Purple loosestrife	<i>Lythrum salicaria, L. virgatum</i>	x (Category 2)	x	N/A	N/A	N/A	N/A
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>	x (Category 3)	N/A	N/A	N/A	N/A	N/A
Scotch thistle	<i>Onopordum acanthium</i>	N/A	x	N/A	N/A	N/A	One (1) population: MP 218.75-218.76
Japanese knotweed	<i>Polygonum cuspidatum, sachalinense and polystachyum</i>	x (Category 3)	N/A	N/A	N/A	N/A	N/A
Sulfur cinquefoil	<i>Potentilla recta</i>	x (Category 1)	N/A	N/A	N/A	N/A	N/A
Tall buttercup	<i>Ranunculus acris</i>	x (Category 2)	N/A	N/A	N/A	N/A	N/A
Tansy ragwort	<i>Senecio jacobea</i>	x (Category 2)	N/A	N/A	N/A	N/A	N/A
Buffalobur	<i>Solanum rostratum</i>	N/A	N/A	N/A	x	x	N/A
Perennial sowthistle	<i>Sonchus arvensis</i>	N/A	x	N/A	N/A	N/A	N/A
Swainson pea	<i>Splaerophysa salsula</i>	N/A	N/A	x	N/A	N/A	N/A
Tamarisk or saltcedar	<i>Tamarix spp.</i>	x (Category 2)	x	N/A	N/A	N/A	Three (3) populations: MP 97.42-97.44; 125.64-125.65; 138.80-138.81

TABLE 1 DESIGNATED NOXIOUS WEED SPECIES AND KNOWN POPULATIONS WITHIN THE PROJECT AREA

Common Name	Scientific Name	Species Designations					Known Populations within the Project Area ⁴ (20100720 CL)
		Montana ¹	Wyoming ²	Fremont County, Wyoming ³	Natrona County, Wyoming ³	Johnson County, Wyoming ³	
Common tansy	<i>Tanacetum vulgare</i>	x (Category 1)	N/A	N/A	N/A	N/A	N/A
Puncturevine	<i>Tribulus terrestris</i>	N/A	N/A	N/A	x	x	N/A
Common mullein	<i>Verbascum thapsus</i>	N/A	N/A	N/A	N/A	x	N/A
Common cocklebur	<i>Xanthium strumarium</i>	N/A	N/A	N/A	N/A	x	N/A

¹Montana Department of Agriculture 2008.

²Wyoming Department of Agriculture (no date).

³Wyoming Weed and Pest Council 2008.

⁴Noxious weed populations identified during field surveys conducted in 2009 and 2010.

3.2.2 Post-construction Herbicide Treatment

Post-construction treatment of noxious weeds, if required, would likely require use of more persistent herbicides (upland sites that are more than 100 feet from water bodies, wetlands, or riparian areas). As discussed in Section 3.2.1 only approved herbicides would be used to control noxious weeds near water, wetlands, and riparian areas.

Supplemental seeding would be based on the criteria in the Project’s Reclamation Plan. The timing of subsequent revegetation efforts would be based on the life of the selected herbicide. In areas of dense infestation, a broader application may be used and a follow-up seeding program implemented.

3.3 Education

Information regarding noxious weed identification, management, and impacts on livestock and wildlife would be provided to all Project personnel. Additionally, workers would be informed of the critical importance of preventing the spread of noxious weeds in areas not infested, and controlling the proliferation of weeds already present. The importance of adhering to measures to prevent the spread of noxious weeds (e.g. not driving off the cleared ROW, cleaning vehicles that collect soil and plant seeds prior to entering the ROW, and quickly identifying new infestations of noxious weeds) would be emphasized.

4.0 Monitoring

Greencore would be directly responsible for monitoring the ROW and ancillary facilities for noxious weeds for five years annually after construction is complete. Site specific field surveys would be conducted every year to include: 1) invasion or infestation sites on the ROW or ancillary facilities, as identified by local BLM offices, Districts, or the Project EIs prior to construction; and 2) areas previously treated for noxious weeds.

TABLE 2 – PROPOSED MONITORING SCHEDULE FOR THE GREENCORE CO2 PIPELINE PROJECT

Task Description	2012	2013	2014	2015	2016	2017
2011 Construction Season (Spreads 2 and 3)	Full ROW (115 Miles)	Known Infestation Areas Only	Full ROW (115 Miles)	Known Infestation Areas Only	Full ROW (115 Miles)	None
2012 Construction Season (Spreads 1 and 4)	None	Full ROW (115 Miles)	Known Infestation Areas Only	Full ROW (115 Miles)	Known Infestation Areas Only	Full ROW (115 Miles)

Based on agency requirements, noxious weed monitoring would commence in the summer of 2012 and thereafter would occur every year for five years. Greencore would use a stratified monitoring approach which would entail full ROW monitoring every other year (1st, 3rd, and 5th years), and monitoring in known populations only during the 2nd and 4th years. Table 2 provides a summary of this proposed monitoring schedule and Appendix D presents the construction schedule by spread (spreads 1-4).

Data collected during monitoring events would include: the noxious weed species, location information (GPS documentation and accompanying map products), the extent of the infestation, results of previous control measures implemented (if any), and recommendations for further control (if needed). Estimates would be made for the entire problem area, comparing disturbed and adjacent areas, and include the range of species cover and density values. AECOM will consult with local weed districts and land management agencies to determine the most appropriate control measures. All noxious weeds identified within the construction corridor will be delineated via Trimble GeoXH global positioning system units (sub meter accuracy).

5.0 Herbicide and Pesticide Application and Handling

5.1 Herbicide Application and Handling

The use of herbicides would be in compliance with all Federal and State laws on proper use, storage, and disposal. Prior to herbicide application, Greencore would obtain the required permits from the local BLM office and District, as appropriate. The chemical application would be done by the operations personnel or an independent, licensed contractor in accordance with all applicable laws and regulations. The contractor would either prove knowledge in noxious weed identification, or be accompanied by a qualified botanist to ensure that the appropriate species are treated on site.

All guidelines by the U.S. Environmental Protection Agency (USEPA) herbicide label instructions would be strictly followed. Applications of herbicides would not be permitted when the instructions on the herbicide label indicate conditions that are not optimal

Application of herbicides would be suspended if the following conditions exist:

- Wind velocity exceeds 20 miles per hour;
- Snow or ice covers the foliage of noxious weeds; or
- Precipitation is occurring or imminent.

Vehicle-mounted sprayers (e.g., handgun, boom, and injector) would be used primarily in open areas that are readily accessible by vehicle. Hand application methods (e.g., backpack spraying) that target individual plants would be used to treat small scattered weed populations in rough terrain. Application of herbicides or herbicides would follow these restrictions: boom and hand gun sprayers would not be used within 25 feet of surface water; broadcast backpack spraying would not occur within 10 horizontal feet of water; only wipe applications (or hand-directed spray using a backpack sprayer) would be allowed within 10 horizontal feet of surface water; and herbicides would not be mixed in an area where an accidental spill could enter a water body. Fertilizers, lime, or mulch would not be used in wetlands unless required by agencies.

Herbicides would be transported to the Project site with the following provisions:

- Concentrate would be transported only in containers in a manner that would prevent tipping or spilling and in a compartment that is isolated from food, clothing, and safety equipment; and
- Mixing would only be conducted on-site and more than 200 feet from open or flowing water, wetlands, or other sensitive resources.

5.2 Worker Safety and Spill Reporting

All herbicide contractors would obtain and have readily available copies of the appropriate USEPA Material Safety Data Sheets (MSDS) for the herbicides being used. Herbicide spills would be reported in accordance with all applicable laws and requirements.

5.3 Herbicide Use

The use of herbicides shall comply with the Federal and state laws governing their proper use and storage, and disposal. Further, their use shall only occur within any limitations imposed by the Secretary of the Interior.

The following is the sequence of events to be followed for using herbicides on BLM administered lands:

- An onsite reconnaissance shall occur between the company personnel, or their contractor, and County Weed and Pest District personnel certified in pesticide application. A treatment plan would be formulated.
- The primary species targeted for control on BLM and private lands would include the Wyoming Noxious Weed list as well as specific species of concern from the designated County Weed and Pest districts.
- Individual and habitat loss to special status plant species due to weed control measures during ROW maintenance would be avoided by consultation between the special status plant species jurisdictional agency and weed control specialists.
- A three year Pesticide Use Proposal (PUP) form would be completed, for herbicide application, by the permit holder and submitted to the BLM certified pesticide applicator (Authorized Officer) at the appropriate office. The PUP would be developed with assistance from Natrona County Weed and Pest Supervisor Brian Connelly.
- The permit holder would be notified by this office of approval of the PUP and be furnished a copy of the document with any changes noted and explained.
- Any special conditions, such as sign posting requirements or notice to livestock grazers, would be noted.
- The appropriate BLM office would be notified at least 72 hours prior to pesticide application so that application operations can be inspected.
- All herbicides, both restricted use and nonrestrictive use, shall be applied only by personnel certified in the use of these herbicides or under the direct supervision of certified applicators (State of Wyoming Commercial Applicator's License). A Pesticide Application Record (PAR) form shall be completed within 24 hours of ceasing herbicide application. The PAR shall be submitted by the permit holder to the certified BLM pesticide applicator and the County Weed and Pest District supervisors, within 7 days of completion of field treatment operations for the season.

6.0 References

- Baker, L. 2010. Fremont County Weed and Pest District. Personal communication with P. Swartzinski, AECOM, Fort Collins, Colorado. September 15, 2010.
- Johnson, K. 2010. Fremont County Weed and Pest District. Personal communication with P. Swartzinski, AECOM, Fort Collins, Colorado. September 16, 2010.
- Litzel, R.. 2010. Johnson County Weed and Pest District. Personal communication with P. Swartzinski, AECOM, Fort Collins, Colorado. September 17, 2010
- Montana Weed Control Association (MWCA). 2008. Montana Weed Management Plan. Internet website: <http://www.mtweed.org/threatsImpacts.html>. Reviewed November 6, 2008
- Schmelzle, Q. 2010. Campbell County Weed and Pest District. Personal communication with P. Swartzinski. AECOM, Fort Collins, Colorado. September 14, 2010.
- Sheley, R.L., M. Manoukin, and G. Marks. 1999. Preventing Noxious Weed Invasion, pages 69-72 in, R.L. Sheley and J.K. Petroff, editors. Biology and Management of Noxious Rangeland Weeds. Oregon State University Press, Corvallis, OR.
- USFR (U.S. Federal Register), 1999. Presidential Document, Executive Order 13112. Invasive Species, Federal Register 64:6183-6186.
- Wyoming State Weed Team Wyoming. 2003. Weed Management Strategic Plan.

Attachment 1

Correspondence Summaries from County Week Supervisors

Brian Connelly, Supervisor, Natrona County Weed and Pest Control District. Personal Communication April 30, 2010

Recommendations:

Due to its pervasive nature, cheatgrass was added to the Natrona County list to encourage ranchers and private landowners (through financial/resource incentives) to manage populations. For the proposed Project, pre-construction surveys are *not* required. Cheatgrass can be mitigated through proper reclamation procedures and techniques (e.g., adequate reclamation seed mixture, seed application rate and timing, topsoil stockpiling, and equipment/vehicle wash stations, etc).

During post-construction monitoring, if cheatgrass infestations are identified within Natrona County, consultation with Natrona County Weed and Pest would be conducted and mitigation stipulations may be developed to address additional control measures.

Lars Baker, Supervisor, Fremont County Weed and Pest Control District. Personal Communication, September 15, 2010

Recommendations:

1. Aggressive pre-treatment of identified noxious weeds along ROW and construction corridor where traffic will be traveling.
 - a. Concerned with spreading weeds up and down the line. Specifically, Knapweed as it readily attaches to trucks and construction equipment.
 - b. Knapweed has a 40 year seed dormancy so if not effectively pretreated can be problem throughout the lifetime of the project.
 - c. BLM may require wash stations in highly infected areas.
2. When applying herbicide to population should extend spraying or buffer the spraying to capture potential outlying plants.
3. Post construction monitoring should be done during July, August and September to capture the different flowering times of potential weeds.
4. Potential use of the Weed district as a contractor for spraying weeds within their own districts.
 - a. District staff are more experienced with weed species and effective measures to control them including timing of application and identification of weed plants.
 - b. Too often herbicide contractors are not familiar with weed species and effective measures to control them, as they do not have enough experience.
 - c. Example cited was a contractor he knew of had just hired a guy to spray weeds along a ROW. The person's previous job was driving a Schwan's truck the week before. He sees inexperienced people applying herbicide too often in the herbicide contractor business.
5. Recommended contacting Kim Johnson in the Riverton office. She is the GIS person who updates the weed database for Fremont County as well as other counties. Good place to get existing weed data locations for our project area.

Quade Scmelzle, Supervisor, Campbell County Weed and Pest Control District. Personal Communication September 14, 2010

Recommendations:

1. Campbell County is most concerned with the spread of Knapweed and Leafy Spurge.
 - a. Pre-treatment of infected areas is preferred and will most likely have the biggest impact in eradication of these species
 - b. Proper timing of herbicide application is critical for eradication of any species.
 - i. Fall spraying for Knapweed, spring spraying for Whitetop are examples of preferred spray times for particular species.
 - ii. Biennial thistles (Musk thistle and Plumeless thistle) should be sprayed in the fall and perennial thistles (Canada thistle) in early summer.
 - iii. Whitetop should be sprayed in the spring.
2. New species of concern in Campbell County include the spread of Halogeton and Buffalo Bur
3. Currently there are no wash station requirements from the Campbell County weed districts guidance
4. Recommended using Milestone herbicide for Knapweeds and Thistles. Milestone is not an approved herbicide for BLM lands but can be used on private lands. For BLM lands, he recommends 2,4_D.

Rod Litzel, Supervisor, Johnson County Weed and Pest Control District. Personal Communication September 17, 2010

Recommendations:

1. Johnson County is most concerned with Scotch thistle, Knapweed, Whitetop leafy spurge and Salt cedar.
 - a. Herbicide recommendations for these species:
 - i. Whitetop: Escort
 - ii. Thistles: Milestone/Tardon mix
 - iii. Knpweed: Milestone
 - iv. Leafy Spurge: Tardon/Plateau
2. Aggressive pre-treatment of weeds before construction starts is highly recommended.
 - a. Pre-treatment would help alleviate the spread of weeds up and down the ROW once construction occurs.
3. Recommends utilizing expertise of local weed districts for herbicide application methods and timing. Would be able to recommend local herbicide companies that are experienced and capable.
 - a. This would help local economies
 - b. Local experience helped when dealing with landowners.
4. Monitoring and herbicide application should be done yearly for a minimum of 5 years.
 - a. First year after construction is most critical time as this will be when the big flush of weeds will occur. Need to be aggressive with herbicide to ensure that weed problems will be lessened in the future.
5. Will give permission to Kim Johnson (weed mapping) to release shapefiles of known infestations along the pipeline ROW.

Brian Connelly, Supervisor, Natrona County Weed and Pest Control District. Personal Communication October 28, 2010

Recommendations:

1. Priority species of concern include Russian knapweed, leafy spurge, diffuse knapweed, spotted knapweed, Scotch thistle and salt cedar.
 - a. All other State Designated Noxious weeds should be controlled
2. The NCW&P District will survey the right of way in the County in a timely manner to identify problem areas
3. Treatment of identified weed areas should be done pre-excavation and with the best applicable herbicides/timing labeled for control of that weed spp.
4. The NCW&P District would like copies of annual spray reports of areas treated in the County.
5. The NCW&P would like to collaborate on all aspects of noxious weed control involved in this project
 - a. Collaboration could include treatment recommendations, data sharing, mapping, efficacy oversight, weed treatment, and monitoring.
 - b. The NCW&P District retains the right to take over weed control on public lands if private entities are unable to gain and maintain control.

Attachment 2

Bureau of Land Management Pesticide Use Proposal

STATE: **WY**

COUNTY: **Fremont, Natrona, Johnson, Campbell, Powder River**

FIELD OFFICE: **CFO 060 (Casper)**

DURATION OF PROPOSAL: **5 Years**

LOCATION:

ORIGINATOR – NAME: **Paul Swartzinski**

ORIGINATOR – COMPANY: **Grencore Pipeline LLC**

ORIGINATOR – CONTACT INFORMATION:

DATE:

PROPOSAL NUMBER:

EA REFERENCE NUMBER:

DECISION RECORD (DR) NUMBER:

.....

I. APPLICATION INFORMATION – (Including mixtures and adjuvants): **See Attached Tables for 1-9.**

1. TRADE NAME(S):
2. COMMON NAME(S):
3. EPA REGISTRATION NUMBER(S):
4. MANUFACTURER(S):
5. METHOD OF APPLICATION:
6. MAXIMUM RATE OF APPLICATION – AS STATED ON THE LABEL:
 - a. Formulated Product:
 - b. Pounds Active Ingredient or Acid Equivalent/acre:
7. INTENDED RATE OF APPLICATION:
 - a. Formulated product:
 - b. Pounds Active Ingredient or Acid Equivalent/acre:
8. APPLICATION DATE(S):
9. NUMBER OF APPLICATIONS:

II. PEST [List specific pest(s) and reason(s) for the proposed application of the pesticide]: See attached Species Table.

III. DESIRED RESULTS OF THE APPLICATION - LINKED TO THE OBJECTIVES OF THE APPLICATION:

The goals of weed control are to implement preventative measures to eliminate the spread of noxious weeds during construction of the pipeline system. Monitoring and treatment both prior to construction and during the operational phase, as applicable, will ensure that goals are achieved.

IV. APPLICATION SITE DESCRIPTION:

1. ESTIMATED NUMBER OF ACRES: To be determined.
2. GENERAL DESCRIPTION (Describe land type or use, size, stage of growth of target species, soil characteristics, and any additional information that may be important in describing the area to be treated.)

The proposed Project area is located entirely within the Powder River Basin floristic region of northeastern Wyoming and southeastern Montana, and characterized by flat to low rolling terrain with intermittent terraces, steep slopes, and rocky ridges.

Approximately 226.9 miles (97.8 percent) of the proposed route would cross grassland/shrubland habitat. Grassland/shrubland habitats most commonly occupy valley bottoms, plains, foothills, plateaus, and benches. This vegetation cover type is dominated by big sagebrush (*Artemisia tridentata*), black sagebrush (*Artemisia nova*), and bud sagebrush (*Picrothamnus desertorum*), and codominated by antelope bitterbrush (*Purshia tridentata*) and rabbitbrush species (*Chrysothamnus* sp.). Common graminoid species include western wheatgrass (*Pascopyrum smithii*), needlegrass (*Achnatherum* sp.), needle-and-thread (*Hesperostipa comata*), Sandberg bluegrass (*Poa secunda*), threadleaf sedge (*Carex filifolia*), bluebunch wheatgrass (*Pseudoroegneria spicata*), little bluestem (*Schizachyrium scoparium*), and Indian ricegrass (*Achnatherum hymenoides*). Common forb species include buckwheat (*Erigonum* sp.), bluebells (*Mertensia* sp.), broom snakeweed (*Gutierrezia sarothrae*), and soapweed yucca (*Yucca glauca*). Perennial herbaceous components typically contribute less than 25 percent vegetative cover.

V. SENSITIVE ASPECTS AND PRECAUTIONS (Describe sensitive areas - marsh, endangered, threatened, candidate, and sensitive species habitat - and distance to application site. List measures to be taken to avoid impact to these areas):

No sensitive plant species have been identified within the Project area there for there is no expected loss of sensitive plants due to herbicide treatment. Habitat loss to special status plant species due to weed control measures during ROW maintenance would be avoided by consultation between the special status plant species jurisdictional agency and weed control specialists.

VI. NON-TARGET VEGETATION (Describe potential immediate and cumulative impacts to non-target pests in project area as a result of the pesticide application. Identify any planned mitigation measures that will be employed - BE GENERAL, SPECIFICS DISCUSSED IN THE EA):

Some non-target vegetation may be affected by proposed treatments. Spot treatments will be utilized in most circumstances, mitigating the potential for non-target control. Application rates will be tailored to the infestation and will be in compliance with label restrictions to minimize extended impacts. Cumulative impacts associated with isolated non-target species control should be minimal, as spot treatments will ensure any adversely affected areas will be small in size and easily re-established with surrounding native species.

VII. INTEGRATED PEST MANAGEMENT PRACTICES CONSIDERED IN THE OVERALL PROJECT: Mechanical and biological management practices were considered but dropped as viable for long term effectiveness of the project.



VIII. SIGNATURES:

Pesticide Use Proposal's Originator: _____ Date: _____

Company: _____

Certified Pesticide Applicator: _____ Date: _____

License Number: _____

Certifying Organization: _____

Field Office Pesticide/Noxious

Weed Coordinator: _____ Date: _____

Field Office Manager: _____ Date: _____

BLM State Pesticide

Coordinator: _____ Date: _____

Deputy State Director: _____ Date: _____

- Concur or Approved
- Not Concur or Disapproved
- Concur or Approved With Modifications

HERBICIDES AND TARGETED WEED SPECIES

Herbicide Trade Name	Herbicide Common Name	Manufacturer	EPA Registration #	Maximum Rate Of Application		Rate Of Application		Application Dates	Number of Applications	Targeted Weed Species(Numbers correspond to attached species list)	Application Method
				Formulated Product	Lbs Active Ingredient	Formulated Product	Lbs Active Ingredient				
Tordon/Outpost	Picloram (L)	Dow Agrosiences	62719-6	2 qt/acre	1 lb/acre	2 qt/acre	1 lb/acre	May-Sept	1	2,9,10,11,12,16,21,24,36	Ground based with calibrated equipment (L)
Telar XP	Chlorsulfuron (DF)	Dupont	352-654	1 1/3 oz/acre	0.1lb/acre	1 1/3 oz/acre	0.1lb/acre	May-June/ Aug-Sept	1	28,34,50,51	Ground based with calibrated equipment (DF)
Escort XP	metsulfuron methyl (DF)	Dupont	352-439	2 oz/acre	.075 lb/acre	2 oz/acre	.075 lb/acre	May-June/ Aug-Sept	1	7,19,28,35	Ground based with calibrated equipment (DF)
4 LB. Amine or equivalent	2,4-D Amine (L)	Cornbelt	11773-2	2 qt/acre	1.9 lb/acre	2 qt/acre	1.9 lb/acre	May-Sept		Labeled annual and biennial listed weeds	Ground based with calibrated equipment (L)
4 LB. Amine or equivalent	2,4-D Amine (L)	Cornbelt	11773-2	2 qt/acre	1.9 lb/acre	1 qt/acre	.95 lb/acre	May-Sept		Labeled annual and biennial listed weeds	Ground based with calibrated equipment (L)
4 LB. Amine or equivalent	2,4-D Amine (L)	Cornbelt	11773-2	2 qt/acre	1.9 lb/acre	1 pt/acre	.475 lb/acre	May-Sept		Labeled annual and biennial listed weeds	Ground based with calibrated equipment (L)
4 LB. Lovol Ester or equivalent	2,4-D Ester (L)	Cornbelt	11773-3	2 qt/acre	1.9 lb/acre	2 qt/acre	1.9 lb/acre	growing season		Labeled annual and biennial listed weeds	Ground based with calibrated equipment (L)
Redeem R&P	triclopyr, clopyralid (L)	Dow Agrosiences	62719-337	2 qt/acre	1.125 lb/acre triclopyr .375 lb/acre clopyralid	2 qt/acre	1.125 lb/acre triclopyr .375 lb/acre clopyralid	May-June/ Aug-Sept	1	9,10,11,12,16,40,46	Ground based with calibrated equipment (L)
Dicamba or equivalent	Dicamba (L)	AgriStar, Albaugh Inc	42750-40	2 qt/acre	2 lb/acre	2 qt/acre	2 lb/acre	May-Sept		Labeled annual and biennial listed weeds	Ground based with calibrated equipment (L)
Plateau	Imazapic (L)	BASF Corporation	541-365	8 oz/acre	.125 lb/acre	8 oz/acre	.125 lb/acre	Aug-Oct	1	5	in fall pre-emergent application only
Buccaneer Plus or equivalent	Glyphosate (L)	Tenkoz	55467-9	5 qt/acre	3.75 lb/acre	3 qt/acre	2.25 lb/acre	May-Sept		Pre-plant applications for labeled weeds, vegetation	Ground based with calibrated equipment (L)
Brewer 90 or equivalent	non-ionic surfactant (L)	Brewer International	N/a	1 qt/100 gal	N/A	1qt/100 gal	N/A	N/A	N/A	adjuvant w/ labeled herbicides	Ground based with calibrated equipment (L)

SPECIES LIST

Species Number	Common Name	Scientific Name
1	Quackgrass	<i>Agropyron repens</i>
2	Common burdock	<i>Arctium minus</i>
3	Showy milkweed	<i>Asclepias speciosa</i>
4	Hoary alyssum	<i>Berteroa incana</i>
5	Cheatgrass or downy brome	<i>Bromus tectorum</i>
6	Flowering rush	<i>Butomus umbellatus</i>
7	Whitetop or hoary cress	<i>Cardaria draba</i>
8	Plumeless thistle	<i>Carduus acanthoides</i>
9	Musk thistle	<i>Carduus nutans</i>
10	Diffuse knapweed	<i>Centaurea diffusa</i>
11	Spotted knapweed	<i>Centaurea maculosa</i>
12	Russian knapweed	<i>Centaurea repens</i>
13	Yellow starthistle	<i>Centaurea solstitialis</i>
14	Rush skeletonweed	<i>Chondrilla juncea</i>
15	Oxeye-daisy	<i>Chrysanthemum leucanthemum</i>
16	Canada thistle	<i>Cirsium arvense</i>
17	Field bindweed	<i>Convolvulus arvensis</i>
18	Common crupina	<i>Crupina vulgaris</i>
19	Houndstongue	<i>Cynoglossum officinal</i>
20	Scotch broom	<i>Cytisus scoparius</i>
21	Tall larkspur	<i>Delphinium occidentale</i>
22	Blueweed	<i>Echium vulgare</i>
23	Russian olive	<i>Elaeagnus angustifolia</i>
24	Leafy spurge	<i>Euphorbia esula</i>
25	Skeletonleaf bursage	<i>Franseria discolor</i>
26	Wild licorice	<i>Glycyrrhiza lepidota</i>
27	Curlycup gumweed	<i>Grindelia squarrosa</i>
28	Halogeton	<i>Halogeton glomerata</i>
29	Orange hawkweed	<i>Hieracium aurantiacu</i>
30	Meadow hawkweed	<i>Hieracium pratense, H. floribundum, H. piloselloides</i>
31	Black henbane	<i>Hyoscyamus niger</i>
32	St. Johnswort	<i>Hypericum perforatum</i>
33	Yellowflag iris	<i>Iris pseudacorus</i>

SPECIES LIST

Species Number	Common Name	Scientific Name
34	Dyer's woad	<i>Isatis tinctoria</i>
35	Perennial pepperweed	<i>Lepidium latifolium</i>
36	Dalmatian toadflax	<i>Linaria dalmatica</i>
37	Yellow toadflax	<i>Linaria vulgaris</i>
38	Purple loosestrife	<i>Lythrum salicaria</i> , <i>L. virgatum</i>
39	Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
40	Scotch thistle	<i>Onopordum acanthium</i>
41	Japanese knotweed	<i>Polygonum cuspidatum</i> , <i>sachalinense</i> and <i>polystachyum</i>
42	Sulfur cinquefoil	<i>Potentilla recta</i>
43	Tall buttercup	<i>Ranunculus acris</i>
44	Tansy ragwort	<i>Senecio jacobea</i>
45	Buffalobur	<i>Solanum rostratum</i>
46	Perennial sowthistle	<i>Sonchus arvensis</i>
47	Swainson pea	<i>Splaerophysa salsula</i>
48	Tamarisk or saltcedar	<i>Tamarix spp.</i>
49	Common tansy	<i>Tanacetum vulgare</i>
50	Puncturevine	<i>Tribulus terrestris</i>
51	Common mullein	<i>Verbascum thapsus</i>
52	Common cocklebur	<i>Xanthium strumarium</i>

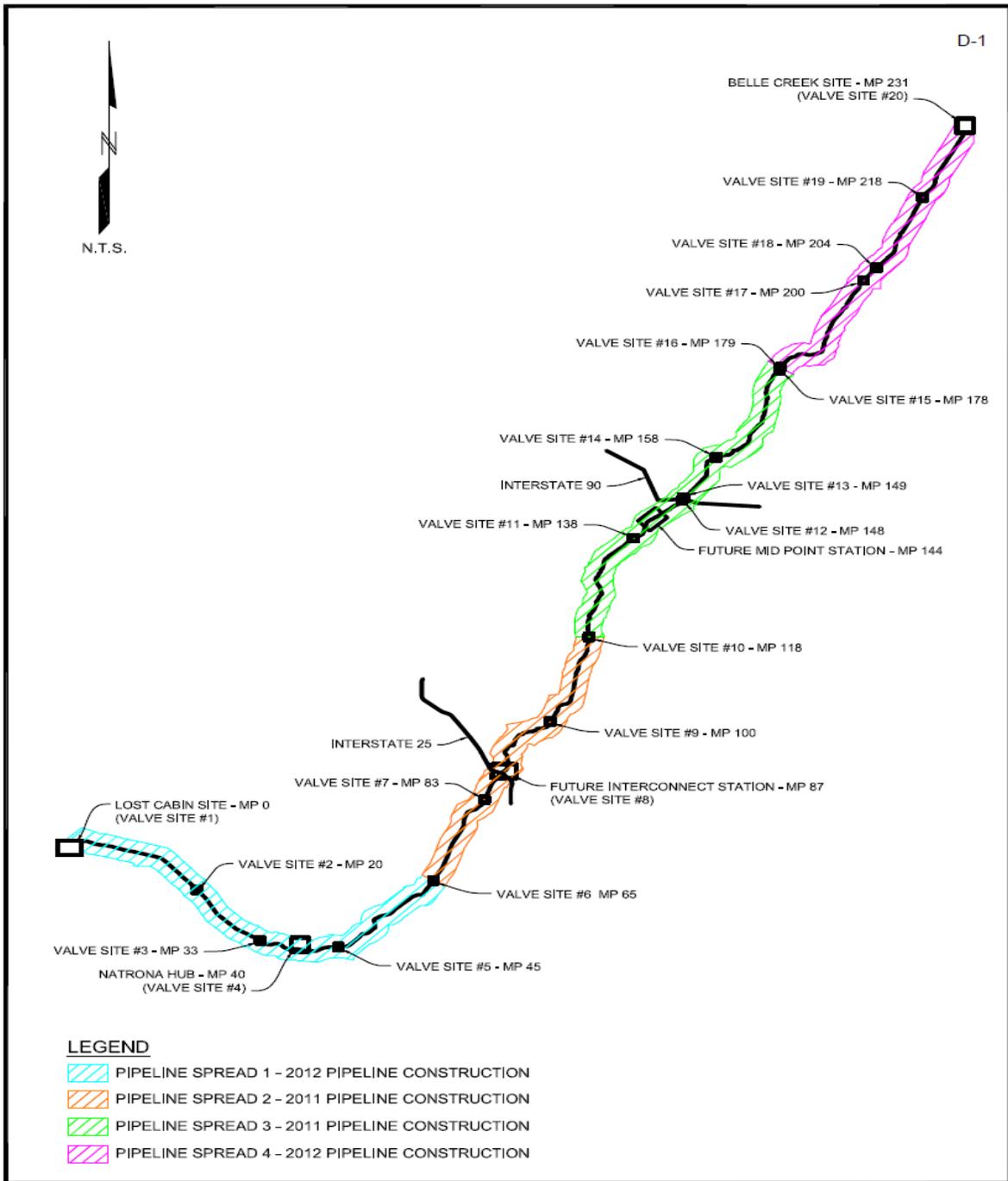
EQUIPMENT CLEANING STATION NOTES:

1. CLEANING SHALL BE CARRIED OUT UNDER THE SUPERVISION AND TO THE SATISFACTION OF THE ENVIRONMENTAL INSPECTOR.
2. STATION TO BE EQUIPPED WITH TIMBER MATS, SKID PADS, OR RACKS TO ELEVATE EQUIPMENT TRACKS/TIRES SO THAT SOIL AND WEEDS WILL BE CONTAINED IN THE STATION BASIN.
3. FILTER FABRIC TO BE INSTALLED AS A CONTINUOUS PIECE AND PLACED OVER THE TOP AND TO THE OUTSIDE EDGE OF THE BERMS AND FIRMLY FASTENED IN PLACE. THE EDGES OF PARALLEL PIECES SHALL BE OVERLAPPED A MINIMUM OF 12 INCHES (SHINGLE STYLE), AND FOLDED OVER (SEE DETAIL A). STAPLE THROUGH THE OVERLAPPED AREA EVERY 12 INCHES.
4. FILTER FABRIC SHALL BE NON-WOVEN POLYPROPYLENE, WITH AN APPARENT OPENING SIZE OF 70 TO 100 (U.S. SEIVE), 200-POUND GRAB STRENGTH, AND 8 OUNCES PER YARD UNIT WEIGHT, OR BETTER. IN AREAS THAT ARE NOT ROCKY, CONTRACTOR MAY CHOOSE TO USE NON WOVEN POLYPROPYLENE, 160 PCUND CRAB STRENGTH, AND 6 OUNCES PER YARD UNIT WEIGHT.
5. WATER USED FOR CLEANING SHALL NOT BE ALLOWED TO FLOW NTO ANY WATERBODY, WETLAND OR IRRIGATION CANAL/DITCH.
6. SIZE OF STATION SHALL BE ADEQUATE TO ACCOMMODATE THE MAXIMUM SIZE OF EQUIPMENT EXPECTED.
7. SKIDS ARE TO BE CLEANED BETWEEN WASHING INDEPENDENT PIECES OF EQUIPMENT.
8. FILTER FABRIC WILL BE REMOVED TO AN ACCEPTABLE LANDFILL WHEN THE WASH STATION S DISMANTLED.
9. THE DEPRESSION WILL BE BACKFILLED WITH BERMED MATERIAL. ANY SOILS CONTAMINATED BY PETROLEUM BASED OR OTHER UNDESIRABLE MATERIALS FROM CLEAN OFF STATIONS SHALL BE REMOVED IN ACCORDANCE WITH APPLICABLE REQUIREMENTS.
10. TOPSOIL WILL BE RETURNED AND THE AREA RECLAIMED.
11. CLEANING SITES WILL BE MONITORED DURING THE POST CONSTRUCTION MONITORING PROGRAM AND WEEDS CONTROLLED AS REQUIRED.

REVISIONS						OWNER:	  TYPICAL EQUIPMENT CLEANING STATION (SHT. 2 OF 2)					
△						CHECKED BY:						
△						DESIGNED BY:						
△						APPROVED BY:						
△						PROJECT NUMBER:						
△	ISSUED FOR REVIEW	12/08/10	JTS	CLJ	TW	SCALE: NONE	PROJECT NUMBER	2568-01	DRAWING NUMBER	TYP-058A	REV.	A
NC.	DESCRIPTION	DATE	BY	CHK	APPR.							

Attachment 4

Construction Flow Diagram





GREENCORE



CH2MHILL

Greencore CO₂ Pipeline
Lost Cabin to Belle Creek

CONSTRUCTION FLOW DIAGRAM

2568-01 CONFLOW-01
REV E - NOVEMBER 5, 2010

Appendix L

Emergency Response Plans

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Contractor’s Potential Spill Sources
Contractor’s Hazardous Substances Inventory
Hazardous Materials and Wastes Inspection Log
Spill Report Form
Reportable Quantities

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- 1 Project Team Contacts
- 2 Emergency Contacts
- 3 County Contacts
- 4 BLM Contacts

1.0 Safety Response Plan

This Safety Plan (Plan) identifies measures to be taken by Greencore and its contractors to minimize hazards to persons working on and visiting the project and to comply with applicable safety requirements and regulations.

Measures identified in this Plan apply to work within the project area defined as the right-of-way, access roads, temporary use areas, and other areas used during construction of the project.

Greencore and Contractor personnel are to be thoroughly familiar with this Plan and its contents prior to initiating construction on the project. This Plan will be stored on site for reference by Greencore and Contractor personnel.

1.1 Purpose

The purpose of this Plan is to describe safety standards and practices that will be implemented to minimize health and safety concerns related to construction of the project with the goal of elimination of accidents.

1.2 Greencore

Greencore shall comply and ensure compliance by its employees, suppliers, and visitors with applicable occupational safety and health laws and regulations. Greencore shall observe and monitor the Contractor's practices and procedures and shall inform the Contractor of violations to the afore-mentioned regulations. If Greencore becomes aware of a violation that presents immediate danger to human life or property, Greencore shall order an immediate stoppage of work until unsafe conditions or practices are corrected.

1.3 Contractor

The Contractor has the prime responsibility for the safe construction of the pipeline and associated facilities. The Contractor has the responsibility to provide Greencore with its comprehensive safety plan, which shall, at a minimum, comply with regulatory and state-of-the-art industry safety practices. The Contractor's safety plan must be approved by Greencore before construction begins. The Contractor is responsible for providing safety orientation to Contractor personnel.

1.4 Construction Inspector

Greencore's Construction Inspectors shall not be responsible for ensuring a safe, incident-free project or for ensuring Contractor compliance with its safety plan or any other regulatory requirements regarding safety. However, it is the Construction Inspector's responsibility to be an attentive, willing, and proactive monitor and observer of the Contractor's work practices and to record and report seemingly unsafe work practices. The Construction Inspectors will be OSHA competent for ditch inspections. Construction Inspectors will have "Stop Work" authority during construction.

1.5 Safety Training

Prior to initiating construction activities, Grencore shall arrange a meeting between the Contractor and Grencore's Construction Inspection Staff to discuss safety aspects of the work, safety hazards particular to the work site, and to outline safety responsibility and authority of Grencore and Contractor personnel.

During construction of the project, it shall be the responsibility of the Contractor to train workers (and visitors) and keep them up-to-date regarding safety matters. The Contractor shall provide pre-job orientation to workers engaged on the project and ensure workers are competent to perform any job requested. The Contractor shall also make all of its workers available for any required Grencore orientation or safety training.

1.6 General Requirements

The Contractor shall ensure that the following measures are implemented:

- Adhere to procedures presented in the Contractor's approved safety plan and to applicable federal, state, and local statutory requirements.
- Report accidents and injuries to the Construction Inspector.
- Remedy any unsafe conditions or situations as requested by the Construction Inspector.
- Work safely so other employees are not placed at risk.
- Use specified and required personal safety equipment in performance of duties.
- Maintain construction sites in a sanitary condition.
- Cease normal pipeline construction activities, except pressure testing activities, by sunset.
- Ensure that equipment is properly maintained to reduce emissions and comply with federal, state, and local air quality emission standards and regulations.
- Prohibit firearms, hunting, alcohol, and drugs on Grencore property, the construction right-of-way, temporary use areas, access roads, and off-right-of-way project facilities.
- Ensure, when radiographic equipment is to be used, that the area is clear and that personnel are at a safe distance from the radiation source. Radiation warning signs will be placed at the edges of the safe area.
- Heed OSHA, federal, state, and local trenching regulations, and implement measures to ensure the safety of workers working in the trench by using sheet piling, sloping, etc.
- Comply with federal, state, county, and local fire regulations pertaining to the prevention of uncontrolled fires. Refer to the Fire Prevention and Suppression Plan for additional information.
- Ensure that hazardous and potentially hazardous materials are transported, stored, and handled in accordance with applicable legislation. Refer to the Hazardous Materials

Management and Spill Prevention, Containment and Countermeasure Plan for additional information.

- Implement safety precautions during static testing as described in the Pressure Testing Plan.
- Keep alternate means of communication on-site with each work spread in case cell phone coverage is inadequate.

1.7 Working Hours

With the exception of strength testing, HDD pull back, and hydrostatic testing, working hours will generally be from sunrise to sunset.

1.8 Incident Reporting

All injuries, fires, and accidents will be recorded and reported to Grencore and the required regulatory agencies within the required time frames.

1.9 Mechanical Damage to Underground Facilities

The Contractor will give adequate advance notification of work that will be performed within existing pipeline easements, rights-of-way, or property so that site preparation and supervision can be provided. Before commencing any excavation, the Contractor will receive authorization to proceed from Grencore's Construction Inspector.

The Contractor will utilize the "One Call" system to locate and stake the centerline and limits of all underground facilities in the area of proposed excavation. The Contractor will provide 48-hour notification to the owner/operator of any foreign pipeline prior to performing any work within 10 feet of buried or aboveground pressurized gas piping. Machine excavation will not be performed closer than 5 feet from any existing pipeline encountered in the right-of-way unless authorized by the pipeline owners/operators. At a minimum, the ditch will be excavated to allow 24 inches of clearance (unless otherwise specified by the foreign pipeline owner/operators) between Grencore's pipelines and other pipelines or underground facilities.

1.10 Damaged Pipe

Any dents, gouges, scratches or other similar defects will be brought to the attention of Grencore's Construction Inspector as soon as they are detected. Detrimental defects will not be accepted and will be repaired or cut out of the line as directed by Grencore's Construction Inspector, regardless of when or how they may have occurred. Grinding to remove defects within dented areas will not be permitted.

Gouges, grooves, scratches or tears may be removed by grinding provided that the wall thickness is not reduced to less than 95 percent of the specified nominal wall thickness. Dents other than those described above will be permitted provided they do not exceed the following maximum levels specified for each case.

- As delivered from the pipe mill - maximum depth of 0.5 percent of the pipe diameter and 25 percent of the pipe diameter in any other dimension.

- Allowable damage in the field prior to backfill - maximum depth of 1 percent of the pipe diameter and 50 percent of the pipe diameter in any other dimensions.
- Allowable damage in the field after backfill - maximum depth of 2 percent of the pipe diameter and 75 percent for the pipe diameter in any other dimension. Pounding or jacking to remove dents is prohibited.

Defects greater than those noted above will be cut out as a cylinder and replaced by welding a pup joint to the line.

1.11 Emergency Contacts

TABLE 1—PROJECT TEAM CONTACTS

CALL 911 FOR EMERGENCY RESPONSE

Name	Title	Phone	Address
Kevin Kuehler	Denbury Project Manager	214-601-5600	5100 Tennyson Parkway Suite 1200 Plano, Texas 75024
Tom Wanzeck	CH2M HILL Project Manager	720-286-2195	6399 S. Fiddlers Green Circle Suite 500 Greenwood Village, Colorado 80111
Terry Brown	ROW Supervisor	813-240-2504	907 N. Poplar Street Suite 220 Casper, Wyoming 82601
Mike Kilpatrick	Construction Manager	970-759-6326	907 N. Poplar Street Suite 220 Casper, Wyoming 82601
Randy Robichaux	Denbury Environmental Manager	985-209-3875	5100 Tennyson Parkway Suite 1200 Plano, Texas 75024
Chad Barnes	AECOM Environmental Manager	970-420-0333	1601 Prospect Parkway Fort Collins, Colorado 80525

TABLE 2—EMERGENCY CONTACTS

CALL 911 FOR EMERGENCY RESPONSE

Location	Service	Phone	Address
Wyoming County			
Natrona	Police	307-235-9282	201 N. David, Casper
	Police non-emergency	307-235-8228	201 N. David, Casper
	Fire District	307-234-8826	
	Fire Station 7	307-265-8656	2800 Pheasant Drive, Mills
	Fire Station 13	307-234-6694	6650 Wildcat Drive, Mills
	Emergency Management Admin	307-235-9205	201 N. David, Casper
Freemont	Police-Sheriff	307-856-7200	460 Railroad Ave, Lander
	Police	1-800-967-2302	460 Railroad Ave, Lander
	Emergency Management Admin	307-856-2374	322 North 8th West St, Riverton
Johnson	Police-Sheriff	307-684-5581	639 Fort St, Buffalo
	Fire	307-684-9058	314 Railroad Ave, Buffalo
	Emergency Management Admin	307-684-2761	26 N. Desmet Ave, Buffalo
	Emergency Management Admin	cell 307-217-1879	26 N. Desmet Ave, Buffalo
Campbell	Police	307-682-7271	W. Boxelder Rd, Gillette
	Fire	307-682-5319	116 Rohan Ave, Gillette
	Emergency Management Admin	307-686-7477	500 S. Gillette Ave, Ste 1100
Wyoming City/Town			
Casper	Police	307-235-8225	201 N. David, Casper
	Fire	307-235-8222	200 N. David, Casper
	Rescue-EMT	307-235-8222	200 N. David, Casper
	Emergency Management Admin	307-235-9200	200 North Center, Casper
Gillette	Police	307-682-5155	201 E. 5th St, Gillette
	Fire	307-682-5319	106 Rohan Ave, Gillette
	Emergency Management Admin	307-685-1067	600 W Boxelder Rd, Gillette
Montana County			
Powder River	Police	406-436-2333	114 N. Park Ave, Broadus, MT
	Fire-Belle Creek Fire District	406-436-2259	100 S. Lincoln St.
	Emergency Management Admin	406-436-2297	Broadus, MT

2.0 Hazardous Materials Management and Spill Prevention, Containment, and Counter Measure Plan

This Hazardous Materials Management and Spill Prevention, Containment, and Countermeasure Plan (Plan) describes measures to be taken by Greencore and its contractors Contractor to reduce the risks associated with the use, storage, transportation, production, and disposal of hazardous materials (including hazardous substances and wastes) and petroleum products. In addition, this Plan outlines the required spill prevention and response (cleanup) procedures for the project.

In general, hazardous materials and cleanup equipment will be stored at contractor yards. Yards will be located on private land and on land that has been used for similar purposes previously. Material Safety Data Sheets (MSDS) will be maintained at contractor yards throughout the construction period (Attachment 1).

The Contractor will prepare and have Greencore review and approve a Hazardous Materials Management and Spill Prevention, Containment and Countermeasure Plan prior to any storage of hazardous substances or petroleum products.

Measures identified in this Plan apply to work within the project area defined as the right-of-way, access roads, temporary use areas, and other areas used during construction of the project.

Greencore and Contractor personnel are to be thoroughly familiar with this Plan and its contents prior to initiating construction on the project.

2.1 Purpose

The purpose of this Plan is to provide a description of hazardous materials management, spill prevention, and spill response/cleanup measures associated with the construction, operation, and maintenance of the project. In addition, this Plan provides the Contractor with requirements and guidance for the creation of its Hazardous Materials Management and Spill Prevention, Containment, and Countermeasure Plan. This Plan was developed as the implementing document for relevant design criteria measures contained in the Environmental Assessment.

2.2 General Overview

This Plan includes the following components:

- an introduction
- a description of the spill prevention procedures related to vehicle refueling and servicing and the transportation, storage, and disposal of hazardous materials

- guidelines for developing the Contractor's Hazardous Materials Management and Spill Prevention, Containment, and Countermeasure Plan
- a description of the physical and procedural methods for spill control and cleanup
- an overview of the notification and documentation procedures to be followed in the event of a spill

2.3 Regulatory Overview

Major legislation pertaining to hazardous materials includes the Comprehensive Environmental Response, Compliance, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), the Clean Air Act, and the Clean Water Act. Numerous other federal, state, and local regulations also govern the use, storage, transport, production, and disposal of hazardous materials. Some of the key requirements of these laws are outlined in the following:

- Title 29 CFR Part 1910.1200-Hazard Communication Standard
- Title 27 CFR Part 555-Commerce in Explosives for storage and use of explosives
- Title 40 CFR, Parts 112, 260 to 263, and 279-Hazardous Wastes Definitions, Standards for Hazardous Waste Generators, and Requirements for Spill Prevention, Containment and Countermeasure Plans
- Title 49 CFR Parts 171 to 180-Hazardous Materials Transportation
- Title 29 CFR Parts 1910.101 to 1910.110 and Part 1910.120-Occupational Safety and Health (OSHA) Regulations
- Superfund Amendments and Reauthorization Act (SARA) Title IH, Sections 301 to 303, Section 304, Section 311 and Section 312-Emergency Planning, Emergency Release Notification, Community Right-to-Know Reporting Requirements

This Plan is intended to comply with and compliment existing regulations pertaining to the safe use of hazardous materials. Persons responsible for handling hazardous materials for this project will be trained in the proper use and management of the materials and will be familiar with applicable laws, policies, procedures, and best management practices (BMPs) related to them.

2.4 Contractor Guidelines

The following sections provide specific guidelines for the preparation of the Hazardous Materials Management and Spill Prevention, Containment, and Countermeasure Plan by the Contractor. The Contractor will complete the relevant documentation for the counties where they are working and where the contractor yards are located.

2.4.1 Certificate, Acknowledgments, and Designations

Contractor will certify that all of the information provided in the Hazardous Materials Management and Spill Prevention, Containment, and Countermeasure Plan is accurate and complete to the best of their knowledge. The Contractor will also certify that they are

committed to implementing the Hazardous Materials Management and Spill Prevention, Containment, and Countermeasure Plan as written.

2.4.2 Amendments

In completing this certification, the Contractor will agree to make necessary and appropriate amendments to the Hazardous Materials Management and Spill Prevention, Containment, and Countermeasure Plan and submit any such amendment to Grencore and the appropriate county, state, and/or federal authorities within 7 days of finding an amendment is necessary. Amendments to the Hazardous Materials Management and Spill Prevention, Containment, and Countermeasure Plan will be necessary under any of the following circumstances:

- 100 percent or more increase of a previously disclosed material
- any handling of a previously undisclosed hazardous material subject to inventory requirements (as defined on the "Contractor's Potential Spill Sources" and "Contractor's Hazardous Substances Inventory" forms included in Attachment 1)
- a change in formulation of a previously disclosed material (e.g., solid to liquid)
- a change of business address, name, or ownership, or
- as needed due to unforeseen circumstances

2.4.3 Responsible Persons

The Contractor is responsible for contacting county representatives to determine county requirements for Hazardous Materials Management Plans. Generally, counties will provide guidelines and forms for completion and submittal to the county. As required in Attachment 1 and on the applicable county forms that the Contractor will obtain, the Contractor will designate a primary emergency coordinator for hazardous materials management and emergency response. Two alternates will also be identified. Business, residential, and cellular or pager telephone numbers will be provided for the three persons as necessary, to allow for contact on a 24-hour basis. Primary and alternate emergency coordinators will be knowledgeable of the chemicals and processes involved in the Contractor's operation. They will have full access to all facilities, including locked areas, and must have the authority to commit Grencore resources. They will also have stop work authority to prevent impacts (potential or actual) to environmental resources.

2.4.4 Facilities Descriptions and Inventory of Materials

The Contractor's submittals will be provided to Grencore. Grencore will provide submitted information to the jurisdictional agencies as appropriate and/or requested.

2.4.5 Site Map

The Contractor is required to provide a site/facility map for each contractor yard indicating storage and safety precautions for hazardous materials and hazardous wastes. The Contractor's site map will, at a minimum, indicate the following:

- orientation and scale
- total land area in square feet
- access and egress points

- buildings and/or temporary trailers
- parking lots
- adjacent land uses
- surrounding roads, storm drains, and waterways (including waterbodies and wetlands)
- locations of hazardous materials and hazardous waste storage
- aboveground tanks
- containment or diversion structures (dikes, berms, retention ponds)
- shutoff valves and/or circuit breakers
- location of emergency response materials and equipment
- location of Hazardous Materials Management and Spill Prevention, Containment, and Countermeasure Plan and MSDS
- location of emergency assembly area
- location of clean up equipment within the yard

Maps must be provided on standard 8 ½ by 11-inch weather-proofed paper.

2.4.6 Inventory

The Contractor will provide a complete inventory to Grencore of hazardous substances that will be used (refer to Title 40 CFR, Parts 116 and 302). Inventory forms required by the relevant county will be provided by the Contractor as part of their Hazardous Materials Management and Spill Prevention, Containment, and Countermeasure Plan. This inventory will be provided to Grencore's Environmental Manager prior to construction and updated as necessary during construction of the project (Attachment 1).

2.5 Hazardous Materials Management

Construction, operation, and maintenance of the project will require the use of certain potentially hazardous materials such as fuels, explosives, and herbicides. By definition, hazardous materials (substances and wastes) have the potential to pose a significant threat to human health and the environment based upon quantity, concentration, or chemical composition. Hazardous materials will be stored in contractor yards and not on the right-of-way. When stored, used, transported, and disposed of properly as described below, the risks associated with these materials can be reduced substantially.

2.6 Overview of the Hazardous Materials Proposed For Use

The following project-specific measures pertain to vehicle refueling and servicing activities as well as the storage, transportation, production, and disposal of hazardous materials (substances and wastes). These measures are intended to prevent the discharge of fuels, oils, gasoline, and other harmful substances to waterbodies, groundwater aquifers, and/or other sensitive resource areas during project construction.

Hazardous materials (substances) used during project construction may include solvents, explosives, and other substances. In addition, petroleum products such as gasoline, diesel fuel, lubricating oils, and hydraulic fluid will be used. Some of these materials will be used in relatively large quantities in contractor yards and on the right-of-way to operate and maintain

equipment during construction. Explosives may be used for blasting rock on portions of the right-of-way. The use of explosives for this project would be identified in the blasting plan provided by the blasting contractor. Smaller quantities of other materials such as herbicides, paints, and other chemicals will be used during project operation and maintenance.

Additional materials may be necessary at other locations along the right-of-way (e.g., wide waterbody crossings, hydrostatic test stations) and at off-right-of-way contractor yards. Listings of other hazardous materials that will be used during construction, operation, and maintenance of the project will be identified on the Hazardous Substances Inventory form included in Attachment 1. Grencore will compile and update the inventory of hazardous materials used or stored on the project as needed throughout the life of the project. This information will be provided to the appropriate regulatory agencies as required.

2.7 Training

Project personnel will receive basic spill prevention training as part of the environmental training class. Grencore is required to maintain a record of those workers who have received environmental training and ensure that only trained employees are allowed to work on the project. In addition, Contractor personnel who will be involved with the transportation and storage of fuels or hazardous substances, equipment maintenance, or spill response will be required to attend a higher level training class given by the Contractor as described in Section 5.1.

2.8 Vehicle Refueling and Services

Construction vehicles (e.g., trucks, bulldozers, etc.) and stationary equipment (e.g., pumps, generators, etc.) will be fueled and serviced in upland areas at least 100 feet from waterbodies and wetlands. Within the Rawlins Resource Area, the set back will be 500 feet from all permanent waters, wells, springs, wetlands, and riparian areas, as well as 100 feet from the inner gorge of ephemeral stream channels. On lands managed by the Colorado Division of Wildlife, the setback will be 300 feet from all riparian areas and drainages. Stationary equipment will be contained within secondary containment structures to prevent the spill or release of hazardous materials into a waterway. When selecting refueling areas, consideration will be given to slopes and other topographic conditions. Refueling locations will generally be flat to minimize the chance of spilled substance reaching a waterbody. In most cases, rubber-tired vehicles will be refueled and serviced at local gas stations or contractor yards off the right-of-way. Tracked vehicles will typically be refueled and serviced by fuel and service vehicles on the right-of-way.

Every effort will be made to minimize the threat of a fuel spill during refueling and servicing. Fuel and service vehicles will carry a minimum of 20 pounds of suitable absorbent material to handle potential spills. In addition, vehicles will be inspected for leaks prior to being brought on-site and regularly throughout the construction period. In the event that a leak is found, equipment will not be allowed to operate until the leaks have been repaired. If the damaged equipment results in a spill of hazardous material, the equipment will not be allowed to operate until it is repaired and the spill is cleaned up. Vehicles will also be equipped with fire-fighting equipment as specified in the Fire Prevention and Suppression Plan.

Construction equipment requiring maintenance that might result in the draining or leaking of fluids will be serviced only after a 12 mil plastic liner has been installed between the equipment and the soil. This liner must be placed in such a manner that all fluid is contained.

2.9 Equipment Inspection and Decontamination

Prior to moving equipment onto the right-of-way, the equipment will be checked for leaks and drips, and any necessary repairs will be completed prior to removal from the contractor yard.

2.10 Transportation of Hazardous Materials

Procedures for loading and transporting fuels and other hazardous materials will meet the minimum requirements established by the Department of Transportation (DOT) and other pertinent requirements. Hazardous materials will be transported in DOT-approved containers. Prior to transporting hazardous materials, appropriate shipping papers will be completed. Transportation of hazardous materials will be allowed only on approved access roads. Vehicles carrying hazardous materials will be equipped with shovels, barrier tape, 4 to 6 mil plastic bags, personal protective clothing, and spill pads to contain a small spill should one occur during transport. In addition, vehicles transporting such materials will be properly signed (placarded) and marked. Prior to transporting hazardous materials, vehicles will be inspected for leakage and other potential safety problems. The Contractor will ensure that vehicle drivers are properly trained to respond to and report spills, leakage, and/or accidents involving hazardous materials (see Section 5.1 of this Plan).

Hazardous materials used for the project will be properly containerized and labeled, including during transportation. Smaller DOT-approved containers will be used on-site to transport needed amounts of hazardous materials to a specific location. Transfer of materials from large to small containers will not be done by hand pouring, but will be accomplished using appropriate equipment including pumps, hoses, and safety equipment. These smaller service containers will also be clearly labeled.

2.11 Storage of Hazardous Materials

Hazardous materials will be stored in contractor yards located at least 100 feet from the edge of waterbodies and wetlands. Stationary equipment (pumps, diesel powered generators, etc.) will be located at least 100 feet from the edge of waterbodies and wetlands and configured with secondary containment equipment. If storage areas cannot be located at least 100 feet from waterbodies and wetlands because of topographic conditions or space limitations, special precautions will be taken to prevent the spill or release of hazardous materials into the waterway. These precautions will include limiting the quantity and amount of time such materials are stored near the waterbody or wetland, providing secondary containment, and using trained personnel to monitor activities at the storage site. Storage of greater than 55 gallons of hazardous materials will not be permitted within 100 feet of waterbodies or wetlands. Hazardous materials will not be stored in areas subject to flooding or inundation.

2.11.1 Physical Storage Requirements

Security

Hazardous materials will be stored in secure areas to prevent damage, vandalism, or theft. During construction hours, hazardous materials may be stored temporarily on the right-of-way but overnight storage on the right-of-way will be prohibited. Storage containers will remain sealed when not in use and storage areas will be secured (gated, locked, or guarded) at night and during non-construction periods.

Storage Containers

Containers will be compatible with the hazardous materials or wastes stored. If the container leaks or becomes damaged, the substance must be transferred to a container in good condition. A supply of DOT-approved overpack drums will be maintained at storage locations. The Contractor will inspect containers at least weekly to discover any leaks in the containers or the containment systems. Containers used for transportation must comply with the DOT requirements, including those in Title 49 CFR Part 173.

Secondary Containment

Secondary containment will consist of bermed or diked areas that are lined and capable of holding 110 percent of the volume of the stored material plus any potential precipitation accumulation, and will be provided for fuel and oil tanks stored on-site [i.e., in contractor yards].

Container Management

Containers holding hazardous substances will be kept closed during transfer and storage, except when it is necessary to add or remove the substance.

Incompatible Wastes

Wastes that are incompatible with other wastes will not be placed in the same container, nor in an unwashed container, that previously held an incompatible material.

Ignitable or Reactive Substances

Substances that may ignite or are reactive must be located at least 50 feet outside of the construction yard boundary. "NO SMOKING" signs will be conspicuously placed wherever there is a hazard from ignitable or reactive waste. Examples of ignitable wastes are: paint wastes, certain degreasers, thinners and solvents (petroleum distillates), epoxy resins, and adhesives. An example of reactive waste that may be found at construction yards is permanganate and manganese wastes from dry cell batteries.

Stormwater

It may be necessary to drain accumulated stormwater from within the secondary containment areas that contain the fuel storage tanks. If the stormwater has been contaminated, absorbent pads or booms will be used to remove floating petroleum products. After the contamination has been removed, the stormwater will be left to evaporate, if possible, otherwise it will be disposed of in an appropriate manner (according to permit requirements). Prior to disposal, the Environmental Inspector will check for sheen or other evidence of contamination.

2.11.2 Container Labeling Requirements for Hazardous Waste

The Contractor will comply with the following labeling requirements for any on-site container (including tanks) used to store accumulated hazardous wastes. The containers will be labeled as required in Title 40 CFR Part 262 and will contain at least the following information:

- chemical name (oil, diesel, etc.);
- the accumulation start date and/or the date the 90-day storage period began; and
- the words "Hazardous Waste" and warning words indicating the particular hazards of the waste, such as "flammable", "corrosive", or "reactive".

2.12 Disposal of Hazardous Wastes

The Contractor will be responsible for ensuring that hazardous wastes generated during their operations are collected regularly and disposed of in accordance with applicable laws. If state laws pertaining to waste disposal are more stringent than federal laws, state laws will take precedence. The Contractor will determine details on the proper handling and disposal of hazardous waste, and will assign responsibility to specific individuals prior to construction of the project.

Hazardous wastes typically include chemicals, spent batteries, and other items. The Contractor will ensure that every effort will be made to minimize the production of hazardous waste during the project including, but not limited to, minimizing the amount of hazardous materials needed for the project; using alternative non-hazardous substances when available; recycling usable materials such as waste oil, paints and batteries to the maximum extent; and filtering and reusing solvents and thinners whenever possible.

Any Contractor (generator) producing more than 100 kilograms (220 pounds) per month of hazardous waste must apply for an EPA Identification Number. Contractors (generators) producing less than 100 kilograms per month are considered conditionally exempt small quantity generators. A generator can store hazardous wastes on-site for a period of up to 90 days without having to obtain a permit as a storage facility (storage must be according to 40 CFR 262.34). If this project results in production of more than 100 kg of hazardous waste per month or if hazardous wastes must be stored for a period in excess of 90 days EPA regulations will be followed (40 CFR 262 generator standards and 40 CFR 264 storage standards).

2.13 Contaminated Containers

Containers that once held hazardous materials as products or which held hazardous wastes must be considered as potential hazardous wastes due to the residues of hazardous contents that may persist. In order for the container to be handled as non-hazardous waste, regulations require that the container be essentially empty and that certain handling requirements for the empty container be followed, including the following:

- The containers must be empty, which means as much of the contents have been removed as possible so that none will pour out in any orientation.
- Empty containers less than 5 gallons will be disposed of as a non-hazardous solid waste.

- Empty containers greater than 5 gallons, will be:
 - returned to the vendor for re-use,
 - sent to a drum recycler for reconditioning, or
 - used or recycled on-site.

2.14 Waste Oil Filters

Used, metal canister oil filters can be managed as solid waste as long as they are thoroughly drained of free-flowing oil (oil exiting drop-by-drop is not considered free-flowing); the filters are accumulated, stored, and transferred in a closed, rainproof container. Waste oil filters are best drained by puncturing and gravity draining while the filter is still hot.

2.15 Used Lubricating Oils

Waste lubrication oil, including contaminated soil and rags, have specific requirements for storage, transportation, and disposal. The Contractor is considered a "Used Oil Generator" and as such must meet the following requirements:

- Have a Hazardous Materials Management and Spill Prevention, Containment, and Countermeasure Plan certified by a registered Professional Engineer and approved by Grencore.
- Conduct spill prevention briefings to ensure adequate understanding by all workers.
- Label used oil storage containers "Used Oil" (not "Waste Oil").
- Ensure storage containers do not have visible leaks and have secondary containment equal to 110 percent, plus potential precipitation.
- Designate an individual who is accountable for managing oil spills.
- Hire a subcontractor with an EPA identification number for the transportation of used oil or limit transported quantities to 55 gallons.
- Dispose of used oil in a manner consistent with state and federal regulations.
- Provide documentation if required.
- If a spill occurs, conduct appropriate cleanup actions based on size and location of spill.

2.16 Inspection and Recordkeeping

The Contractor will inspect storage facilities on a regular basis, but not less than weekly. The Weekly Hazardous Materials Inspection Log in Attachment 1 will be used to record the condition of the facility. The Contractor will provide a copy of the weekly inspection log to Grencore's Environmental Inspector. In addition to the weekly log, the Contractor will maintain records for hazardous materials and hazardous wastes as required by applicable federal, state, and local regulations and permit conditions. Record keeping requirements include:

- hazardous material/waste inspection log;
- transportation documents (e.g., bills of lading, manifests, shipping papers, etc.);
- training records; and
- spill report forms.

Greencore's Environmental Inspector will monitor, inspect, document, and report on the Contractor's compliance with hazardous materials and hazardous waste management practices.

2.17 Contaminated Sites

This general procedure is included as a contingency in the event that unexpected or unknown (pre-existing) contaminated sites are encountered during the course of construction. During the course of construction, some potential exists for encountering contaminated soils, groundwater, or other materials. Should such a situation develop where there is a reasonable basis for believing that contaminated materials have been encountered (where contamination is suggested by visible indications or unusual odors), the Contractor will stop work and immediately notify the Environmental Inspector. The Environmental Inspector will complete notifications as required.

2.18 Spill Control and Counter Measures

The measures in this Plan are intended to prevent the spill of hazardous materials during normal project construction, operation, and maintenance activities. However, not all potential spill situations can be reasonably foreseen or prevented. The following section outlines the physical and procedural steps to be taken in the event of a spill. In general, the Contractor will perform cleanup activities including:

- specifying in their Hazardous Materials Management and Spill Prevention, Containment, and Countermeasure Plan specific containment and cleanup procedures;
- providing necessary materials and labor; and
- performing reporting and documentation, as required. Notification and documentation of spills is discussed in greater detail in Section 6.0 of this Plan.

2.19 Training

The Contractor will provide spill prevention and response training to appropriate construction and personnel. Persons accountable for carrying out the procedures specified herein will be designated prior to construction and informed of their specific duties and responsibilities with respect to environmental compliance and hazardous materials. The Contractor is required to maintain a record of those workers who have received training. Note that this training is in addition to the general environmental training that will be conducted by the Contractor. The Contractor's training will be provided to inform appropriate personnel of site-specific environmental compliance procedures. At a minimum, this training will include the following:

- a review of Grencore and Contractor Hazardous Materials Management and Spill Prevention, Containment, and Countermeasure Plans, and discussion of individual responsibilities
- an overview of all regulatory requirements
- methods for the safe handling/storage of hazardous materials and petroleum products
- spill prevention procedures
- operation and location of spill control materials
- inspection procedures for spill containment equipment and materials
- emergency response procedures
- use of personal protective equipment (PPE)
- procedures for coordinating with emergency response teams
- standard information regarding a spill to be provided to Grencore for agency notification (see Section 6.2)

2.20 Physical and Procedural Response Methods

Physical response actions are intended to ensure that spills are promptly and thoroughly cleaned up. However, the first priority in responding to any spill is personnel and public safety. Construction personnel will be notified of evacuation procedures to be used in event of a spill emergency. In general, the first person on the scene will:

- attempt to identify the source, composition, and hazard of the spill or stain;
- isolate and stop the spill and begin clean up of the spill or stain, if possible (i.e., if it is safe).
 - contain spills or stains of unknown substances in a barrel or plastic to prevent migration if rain occurs
 - properly store
 - obtain a sample of the unknown substance for laboratory analysis
- notify appropriate personnel and initiate reporting actions; and
- initiate evacuation of the area if necessary.

Persons should only attempt to clean up or control a spill if they have received proper training. Untrained individuals will immediately notify the Contractor's primary or alternate emergency coordinators.

In general, expert advice will be sought to properly clean up major spills. For spills on land, berms will be constructed to contain the spilled material and prevent migration of hazardous materials or petroleum products toward waterways. Dry materials will not be cleaned up with water or buried. Contaminated soils will be collected using appropriate machinery, stored in suitable containers, and properly disposed of in appropriately designated areas off-site. After contaminated soil is recovered, machinery utilized will be decontaminated, and recovered soil

will be treated as used oil if contaminated with petroleum products or hazardous waste if contaminated with hazardous waste. Contaminated cleanup materials (absorbent pads, etc.) and vegetation will be disposed of in a similar manner. For major spills, cleanup will be verified by sampling and laboratory analysis.

If spilled materials reach water, booms and skimmers will be used to contain and remove contaminants. Other actions will be taken as necessary to clean up contaminated waters. Cleanup materials including absorbent spill pads and plastic bags will be placed on-site at waterbodies and wetlands when construction is occurring within 200 feet of these areas.

2.21 On-Site Equipment

The following equipment will be maintained on-site with each crew using heavy equipment for use in cleanup situations.

- shovels
- absorbent pads/materials
- personal protective gear
- firefighting equipment
- medical first-aid supplies
- phone list with emergency contact numbers
- storage containers
- personal decontamination equipment

2.22 Notification and Documentation of spill Procedures

Notification and documentation procedures for spills that occur during project construction, operation, or maintenance will conform to applicable federal, state, and local laws. Adherence to such procedures will be the top priority once initial safety and spill response actions have been taken. The following sections describe the notification and documentation procedures, and should be implemented in conjunction with the response procedures listed in other sections of this Plan.

2.22.1 Required Notification

Notification will begin as soon as possible after discovery of a release. The individual who discovers the spill will contact Grencore's Environmental Inspector. If the Environmental Inspector determines that the spill meets the criteria for immediate verbal notification of government agencies (see Section 6.1.3, Reporting Criteria) and/or determines that the spill may threaten human health or the environment, he/she will immediately notify Grencore's Environmental Manager who will make the required agency notifications as described below. Prior to beginning the notification process, the individual initiating notification should obtain as much information as possible to clearly document and communicate the situation Agency Notification

When notifying a regulatory agency, Grencore's Environmental Manager will provide the following information:

- current threats to human health and safety, including known injuries, if any
- spill location, including landmarks and nearest access route
- reporter's name and phone number
- time and date the spill occurred
- type and estimated amount of hazardous materials involved
- potential threat to property and environmental resources, especially waterbodies and wetlands
- status of response actions

On-site personnel should always consult the Environmental Inspector to clarify regulatory requirements.

2.22.2 Fee Landowner Notification

When a spill poses a direct and immediate threat to health and safety and/or property, the fee-landowners potentially affected by the spill will be directly notified by Grencore. The alignment sheets included as Attachment 1 of the Plan of Development delineate land ownership along the entire right-of-way and will be used to determine affected fee-landowners. Immediate notification of fee-landowners is required for any situations in which the spill poses a direct and immediate threat to health and safety and/or property.

2.24 Reporting Criteria

The Contractor will report to Grencore's Environmental Inspector any hazardous substance releases regardless of size, any spill which threatens or enters any waterbody, and any petroleum spill larger than 25 gallons. Verbal reports are required immediately following a major spill when doing so would not delay clean up or administration of urgent medical care. Grencore's Environmental Inspector will determine if the spill meets the following criteria for immediate agency notification:

- any release of hazardous material over the applicable reportable quantities (refer to Attachment 3-List of Reportable Quantities)
- a spill which threatens or enters a waterbody or wetland
- a petroleum spill over 25 gallons

2.25 Documentation

The Contractor will maintain records for all spills (Attachment A). The Contractor will provide a written report of the reportable spills requiring agency notification within 24 hours.

The Contractor will record spill information in a daily log. The following is a list of items that should be included in the daily log (as appropriate, based on the spill incident):

- time and date of each log entry
- name of individual recording log entry
- list of individuals notified, including time and date
- type and amount of material spilled
- resources affected by spill
- list of response actions taken, including relative success
- copies of letters, permits, or other communications received from government agencies throughout the duration of the spill response
- copies of 1 outgoing correspondence related to the spill
- photographs of the response effort (and surrounding baseline photographs if relevant)

Maintaining detailed and organized records during a spill incident is an important and prudent task. One Contractor representative should be designated to manage the records for an incident. If extensive spill response and cleanup operations are required, the Contractor may choose to assign a bookkeeper to assist in the documentation process. The Contractor's on-site bookkeeper will track and manage expenditures (i.e., equipment, personnel/labor hours, and associated resources) and will help supplement the information provided in the daily log book.

3.0 Fire Prevention and Suppression Plan

The Fire Prevention and Suppression Plan (Plan) identifies measures to be taken by Greencore and its contractors to ensure that fire prevention and suppression techniques are carried out in accordance with federal, state, and local regulations.

The purpose of this Fire Prevention and Suppression Plan is to prepare a plan that will be followed in order to avoid fire and ensure public safety. Measures identified in this Plan apply to work within the project area defined as the right-of-way (ROW), access roads, temporary use areas, and other areas used during construction of the project. Greencore and Contractor personnel are to be thoroughly familiar with this Plan and its contents prior to initiating construction on the project.

3.1 Purpose

The risk of fire danger during pipeline construction is related to smoking, refueling activities, operating vehicles and other equipment off roadways, welding activities, and the use of flammable liquids. During pipeline operation, risk of fire is primarily from unauthorized entry onto the right-of-way. During maintenance operations, risk of fire is from smoking, use of flammable liquids, operation of vehicles, and pipeline maintenance activities that require welding.

This Plan establishes standards and practices that will minimize the risk of fire danger and, in case of fire, provide for immediate suppression. This Plan was developed as the implementing document for relevant mitigation measures contained in the Environmental Assessment.

3.2 Objective

The objective of this Plan is to minimize or eliminate potential wildfires within the project area created by construction machinery or personnel, and to implement aggressive action for all wildfires that could result from the construction of the project. This Plan requires increased commitments of fire protection equipment, fire watch/monitoring efforts, and personnel from Greencore during high fire risk periods.

3.3 Responsibilities and Coordination

Greencore and the Contractor are responsible for providing necessary fire-fighting equipment on the project site to their respective employees and operating under the requirements of this Plan. In addition to the EI and other Construction Inspectors, Federal Compliance Monitors will also be assigned to each federal jurisdictional administrative unit crossed by the project. These Federal Monitors will inform the EI and Chief Inspector in writing of potential fire hazard conditions or changes in prevention methods.

Prior to construction, Greencore will contact the appropriate authorities to establish communications, obtain permits (if applicable), and/or fulfill other obligations as directed by

county fire control authorities. In addition to the above, it will be the responsibility of the EIs and Chief Inspector, along with the Federal Monitors to:

- Ensure prevention, detection, pre-suppression, and suppression activities are in accordance with this Plan and federal, state and county laws, ordinances, and regulations pertaining to fire.
- Comply with all federal, state and local laws, ordinances, and regulations that pertain to the prevention, pre-suppression, and suppression of fires.
- If observed, report all wildfires outside of the project area to the nearest fire dispatch.
- Accompany agency representatives on fire tool and equipment inspections and take corrective action upon notification of any fire protection requirements that are not in compliance.
- Stop work or reduce construction activities or operations that pose fire hazard until the appropriate measures have been implemented.
- The fire prevention and suppression measures described in this Plan shall be in effect from June 1st until snow fall. These dates may change by advance written notice from fire control authorities. However, required tools and equipment shall be kept in serviceable condition and be immediately available for fire suppression at all times.
- Direct Grencore and the Contractor to increase the level of fire monitoring, install additional fire prevention equipment, or stop work, if necessary, and if extreme danger is present, Grencore will coordinate with federal and state fire management personnel during periods of high fire or severe fire conditions to ensure that permit stipulations are being met and appropriate preventative measures are in place during all construction related activities.
- Initiate and implement all fire control activities during construction until relieved by professional fire suppression crews, if necessary. Actions should not be taken that may endanger employee safety. The Contractor should not attempt to suppress fires that cannot be safely contained with fire control personnel.
- Insure that Grencore has required that Contractor to have a Field Safety Office (FSO) in place on each construction spread. The FSO will report directly to the EI and Chief Inspector. In addition, the FSO will accompany the Federal Monitor and inspectors on fire inspections of the project.

Additional responsibilities will include:

- Conducting weekly inspections during the fire season of tools, equipment, and first aid kits;
- Conducting regular inspections of flammable fuels and explosives storage and handling areas;
- Posting "No Smoking" and "Designated Smoking Area" signs at appropriate locations within the project area;

- Providing initial response support in the event of a fire in the project area and supervise fire suppression activities until relieved by the Federal Monitor;
- Providing written blasting schedules to all monitors, inspectors, and the Federal Monitor; and
- Monitoring construction site areas where activities may present fire safety issues, such as blasting.

3.4 Notification Procedures

Construction personnel shall report all fires, whether extinguished or uncontrolled, to Greencore’s Chief Construction Inspector and Greencore’s Environmental Inspector. If the fire is uncontrolled, the Contractor shall call the nearest fire suppression agency (refer to Table 3 Fire Suppression Contacts). Information regarding the location of the fire, property ownership, and closest access roads should be provided to the dispatch office listed in Table 2 above and Greencore. If a reported fire is controlled, but not extinguished, the Contractor shall call to notify the nearest fire suppression agency to alert them of the situation.

TABLE 3—COUNTY CONTACTS

Location	Service	Phone	Address
Wyoming County			
Natrona	Fire District	307-234-8826	
	Fire Station 7	307-265-8656	2800 Pheasant Drive, Mills
	Fire Station 13	307-234-6694	6650 Wildcat Drive, Mills
Johnson	Fire	307-684-9058	314 Railroad Ave, Buffalo
Campbell	Fire	307-682-5319	116 Rohan Ave, Gillette
Wyoming City/Town			
Casper	Fire	307-235-8222	200 N. David, Casper
Gillette	Fire	307-682-5319	106 Rohan Ave, Gillette
Montana County			
Powder River	Fire-Belle Creek Fire District	406-436-2259	100 S. Lincoln St.

TABLE 4—BLM CONTACTS

Counties	Center Manager	Phone	Region
Casper Interagency Dispatch Center			
Natrona, Johnson, and Campbell	Sheryl Carpenter	800-295-9952	Northeast and Central WY
		307-261-7691	
Cody Interagency Dispatch Center			
Fremont	Kathy Hutton	800-295-9954 307-578-5740	Northwest WY

Miles City Interagency Dispatch Center			
Powder River	Amy Landcaster	877-569-3473 406-233-2900	Southeast MT

3.5 Emergency Fire Protocols During Fire Season

Fire condition classes based on standard vegetation fuel models will be used by the land managing agencies to determine fire prevention, control, and monitoring efforts during construction of the project. Fire restrictions (i.e. Stage I, Stage II) are typically set on a daily basis by the local federal land managing agency. Certain activities such as blasting, welding, or grinding may be restricted during periods of high fire danger. The Federal Monitor may modify or change requirements based upon assessment of specific fire restriction notices, or localized risks or hazards. Fire restriction level and required preventive measures are listed below:

3.5.1 No Fire Restrictions

Normal Fires Precautions

3.5.2 Stage I Fire Restrictions

- Building, maintaining, attending, or using a fire, campfire, coal or wood burning stove, any type of charcoal fueled broiler or open fire of any type in undeveloped areas.
- Smoking, except within an enclosed vehicle or building, in a developed recreation site or while stopped in an area at least 3 feet in diameter that is barren or cleared of all flammable vegetation.
- Using explosive material: (i.e. fireworks, blasting caps or any incendiary device which may result in the ignition of flammable material).
- Welding, or operating an acetylene or other similar torch with open flame.
- Operating or using an internal combustion engine without a spark arresting device properly installed, maintained and in effective working order.

3.5.3 Stage I Fire Restrictions with “Red Flag Warning”

- All machine treatment of slash, skidding, yarding, blasting, welding, metal cutting, offloading on the ROW are subject to BLM requirements.
- No smoking or warming/cooking fires are permitted.
- Power saws shut down from 9:00 AM to 8:00 PM MST.
- Hauling trucking must stay on the ROW or surfaced roads after 2:00 PM MST.
- Utilization of additional personnel, equipment and prevention measures.

3.5.4 Stage II Fire Restrictions

- Shutdown of all construction activities except operations on mineral soil, road excavation, watering, grading, trench excavation, padding, backfilling, and clean up.
- All other activities, such as blasting and welding, require an exemption from the Federal Monitor.
- The Chief Inspector and EI have the discretion to restrict or shutdown construction activities on private land during all precautionary periods.
- In extreme cases, the Federal Monitor has the discretion to shut down all construction activities and bar all ROW areas from entry.

The Federal Monitor will notify the Contractor's Field Safety Office no later than 9:00 AM local time if there is a change in the fire restrictions. This also applies to single day changes, such as a "red flag warning". The Field Safety Officer will notify the Chief Inspector and the EI of restriction notices and changes.

3.6 Fire Prevention Methods

3.6.1 Pre construction and Construction

Methods and procedures that will be implemented prior to and during the construction period to minimize the risk of fire are described below.

3.6.2 Training

The Contractor will train personnel about the measures to take in the event of a fire and will inform each construction crew member of fire dangers, locations of extinguishers and equipment, and individual responsibilities for fire prevention and suppression. Smoking and fire rules will also be discussed with the Contractor and field personnel during the safety training program.

3.6.3 Smoking

Smoking is prohibited except inside a building, vehicle, or while seated in an area of at least three feet in diameter that is barren or cleared of flammable materials. Burning tobacco and matches will be extinguished before discarding. Smoking is also prohibited while operating equipment or vehicles, except in enclosed cabs or vehicles (36 CFR 261.52(d)).

3.6.4 Spark Arresters and Mufflers

During construction, operation, and maintenance of the right-of-way, Contractor and Grencore equipment operating with an internal combustion engine shall be equipped with federally approved spark arresters. Spark arresters are not required on trucks, buses, and passenger vehicles (excluding motorcycles) that are equipped with an unaltered muffler or on diesel engines equipped with a turbocharger. A Bureau of Land Management (BLM) fire prevention officer will have full authority to inspect spark arresters on project equipment prior to its use on the project on federal lands and periodically during the construction project.

Operating or using any internal combustion engine, on any timber, brush, or grass covered land, including trails and roads traversing such land, without a spark arrester, maintained in

effective working order, meeting the Society of Automotive Engineers (SAE) recommended Practices J335, "MULTIPOSITION SMALL ENGINE EXHAUST SYSTEM FIRE IGNITION SUPPRESSION," (current revision) and J350, 36 CFR 261.52(j), is prohibited.

Passenger carrying vehicles, pickups, and medium and large highway trucks (80,000 Gross Vehicle Weight) will be equipped with a factory designed muffler system that is specified for the make and model of the respective vehicle/truck or with a muffler system that is equivalent to or exceeds factory specifications. Exhaust systems shall be properly installed and continually maintained in serviceable condition.

3.6.5 Parking, Vehicle Operation and Storage Areas

In no case will motorized equipment, including worker transportation vehicles, be driven or parked outside of the designated and approved construction workspace. Equipment parking areas, the right-of-way, temporary use areas, and small stationary engine sites, where permitted, will be cleared of flammable material.

Gasoline, oil, grease, and other highly flammable material shall be stored either in a separate building, at a site where debris is cleared within a 25-foot radius or in a specially designed fuel truck or tank within a truck. Storage buildings or sites shall be a minimum distance of 50 feet from other structures. Storage buildings shall be adequately posted to warn of the flammables and to prohibit smoking in or around the building. Glass containers shall not be used to store gasoline or other flammables. OSHA-approved containers would be used to store and transport gasoline and other flammables.

3.6.6 Equipment

While in use, each internal combustion engine including tractors, trucks, yarders, loaders, welders, generators, stationary engines, or comparable powered equipment will be provided with at least the following:

- One fire extinguisher, at least 5# ABC with an Underwriters Laboratory (UL) rating of 3A - 40BC, or greater.
- One shovel, sharp, size O or larger, round-pointed with an overall length of at least 48 inches.

Extinguishers and shovels shall be mounted so as to be readily available from the ground. Tools shall be maintained in a serviceable condition.

3.6.7 Road Closures

The Contractor will notify the appropriate fire suppression agency of the scheduled closures prior to the open-cut crossing of a road. If required, the Contractor will construct a bypass prior to the open-cut installation of a road crossing, unless a convenient detour can be established on existing approved roads or within approved work limits. Bypasses will be clearly marked by the Contractor. During road closures the Contractor will designate one person who knows the bypass to direct traffic. The Contractor will minimize to the extent possible, the duration of road closures. Additional information is provided in the Transportation Management Plan.

3.6.8 Refueling

Fuel trucks shall have a large fire extinguisher charged with the appropriate chemical to control electrical and gas fires. The extinguisher shall be a minimum size 35-pound capacity with 40 BC or higher rating.

3.6.9 Burning

No burning of slash, brush, stumps, trash, or other project debris will be permitted on the project. No campfires, lunch fires, or warming fires will be allowed within the ROW.

3.6.10 Welding and Blasting

One 5-gallon backpack pump will be required with each welding unit in addition to the standard fire equipment required in welding vehicles.

Explosives shall be stored in a locked box marked "Explosives". Powder and blasting caps shall be stored in separate boxes.

3.6.11 Monitoring

Construction and Environmental Inspectors for Grencore shall inspect the construction workspace and the Contractor's operations for compliance with provisions of this Plan. In addition, federal, state, and local fire control agencies may perform inspections in areas under their jurisdiction at their discretion.

3.6.12 Pipeline Operation and Maintenance

During pipeline operation, the risk of fire danger is minimal. The primary causes of fire on the right-of-way result from unauthorized entry by individuals utilizing the right-of-way for recreational purposes and from fires started outside of the right-of-way. In the latter case, the right-of-way can be used by authorities as a potential fire break. During maintenance operations, Grencore or the Contractor shall equip personnel with basic fire-fighting equipment including fire extinguishers and shovels as described in Section 3.1.5. Maintenance crews shall also carry list of fire suppression contacts as described in Table 1.

3.7 Fire Prevention Requirements for Construction Equipment

Grencore and its Contractors will submit a list to the Federal Monitor of all fire prevention and control equipment proposed for use on the project. The Federal Monitor, Chief Inspector, or EI may inspect all equipment prior to construction. Equipment will be regularly inspected during construction.

3.7.1 Vehicles

All manhaul, trucks, tractors, pickup trucks, and personnel vehicles must be equipped with one 5-lb. minimum dry chemical fire extinguisher and one shovel. "Red flag warning" and Stage II scenarios will be outfitted with pressure pump, adjustable nozzle, threaded rubber-lined hose, a minimum of 300 feet of 1 ½-inch cotton jacket, and have minimum water storage capacity of 1,500 gallons.

3.7.2 Spark Arresters

All construction related vehicles, stationary and mobile, will be equipped with spark arresters that meet or exceed minimum federal and state requirements. Spark arresters will be regularly maintained and repaired when necessary. If required, flues used in material staging yards will be equipped with spark arresters.

3.7.3 Gasoline Powered Saws

Chainsaws will be outfitted with arresters/mufflers that contain 0.023-inch mesh, stainless steel screens. Chainsaw operators must have a fire extinguisher and shovel available for use at all times. Saw refueling will take place at least 10 feet from the work areas and fuel must be stored in approved containers.

3.7.4 Warning Devices

Torches, fuses, highway flares, or other devices with an open flame are prohibited from use during fire season. Grencore will use electric or battery-operated warning devices on within the project area.

CONTRACTOR'S POTENTIAL SPILL SOURCES

Contractor will identify sources of potential spills, including tank overflow, rupture or leakage. Spill Prevention, Control, and Countermeasure information must be included for all containers larger than 660 gallons, or that have a total capacity of 1320 gallons at one location that contain oil, including petroleum, fuel oil, sludge, oil refuse, and oil mixed with waste, as required in 40 CFR Part 112.

(1) Material: _____ Total Quantity: _____

Location of Use: _____

Potential direction of flow: _____ Maximum Rate of Flow: _____

Structures or equipment to contain spills: _____

(2) Material: _____ Total Quantity: _____

Location of Use: _____

Potential direction of flow: _____ Maximum Rate of Flow: _____

Structures or equipment to contain spills: _____

(3) Material: _____ Total Quantity: _____

Location of Use: _____

Potential direction of flow: _____ Maximum Rate of Flow: _____

Structures or equipment to contain spills: _____

(4) Material: _____ Total Quantity: _____

Location of Use: _____

Potential direction of flow: _____ Maximum Rate of Flow: _____

Structures or equipment to contain spills: _____

CONTRACTOR'S HAZARDOUS SUBSTANCES INVENTORY

Contractor will identify hazardous substances which will be used or stored on the project to GEC.

(1) Material: _____

Location of Use: _____

Storage Location: _____

Expected Quantity On Hand: _____

(2) Material: _____

Location of Use: _____

Storage Location: _____

Expected Quantity On Hand: _____

(3) Material: _____

Location of Use: _____

Storage Location: _____

Expected Quantity On Hand: _____

(4) Material: _____

Location of Use: _____

Storage Location: _____

Expected Quantity On Hand: _____

HAZARDOUS MATERIALS AND WASTES INSPECTION LOG

For each item listed below, Contractor will indicate whether existing conditions are acceptable (A) or unacceptable (U). Contractor will inspect storage facilities on a regular basis, but not less than weekly. Contractor will keep records of all inspections on file. Contractor will provide a copy of the completed form to the Environmental Inspector on a weekly basis.

STORAGE AREAS FOR FUELS, LUBRICANTS AND CHEMICALS

General

- Construction yard or storage areas secured
- Storage areas properly prepared and signed
- Material Safety Data Sheets available
- Hazardous Materials Management and Spill Prevention, Containment, and Countermeasure Plan available
- Emergency response equipment available on-site

Hazardous Materials Management

- No evidence of spilled or leaking materials
- Incompatible materials separated
- All containers labeled properly and securely closed
- All containers upright
- No evidence of container bulging, damage, rust or corrosion

Secondary Containment Areas

- Containment berm intact and capable of holding 110% of material stored plus precipitation
- Lining intact
- No materials overhanging berms
- No materials stored on berms
- No flammable materials used for berms

Compressed Gases

- Cylinders labeled with contents
- Cylinders secured from falling
- Oxygen stored at least 25 feet away from fuel

HAZARDOUS MATERIALS AND WASTES INSPECTION LOG

HAZARDOUS WASTE MANAGEMENT

Waste Container Storage

- No evidence of spilled or leaking wastes
- Adequate secondary containment for all wastes
- Separate containers for each waste stream-no piles
- Waste area not adjacent to combustibles or compressed gases
- All containers securely closed
- Bungs secured tightly
- Open-top drum hoops secured
- All containers upright
- No evidence of container bulging, corrosion
- No severe container damage or rust
- Containers are compatible with waste
- No smoking and general danger/warning signs posted

Waste Container Labeling

- Containers properly labeled
- Name, address and EPA ID number or ID Number of generator listed (Not required if Contractor is an exempt small quantity generator.)
- Accumulation start date listed
- Storage start date listed
- Chemical and physical composition of waste listed
- Hazardous property listed

Non-Hazardous Waste Areas

- No litter in yard
- No hazardous wastes or used oil mixed with trash
- Empty oil and aerosol containers for disposal are completely emptied

HAZARDOUS MATERIALS AND WASTES INSPECTION LOG

CORRECTIVE ACTIONS TAKEN (Required for all unacceptable conditions)

Date: _____ Contractor: _____

Inspected By: _____

Signature: _____

SPILL REPORT FORM

The Contractor must complete this form for any hazardous material spill regardless of size, any spill that enters waterbodies or wetlands, and/or any petroleum spill greater than 25 gallons. The form must be submitted to the Greencore Environmental Inspector within 24 hours of the occurrence.

Responsible Party or Company	
Company Name:	
Company Field Address:	
Company Field Contact/Title:	
Company Field Contact Phone:	
Reporting Party	
Name:	
Title:	
Phone:	
Location of Spill	
County and Legal Description:	
Nearest Pipeline Milepost:	
Nearest Landmark(s):	
Nearest Access Road:	
Nearest Waterbody:	
Name of Landowner:	
Spill Information	
Date and Time of Spill (if known):	
Date and Time of Discovery:	
Spill Material and Amount:	
Area of Impact (length X width X depth):	
Cause of spill:	
Response Information	
Containment, Cleanup, and Disposal Procedures Undertaken :	

Further Response Actions Needed:	
Notifications	
Date of Landowner Notification:	
Dates and Names of Agencies Notified:	

REPORTABLE QUANTITIES

This table lists the substances that may be used during construction and the Federal reportable quantity for that substance. If the Contractor is using substances not listed on this table, the Contractor shall provide an updated table that lists the substance and reportable quantity.

Substance	Federal Reportable Quantity ¹
Diesel Fuel	None listed
Gasoline	None listed
Engine Oil	None listed
Cutting Oil	None listed
Hydraulic Oil	None listed
Pipe Dope	None listed
Solvents	None listed
Grease	None listed
Acetone Solvent	5,000 pounds
Paint	None listed

¹Per 40 CFR 302.4