

APPENDIX C

DRAFT ENVIRONMENTAL PROTECTION PLAN

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1 INTRODUCTION

This Pipeline Environmental Protection Plan (EPP) describes environmental measures to be used during construction of the Vantage Pipeline in order to minimize potential construction related impacts. The EPP contains environmental best management practices (BMPs) to be implemented by the pipeline contractor(s).

Construction of the Vantage Pipeline is scheduled to take place in the third and fourth quarter of 2012. Clean-up and reclamation of disturbed portions of the right-of-way (ROW) will be conducted immediately following construction or as soon as soil and weather conditions permit.

This EPP will be included in the contract documents. Selected Contractors and Vantage Pipeline Representatives will be provided with copies of the approved EPP, including the most recent updates and revisions. Unless otherwise specified, the primary construction contractor (Contractor) will be responsible for implementing the requirements of the EPP. All contractors and subcontractors engaged in the construction are expected to follow the EPP requirements. Vantage representatives will provide pipeline construction oversight.

The following sections of the EPP include: pre-construction activities; construction activities; clean-up and reclamation; post construction monitoring; emergency and project contacts; and contingency plans.

2 PRECONSTRUCTION ACTIVITIES

2.1 PERMITTING

Required licenses and permits shall be obtained prior to construction. The North Dakota Public Service Commission is responsible for siting facilities such as power plants and transmission lines and enforcement of safety requirements for intrastate distribution and transmission of natural gas. .

2.2 PRE-CONSTRUCTION MEETING

This meeting will provide supervisory personnel with an overview of the key environmental issues, contingency planning, and rules and regulations applicable to the Vantage Pipeline construction. In addition, periodic meetings will be conducted with agency representatives to communicate permit related activities.

Vantage personnel and Contractor support staff will possess a thorough understanding of pipeline planning, construction methods, and their potential environmental impacts, including the timely implementation of the EPP during all critical phases (topsoil stripping and replacement, grading, soils handling, watercourse and wetland crossings, reclamation, and clean-up). Field support staff, including, but not limited to biologists, wetland specialists, soil scientists, reclamation scientists, and cultural resource specialists will be available for consultation throughout the project.

2.3 LINE LIST

Vantage will provide the contractor with a construction Line List that describes special requirements (*e.g.*, soil salvage, seeding, road crossings, restoration measures, fencing requirements, etc.) as determined from the alignment location and design, in addition to any permit requirements and Landowners stipulations.

The contractor must comply with these special requirements, or take all appropriate precautions to protect livestock and crops affected by construction. The Line List reflects requirements and comments provided by Landowners; however, it is not a comprehensive list of construction requirements. The Line List must be considered in conjunction with other project documents. The contractor shall not make any agreements between the contractor and the landowner without approval from Vantage.

2.4 PRE-CONSTRUCTION WEED CONTROL

A pre-construction weed species survey will be conducted on all lands along the pipeline route. All construction equipment shall arrive and leave the pipeline construction area in a weed free condition to minimize the risk of weed introduction. Recommendations made in the pre-construction weed survey shall be followed to limit the risk of transporting weed seeds from weed infested areas. In addition, local county officials will be contacted to obtain information about weed control and issues.

Weed growth on soil stockpiles will be monitored during construction activities. In addition, spot spraying of herbicides or weed mowing may be considered, if warranted.

2.5 CONSTRUCTION STIPULATIONS

Stipulations (STIPs) constitute restrictions or a restricted activity period for construction activities. For example, a stipulation might require construction activities to stop during a specific time of year due to bird nesting. STIPs will be identified prior to initiating construction activities. All construction activities and schedules must comply with stipulations. Stipulations related to wildlife and threatened and endangered species are presented in Section 8.9.

2.6 CONDITIONS REQUIRING CONTINGENCY PLANNING

Various conditions that would require implementation of environmental protection during construction would be mitigated using the contingency plans explained in Section 8 below. The conditions that may require the implementation of contingency plans are described in sections 2.6.1-2.6.12 below. All key personnel on the construction ROW should have an understanding of the conditions outlined below that would require contingency plan implementation, as well as any associated monitoring and reporting requirements.

2.6.1 Wet Weather

In order to minimize terrain disturbance, compaction, soil structure damage, and erosion and sediment discharge, construction activities will be suspended or modified in the event of excessively wet soil conditions. Contingency measures will be initiated if the following indicators occur: excessive rutting, wheel slip, build-up of mud on tires and cleats, and excessive tracking of mud down the road as vehicles leave the construction area. The wet weather shut-down decision will be made by Vantage as specified in the Soil Conditions Contingency Plan (Section 8.3).

2.6.2 Water Withdrawal and Dewatering

If required, the North Dakota Department of Health (NDDH) would be contacted regarding allocations for temporary water usage for the purpose of hydrostatic pressure testing. If temporary water use permits are needed, the contractor would be required to comply with all permit requirements.

A temporary discharge permit for construction dewatering (NDDH) would be required for trench dewatering. The contractor would be required to comply with the permit limits, and monitoring and report requirements.

2.6.3 Spill Prevention

The U.S. Environmental Protection Agency (EPA) Oil Pollution Prevention regulation (40 CFR part 112), which includes requirements for specific facilities to prepare, amend, and implement Spill Prevention, Control, and Countermeasure (SPCC) Plans is applicable to the construction of the Vantage Pipeline. The SPCC rules are applicable to any owner or operators of non-transportation-related facilities that: Drill, produce, store, process, refine, transfer, distribute, use, or consume oil or oil products, and could reasonably be expected to discharge oil into U.S. navigable waters or adjoining shorelines. Facilities are subject to the SPCC rule if they meet at least one of the following capacity thresholds: aboveground oil storage capacity greater than 1,320 gallons, or completely buried oil storage capacity greater than 42,000 gallons. The following are exempt from the rule: completely buried storage tanks subject to all the technical requirements of the underground storage tank regulations, containers with a storage capacity less than 55 gallons and motive power containers. Further, mobile fuelers used during construction are exempt from sized secondary containment requirements, although general secondary containment requirements apply.

The details for the contractor specific SPCC plan and compliance with the SPCC rules would be developed for the specific storage requirements, equipment, activities and other factors that are controlled by the contractor. Therefore, the SPCC Plan will be prepared by the contractor so contractor specific factors can be incorporated in the plan. The contractor's SPCC plan will be presented as Attachment 5 to this EPP.

The Contractor(s) shall ensure that during the course of the project, no release of hazardous substances including fuel, lubricating and hydraulic fluids, methanol, antifreeze, herbicides, or other chemicals are occur on the ground or into any watercourse. In the event of a spill of any quantity, a spill report and spill cleanup will be implemented immediately as described in the spill contingency plan guidelines (Section 8.1). The SPCC plan for construction shall be prepared and administered by the primary construction contractor and should be developed to address the site specific conditions related to the contractors equipment, fueling, maintenance and fuel storage requirements. The North Dakota Department of Health (NDDH) has jurisdiction over spill reporting. The NDDH requires reporting in the event of a reportable spill. The required form is available at the following link: <http://www.ndhealth.gov/ehs/eir/NonOilfield/>.

2.6.4 Equipment Refueling and Servicing

Spills resulting from equipment fueling and maintenance activities may result in discharge to surface and groundwater, and impacts to soils. Vantage would implement BMPs included in the SPCC Plan and the Storm Water Pollution Prevention (SWPP) Plan to mitigate potential impacts. Secondary containment would be placed beneath servicing and refueling equipment with the potential for accidental spills (e.g., oil changes, servicing of hydraulic systems, temporary tanks). Refueling, oil changes, and lubricating of mobile construction equipment would be conducted a minimum of 100 yards away from waterbodies or watercourses to minimize the potential for impacts. Refueling would be conducted on road sides rather than on agricultural land, if feasible.

Waste oil, lubricants, and filters will be collected in labeled drums and recycled or disposed of at an approved location. Contractors will be trained on the requirements of the SPCC Plan (Attachment 5) and the Emergency Response Plan (Attachment 3). Contingency measures will include spill response and reporting, spill sorbent material, and recommended spill cleanup materials for construction activity in accordance with the Fuels and Hazardous Materials Spill Contingency Plan (Attachment 4).

The following measures will be employed to minimize the risk of fuel spills in water, where stationary equipment is required to operate within 100 yards of a sensitive area (e.g., wetland).

- all containers, valves, hoses, nozzles, and lubrication systems are leak free;
- all fuel nozzles are equipped with automatic shut-offs;
- no equipment washing will be allowed within 100 yards of water courses or water bodies;
- operators will be present during fueling operations within visibility of both ends; and
- fuel remaining in the hose is returned to the storage tank.

2.6.5 Noise

Equipment will be in good working condition to minimize unnecessary noise (*i.e.*, mufflers). Pipeline construction activities performed near populated areas or rural residences will be conducted during daylight hours.

2.6.6 Wildlife Stipulations

During pipeline construction, all actions must comply with the Endangered Species Act, which includes coordination with the USFWS and prevention of actions that may affect a threatened or endangered species. Additionally, all actions during pipeline construction must comply with the Bald and Golden Eagle Protection Act, which prohibits anyone without a permit from taking Bald or Golden Eagles, including their parts, nests, or eggs. Likewise, all actions during pipeline construction must also comply with the Migratory Bird Treaty Act, which prohibits the taking, killing, possession, and transportation (among other actions) of migratory birds, their eggs, parts, and nests, except when specifically permitted by regulations. Stipulations to mitigate potential impacts to the listed threatened and endangered species, critical habitat, Golden and Bald Eagles, and Migratory Birds are presented in the Wildlife Contingency Plan (Section 8.9).

2.6.7 Garbage

All construction garbage and debris will be collected and disposed of on a routine basis (weekly) at an approved facility. Waste containers will accompany each working unit. All construction personnel will follow guidelines established in the contractors Waste Management Plan (Attachment 7).

2.6.8 Construction Roads and Access

Construction activities and traffic will be confined to the ROW areas. All roads damaged by construction vehicles will be repaired to pre-construction conditions. All traffic safety and road closure regulations will be followed in accordance with North Dakota DOT or specific county requirements. Access route with known soils prone to compaction, rutting or other conditions that may be problematic would be identified during the pre-construction meeting.

2.6.9 Erosion and Sedimentation

Soil erosion and sedimentation will be controlled by implementing stormwater best management practices designated in the Stormwater Pollution Prevention Plan (SWPP Plan, Attachment 6). Vantage will obtain a Construction Stormwater Permit from the North Dakota Health Department prior to the commencement

of construction. The SWPP Plan will be prepared at that time in accordance with requirement of the NDHD. The construction contractor will be responsible for implementing and monitoring the SWPP Plan and construction related BMPs during construction and post-construction.

2.6.10 Wildlife and Livestock Encounters

Construction personnel are not allowed to have dogs on the construction ROW. Any incidents with or collisions with wildlife will be reported to the appropriate agency. Vantage and contractors personnel are not allowed to possess firearms or to hunt while engaged in construction activities.

2.6.11 Fires

Construction personnel will be made aware of proper disposal methods for ignition sources including welding rods, cigarette butts, and other flammable materials. Smoking will be permitted in specified smoking areas only. Vehicles will be in good working condition to prevent fuel leaks or other conditions that may result in fire. Precautions will be made for vehicles parked on stubble or tall grass. A water truck will be maintained on the ROW when the fire hazard is high. Mowing may be required in certain situations to alleviate fire risks. Construction crews will be equipped with fire-fighting equipment and extinguishers capable of controlling wildland fire that may occur as a result of their activities. Contact information for fire departments will be reviewed during the Pre-Construction meeting.

2.6.12 Cultural Resources

Cultural sites discovered during construction will cause pipeline construction in the proximity of the cultural site to be suspended immediately. Work in these locations would be discontinued until permission is granted by the appropriate agency as defined in the Cultural Resources Contingency Plan (Section 8.10).

2.7 NOTIFICATION OF CONCERNED PARTIES

2.7.1 Regulatory Agencies:

Notification of appropriate regulatory agencies will be conducted prior to construction. Coordination with key agency contacts will be maintained until project completion. The following agencies and companies would be periodically contacted during the construction project:

- U.S. Army Corp of Engineers
- Divide County
- North Dakota Department of Health, Division of Water Quality
- North Dakota Department of Health, Environmental Health Section
- North Dakota Department of Transportation
- North Dakota Fish and Game
- North Dakota Public Service Commission
- North Dakota State Land Department
- Private Landowners
- Rail Companies
- USDA - Farm Service Agency
- USDA: Natural Resource Conservation Service

- U.S. Fish and Wildlife Service
- Utility companies
- Williams County

Prior to the preconstruction meeting a list of personnel to serve as contacts for each agency or company will be defined.

2.7.2 Landowner Notification

All landowner notifications and coordination will be made by land agents representing Vantage. The land agents will work closely with Vantage and the Contractor to develop a structured approach for landowner notification and coordination. Land agents will be available at all times during construction for landowner coordination. Protocols for landowner coordination will be addressed in the pre-construction meeting.

3 CONSTRUCTION ACTIVITIES

3.1 MISCELLANEOUS

3.1.1 Surveying

Boundaries of the ROW and any identified additional temporary workspace (TWS) would be staked. No additional clearing or grading will be allowed beyond the stakes unless an additional TWS authorization is obtained from the appropriate Vantage Pipeline representative. The ROWs will be staked so that watercourses and roads are crossed according to crossing agreements. Any required runoff controls will be staked to prevent erosion and stormwater problems.

Extra TWS locations will be identified on Alignment Sheets (Attachment 2) with examples including:

- sharp ROW bends, rail crossing, and road crossings;
- locations where additional soil handling and stockpiling may be required; and
- watercourse crossings to ensure sufficient room to permit storage of topsoil and spoil.

3.1.2 Fences

Temporary fencing and gates will be installed where practical or as requested by the landowner/lessees where necessary to maintain livestock containment.

3.1.3 Line Crossings

Topsoil will be salvaged prior to excavating the pipeline trench. Utility lines will be located and “daylighted” if crossings are required. In addition, hydrovac equipment will be available to assist with trenching operations through localized wet areas to minimize rutting.

3.1.4 Soil Salvage for Construction Purposes

Soil will be salvaged to the extent designated on alignment sheets. Soil salvage information is based on soil mapping unit information provided by the USDA, NRCS.

3.1.5 Road and Railroad Crossings

Roads and railroads will be crossed by either open cut or boring methods as indicated on Alignment Sheets (Attachment 2). Borrow ditch ramps and culverts will be installed in specific locations according to approved details (Attachment 1).

3.1.6 Watercourse Vegetation, Trees and Shrubs

Vegetation will be maintained in ecologically sensitive areas (e.g., along a watercourse) unless it is necessary to remove. Trees and vegetation will be removed in a manner to reduce damage to water course banks and beds, and adjacent trees. Shrubs will be salvaged for replanting or replaced within the riparian zone to provide bank stabilization. Grubbing will be restricted to within 10 ft of watercourses bank except along the trench line. Trees and shrubs removed during construction will be replaced in accordance with North Dakota Fish and Game Requirements. Trees damaged during construction activities will be immediately removed.

3.1.7 Hay and Crops

Arrangements will be made for landowner/lessees to harvest hay or cereal grain crops prior to stripping, if possible. Mowing may be performed along the ROW to facilitate topsoil handling.

3.2 GRADING AND TOPSOIL SALVAGE

3.2.1 Grading

Grading operations will be minimized along the pipeline route to reduce the erosion potential and the amount of reclamation required once the pipeline has been installed. Topsoil salvage plans, that detail how soil materials are to be stockpiled, are described on the typical detail, and Alignment Sheets (Appendices 1 and 2).

3.2.2 Roadway Ditch Ramps

When ramp construction is required for crossing roadway ditches or other obstacles, ramp construction will use only subsoil material. Topsoil salvage would be completed prior to placing fill for temporary ramps.

3.2.3 Watercourses and Wetlands

Grading operations will be performed in a manner to minimize sedimentation of watercourses and wetlands. Shrubs will be salvaged or replaced in accordance with agency requirements. Soil salvage in areas traversing watercourses and wetlands would be limited to removal of soil over the trench line only.

3.2.4 Temporary Berms and Silt Fences

Temporary berms and silt fence(s) will be placed near the base of approach slopes to watercourses following soil salvage and grading. Inspections of temporary erosion control structures will be performed on a daily basis and repaired, if warranted, in accordance with the SWPP Plan.

3.3 CUT AND FILL

Fill material will not be placed on slopes within 50 ft of the crest of the slopes unless otherwise advised by a geotechnical engineer. Cut and fills slopes will be maintained within the ROW and cut slopes would be constructed in accordance with Occupational Safety and Health Administration (OSHA) standards.

Grading will not be permitted in proximity to known archeological sites. If required, a cultural resource specialist will be available during construction through areas of high archeological value (see Section 8.10).

3.4 TOPSOIL SALVAGE AND STORAGE

Soil salvage requirements are shown on the Alignment Sheets (Appendix 2). Limiting factors to the soil salvage operations include the amount of topsoil, identification of boundary between topsoil and subsoil, watercourse and wetlands areas, and specific request(s) for alternative topsoil handling by landowner or lessee.

3.4.1 Topsoil Salvage Schedule

Weather conditions (e.g., high wind conditions) may require postponement of pipeline trenching and related topsoil salvage to minimize the period that soil is exposed to wind. Vantage Pipeline representatives will determine when it is necessary to stop work due to wind erosion. Soil Erosion Contingency Plan options to mitigate erosion are described in (Section 8.4).

3.4.2 Stripping Depth

Soil salvage of all available topsoil and subsoil material will be implemented in the locations identified on the Alignment Sheet (Attachment 2) and as described on the typical details (Attachment 1). If unexpected soil conditions are encountered, Vantage Pipeline representatives would be consulted for appropriate construction methods.

3.4.3 Topsoil Salvage

Soil salvage for cultivated prime farm land, will include stockpiling of topsoil, subsoil, and spoil material in separate windrows. Prime farmland locations have been identified on the NRCS soil survey data for Williams and Divide Counties. For all other lands (e.g., pasture land, non-prime farmland), soil salvage will be composed of two stockpiled windrows, one for topsoil and the other for subsoil/spoil material (refer to Alignment Sheets).

Various options for soil salvage are presented in the Details in Attachment 1, and include:

- Option 1- Full width stripping (for cultivated lands, or grassland and pasture land)
- Option 2- Full width stripping (for cultivated lands, or grassland and pasture land) same as Option 1 with alternative stockpile locations.
- Option 3- No stripping within the TWS portion of the ROW (pasture or grassland).
- Option 4- Full width stripping with salvage of the A and B soil horizon (Prime Farm Land).
- Option 5- Limited stripping over the trench line (wetland and watercourse crossings and frozen conditions).

Typical details to be used during pipeline construction are provided in Attachment 1, but variations of the above options may be used when the final design is completed and during construction of the pipeline.

3.4.4 Subsoil Beneficial Use and Salvage

Subsoil would be borrowed from larger areas where topsoil is stripped (*i.e.*, crossings, graded areas) for beneficial uses such as ramp or berm construction. In areas designated as prime farmland, A and B soil horizons would be salvaged prior subsoil excavation (refer to Attachments 1 and 2).

3.4.5 Windrow Gaps

Soil salvage windrow gaps will be left in obvious drainage courses and where requested to allow farm machinery, livestock, and wildlife the ability to cross the ROW. Gaps will be provided at crossings where materials are stockpiled in the TWS.

3.5 TRENCHING AND STRINGING

3.5.1 Timing

Pipeline construction work is most desirable during dry soil conditions to ensure that there is low enough soil moisture to allow trenching without causing excessive rutting or soil compaction.

3.5.2 Gaps in Set-Up Pipe

Gaps in pipe set-up, spoil piles, and trenching will be made to allow crossing opportunities for livestock, wildlife, and farm equipment within the ROW. Breaks in pipe shall be coincident with gaps in topsoil and spoil windrows. Gaps will also be located at obvious drainages, crossings for livestock, wildlife, and farm equipment.

3.5.3 Trenching

Trenching width will be according to specifications to minimize disturbed soil and windrow requirements. Open ditch length at any one time will be minimized to reduce the risk of trench sloughing and wildlife/livestock accidents. In addition, a 2:1 sloped ramp will be built at the end of the trench each day to allow accidentally trapped wildlife/livestock with an escape route. The trench will be inspected at least twice each day for trapped wildlife/livestock.

3.5.4 Drain Tile

Locations of any drainage tile or culverts will be marked prior to pipeline construction activities to prevent clogging with soil or debris.

3.5.5 Trench Dewatering

Trench dewatering may be required periodically during high rainfall events. Water may be pumped into an approved dewatering structure, or onto a stable and well-vegetated areas at least 100 yards from a watercourse or wetland

3.5.6 Topsoil/Subsoil Separation

Topsoil windrow piles will be kept separate from subsoil and/or spoil piles to prevent mixing.

3.5.7 Unstable Trench Walls

Trenching may result in soil sloughing in certain areas based on soil characteristics. If sloughing is evident, a wider area for soil storage may be necessary to avoid the potential mixing of segregated soils.

When unstable trench conditions occur, the time in which the trench is left open should be minimized to reduce the risk of sloughing.

3.6 BACKFILLING

3.6.1 Install Trench Breakers

Installation of trench breakers (e.g., sack, foam or bentonite) may be warranted on moderate and steep slopes and at the edge of watercourses or wetlands (see details, Attachment 1). Exact location of trench breakers will be determined in the field based on slope length and slope angle.

3.6.1 Watercourses/Wetlands

Where the trench has the potential to impact a wetland or watercourse, trench breakers will be installed to maintain the original hydrology. Care will be taken to ensure that trench crowns or subsidence are not left in these hydrologically sensitive areas

3.6.2 Backfill Trench

Backfilling of the trench will be completed according to project specifications. Mixing of topsoil with spoil is not permitted in any trench backfilling location. Equipment with fine depth control will be used in backfilling operations. In general, the lower lift consists of placement of spoil and subsoil material prior to the placing the upper lift. Compact fill with equipment capable of adequately compacting the trench.

3.6.1 Excess Trench Backfill Material

Excess backfill and topsoil material from the stripped portion of the ROW will be placed or feathered out over the stripped area in a manner not to cause excessive subsidence of the trench.

3.6.2 Crown Trench

Excess soil will be placed forming a crown over the trenching to allow for settlement. Trench crown breaks will be located in obvious drainages and wherever seepage occurs to minimize interference with natural surface water drainage.

3.6.3 ROW Contouring

Grading of the ROW will be performed with a goal of restoring the contours to pre-construction grades and to reestablish the original drainage patterns. Special attention will be paid to areas comprised of wetlands, and watercourses. All temporary construction fill (e.g., ramps) will be removed.

3.6.1 Drainage Tiles

Drainage tiles or culverts damaged during trenching will be replaced.

3.7 HYDROSTATIC TESTING

Once the pipeline has been installed, hydrostatic testing will be conducted to evaluate the integrity of the pipeline. The specific steps outlined for the hydrostatic testing procedures are as follows:

3.7.1 Notification, Sampling, and Reporting

Ensure the proper permit requirements are completed prior to dewatering activities. Adhere to applicable notification, sampling, and reporting requirements for discharge (if required) by the North Dakota Department of Health.

3.7.2 Equipment and Workers

Ensure that an adequate number of workers and equipment are available on-site to repair any rupture, leak, or erosion problem that arises during testing.

3.7.3 Isolate Pumps

Test pumps and lined storage tanks will be isolated to prevent spills of fuels or lubricants.

3.7.4 Pigging Debris

Pigging debris will be transported for approved disposal (*i.e.*, landfill).

3.7.5 Dewatering

Proper dewatering procedures will be used to minimize erosion, flooding, and risk of water quality impacts.

3.7.6 Daylighting

Applicable measures for pipeline exposure (daylighting) monitoring will be adhered to during pipeline inspections and repairs.

3.8 WATERCOURSE AND WETLAND CROSSINGS

Pipeline construction in or near watercourses or wetlands requires special consideration due to unstable soils and protection of natural ecosystems. Whenever possible, construction activities will be minimized in wetlands including reduction of temporary work areas. Pre-construction planning will consider construction methods, timing, erosion control, and restoration/reclamation. The contractor must use the construction ROW, TWS and approved roads to access watercourse or wetland areas.

3.8.1 General Requirements

Storage of Fuels and Other Materials

No storage of fuels, lubricating oils, hazardous materials, or chemicals will be permitted in, or within 100 yards from a watercourse or wetland boundary.

Refueling and Fuel Handling

Refueling and fuel handling will be conducted in upland areas at least 100 feet from watercourse or wetland boundaries. If boring equipment is located within 100 feet of a water body, refueling would occur in accordance with requirements outlined in the SPCC Plan.

Clearing

Clearing the construction ROW in a watercourse or wetland will be limited to topsoil salvage over the trench line. A minimum vegetative buffer of 10 feet would be provided outside of the stream bank.

Typical details for flowing and non-flowing watercourse crossings are presented in Attachment 1. Requirements for stormwater BMPs are provided in Attachment 1 and within the SWPP Plan. In locations where the ROW traverses an adjacent wetland, a buffer zone would be maintained between the wetland and the construction work area. Sediment controls in accordance with the SWPP Plan would be implemented.

Vegetation and Shrub Salvage

Live shrubs or bushes and other wetland species from the banks of all watercourses and wetland will be salvaged, if possible, in accordance with NDFG requirements.

Temporary Berms and Silt Fences

Temporary sediment control structures (berms and silt fencing) will be installed on approach slopes during crossing construction. Structures will be repaired before the end of each working day, or as needed.

All trench related drilling equipment will be equipped with spill containment kits (e.g., sorbent pads and pigs) prior to commencing construction. In addition, spill response equipment will be available for containment of fluids.

3.8.2 Watercourse or Wetland Construction Techniques

Recommended pipeline watercourse or wetlands crossing methods are referenced in the alignment sheets. In general, the watercourse crossings traversed by the Vantage Pipeline are non-flowing and the open cut crossing method would be used. Directional boring may be required if water is present and the open cut method is not feasible at the time of construction. Details of boring methods are provided in Attachment 1. Pre-construction planning will help determine equipment requirements and open cut methods for each watercourse or wetland area. Consideration should be given to soil type, moisture content, potential for rutting, compaction, and trench sloughing. Pre-built pipe runs will generally be integrity tested prior to initiating watercourse or wetland construction.

The locations of anticipated watercourse and wetland crossings are identified on Table A-1. A description of each crossing is provided and identifies wetland type and potential for open water and flooded conditions.

Table A-1. Watercourses and Wetlands Crossing Methods

Site No.	Mile Post	Wetland Type	Restricted Activity Period	Comments
1	2.511	Palustrine Emergent B/C	April 15 to June 1	Fresh wet meadows / shallow marshes
2	9.382	Palustrine Emergent C/F	April 15 to June 1	Shallow/deep marshes
3	11.925	Palustrine Emergent B/C	April 15 to June 1	Fresh wet meadows / shallow marshes
4	12.815	Palustrine Emergent B / Palustrine Unconsolidated Bottom	April 15 to June 1	Fresh wet meadows / shallow open water
5	15.843	Palustrine Emergent A	April 15 to June 1	Seasonally flooded basins
6	17.977	Palustrine Emergent C	April 15 to June 1	Shallow marshes
7	29.555	Palustrine Emergent B	April 15 to June 1	Fresh wet meadows
8	75.062	Palustrine Emergent B/C	April 15 to June 1	Fresh wet meadows / shallow marshes

Open Cut Crossings

Open cut crossing will be used for non-flow and flowing waterways unless it is determined by the project engineer that use of the open cut method is not feasible. Following open cut crossings, native material/washed backfilled gravel will be placed back into the crossing as soon as possible after lowering-in of the prefabricated pipeline.

For watercourse or wetlands crossing with standing water and saturated soils, the pipeline will be assembled in upland areas. Excavation of the trench may be performed by using a backhoe supported on geotextile materials or timber mats. The prefabricated section of pipe will be positioned across the wetland and lowered into the trench followed by backfilling.

Horizontal Directional Bore Method

Directional boring methods may be used to install underground pipe runs in a prescribed path below the surface. The benefit of the push/pull boring method is the minimal impact to the surrounding area. This method allows for crossing under watercourses or roadways where open trench pipe installation is not feasible. A directional bore machine pushes a bore head, connected to hollow drill pipe, into the ground at an angle to excavate the pilot borehole. As each joint of drill pipe is pushed into the ground, a new one is added behind. Non-hazardous drilling fluid, composed of a mixture of bentonite clay and water, is used for drilling lubrication. Once the bit reaches the exit point, it is replaced with a reamer and the hole is enlarged by operating the drill in the reverse direction. After enlarging the bore, the product pipe is pulled from the exit point back to the boring machine. Once the pipe is installed, the exit and entry points are excavated if necessary with connections made as needed.

3.8.3 Construction Monitoring

Watercourse and wetlands crossings will be monitored for immediate effects of crossing construction to ensure the effectiveness of prescribed mitigation measures. Photo documentation of before and after watercourse and/or wetlands condition will be completed to establish baseline conditions and to evaluate restoration.

3.8.4 Bank Protection

Installation of temporary erosion and sediment control measures, such as silt fencing, rip rap, temporary diversion berms, sandbags, or straw bales may be necessary to maintain bank stability. Trench breakers may also be installed if banks are composed of erodible materials.

3.8.5 Reclamation

Banks and approaches of all watercourses are to be reclaimed with appropriate seed mix identified in Section 4.7 below. Stormwater controls will be maintained at the base of approach slopes until revegetation of the ROW is complete in accordance with the SWPP Plan. Rolled Erosion Control Products (RECP) can be used, if deemed necessary by the Vantage representative.

3.8.6 Post-Construction Monitoring

Erosion and sediment control measures will be monitored frequently and after significant precipitation events or rapid melt of snow as specified in the SWPP Plan. Documentation of post-construction site conditions will be performed, including success of revegetation (see Section 5).

4 CLEAN-UP AND RECLAMATION

4.1 CLEAN-UP SCHEDULE

Clean-up of garbage and construction debris along ROWs will occur immediately after each segment of pipeline construction is completed. Designated garbage disposal containers will be located for contractor access for solid waste clean-up each day.

4.2 RESTORATION OF WATERCOURSE(S)/WETLAND(S)

Temporary crossings at watercourse or wetlands will be removed as quickly as practical. Appropriate erosion and sediment control best management practices (BMPs) will be established and maintained in accordance with the SWPP Plan, until revegetation stabilizes the area. On steep banks, use of RECPs over seeded areas will be implemented to provide bank stabilization until seeding becomes established. Application of fertilizer or mulch in or near watercourses or wetlands is prohibited.

4.3 SLOPEBREAKERS

Stormwater BMPs (e.g., slopebreakers) will be installed in selected locations to prevent run-off and subsequent erosion along the ROW. Locations for slopebreakers will be determined in the field and will be constructed of subsoil material capped with topsoil.

4.4 GRADING

Grading will be performed for areas with vehicle ruts, erosion gullies, or trench settlement prior to topsoil placement, tillage, and seeding operations. Any temporary fills placed to accommodate construction access will be removed and cut materials replaced in the original borrow location.

4.5 SOIL TILLAGE AND PREPARATION

A multi-shank ripper may be employed for compacted soils caused by excessive equipment traffic or prolonged wet weather. Tillage equipment including a chisel plow, disc, or harrow may be used to smooth

the soil surface prior to seeding operations. Boulders that might interfere with topsoil placement and seeding will be removed. Disc and harrow operations will be conducted only if the site is to be seeded immediately, otherwise ripped soil provides a means of temporarily reducing the wind erosion potential.

4.6 TOPSOIL PLACEMENT

Topsoil will be placed evenly across the graded subsoil surface. If necessary, excess topsoil can be feathered-out over the stripped area. Topsoil placement may need to be postponed during wet weather or high winds to reduce soil loss. Seedbed preparation may be required depending on soil surface conditions and seeding equipment selection. Cultivation will be limited in areas of fine textured soils to prevent pulverization of the soil.

4.7 SEEDING

Seeding of the ROW will be arranged by the Vantage representative. Traffic should be minimizing on seeded areas to allow the vegetation to become established. Seed selection will be prescribed to match the surrounding land use. Tables A-2 through A-4 contain seed mix recommendations for native grassland, pastureland, and wetland sites. Cultivated crop land will not be seeded until it is put back into production by the land owner or lessee.

Table A-2. Seed Mix A - Native Grassland

SEED MIX A		
SCIENTIFIC NAME	COMMON NAME	%
<i>Hesperostipa comata</i>	Needle and thread grass	15
<i>Stipa viridula</i>	Green needle grass	15
<i>Schizachyrium scoparium</i>	Little Bluestem	15
<i>Bouteloua curtipendula</i>	Sideoats Grama	10
<i>Pseudoroegneria spicata</i>	Bluebunch Wheatgrass	10
<i>Pascopyrum smithii</i>	Western wheatgrass	10
<i>Elymus trachycaulus</i>	Slender wheatgrass	10
<i>Acnatherum hymenoides</i>	Indian Ricegrass	10
<i>Koeleria macrantha</i>	Junegrass	3
<i>Astragalus Canadensis</i>	Canada milk vetch	1
<i>Vicia Americana</i>	American vetch	1

Note: Drill at 14 lbs/acre if drill seeded or 28 lbs/acre if broadcast. If highly erodible soil is encountered add *Triticum aestivum* at 7 lbs/ac to Seed Mix A.

The selected seed mix will be confirmed with the landowner/lessee prior to seeding. Limited disturbance to wetland sites is anticipated where soil will be stripped from the trench line at watercourse crossings. Hand seeding in these locations would use Seed Mix B.

Table A-3. Seed Mix B - Wetlands, Depressions and Saline Sites

SEED MIX B		
SCIENTIFIC NAME	COMMON NAME	%
<i>Agropyron smithii</i>	Western wheatgrass	20
<i>Agropyron trachycaulum var. trachycaulum</i>	Slender wheatgrass	20
<i>Poa juncifolia</i>	Alkali bluegrass	10
<i>Puccinellia nuttalliana</i>	Nuttall's alkali grass	10
<i>Deschampsia caespitosa</i>	Tufted hair grass	10
<i>Beckmannia syzigachne</i>	Slough grass	10
<i>Hierochloe oderata</i>	Sweet grass	10
<i>Poa palustris</i>	Fowl bluegrass	10

Note: Hand seed at 15 lbs/acre equivalent and hand rake.

Seeding of disturbed soil on pasture or hay land, or CRP land will be conducted with a seed mix approved by the landowner/lessee. Seed mix C will be used if the landowner or land management agency does not specify use of other mixtures.

Table A-4. Seed Mix C – Pasture Lands

SEED MIX C		
SCIENTIFIC NAME	COMMON NAME	%
<i>Elymus lanceolatus</i>	Thickspike Wheatgrass	20
<i>Pseudoroegneria spicata</i>	Bluebunch Wheatgrass	20
<i>Elymus trachycaulus</i>	Slender wheatgrass	20
<i>Acnatherum hymenoides</i>	Indian Ricegrass	15
<i>Pascopyrum smithii</i>	Western wheatgrass	15
<i>Koeleria macrantha</i>	Junegrass	10

Note: Drill at 14 lbs/acre if drill seeded or 28 lbs/acre if broadcast. If highly erodible soil is encountered add *Triticum aestivum* at 7 lbs/acre to Seed Mix C.

4.7.1 Seeding of Road Ditches

Seed road ditches with the same mix as adjacent land, where applicable. Vantage will coordinate with the NDDOT to determine seeding requirements for highway road crossing.

4.8 FENCES

Temporary fences will be installed at locations determined by the Vantage representative and landowner/lessee to be required for livestock containment purposes.

4.9 FERTILIZATION AND WEED CONTROL

Fertilizer and weed control practices will be used according to adjacent land use standard practices while being protective of water resources.

5 POST-CONSTRUCTION MONITORING (PCM) AND FOLLOW-UP

5.1 POST-CONSTRUCTION SOILS ASSESSMENT – SOIL PARAMETERS

A representative from Vantage with expertise in environmental science will conduct a post-construction soil assessment. Documentation of locations along the ROW will be pre-determined after having consulted available soil mapping. Soil properties including topsoil depths, problem soils, and stability, will be evaluated. Criteria to be considered in determining the locations for soils assessments may include topsoil depths, landscape variation, land use, and construction procedures. The reclaimed surface will be inspected to identify settlement of trench backfill.

Soil parameters will be assessed including but not limited to: the degree of subsoil compaction; topsoil depth; topsoil and subsoil texture; degree of topsoil and subsoil mixing; contour restoration and erosion. Field forms and photography will be used to document observations and measurements.

5.2 RECLAMATION PERFORMANCE AND VEGETATION MONITORING

The ROW will be visually inspected for vegetation issues such as invasive weed infestations, poor vegetation establishment, and reduced crop growth along the ROW. If visual differences are noted on and off the ROW, then plant yield indices such as height, density and vigor will be considered. Particular attention will be paid to areas with extensive surface disturbance, moderate to steep slopes, watercourse and wetlands crossings, and areas of terrain instability that may be prone to erosion. Detailed vegetation assessments will be conducted, if warranted, at sites where reclamation problems are identified.

5.3 WATERCOURSE MONITORING

The ROW will be inspected at all watercourse crossings during the post-construction reclamation soil and vegetation assessments. The banks and approach slopes will be monitored for stability, erosion, invasive weed infestations, and vegetation cover. The ROW will also be monitored to determine if there is any disruption of natural drainage patterns. Photography will be used to document observations.

5.4 MITIGATIVE MEASURES

Mitigative measures will be recommended if issues are identified during PCM. Vantage will implement mitigative measures as soon as feasible. Issues that cannot be mitigated immediately (*e.g.*, subsoil compaction) will be documented in a report for future mitigation.

5.5 DOCUMENTATION AND REPORTING

The PCM program will document all environmental issues identified for the project. Issues that have been successfully mitigated will be listed as resolved. The report will also include any locations with unresolved environmental issues and planned mitigation activities.

6 OPERATIONS AND MAINTENANCE ACTIVITIES

Vantage's environmental and operations personnel will conduct regular inspections along the ROWs as needed to document weeds, trench subsidence, and erosion. Mitigative measures would be implemented

on a timely basis during operations. Routine monitoring by Vantage personnel will continue throughout the life of the pipeline.

7 EMERGENCY AND PROJECT CONTACTS

The following tables provide information on the emergency services available in vicinity of the proposed project area (Table A-5), project and government personnel (Table A-6), and county contact information (Table A-7)

Table A-5. Emergency Services

SERVICE	COUNTY	LOCATION/ CONTACT	PHONE NUMBER
If it is an emergency, dial 911.			
Emergency Management Response	Divide County	Rob Melby P.O. Box 275 Crosby, ND 58730	701-965-6461
	Williams County	Mike Hallesy 223 E. Broadway St., Suite 202 Williston, ND 58801	701-577-7707

Table A-5. Emergency Services, continued

SERVICE	COUNTY	LOCATION/ CONTACT	PHONE NUMBER
If it is an emergency, dial 911.			
Ambulance	Divide County	Divide County Ambulance Service Paul Peterson 107 Central Ave W Crosby, ND 58730	701-965-5844 day 701-965-6359 evening
		Grenora Ambulance Service Jane Schenstad 205 Main Street Grenora, ND 58845	701-694-3391 day 701-694-2932 evening
	Williams County	Ray Community Ambulance District Myron Eide 24 1st Ave W Ray, ND 58849	701-568-2294
		Tioga Ambulance Service Daniel McGinnity 12 Front St NE Tioga, ND 58852	701-664-2578 day 701-641-2045 evening
		Williston Ambulance Service Richard Shearer 317 11th St W Williston, ND 58801	701-572-3400 day 701-770-0350 evening
If it is an emergency, dial 911.			
Fire	Divide County	Crosby and Rural Fire Department 107 West Central Crosby, ND 58730	701-965-6304
		Fortuna Rural Fire Protection District 270 Main Street Fortuna, ND	701-834-2212
		Noonan Fire Department Main Street Noonan, ND	701-925-5783
	Williams County	Alamo Rural Fire Protection District 13257 75 th Street Alamo, ND	701-528-3662
		Grenora Rural Fire Protection District 210 Main Street Grenora, ND	701-694-6203
		Ray Fire Protection District 1 st Avenue Ray, ND	701-568-3421
		Tioga Rural Fire Department 514 Willard Blvd Tioga, ND 58852	701-664-2200
		Wildrose Fire Protection District Carmody Street Wildrose, ND 58795	701-593-2110
Williston Rural Fire Protection District- Ambulance 317 11 th Street W Williston, ND	701-572-3400		

Table A-5. Emergency Services, continued

SERVICE	COUNTY	LOCATION/ CONTACT	PHONE NUMBER
If it is an emergency, dial 911.			
Hospital/Health Centre	Divide County	St. Luke's Hospital 702 1 st Street SW Crosby, ND 58730	701-965-6384
	Williams County	Tioga Medical Center 810 N Welo Street Tioga, ND 58852	701-664-3308
		Mercy Medical Center 1301 15 th Ave. W Williston, ND 58801	701-774-7400
If it is an emergency, dial 911.			
County Sheriff	Divide County	Divide County Sheriff P.O. Box 275 Crosby, ND 58730	701-965-6461
	Williams County	Williams County Law Enforcement Center 223 East Broadway, Suite 301 Williston, ND 58801	701-577-7700

Table A-6. Project Contacts

CONTACT	NAME AND POSITION	ADDRESS	CONTACT INFORMATION
Chief Operating Officer	David Schmunk Chief Operating Officer	Mistral Energy Inc. 440, 521-3 rd Ave. SW Calgary, AB T2P 3T3	Phone: (403) 781-8181 Fax: (403) 777-1907 Email: dschmunk@vantagepipeline.com.ca
Operations Manager	Bruce Edmondson Vice President - Operations	Vantage Pipeline Canada Inc. 440, 521-3 rd Ave. SW Calgary, AB T2P 3T3	Phone: (403) 781-8181 Email: bedmondson@vantagepipeline.com
Land Management Specialist	Byron Nelson Vice President - Lands	CLS 113 East Broadway Williston, ND 58801	Phone: (805) 828-6000 Email: bnelson@contractlandstaff.com
Environmental Consultant	David Cameron	KC Harvey Environmental LLC 376 Gallatin Park Drive Bozeman, MT 59715	Phone: (406) 585-7402 Fax: (406) 585-7428 Email: dcameron@kcharvey.com
Project Engineer	Susan Saurette Project Manager	Sunstone Projects Ltd. 400, 540-5 th Ave. SW Calgary, AB T2P 0M2	Phone: (403) 218-6817 Email: susan.saurette@sunstone.ab.ca
NEPA Coordinator	Gary Holsan	Gary Holsan Environmental Planning PO Box 275 Thayne, WY 83127	Phone: (307) 883-2883 Email: ghep@silverstar.com
Archeologist	Lynelle Peterson	Ethnoscience, Inc 4140 King Avenue East Billings, MT 59101	Phone: (406) 252-7945 Email: lynelle@ethnoscience.com

CONTACT	NAME AND POSITION	ADDRESS	CONTACT INFORMATION
GOVERNMENT- FEDERAL			
US Fish and Wildlife Service	Heidi Riddle Fish and Wildlife Biologist	U.S. Fish and Wildlife Service North Dakota Ecological Services Field Office 3425 Miriam Avenue Bismarck ND 58501	Phone: (701) 250-4481 Email: heidi_riddle@fws.gov
US Army Corp of Engineers	Daniel Cimarosti North Dakota Regulatory Program	US Army Corps of Engineers 1513 South 12th Street Bismarck, ND 58504	Phone: (701) 255-0015 Fax: (701) 255-4917 Email: Daniel.E.Cimarosti@usace.army.mil
USDA - NRCS Divide County, North Dakota	Robert Casteel District Conservationist	NRCS Wallin Building 206 Main Street, Box 66 Crosby, ND 58730-0066	Phone: (701) 965-6491 Fax: 701-965-6064 Email: rob.casteel@nd.usda.gov
USDA - NRCS Williams County, North Dakota	David W. Schmidt District Conservationist	Williston Field Office 1106 West 2nd Street Williston, ND 58801	Phone: (701) 572-6729 Fax: 701-572-0484 Email: david.schmidt@nd.usda.gov
In the Event of a Spill	National Response Center	National Response Center c/o United States Coast Guard (CG-5335) - Stop 7581 2100 2nd Street, SW Washington, DC 20593- 0001	Toll Free: 800-424-8802 Direct: (202) 267-2675 Fax: (202) 267-1322 Email: HQS-DG-1st-NRCINFO@uscg.mil
GOVERNMENT- STATE			
State Historical Society of North Dakota	Paul Picha Chief Archeologist	North Dakota Heritage Center 612 East Boulevard Avenue Bismarck, ND 58505-0830	Phone: (701) 328-3574 Fax: (701) 328-3574 Email: ppicha@nd.gov
North Dakota Game and Fish Department	Bruce Kreft Resource Biologist	100 North Bismarck Expressway Bismarck, ND 58501-5095	Phone: (701) 328-6224 Fax: (701) 328-6352 Email: bkreft@state.nd.us
North Dakota Department of Agriculture Plant Industries Division	Judy Carlson Director of Noxious Weed Team	600 E Boulevard Ave, Dept 602 Bismarck, ND 58505	Phone: (701) 328-4997 Email: jcarlson@nd.gov

Table A-7. County Official and Offices

COUNTY	CONTACT NAME	CONTACT NUMBER
Divide County Commissioners	Tim Selle	701-834-2451
	Gerald Brady	701-965-6112
	Douglas Graupe	701-965-6489
Williams County Commissioners	David Montgomery	701-577-4500
	Dan Kalil	701-577-4500
	Barry Ramberg	701-577-4500
	Martin Hanson-Zahl	701-577-4500
	Don Arnson	701-577-4500
Williams County Highway Office	Dennis Nelson, Superintendent	701-577-4521
Crosby Municipal Highway Department	705 5th Avenue Southeast Crosby, ND 58730	701-965-6192
Williams County Weed Officer	Jim Basaraba	701-572-4883

Divide County Weed Officer	Gary Smithberg	701-925-5798
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8 CONTINGENCY PLANS

8.1 SPILL CONTINGENCY PLAN GUIDELINES

Completion of a detailed Spill Prevention Control and Countermeasures Plan (SPCC Plan) that addresses potential spills related to pipeline construction activities is the responsibility of the Vantage Pipeline Contractor (see Attachment 5). The detailed SPCC plan will address the following in the event of a release.

8.1.1 Initial Spill Response

In the event of a spill, responders are required to complete the following actions:

- Control danger to human life and appoint an on-site lead person;
- Remove the source of ignition, if safe to do so;
- Identify the source of the spill and stop or contain spill, if safe to do so;
- Conduct appropriate steps for following the Vantage Emergency Response Plans including contacting Vantage's Spill Coordinator/Environmental Staff;
- Refer to the Spill Prevention Control and Countermeasures (SPCC) Plan section that details spill response;
- Advise Vantage's Environmental Spill Coordinator/Environmental Staff of clean-up requirements and assist in arranging the necessary spill response equipment and/or contractors to be mobilized to control and contain the spill;
- Prevent traffic on contaminated soils; and
- Ensure the proper agencies have been contacted and spill reports have been completed.

8.1.2 General Spill Clean-up Procedure

Clean-up requirements for spills generally involve one or more of the following steps:

- Contain spilled petroleum product;
- Pump liquids into a tanker or appropriate container;
- Clean-up residual contaminated soil area with spill clean-up equipment; and
- Dispose of sorbent pads, heavily contaminated soil and vegetation at an approved facility.

8.1.3 Spill Clean-up next to Waterbodies

- Construct berm and/or trenches to contain spilled product prior to entry into a waterbody;
- Deploy booms, skimmers, sorbents etc., if feasible, to contain and recover spilled material from waterbody;
- Pick up spilled product and clean-up impacted areas including streambanks and shorelines; and

- Dispose of heavily contaminated soil and vegetation at an approved facility.

8.1.4 Spill Report Form

A spill report form is included in the contractors SPCC Plan. In addition, a link to the North Dakota spill reporting form is available at <http://www.ndhealth.gov/ehs/eir/NonOilfield/>.

8.2 FIRE CONTINGENCY PLAN

Prior to commencement of construction, the primary Vantage Pipeline Contractor will designate a staff member as Lead Fire Representative (LFR). This individual will be familiar with all fire-fighting methods and equipment, and local fire-fighting departments.

- All vehicles and equipment will be required to carry fire-fighting equipment including shovels and fire extinguishers. In addition, all motorized equipment must carry a fully charged fire extinguisher. All fire extinguishers will be checked at least monthly.
- The LFR will ensure the following fire prevention measures are implemented:
 - Belly pans of crawler tractors are periodically removed and cleaned;
 - Fire contact list is current and reporting requirements are understood by all crews;
 - Equipment used on-site is in good working order and does not present a fire danger; and
 - Safety meetings include basic training procedures including fire extinguisher use and maintenance.
- Crews that experience a fire will follow steps, including:
 - Perform fire suppression measures immediately upon detection of fire **if safe to do so**;
 - Report location, size, and current status of fire to Vantage Safety personnel and local fire department;
 - Deploy fire-fighting equipment and crew to create fire breaks or extinguish the fire directly **if safe to do so**; and
 - Request additional local fire department assistance if Contractor resources are insufficient.

Contact information for local fire officials is shown in Table A-8 below.

Table A-8. Fire Contact Information

COUNTY	LOCATION/ CONTACT	PHONE NUMBER
If it is an emergency, dial 911.		
Divide County	Crosby and Rural Fire Department 107 West Central Crosby, ND 58730	701-965-6304
	Fortuna Rural Fire Protection District 270 Main Street Fortuna, ND	701-834-2212
	Noonan Fire Department Main Street Noonan, ND	701-925-5783
Williams County	Alamo Rural Fire Protection District 13257 75 th Street Alamo, ND	701-528-3662
	Grenora Rural Fire Protection District 210 Main Street Grenora, ND	701-694-6203
	Ray Fire Protection District 1 st Avenue Ray, ND	701-568-3421
	Tioga Rural Fire Department 514 Willard Blvd Tioga, ND 58852	701-664-2200
	Wildrose Fire Protection District Carmody Street Wildrose, ND 58795	701-593-2110
	Williston Rural Fire Protection District- Ambulance 317 11 th Street W Williston, ND	701-572-3400

8.3 SOIL CONDITIONS CONTINGENCY PLAN

During pipeline construction, the following problems may arise which could result in loss of soil productivity if not addressed. Environmental soil handling options to reduce the potential impacts are listed in the following table.

Table A-9. Soil Handling Environmental Protection Options

CONDITION/CONCERN	ENVIRONMENTAL PROTECTION OPTIONS
Wet soils	<ul style="list-style-type: none"> • Restrict construction vehicle traffic to equipment with low-ground pressure tires or wide pad tracks. • Salvage topsoil from full ROW to prevent mixing and rutting. • Shut down construction activities until conditions improve. • Use matting to minimize soil mixing
Limiting topsoil depth	<ul style="list-style-type: none"> • Salvage surface soil to a depth of first color change or depth indicated on the alignment sheets whichever is greatest.
Topsoil identification	<ul style="list-style-type: none"> • Use topsoil depths provided on Alignment Sheets as a guide. • Assign a construction oversight person to guide the equipment operator.
Uneven surfaces	<ul style="list-style-type: none"> • Use topsoil depths provided on Alignment Sheets as a guide. • Assign a construction oversight person to guide the equipment operator. • Use equipment with fine depth control.
Stony soils	<ul style="list-style-type: none"> • Attempt to use conventional excavation equipment to strip topsoil. • Employ backhoe, if conventional equipment fails. • Replace stones and rocks to the equivalent of surrounding land areas.
Shallow bedrock	<ul style="list-style-type: none"> • Ripping is preferable where rock trenching is required. • Excess bedrock should not be replaced in the upper 1.5 feet of the trench. • Excess bedrock will be transported for disposal at locations approved by the landowner/lessee. • Replacement backfill will be transported from a source approved by the landowner/lessee.
Unstable trench walls	<ul style="list-style-type: none"> • Strip extra width of topsoil if topsoil could slough into the trench. • Back slope the trench until stable (up to 1:1). • Prepare pipe runs prior to trenching at locations with soil prone to sloughing to minimize the time the trench is left open.
Soil pulverization	<ul style="list-style-type: none"> • Minimize traffic on ROW. • Increase topsoil stripping to full ROW if fine textured soils will be subjected to undue traffic and pulverization. • Minimize tillage operations once topsoil has been replaced. • Postpone seed bed preparation until immediately prior to seeding.
High winds	<ul style="list-style-type: none"> • Suspend topsoil handling during high wind conditions.

8.4 SOIL EROSION CONTINGENCY PLAN

Soil water and wind erosion contingency planning may be required during the construction of the Vantage Pipeline. The following tables provide erosion control options that may be implemented depending on the field conditions.

8.4.1 Soil Erosion Environmental Protection Options

Table A-10. Soil Water Erosion Protection Options

CONCERN	ENVIRONMENTAL PROTECTION OPTIONS
Erosion by Water	(Refer to SWPP Plan)
Cultivated Land/ Hay Land and Improved Pasture	<ul style="list-style-type: none"> • Construct temporary berms of subsoil, sandbags or bales during construction activities. • Salvage remaining topsoil and stockpile away from area to be regraded. • Install silt fences near the base of slopes. • Regrade rill or gully erosion. • Seed annual cover crop. • Construct temporary cross ditches on slopes following approval by landowner/lessee. • Employ erosion netting, mulch, or tackifier to keep surface soil in place.

Table A-11. Soil Wind Erosion Protection Options

Erosion by Wind	
Topsoil Stockpiles	<ul style="list-style-type: none"> • Refer to alignment sheets regarding erosion prone soils. • Develop measures (e.g., daily watering) to reduce wind erosion of fine-textured loose soils that are vulnerable when stockpiled or windrowed. • Ensure that windrows do not exceed three feet in height and no steeper than 2:1. • Postpone topsoil stripping until three days prior to trenching. • Apply water to the topsoil windrow. • Install silt fences. • Seed cereal cover crop. • Employ mulch or straw crimping at recommended rates (e.g., 1 tons/ac). • Apply hydromulch or tackifier.
Watercourse or Wetlands Erosion	<ul style="list-style-type: none"> • Plant willow stakes in the spring. • Transplant willow clumps and/or install willow wattles. • Apply approved RECP. • Armor bank with riprap. • Install vegetated geogrid.

8.5 INSTREAM BORING FLUIDS MUD RELEASE CONTINGENCY PLAN

The Vantage Pipeline is anticipated to cross non-flowing (based on observation during the fall of 2010) watercourse or wetland areas in approximately eight locations. The open cut method of trenching is planned for these crossings due to limited instream water flow throughout the average year. However, in case direction drilling is required, the following contingency plan includes measures to address the potential release of drilling mud in order to minimize the environmental impacts.

8.5.1 General Measures

- Surface casing may be installed to contain a potential drilling mud release.
- Boring mud will consist of “environmentally friendly” substances (e.g., bentonite and inert additives).
- Berm(s) or sump(s) will be constructed at the entry point and proposed exit point with a capacity adequate to contain the anticipated volume of mud that could be released during pullback and other boring operations.
- The contractor’s boring plan would be required to include a section that addresses boring mud clean-up. This section will be reviewed with the contractor crews prior to boring operations. In addition, Vantage supervisory personnel will be made aware of this contingency plan and how boring mud clean up would be performed prior to initiating boring.

8.5.2 Monitoring

Supervisory personnel will be on-site at all times during boring, reaming, and pullback operations to ensure that emergency response measures will be implemented immediately and effectively. Vantage will assign personnel experienced in emergency spill response during all phases of boring the watercourse.

The amount of boring fluid returned to the mud tank will be measured. Visual inspections of both onshore and instream portions of the bore path and surrounding area will be evaluated for signs of mud release. Monitoring stations will also be established prior to boring for purposes of visual inspections and surface water quality sampling, if necessary.

On watercourses with ice cover, on-site conditions may allow visual monitoring of water quality by observing open reaches or, if safe, by auguring and maintaining an open hole in the ice for sampling.

8.5.3 Emergency Response

Sufficient quantities of the following emergency response equipment will be available on-site during boring operation: sandbags, silt fencing, T-bar posts, post pounders, straw bales, lighting towers, shovels, hydro-vac truck (optional), submersible pump, polyethylene, and water sampling equipment.

In general, boring operations will be immediately ceased if a mud release is detected. A Vantage representative will be immediately notified to address reporting requirements, and to determine the best mitigation procedures. Instream options for removal of drilling mud will likely include use of the submersible pumps or hydrovac truck. Drilling mud releases on land will be addressed similar to removal of hydrocarbon contaminated soil according the procedures outlined in the SPCC plan.

Boring will only be allowed to resume if the potential for significant adverse impacts on the environment is low, as determined by Vantage and Agency personnel. Contacts for North Dakota Department of Health personnel are provided in the following table.

Table A-12. Instream Emergency Contacts

CONTACT	NUMBER
ND Department of Health: Environmental Health Section	701-329-5150
ND Department of Health: Division of Water Quality Dennis Fewless, director	701-328-5210 office 701-223-9398 home 701-400-7080 cell
ND Department of Health: Division of Water Quality Mike Ell, Water Pollution	701-328-5210 office 701-223-4237 home 701-220-5025 cell

8.6 WATER CROSSING SEDIMENT CONTINGENCY PLAN

Erosion and/or runoff caused by construction activities through water crossings may result in sedimentation. The watercourse bed and banks will be restored to pre-construction conditions. Habitat enhancement/compensation measures will be employed, if warranted, to ensure that the productive capacity of the watercourse.

To avoid impacts to water crossings, the following measures will be the responsibility of Vantage.

8.6.1 Fish Habitat Assessment

Review and conduct (if necessary) a fish habitat assessment, of specific watercourses. Recommendations from the consulting fisheries biologist will be followed to ensure the protection of aquatic resources.

8.6.2 Notification/Approvals

Vantage will notify the NDGF and NDDH of activities that may impact streams if flowing conditions are encountered. Applicable permits would be obtained prior to construction.

8.6.3 Fish Salvaging for Instream Construction Activities

Based on field surveys completed during 2010, fish salvage would not be required since fish habitat is not encountered in the watercourse crossings.

8.6.4 Contingency Crossing Method - Open Cut Crossings (Water Present)

Vantage will ensure stream flow is maintained at all times while open cutting during flowing conditions. Work may be performed from both sides of the watercourse, utilizing two backhoes if necessary, to expedite the crossing.

Excavated watercourse bottom sediment will be piled on the banks in a temporary storage area above the high watermark of the watercourse. Containment berms and spoil will be stored in accordance with requirements indicated on the typical crossing details (Attachment 1).

Backfill material will be replaced as soon as possible and will consist of native material/washed gravel. The watercourse streambed shall be returned to approximate pre-construction profile to ensure that flow patterns are unaltered.

Photo documentation (before and after) will provide evidence of baseline and post-construction conditions. In addition, a post construction walk through will be conducted to allow for inspection of erosion and sedimentation related to the pipeline crossing.

8.7 WINTER OR FROZEN CONDITIONS CONTINGENCY PLAN

Winter conditions may be encountered depending on the duration/extent of pipeline construction. When working during frozen soil conditions, Vantage will ensure that there is sufficient frost or low enough soil moisture to allow construction without causing excessive rutting or soil compaction.

Vantage winter construction planning also includes snow management, topsoil salvage and stockpiling, backfilling, grading, clean-up, and reclamation/restoration practices in the event of frozen ground conditions.

8.7.1 Snow Management

Snow management may involve windrowing over the trench to prevent frost penetration along the trench line. The windrowed snow pack can be removed immediately prior to resuming trenching operations. Snow can also be graded along the ROW travel lanes to improve driving conditions.

8.7.2 Topsoil Salvage – Frozen Soil Conditions

During winter/frozen conditions, topsoil salvage will take place in an area approximately 10 feet wide over the centerline of the trench. Stripping activities will be limited to equipment capable of accurately stripping variable depths of topsoil or rip frozen topsoil to the same depth as the salvage requirements. If constructing through frozen wetlands, ensure stripped material is not stockpiled on adjacent uplands.

8.7.3 Backfilling

Backfill the pipeline trench and compact to minimize trench settlement. The lower lift of subsoil will be compacted prior to backfilling with the upper lift topsoil material. Whenever possible, mixing of soil and backfill material should be avoided. If necessary, postpone feathering-out of excess backfill until after winter conditions and soil settlement.

8.7.4 Grading

Final grading should be scheduled for spring to avoid frozen conditions that may impair restoration of the ROW.

8.7.5 Clean-Up

Final clean-up will be performed following backfilling and in the late winter or early spring once the trench soil settlement has occurred. Stockpiles and grade cuts should be stabilized to reduce wind and water induced soil erosion. Permanent stormwater BMPs (e.g., cross ditches and berms) can be installed in the spring, as necessary.

8.7.6 Reclamation/Restoration

Once the weather is conducive for grading operations, vehicle ruts, erosion gullies, and trench spoil will be contoured in preparation for final reclamation. Excess material can be feathered-out over the ROW to minimize soil mounds and trench crowns. Tillage and seeding operations will then be conducted in the spring to take advantage of optimum germination conditions.

8.8 SENSITIVE PLANTS CONTINGENCY PLAN

The proposed Vantage Pipeline traverses a number of distinct vegetation communities, each supporting a vast array of plant species. Preliminary consultation with the USFWS did not indicate any Threatened or Endangered plant species in Divide and Williams Counties. Sensitive plant species that may be encountered in the construction area are identified in the environmental report. Due to the timing of the environmental surveys conducted during the fall of 2010, an evaluation of sensitive plant species was not completed. A survey of sensitive plant species to be conducted during the spring of 2011 will target wetland and riparian communities within the construction limits.

8.8.1 Potential Mitigation Measures

The preferred option in all cases will be avoidance of the plant species of concern. Should avoidance not be feasible, other mitigative options may include:

- Reduce the width of construction on the proposed ROW or TWS (neck down);
- Erect barrier-fencing or buffers;
- Provide protective matting or temporary bridges;
- Employ salvage, propagation and/or transplanting techniques; and
- Take measures to conserve the seed bank (soil handling practices).

8.9 WILDLIFE CONTINGENCY PLAN

Note: To be updated during June 2011 upon completion on wildlife surveys and completion of review with the US Fish and Wildlife Service and other agencies.

8.9.1.1 Introduction

The following mitigation plan pertains primarily to issues regarding species protected under the federal *Migratory Bird Treaty Act*, the *Bald and Golden Eagle Protection Act*, the *Endangered Species Act*, and critical habitat designated by the USFWS.

8.9.2 Identification of Existing Wildlife Issues

Wildlife and wildlife habitat surveys will be conducted prior to construction, including a pre-construction survey of the proposed ROW and TWS, to locate, identify and reconfirm wildlife and habitat-related issues. Site-specific mitigation measures will be developed by professional biologists, and in consultation with appropriate government agencies, to minimize the project's potential impact(s) on the wildlife species and/or habitat. Locations for specific mitigation measures will be identified on the project alignment sheets.

The project's environmental monitor will be responsible for ensuring that all recommended wildlife mitigation measures for a particular issue/species are followed during all phases of construction and reclamation.

8.9.3 Wildlife Contingency Response

A pre-construction wildlife survey is planned for the proposed ROW and TWS for the year of construction, and will be conducted as close to the start of construction activities (including site preparation/staking) as possible. The survey will determine if ground nesting species are present within the construction limits. During the pipeline construction phase, all employees, contractors and consultants will undergo orientation regarding species and habitat of concern that potentially may occur in the project area.

The possibility exists that previously unreported wildlife issues will be discovered immediately prior to or during construction. In that event, construction activities are to be halted and the environmental monitor must be notified. If appropriate, USFWS or other applicable government agencies will be contacted. The construction activities within that area may not resume until an approved mitigation plan has been prepared.

8.9.4 Wildlife Mitigation Measures

General wildlife-related mitigation measures that will be employed throughout the entire construction phase and over the entire length of the ROW include the following:

- use of “good housekeeping” practices to maintain a garbage-free work area (refer to Waste Management Plan for full details);
- all materials, chemicals and equipment will be removed from the site at completion of the project;
- all fuel burning equipment meet emission guidelines;
- all chemicals will be stored in double-walled containers or in secondary containment;
- used chemicals are stored for transportation off site for proper handling;
- in the event of a spill, the SPCC plan will be implemented immediately;
- vehicle servicing and refueling will occur in accordance with the SPCC Plan;
- vehicles will be monitored for petroleum leaks;
- any hazardous waste material generated by project construction or operation will be disposed of in a manner specified by state and federal regulations or as outlined in the Waste Management Plan;
- spill response materials will be kept readily available onsite; and
- in order to avoid disturbance to waterfowl and other wildlife, it is recommended that clearing and construction activities occur outside of the breeding season (February 1 to July 15).

Concerns and stipulations identified by the USFWS during preliminary consultation are identified in Table A-13. Potential mitigation measures that may be utilized in response to specific potential impacts on wildlife and/or wildlife habitat as a result of construction activities are also listed in Table A-13.

Table A-13. Recommended Wildlife Mitigation Measures

POTENTIAL IMPACT	PROTECTION MEASURES
Disturbance of Wildlife	<ul style="list-style-type: none"> • A “no feeding or harassment of wildlife” policy will be implemented and enforced • Employees will undergo wildlife orientation, which will encompass no wildlife feeding and wildlife avoidance, among other topics • Project personnel will not be allowed to have pets on site • All project activities will be contained to the project area. Personnel movement will be restricted to the project area and access routes • Artificial lighting will be directed toward project facilities to avoid light disturbance to surrounding wildlife • Timing restrictions (daily or seasonal) will be placed on construction activities in accordance with Table A-14 • Dust control measures will be implemented when needed
Disturbance of Migratory Bird Nests	<ul style="list-style-type: none"> • In order to avoid disturbance to nesting migratory birds and other species, construction will be avoided in habitats with high potential for migratory birds during the breeding season • If this is not feasible the ROW will be cleared to prevent nesting, particularly within native prairie, pasture and shelterbelt habitats • If pre-mowing is not feasible a bird nest survey adjacent to the ROW is recommended within the 7 days prior construction; if nests of migratory birds are found on the ROW, it is recommended to avoid activities in vicinity of the nest until the young have fledged from the nest site • If construction is scheduled in areas where Sprague’s Pipits have been recorded during the nesting season, it is recommended that a pre-construction survey be completed within the 7 days prior to construction. If a nest is found, USFWS would be contacted and construction may be delayed
Destruction, Degradation or Alteration of Wildlife Habitat	<ul style="list-style-type: none"> • Take measures to avoid disturbance of wildlife sensitive areas • Minimize disturbance to wetlands and drainages; maintain vegetative buffer zones around stream riparian areas by extending bore lengths • Existing trails and disturbed areas will be used where possible to minimize the addition of new linear corridors • The proposed project site will be restored to pre-project conditions. Surrounding lands with similar habitat will be used as reference sites • Protection will be provided for trees, shrubbery, and other vegetation not designated for removal during project construction • Install silt fences and other BMPs as necessary for erosion control • Appropriate seed mixes will be utilized to reclaim native prairie and other uncultivated habitats along the ROW • Narrowing, rerouting or altering of proposed ROW or TWS may be necessary to avoid sensitive habitats
Restriction of Wildlife Movement	<ul style="list-style-type: none"> • Minimizing open trench areas during construction will reduce the likelihood of wildlife falling into the trench • Provide 20 ft wide break in spoil pile every ¼ mile to allow wildlife movement across the pipeline ROW • Provide 2:1 sloped plugs every 1/4 mile along open trench to allow wildlife to escape from the trench • The trench should be checked at least twice daily for trapped wildlife which would be removed by the environmental monitor

Table A-13. Recommended Wildlife Mitigation Measures, continued

Increased Risk of Wildlife Mortality	<ul style="list-style-type: none"> • Posting speed limits and signage along the ROW, access roads, and known wildlife crossings would minimize vehicle/wildlife collisions • Vehicle numbers and trips will be limited and workers will be informed of sensitive areas along the ROW • Project personnel will not be permitted to have firearms on the project site • Hunting and fishing while on the project site or in the vicinity of the project area, including during travel to and from the site is prohibited. Infringement of this policy will be reported and may result in disciplinary measures • During temporary closures, all open holes will be fenced or blocked, in order to prevent wildlife entrapment • An environmental monitor will be employed to reduce potential effects of movement barriers and wildlife mortality during construction
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8.9.5 Wildlife Monitoring

A wildlife monitor will be employed to detect the presence of Whooping Cranes during the crane migration period. All monitoring will be conducted from the active work areas to detect the presence of migrating birds within one mile of the work area. If birds are sighted within this distance, work would be discontinued within the one mile buffer area until the birds have left the area.

8.10 CULTURAL RESOURCES CONTINGENCY PLAN

A Class III cultural resource inventory conducted along the pipeline corridor identified 64 sites and 17 isolated finds. Vantage Pipeline has successfully avoided all sites through the use of reroutes and neck-downs. However, it is likely that a number of unforeseen changes in the pipeline route and/or the need for minor road improvements will be identified in advance of construction. Upon notification of potential impacts outside of the identified ROW, a cultural resource specialist will conduct a survey of the area to be conducted in a manner consistent with the methods and standards used during the 2010 survey. If a site is identified, a field consultation with Vantage personnel will be conducted to determine if changes can be implemented in order to avoid site impact.

If avoidance cannot be assured, the site will undergo immediate testing for eligibility determination, and if appropriate, Native American Tribal Monitors will be given the opportunity to examine the site. If the site is recommended as NRHP eligible, a determination of impact will be conducted. A report detailing the survey results shall be generated and submitted to the DoS, the appropriate federal and state land managing agencies and the North Dakota SHPO for review and comment. If an NRHP eligible site is present and cannot be avoided, the DoS will work with the appropriate agencies and Tribes to develop a programmatic agreement to mitigate the impacts associated with construction.

8.10.1 Procedures at Time of Discovery of Unanticipated Cultural Resources

Tribal and archeology monitors will be present for ground disturbing activities conducted above glacial deposits. They will help to ensure construction stays within the temporary workspace near cultural sites and that proper procedures are followed in the case of unexpected discoveries. The construction crew and safety inspectors will also be given the name and phone number of the archeologist representing Vantage, if unexpected discoveries are found and a monitor is not immediately available.

If unanticipated cultural resources² are discovered during construction, all construction activity will immediately cease within 50 feet in all directions from the discovery. The archeologist will ascertain the nature of the cultural material, the extent of the cultural material, and the potential for intact deposits through an examination of the ground surface, backfill piles, and exposed construction surfaces. The consultant archeologist will also discuss the potential for additional impacts to the cultural resource with the construction manager. Based on this examination, the consultant archeologist will make an initial determination of the significance of the discovery as: (1) not a site (e.g., not cultural, an isolated find, or less than 50 years in age); (2) a National Register of Historic Places (NRHP)-ineligible site (e.g., a sparse scatter of historic artifacts with little potential for intact deposits); (3) a NRHP-eligible or culturally sensitive site for which no further impacts are likely to occur; (4) a NRHP-eligible or culturally sensitive site (e.g. .exposed hearths, house pits) that is likely to be impacted with further construction; or (5) a site for which additional information is required to ascertain extent and NRHP eligibility. If the discovery is not a site, the consultant archeologist will approve the resumption of construction. If the finding is a site, the consultant archeologist will provide information about the cultural resource to the DoS, the NDSHPO, and, if necessary, Tribes, who will determine the most appropriate action. In the event that a cultural resource specialist or other necessary persons are not immediately available, Vantage Pipeline will require that the discovery be protected until such time that the cultural resource specialist can be present for inspection and evaluation. Construction will not resume within the no-disturbance zone until approved by the DoS or approved agency.

8.10.2 Emergency Salvage of Cultural Resources

Unstable earth conditions in trenches or other unforeseen natural or cultural events could endanger cultural resources discovered during construction of the pipeline. If cultural resources are in imminent danger of destruction, Vantage Pipeline will apply prudent methods to stabilize landforms around the unanticipated discovery. Once stabilized, the resource shall be assessed as described above in Section 8.10.1, subject to safety concerns. If the site is deemed significant and in immediate danger of destruction, immediate excavation measures may be discussed with the DoS and approved by phone. If the site is not in immediate danger of destruction, a mitigation plan will be developed for later excavation. This may occur after construction is complete.

8.10.3 Unexpected Discovery of Human Remains and Funerary Objects

Human remains encountered in a discovery situation shall be handled according to the provisions of the North Dakota burial laws. Unless evidence proves otherwise, unmarked graves shall be considered Native American. For graves or human remains encountered, Vantage Pipeline shall follow the steps listed below:

- 1.) Immediately stop work on the location of human remains. This shall include removing all equipment from the site to an adequate distance to assure site protection. This will be site-specific, depending on the extent of the discovery and the topography of the site;

² For the purpose of this report a cultural resource is any tangible or observable evidence of human activity that is over 50 years in age, regardless of significance. Cultural resources consist of objects, sites, structures, or landscapes. Evidence of cultural activity can include artifacts (e.g. flaking debris, bone, bottle glass shards), features (e.g., charcoal stains, patterned arrangements of rock), as well as human remains and/or funerary objects.

- 2.) Depending on location, either the Divide County Sheriff or the Williams County Sheriff shall be notified as per Subsection 4, NDCC 23-06-27. Divide County Sheriff at Crosby (701) 965-6461. Williams County Sheriff at Williston (701) 577-7700;
- 3.) Notify the designated representative of the State Historical Society of North Dakota within 24 hours. The representative shall examine the remains and carry out the activities described in NDAC 40-02-03-04;
- 4.) If the burial is Native American, establish a meeting that includes Native Americans (a representative of the North Dakota Intertribal Reinterment Committee), the landowner/stewards, the designated representative of the State Historical Society Board, The North Dakota State Health Department, and the appropriate federal and state agencies. In addition, a representative of Vantage Pipeline shall also be notified. To insure that both the disturbed remains receive the maximum protection and that costly delays are avoided, this meeting will be conducted, if possible, within 24 to 36 hours of discovery; and
- 5.) Protect the remains from further disturbance until a consensus for the care of the human remains has been achieved. It is anticipated that any such remains will be buried at the location designated by North Dakota Intertribal Reinterment Committee representatives.

Site avoidance is preferred and generally feasible within a pipeline construction zone. If a site can be avoided, Vantage shall establish an appropriate setback and mark it as a “no disturbance” area.

For any graves that are relocated, Vantage shall pay reinterment costs. No scientific study shall be conducted on grave remains or burials excavated for reinterment deemed disrespectful of their spiritual and sacred nature. Grave remains will not be sent to local, state or federal agencies, universities, or research institutions for scientific study, unless approved by the North Dakota burial board. Additional cultural resource contingencies may apply per the recommendations of the DoS, concerning mitigation of discovery sites as well as during the Native American Consultation process.

8.10.4 Emergency Response

In the event of an accident or malfunction that may impact cultural resources, the supervising archeologist will be contacted once the area has been deemed safe and all necessary repairs have taken place. The archeologist shall consult with the Contractor, Vantage, and the appropriate state and/or federal agencies. If applicable, mitigation may be required to salvage or protect impacted cultural resources.

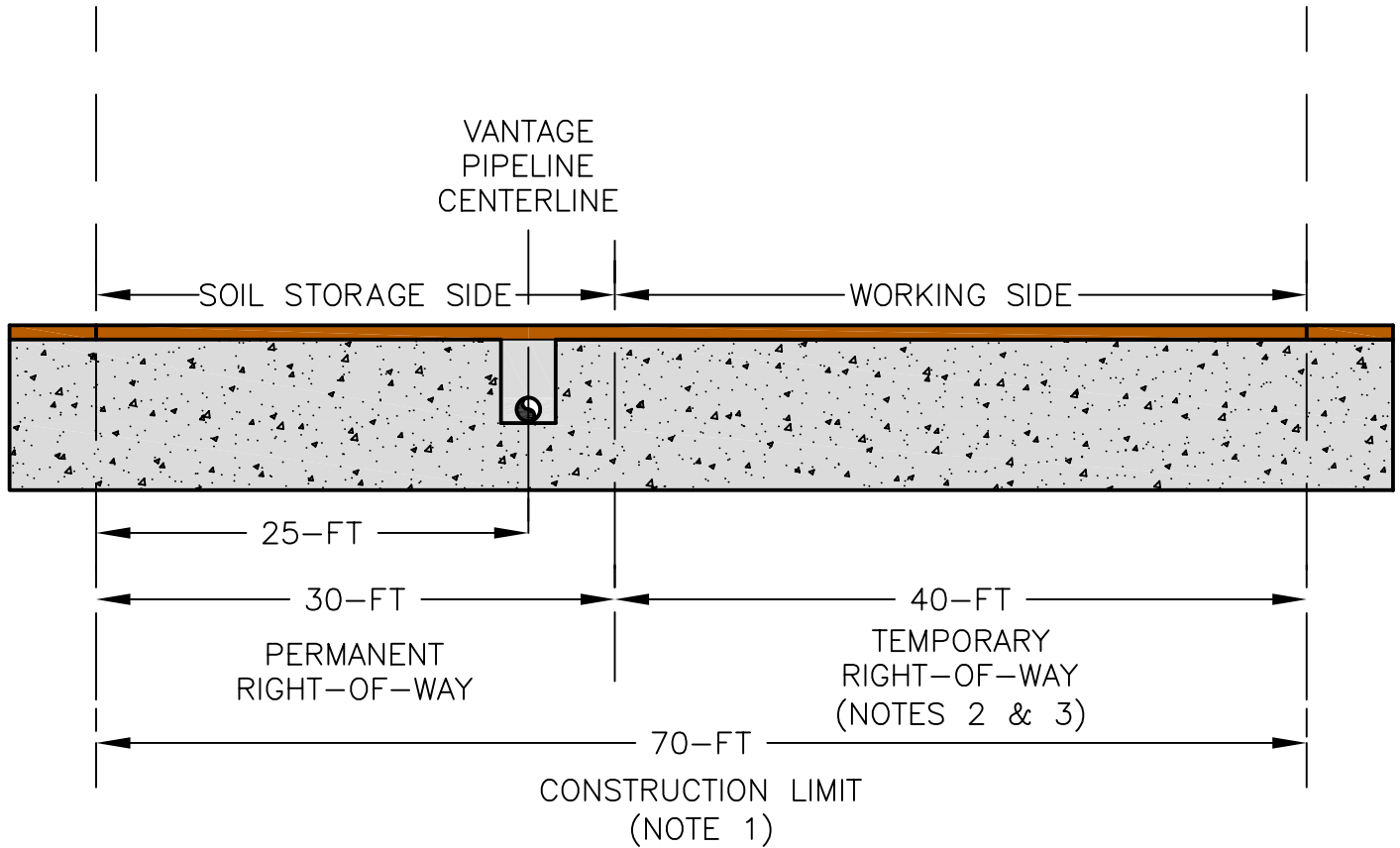
8.10.5 Curation or Disposition of Cultural Materials

All non-human and funerary cultural materials recovered from privately owned lands are the property of the landowner. Cultural materials will be returned to those landowners after analysis is complete. There is no provision at this time to curate identified materials.

Attachment 1
Typical EPP Details

CONSTRUCTION
BOUNDARY

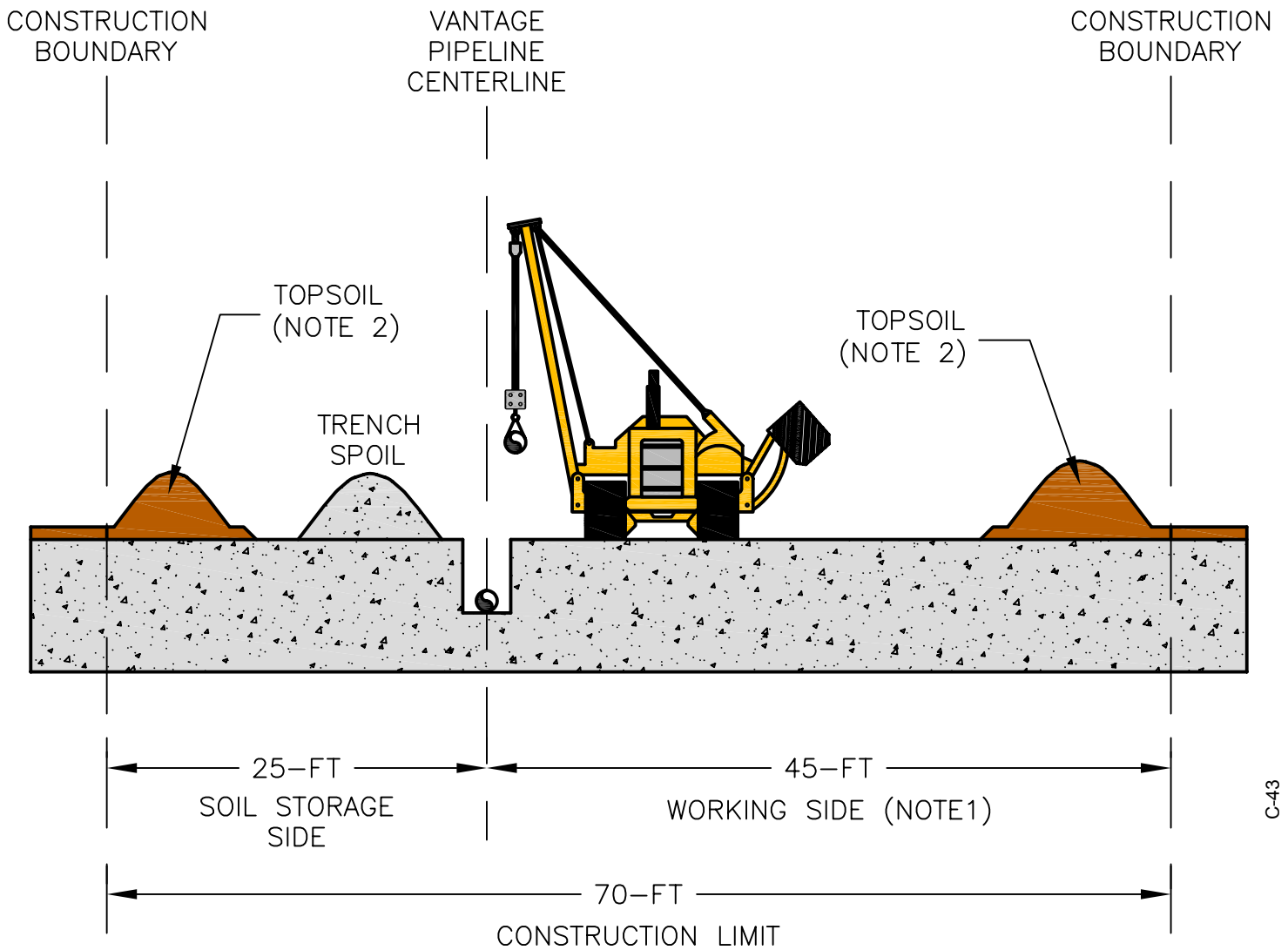
CONSTRUCTION
BOUNDARY



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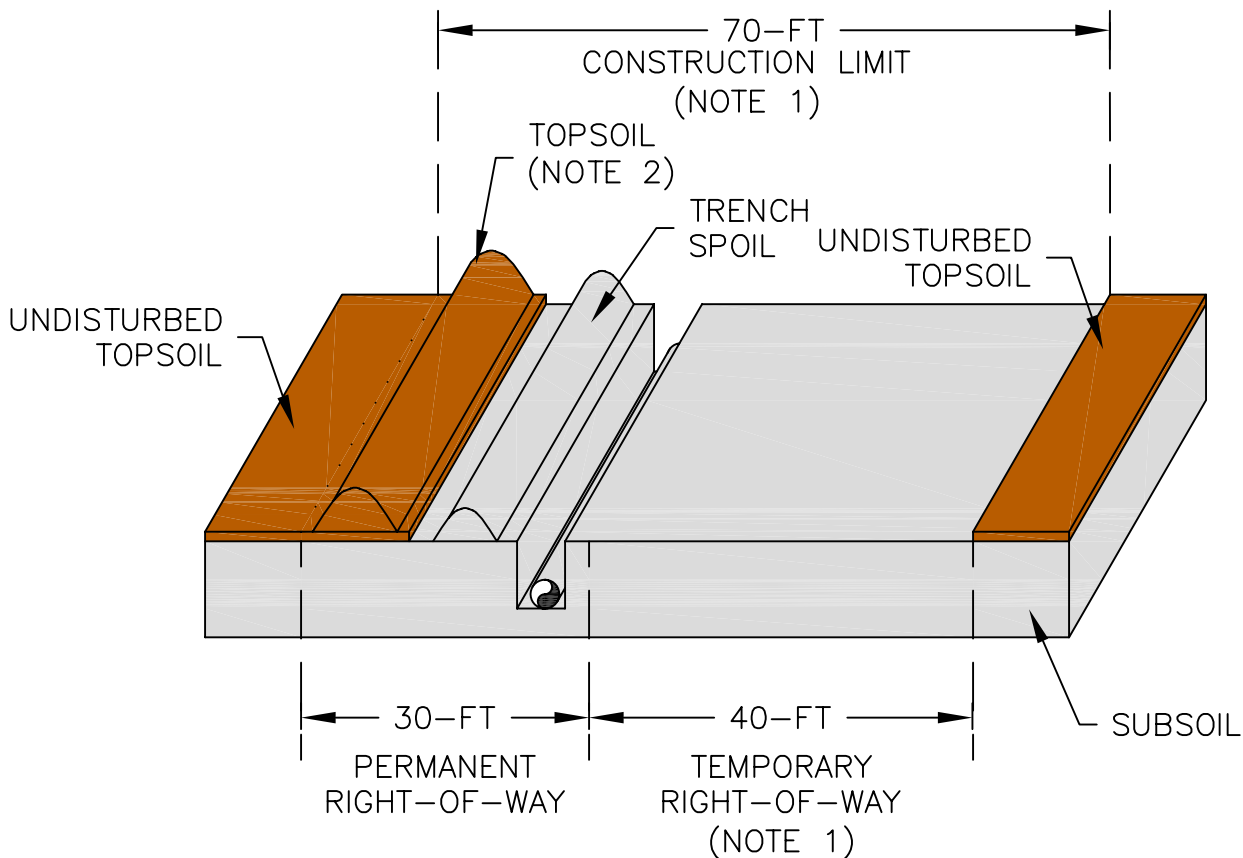
NOTES:

1. THE TYPICAL CONSTRUCTION LIMIT WIDTH WILL BE 70 FEET. THE WIDTH OF THE WORKING SIDE MAY BE DECREASED FOR SHORT DISTANCES IN LOCATIONS IDENTIFIED ON THE PLANS OR AS DIRECTED BY THE OWNER.
2. TEMPORARY RIGHT-OF-WAY WOULD BE LOCATED ON THE RIGHT SIDE OF THE ALIGNMENT UNLESS OTHERWISE NOTED ON THE PLANS.
3. ADDITIONAL TEMPORARY WORK SPACE MAY BE REQUIRED AT ROAD CROSSING LOCATIONS OR OTHER LOCATIONS IDENTIFIED ON THE CONSTRUCTION PLANS.
4. THIS DETAIL HAS BEEN PREPARED FOR ENVIRONMENTAL REVIEW PURPOSES ONLY.



NOTES:

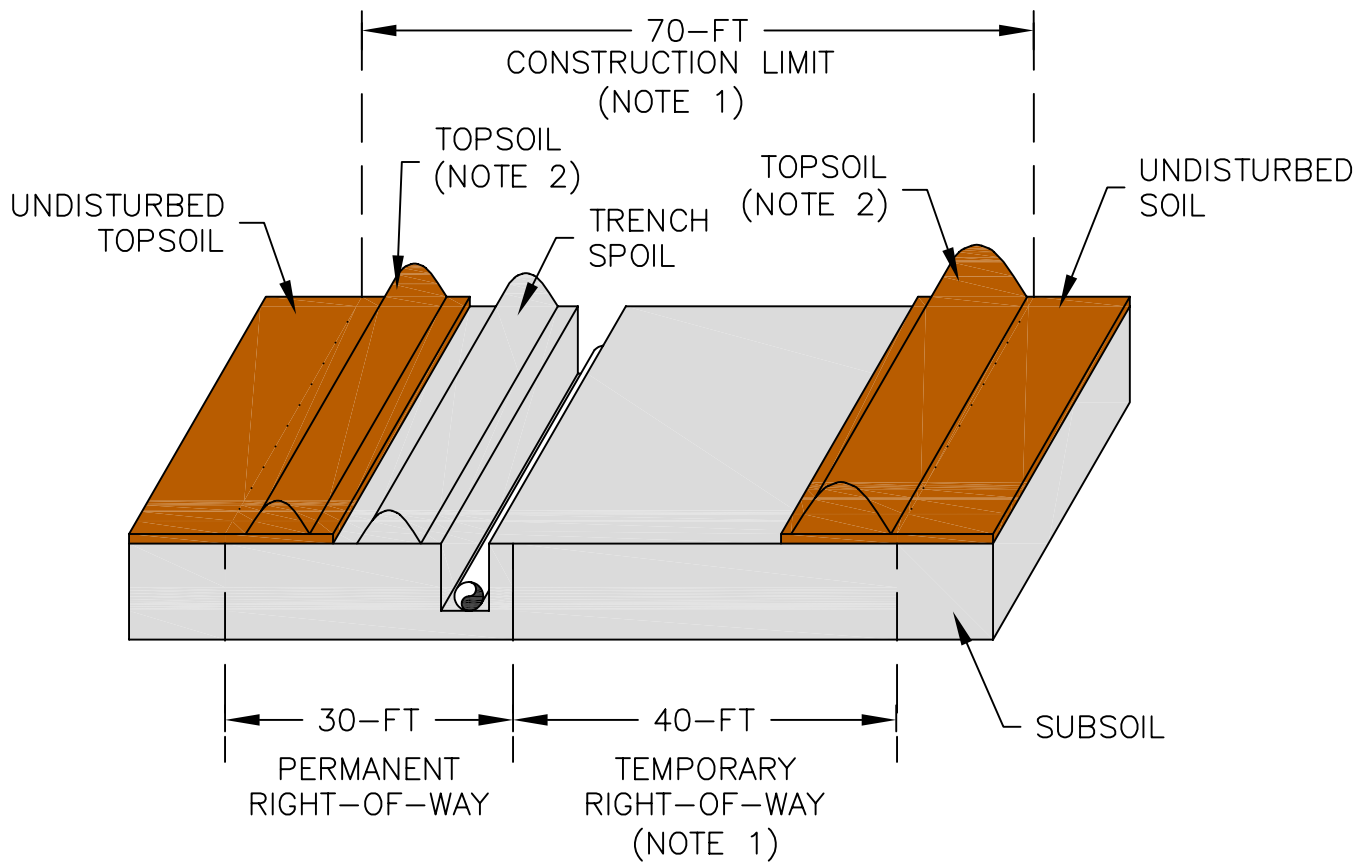
1. THE TYPICAL CONSTRUCTION LIMIT WIDTH WILL BE 70 FEET. THE WIDTH OF THE WORKING SIDE WOULD BE DECREASED FOR SHORT DISTANCES IN LOCATIONS IDENTIFIED ON THE PLANS OR AS DIRECTED BY THE PROJECT ENGINEER.
2. STOCKPILE TOPSOIL AND TRENCH SPOIL SEPARATELY. TOPSOIL MAY BE PLACED IN A SINGLE STOCK PILE OR SPLIT INTO TWO LOCATIONS. REFER TO SOIL HANDLING DETAILS 3 THROUGH 7.
3. THIS DETAIL HAS BEEN PREPARED FOR ENVIRONMENTAL REVIEW PURPOSES ONLY.



NOTES:

USE FULL ROW STRIPPING ON CULTIVATED LAND, AND ON GRASSLAND OR IMPROVED PASTURE LAND WHEN WET CONDITIONS MAY RESULT IN DEEP RUTTING.

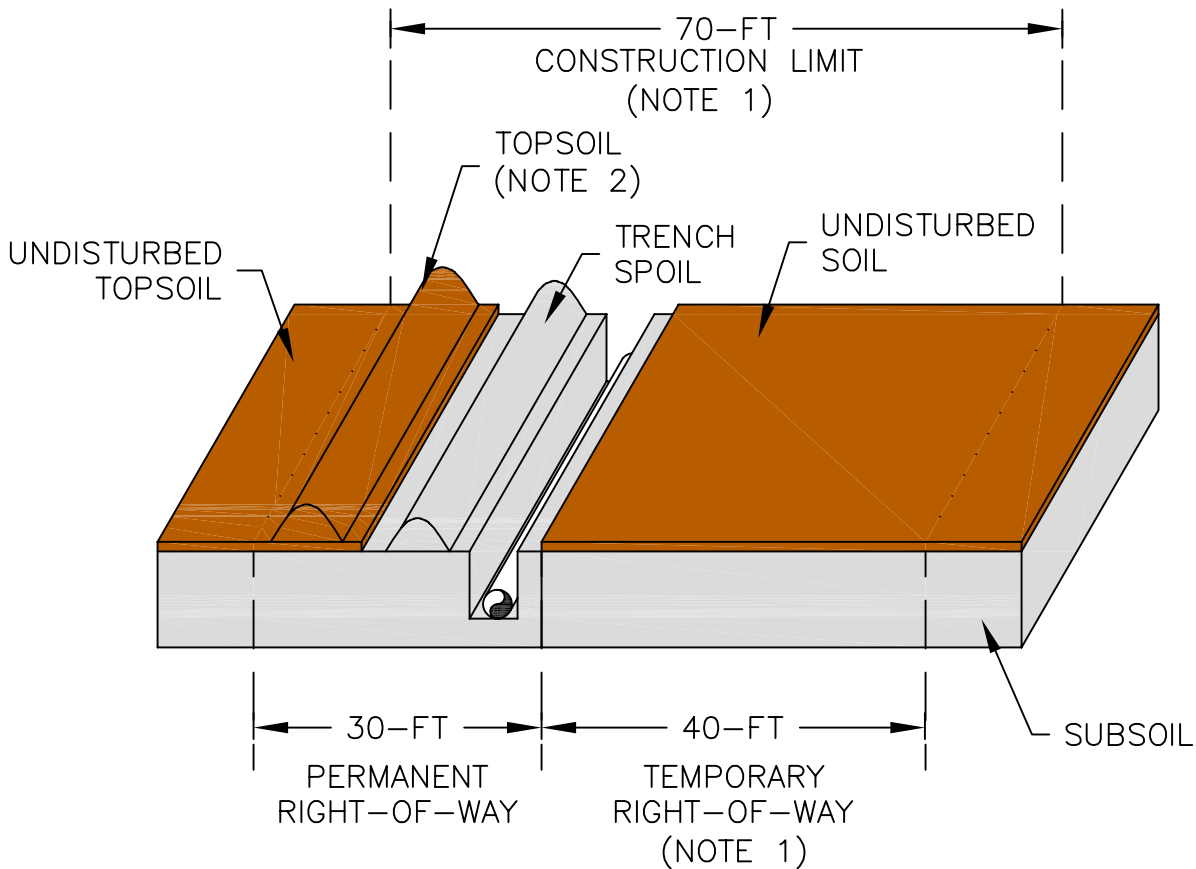
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2. TOPSOIL SHALL BE STRIPPED FROM THE AREA REQUIRED FOR SPOIL STORAGE, ABOVE THE TRENCH AND FROM THE WORK AREA. STRIP AND STOCKPILE TOPSOIL AND TRENCH SPOIL SEPARATELY. TOPSOIL STRIPPING IS NOT REQUIRED BELOW THE AREA REQUIRED FOR TOPSOIL STORAGE. PROVIDE ADEQUATE SEPARATION BETWEEN TOPSOIL AND SPOIL STOCKPILES TO PREVENT MIXING. TYPICAL A HORIZION DEPTH (TOPSOIL) FROM THE NRCS SOIL SURVEY IS INDICATED ON THE ALIGNMENT SHEETS AND IS INTEND AS A GUIDELINE. THE ACTUAL TOPSOIL SALVAGE DEPTH WILL VARY LOCALLY AND ADJUSTMENT OF DEPTH WILL BE REQUIRED TO SALVAGE ALL AVAILABLE TOPSOIL. SEVERAL PASSES USING A GRADER OR OTHER EQUIPEMENT MAY BE REQUIRED.
3. SOIL SALVAGE ACTIVITIES SHOULD NOT BE CONDUCTED IN WET CONDITIONS OR DURING HIGH WINDS IF SOIL IS PRONE TO WIND EROSION. DISCONTINE STRIPPING IN LOCATIONS WHERE BUFFERS ARE REQUIRED AT WATERWAYS, WETLANDS, OR OTHER SENSITIVE AREAS.
4. BACKFILL TRENCH WITH SPOIL AND COMPACT IN ACCORDANCE WITH PROJECT SPECIFICATIONS. PROVIDE CROWN OVER TRENCH USING AVAILABLE SPOIL TO ACCOMMODATE SETTLEMENT. CROWN SHOULD BE DISCONTINUED ACROSS DRAINAGEWAYS.
5. PROVIDE SUBSOIL COMPACTION RELIEF IF REQUIRED AND DISC TO BREAKUP LARGE CLODS IF NECESSARY. REMOVE OVERSIZED BOULDERS PRIOR TO TOPSOIL PLACEMENT.
6. PLACE TOPSOIL EVENLY ACROSS ENTIRE WORK AREA USING GRADER OR OTHER EQUIPEMENT. MAINTAIN CROWN OVER TRENCH CENTERLINE. REMOVE OVERSIZED MATERIALS FROM FINAL SURFACE TO BE CONSISTENT WITH LOCAL CONDITIONS.



NOTES:

USE FULL ROW STRIPPING ON CULTIVATED LAND, AND ON GRASSLAND OR IMPROVED PASTURE LAND WHEN WET CONDITIONS MAY RESULT IN DEEP RUTTING.

1. THE TYPICAL CONSTRUCTION WIDTH WILL BE 70 FEET. THE WIDTH OF THE WORKING SIDE MAY BE DECREASED FOR SHORT DISTANCES IN LOCATIONS IDENTIFIED ON THE PLANS OR AS DIRECTED BY THE PROJECT ENGINEER.
2. TOPSOIL SHALL BE STRIPPED FROM THE AREA REQUIRED FOR SPOIL STORAGE, ABOVE THE TRENCH AND FROM THE WORK AREA. STRIP AND STOCKPILE TOPSOIL AND TRENCH SPOIL SEPARATELY. TOPSOIL STRIPPING IS NOT REQUIRED BELOW THE AREA REQUIRED FOR TOPSOIL STORAGE. PROVIDE ADEQUATE SEPARATION BETWEEN TOPSOIL AND SPOIL STOCKPILES TO PREVENT MIXING. TYPICAL A HORIZION DEPTH (TOPSOIL) FROM THE NRCS SOIL SURVEY IS INDICATED ON THE ALIGNMENT SHEETS AND IS INTEND AS A GUIDELINE. THE ACTUAL TOPSOIL SALVAGE DEPTH WILL VARY LOCALLY AND ADJUSTMENT OF DEPTH WILL BE REQUIRED TO SALVAGE ALL AVAILABLE TOPSOIL. SEVERAL PASSES USING A GRADER OR OTHER EQUIPEMENT MAY BE REQUIRED.
3. SOIL SALVAGE ACTIVITIES SHOULD NOT BE CONDUCTED IN WET CONDITIONS OR DURING HIGH WINDS IF SOIL IS PRONE TO WIND EROSION. DISCONTINE STRIPPING IN LOCATIONS WHERE BUFFERS ARE REQUIRED AT WATERWAYS, WETLANDS, OR OTHER SENSITIVE AREAS.
4. BACKFILL TRENCH WITH SPOIL AND COMPACT IN ACCORDANCE WITH PROJECT SPECIFICATIONS. PROVIDE CROWN OVER TRENCH USING AVAILABLE SPOIL TO ACCOMMODATE SETTLEMENT. CROWN SHOULD BE DISCONTINUED ACROSS DRAINAGeways.
5. PROVIDE SUBSOIL COMPACTION RELIEF IF REQUIRED AND DISC TO BREAKUP LARGE CLODS IF NECESSARY. REMOVE OVERSIZED BOULDERS PRIOR TO TOPSOIL PLACEMENT.
6. PLACE TOPSOIL EVENLY ACROSS ENTIRE WORK AREA USING GRADER OR OTHER EQUIPEMENT. MAINTAIN CROWN OVER TRENCH CENTERLINE. REMOVE OVERSIZED MATERIALS FROM FINAL SURFACE TO BE CONSISTENT WITH LOCAL CONDITIONS.

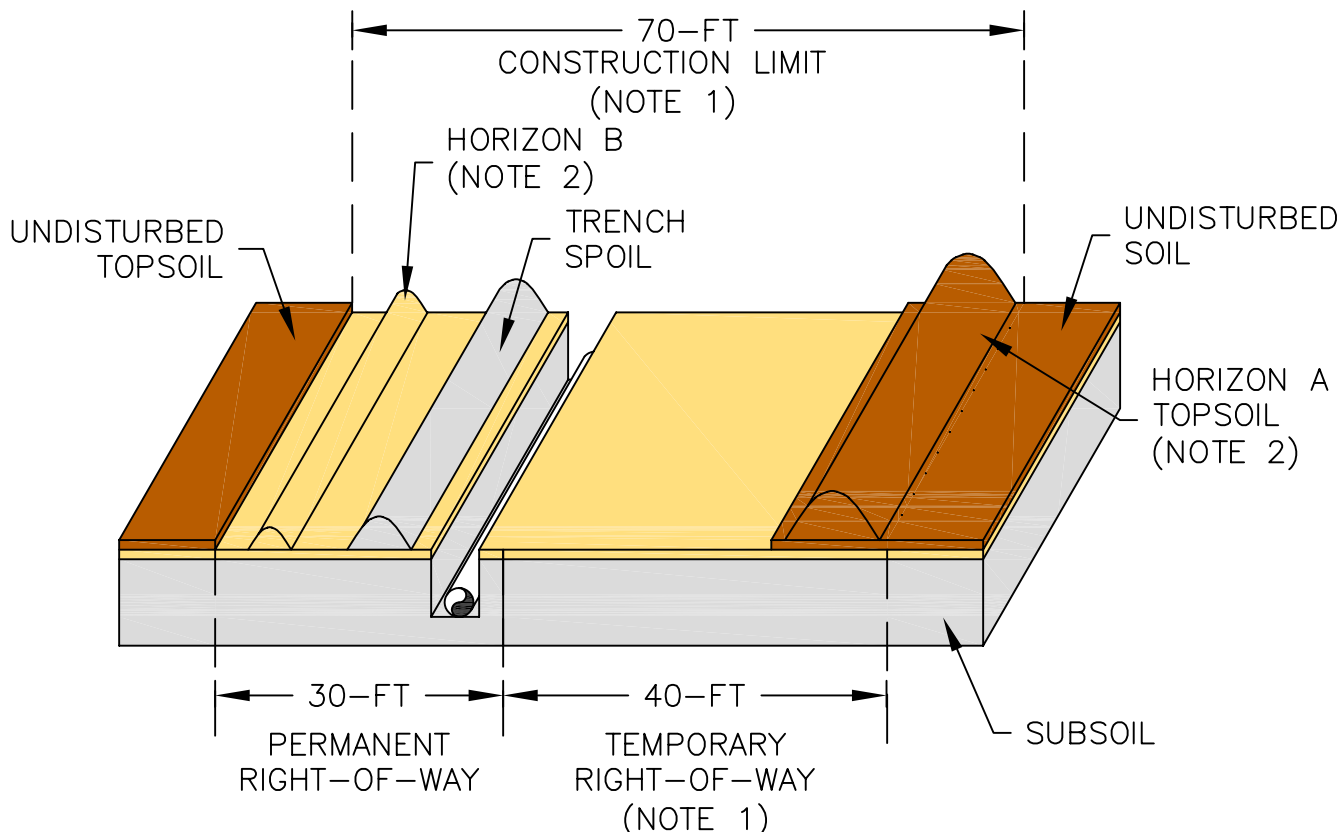


NOTES:

LIMIT STRIPPING TO PERMANENT ROW ON CULTIVATED LAND, ON GRASSLAND OR IMPROVED PASTURE LAND FOR SOILS PRONE TO EXCESSIVE WIND EROSION. OPTION 3 MAY BE USED IN LOCATIONS WHERE THE WIDTH OF STRIPPING WOULD BE LIMITED.

1. THE TYPICAL CONSTRUCTION WIDTH WILL BE 70 FEET. THE WIDTH OF THE WORKING SIDE MAY BE DECREASED FOR SHORT DISTANCES IN LOCATIONS IDENTIFIED ON THE PLANS OR AS DIRECTED BY THE PROJECT ENGINEER.
2. TOPSOIL SHALL BE STRIPPED FROM THE PERMANENT ROW AREA REQUIRED FOR SPOIL STORAGE, AND AREA ABOVE THE TRENCH. STRIP AND STOCKPILE TOPSOIL AND TRENCH SPOIL SEPARATELY. TOPSOIL STRIPPING IS NOT REQUIRED BELOW THE AREA REQUIRED FOR TOPSOIL STORAGE. PROVIDE ADEQUATE SEPARATION BETWEEN TOPSOIL AND SPOIL STOCKPILES TO PREVENT MIXING. TYPICAL A HORIZION DEPTH (TOPSOIL) FROM THE NRCS SOIL SURVEY IS INDICATED ON THE ALIGNMENT SHEETS AND IS INTEND AS A GUIDELINE. THE ACTUAL TOPSOIL SALVAGE DEPTH WILL VARY LOCALLY AND ADJUSTMENT OF DEPTH WILL BE REQUIRED TO SALVAGE ALL AVAILABLE TOPSOIL. SEVERAL PASSES USING A GRADER OR OTHER EQUIPEMENT MAY BE REQUIRED.
3. SOIL SALVAGE ACTIVITIES SHOULD NOT BE CONDUCTED WHEN IN WET CONDITIONS OR DURING HIGH WINDS IF SOIL IS PRONE TO WIND EROSION. DISCONTINUE STRIPPING IN LOCATIONS WHERE BUFFERS ARE REQUIRED AT WATERWAYS, WETLANDS, OR OTHER SENSITIVE AREAS.
4. BACKFILL TRENCH WITH SPOIL AND COMPACT IN ACCORDANCE WITH PROJECT SPECIFICATIONS. PROVIDE CROWN OVER TRENCH USING AVAILABLE SPOIL TO ACCOMMODATE SETTLEMENT. CROWN SHOULD BE DISCONTINUED ACROSS DRAINAGEWAYS.
5. REMOVE OVERSIZED BOULDERS FROM SURFACE PRIOR TO TOPSOIL PLACEMENT.
6. PLACE TOPSOIL EVENLY ACROSS ENTIRE WORK AREA USING GRADER OR OTHER EQUIPEMENT. MAINTAIN CROWN OVER TRENCH CENTERLINE. REMOVE OVERSIZED MATERIALS FROM FINAL SURFACE TO BE CONSISTENT WITH LOCAL CONDITIONS.

C-46

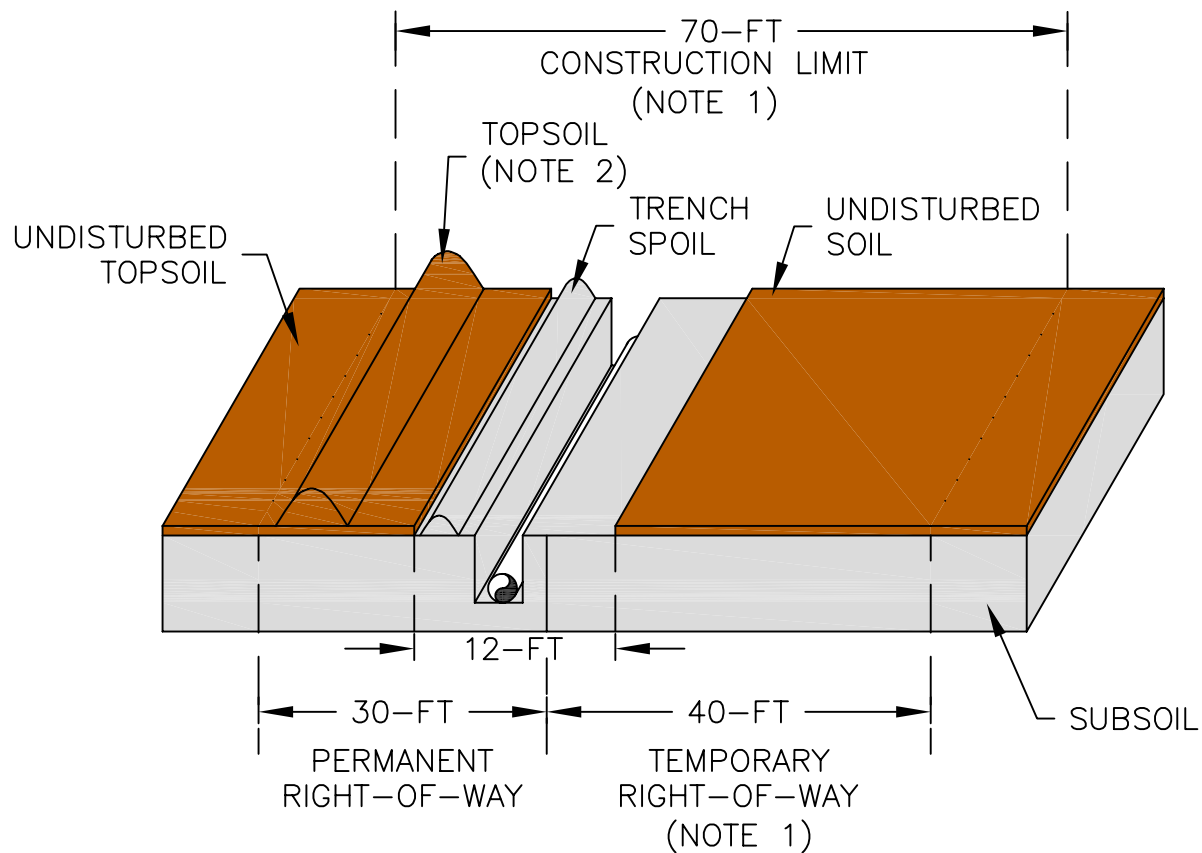


NOTES:

FULL WIDTH ROW STRIPPING ON LAND DESIGNATED AS PRIME FARM LAND. THE A & B HORIZION SOILS WOULD BE SALVAGED AT PRIME FARM LAND LOCATIONS.

1. THE TYPICAL CONSTRUCTION WIDTH WILL BE 70 FEET. THE WIDTH OF THE WORKING SIDE MAY BE DECREASED FOR SHORT DISTANCES IN LOCATIONS IDENTIFIED ON THE PLANS OR AS DIRECTED BY THE PROJECT ENGINEER.
2. TOPSOIL (A HORIZION SOIL) SHALL BE STRIPPED TO EXPOSE THE B HORIZION SOIL. THE A HORIZION SOIL WOULD BE STOCKPILED AT THE OUTSIDE EDGE OF THE TEMPORARY ROW. B HORIZION SOIL WOULD BE STRIPPED AND STOCKPILED WITHIN THE PERMANENT ROW. EXCAVATE TRENCH SPOIL AND STOCKPILE ADJACENT TO TRENCH. STOCKPILE B HORIZION SOIL AND TRENCH SPOIL SEPARATELY. TOPSOIL STRIPPING IS NOT REQUIRED BELOW THE AREA REQUIRED FOR TOPSOIL STORAGE. TYPICAL A AND B HORIZION DEPTHS BASED ON THE NRCS SOIL SURVEY IS INDICATED ON THE ALIGNMENT SHEETS AND IS INTEND AS A GUIDELINE. THE ACTUAL DEPTHS OF SOIL SALVAGE WILL VARY LOCALLY AND ADJUSTMENT OF DEPTH WILL BE REQUIRED TO SALVAGE AVAILABLE SOILS. SEVERAL PASSES USING A GRADER OR OTHER EQUIPEMENT MAY BE REQUIRED.
3. SOIL SALVAGE ACTIVITIES SHOULD NOT BE CONDUCTED WHEN IN WET CONDITIONS OR DURING HIGH WINDS IF SOIL IS PRONE TO WIND EROSION. DISCONTINUE STRIPPING IN LOCATIONS WHERE BUFFERS ARE REQUIRED AT WATERWAYS, WETLANDS, OR OTHER SENSITIVE AREAS.
4. BACKFILL TRENCH WITH SPOIL AND COMPACT PRIOR TO PLACING B HORIZION SOIL. USE CARE TO ENSURE SPOILS ARE REMOVED FROM B HORIZION SOILS BELOW SPOIL PILE. REPLACE AND COMPACT B HORIZION SOIL INTO TRENCH AND COMPACT IN ACCORDANCE WITH PROJECT SPECIFICATIONS. PROVIDE CROWN OVER TRENCH TO ACCOMMODATE SETTLEMENT. CROWN SHOULD BE DISCONTINUED ACROSS DRAINAGeways.
5. PROVIDE COMPACTION RELIEF IF REQUIRED AND DISK IF TO BREAKUP LARGE CLODS IF NECESSARY. REMOVE OVERSIZED BOULDERS PRIOR TO TOPSOIL PLACEMENT.
6. PLACE TOPSOIL EVENLY ACROSS ENTIRE WORK AREA USING GRADER OR OTHER EQUIPEMENT. MAINTAIN CROWN OVER TRENCH CENTERLINE. REMOVE OVERSIZED MATERIALS FROM FINAL SURFACE TO BE CONSISTENT WITH LOCAL CONDITIONS.

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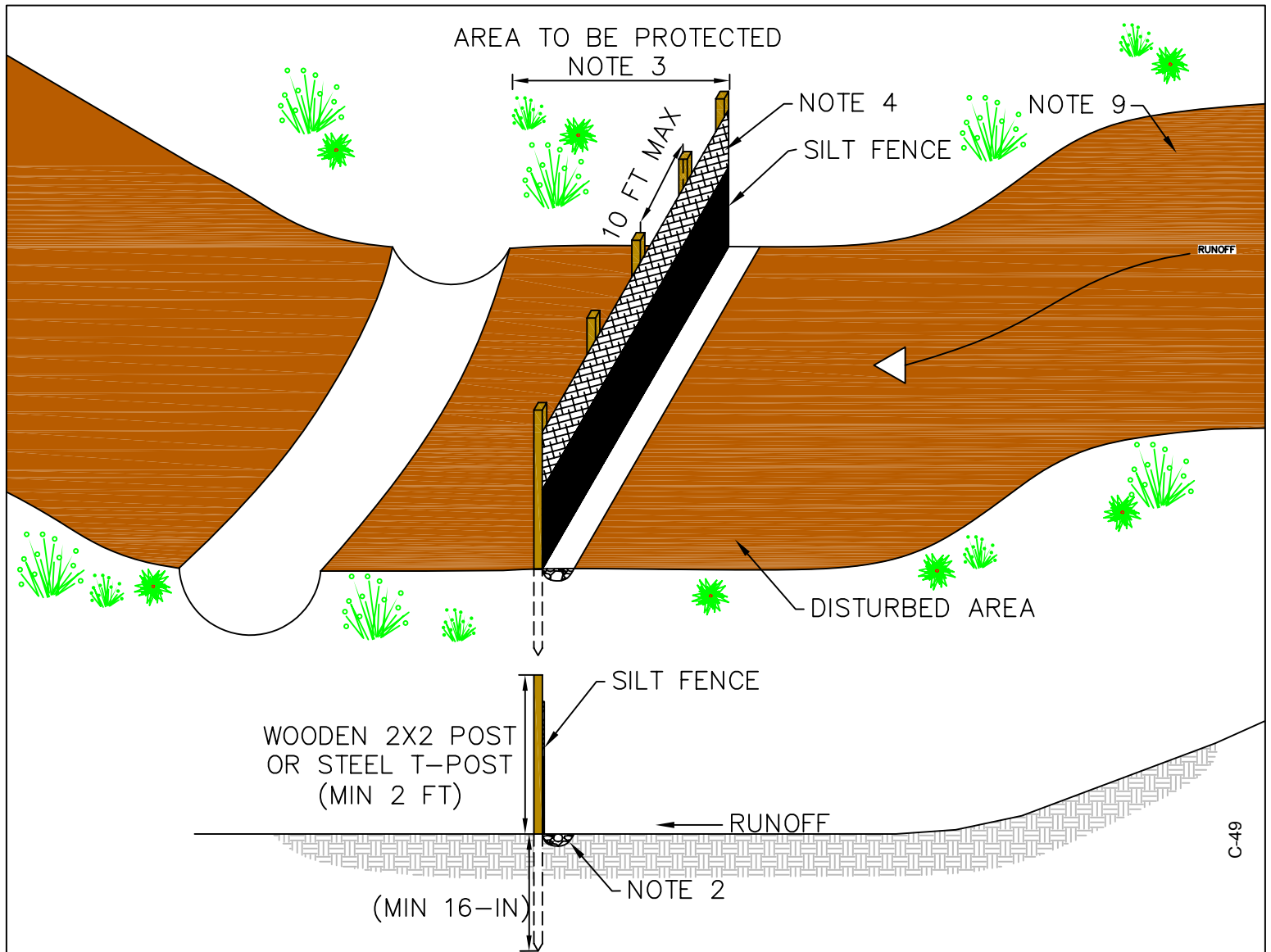


NOTES:

LIMIT STRIPPING TO PERMANENT ROW ON CULTIVATED LAND, ON GRASSLAND OR IMPROVED PASTURE LAND WHEN SOILS PRONE TO EXCESSIVE WIND EROSION. OPTION 3 MAY BE USED IN LOCATIONS WHERE THE WIDTH OF STRIPPING WOULD BE LIMITED.

1. THE TYPICAL CONSTRUCTION WIDTH WILL BE 70 FEET. THE WIDTH OF THE WORKING SIDE MAY BE DECREASED FOR SHORT DISTANCES IN LOCATIONS IDENTIFIED ON THE PLANS OR AS DIRECTED BY THE PROJECT ENGINEER.
2. TOPSOIL SHALL BE STRIPPED ONLY FROM THE AREA ABOVE THE TRENCH. STRIP AND STOCKPILE TOPSOIL AND TRENCH SPOIL SEPARATELY. PROVIDE ADEQUATE SEPARATION BETWEEN TOPSOIL AND SPOIL STOCKPILES TO PREVENT MIXING. TYPICAL A HORIZON DEPTH (TOPSOIL) FROM THE NRCS SOIL SURVEY IS INDICATED ON THE ALIGNMENT SHEETS AND IS INTEND AS A GUIDELINE. THE ACTUAL TOPSOIL SALVAGE DEPTH WILL VARY LOCALLY AND ADJUSTMENT OF DEPTH WILL BE REQUIRED TO SALVAGE ALL AVAILABLE TOPSOIL. SEVERAL PASSES USING A GRADER OR OTHER EQUIPEMENT MAY BE REQUIRED.
3. SOIL SALVAGE ACTIVITIES SHOULD NOT BE CONDUCTED IN WET CONDITIONS OR DURING HIGH WINDS IF SOIL IS PRONE TO WIND EROSION. DISCONTINE STRIPPING IN LOCATIONS WHERE BUFFERS ARE REQUIRED AT WATERWAYS, WETLANDS, OR OTHER SENSITIVE AREAS.
4. BACKFILL TRENCH WITH SPOIL AND COMPACT IN ACCORDANCE WITH PROJECT SPECIFICATIONS. PROVIDE CROWN USING AVAILABLE SPOIL OVER TRENCH TO ACCOMMODATE SETTLEMENT. AVOID DAMAGE TO SOD LAYER BELOW SPOIL. CROWN SHOULD BE DISCONTINUED ACROSS DRAINAGEWAYS.
5. REMOVE OVERSIZED BOULDERS FROM SUBSOIL SURFACE PRIOR TO TOPSOIL PLACEMENT.
6. PLACE TOPSOIL EVENLY ACROSS TRENCH AREA USING GRADER OR OTHER EQUIPEMENT. MAINTAIN CROWN OVER TRENCH CENTERLINE. REMOVE OVERSIZED MATERIALS TO BE CONSISTENT WITH LOCAL CONDITIONS.

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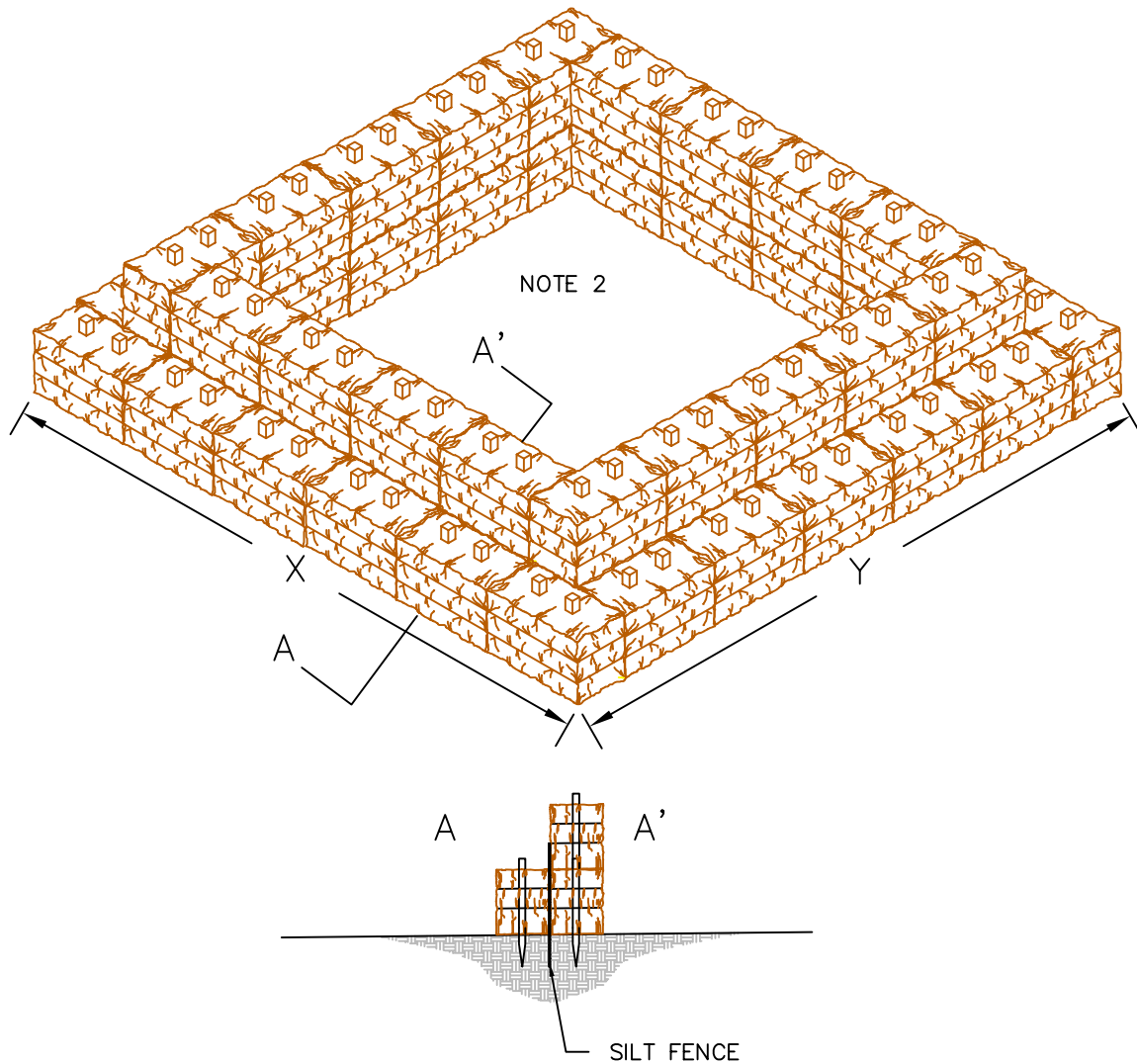


NOTES:

1. TEMPORARY SEDIMENT FENCE SHALL BE INSTALLED PRIOR TO ANY GRADING WORK IN THE AREA TO BE PROTECTED.
2. SILT FENCE MAY BE INSTALLED EITHER BY EXCAVATING AN ANCHOR TRENCH OR USING A SILT FENCE PLOW. ANCHOR TRENCH SHALL BE LOCATED ON UPHILL SIDE OF FENCE.
3. FIELD LOCATE SILT FENCING TO PROVIDE SEDIMENT CONTROL BETWEEN WATERWAYS OR WETLANDS LOCATED ADJACENT AND DOWNGRADIENT OF CONSTRUCTION DISTURBANCE. SILT FENCE SHOULD BE LOCATED TO PROVIDE A BUFFER OF UNDISTURBED VEGETATION BETWEEN WORK AREA AND PROTECTED AREA.
4. FOR LONG-TERM APPLICATIONS, WOVEN WIRE FENCE MAY BE FASTENED TO FENCE POST WITH TIES OR STAPLES.
5. FILTER CLOTH TO BE FASTENED SECURELY TO SMOOTH WIRE OR WOVEN WIRE FENCE WITH TIES.SPACED EVERY 24" ALONG TOP OF FABRIC.
6. WHEN TWO (2) SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX (6) INCHES AND FOLDED
7. SEDIMENT ACCUMULATION SHALL BE REMOVED WHEN BULGES DEVELOP IN THE SILT FENCE.
8. SILT FENCE SHALL BE MAINTAINED, AS NEEDED, THROUGHOUT THE CONSTRUCTION PERIOD AND REMOVED IN CONJUNCTION WITH THE FINAL GRADING AND SITE STABILIZATION.
9. PROVIDE SLOPE BREAKERS ABOVE SILT FENCE WHEN REQUIRED.
10. THIS DETAIL HAS BEEN PREPARED FOR ENVIRONMENTAL REVIEW PURPOSES ONLY.



**VANTAGE PIPELINE PROJECT
DETAIL 8 - TYPICAL SILT FENCE INSTALLATION**

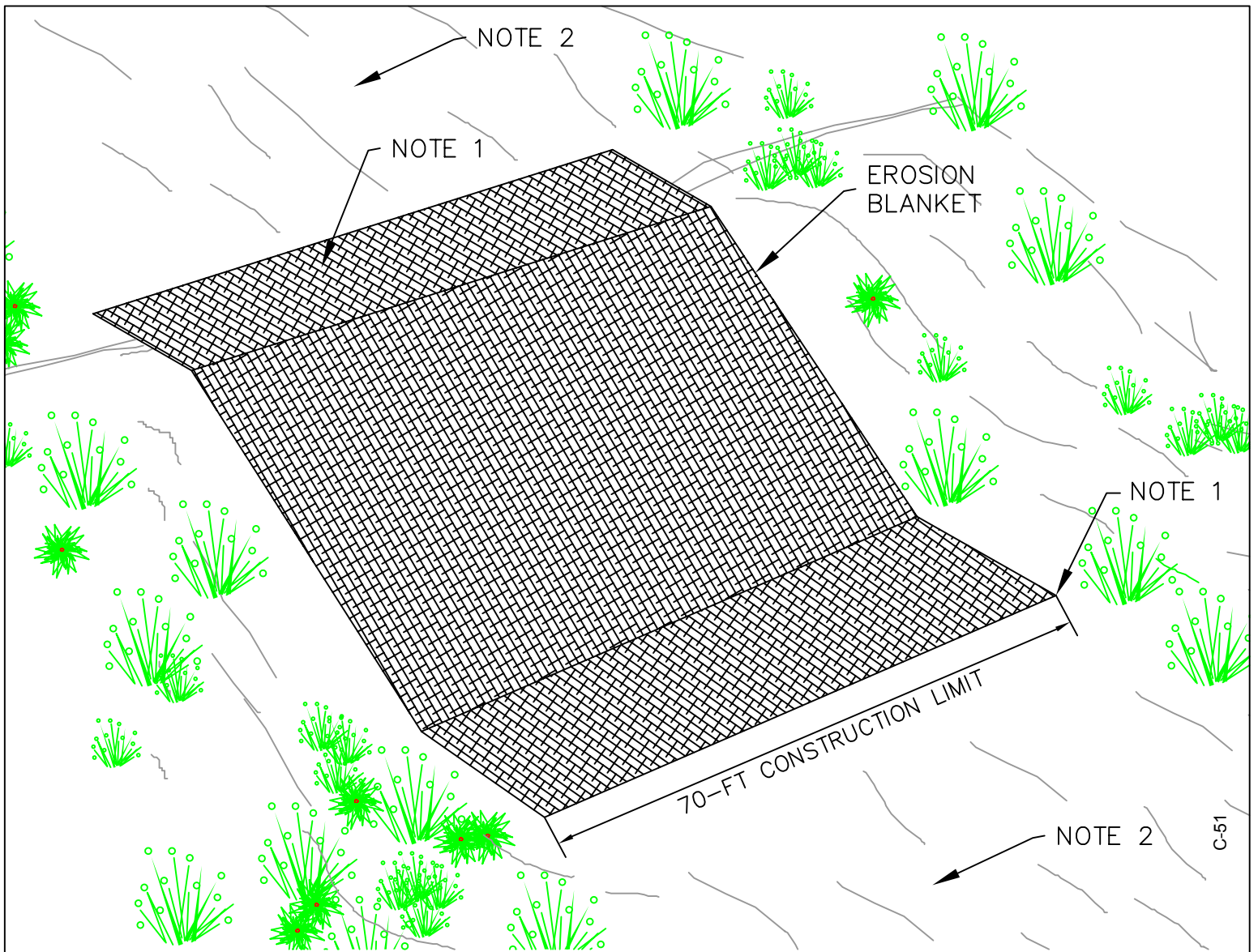


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NOTES:

1. ARRANGE THE STRAW BALES TO THE X AND Y DIMENSIONS AS SPECIFIED BELOW FOR THE REQUIRED PUMPING RATE.
2. PROTECT SUMP FLOOR FROM EROSION. LINE ENTIRE SUMP FLOOR WITH GEOTEXTILE FILTER FABRIC OR OTHER MATERIALS TO PREVENT EROSION.
3. THIS DETAIL HAS BEEN PREPARED FOR ENVIRONMENTAL REVIEW PURPOSES ONLY.

X-DIMENSION	Y-DIMENSION	PUMPING RATE
FT	FT	GPM
10	20	300
15	20	350
20	20	400
20	25	450
25	25	500



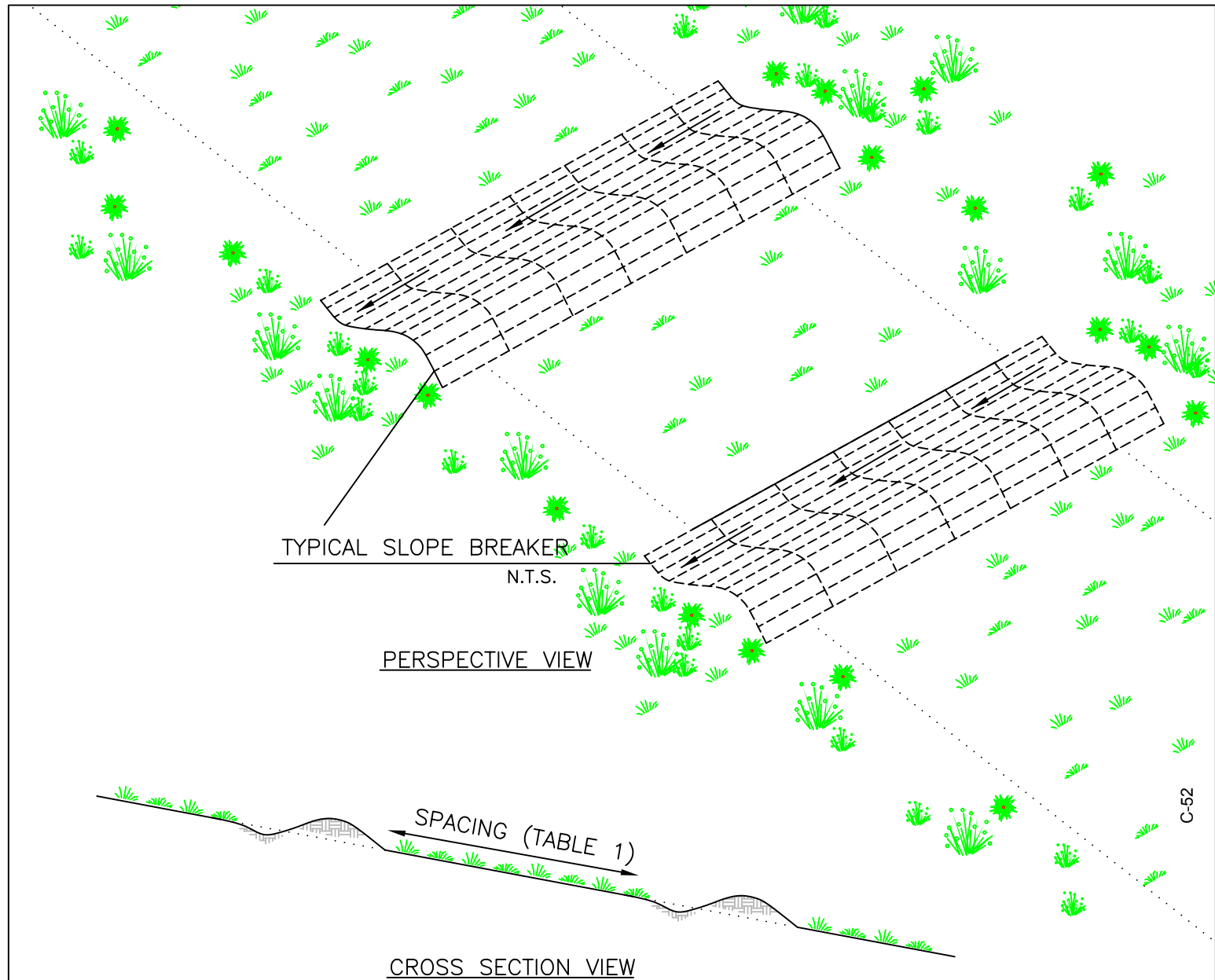
NOTES:

ROLLED EROSION CONTROL PRODUCTS (RECP). TEMPORARY DESIGNED FOR SHORT TERM (UP TO 1 YR).

USE DEGRADABLE MATERIALS (GENERALLY PREFERRED AND MORE PREVALENT) MADE FROM NATURALLY DECOMPOSING MATERIALS. DIFFERENT FIBERS YIELD DIFFERENT CHARACTERISTICS AND BREAKDOWN PATTERNS. RECPS ARE EITHER: PHOTODEGRADABLE – BROKEN DOWN BY SUNLIGHT EXPOSURE OR BIODEGRADABLE – DETERIORATED BY ACTION OF BIOLOGICAL ORGANISMS.

CONSULT PRODUCT DISTRIBUTORS FOR RECOMMENDATIONS REGARDING RECP SELECTION AND PERFORMANCE CRITERIA SUITABLE FOR SITE-SPECIFIC REQUIREMENTS. EVALUATE: DURATION, SLOPE GRADIENT, SOIL TYPE & ERODIBILITY, SEASONAL TEMPERATURE & WEATHER PATTERNS, REGIONAL PRECIPITATION DISTRIBUTION, VEGETATION NEEDS, ESPECIALLY WHERE GERMINATION CONDITIONS ARE NOT OPTIMAL.

1. ANCHOR RECP A MINIMUM OF 5 FEET ABOVE OR BELOW SLOPE BREAKS ACCORDING TO PRODUCT SPECIFICATIONS.
2. RECP TO MATCH GRADE ALONG ADJACENT RECLAIMED AND SEEDED TEMPORARY ROW. PROVIDE SLOPE BREAKERS ABOVE RECP APPLICATION, WHEN REQUIRED.
3. THIS DETAIL HAS BEEN PREPARED FOR ENVIRONMENTAL REVIEW PURPOSES ONLY.



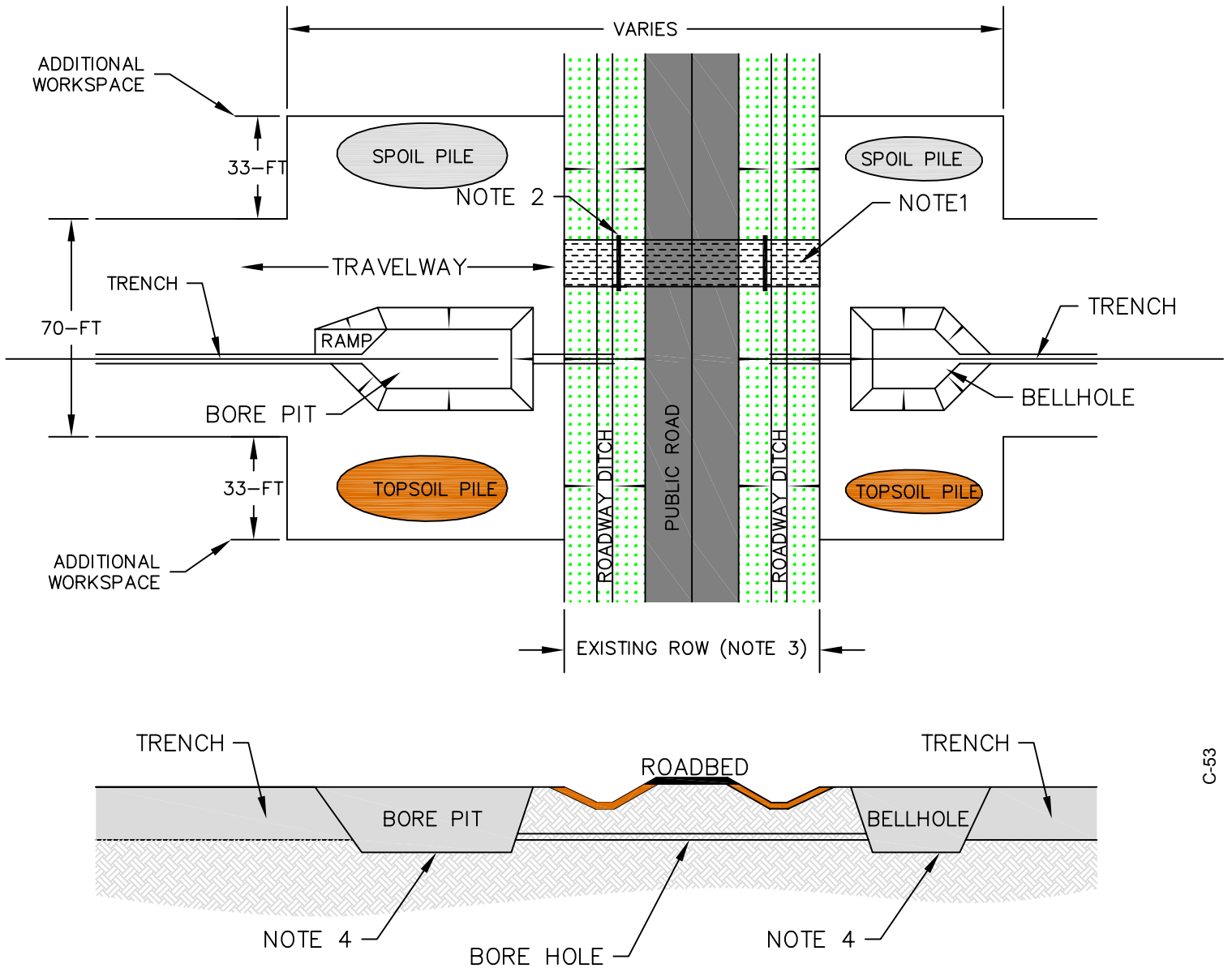
NOTES:

1. INSTALL PERMANENT SLOPE BREAKERS ACCORDING TO THE SPACING IN TABLE 1.
2. IF THE LENGTH OF THE SLOPE IS LESS THAN THE DISTANCE OF THE REQUIRED SPACING IN TABLE 1, NO SLOPE BREAKERS IS REQUIRED UNLESS THE SLOPE IS TO A WATERCOURSE, WHERE ONE LARGE BREAKER SHOULD BE INSTALLED AT THE TOE OF THE SLOPE.
3. DO NOT INSTALL PERMANENT SLOPE BREAKERS ON AGRICULTURAL LAND UNLESS SPECIFICALLY REQUESTED BY THE LANDOWNER.
4. THIS DETAIL HAS BEEN PREPARED FOR ENVIRONMENTAL REVIEW PURPOSES ONLY.

TABLE 1	
SLOPE (%)	SPACING (FT)
5-15%	300 FT
>15-30%	200 FT
>30%	100 FT



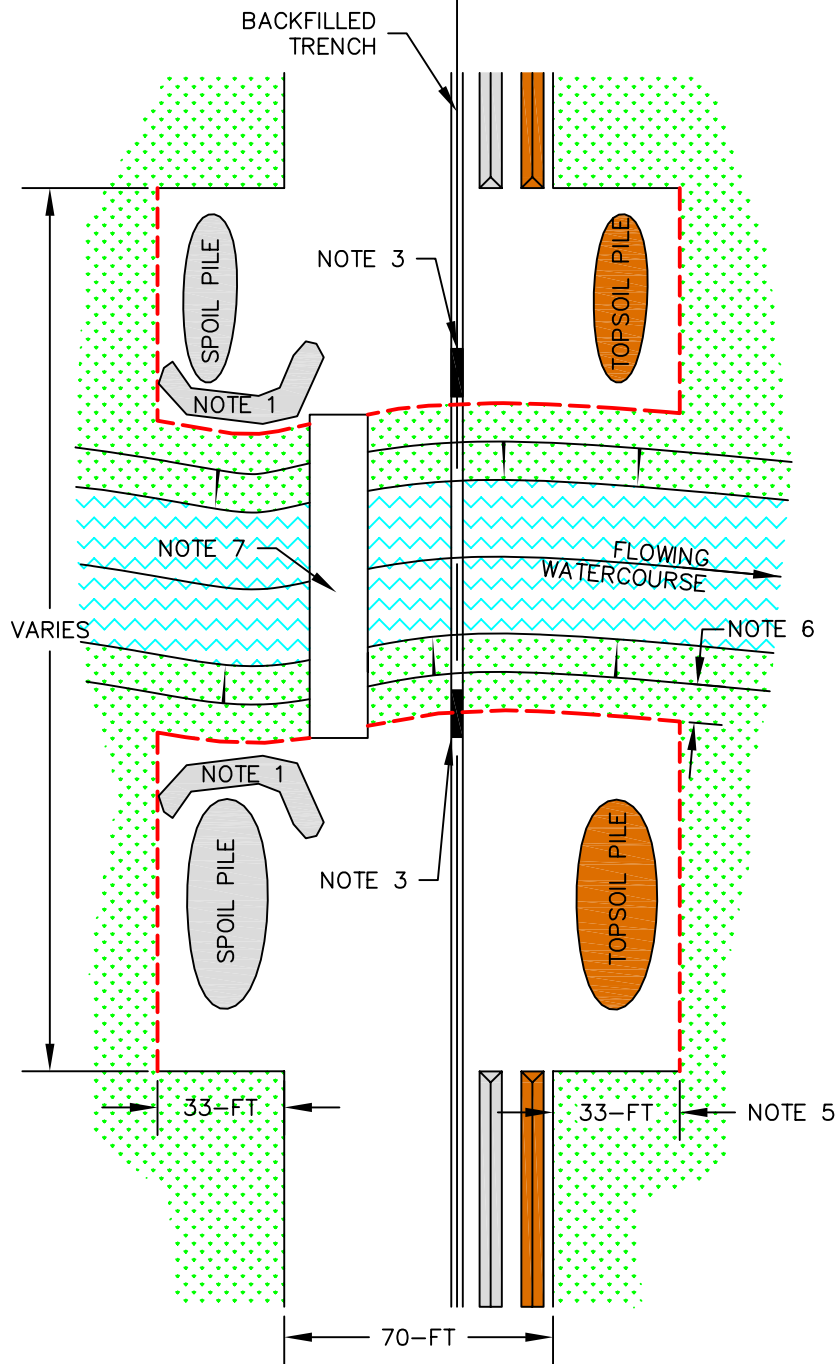
**VANTAGE PIPELINE PROJECT
DETAIL 11 - SLOPE BREAKERS**



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NOTES:

1. INSTALL TEMPORARY CROSSING OVER ROADWAY AND BORROW PITS. PROTECTIVE LAYER SHALL BE USED ON PAVED ROAD SURFACES TO PREVENT DAMAGE FROM TRACKED EQUIPEMENT.
2. IF NECESSARY, INSTALL TEMPORARY CULVERT AND FILL IN BORROW PIT.
3. MAINTAIN EXISTING VEGETATION IN BORROW PITS. STRIPPING SHOULD BE LIMITED TO THE AREA OF TEMPORARY CROSSING. PROVIDE SEDIMENT CONTROLS IN ACCORADANCE WITH STORMWATER MANAGEMENT PLAN.
4. ELEVATION OF BORE PIT AND BELL HOLE FLOORS TO BE ADJUSTED TO PROVIDE MINIMUM COVER BELOW ROADWAY AND BORROW PITS.
5. THIS DETAIL HAS BEEN PREPARED FOR ENVIRONMENTAL REVIEW PURPOSES ONLY.



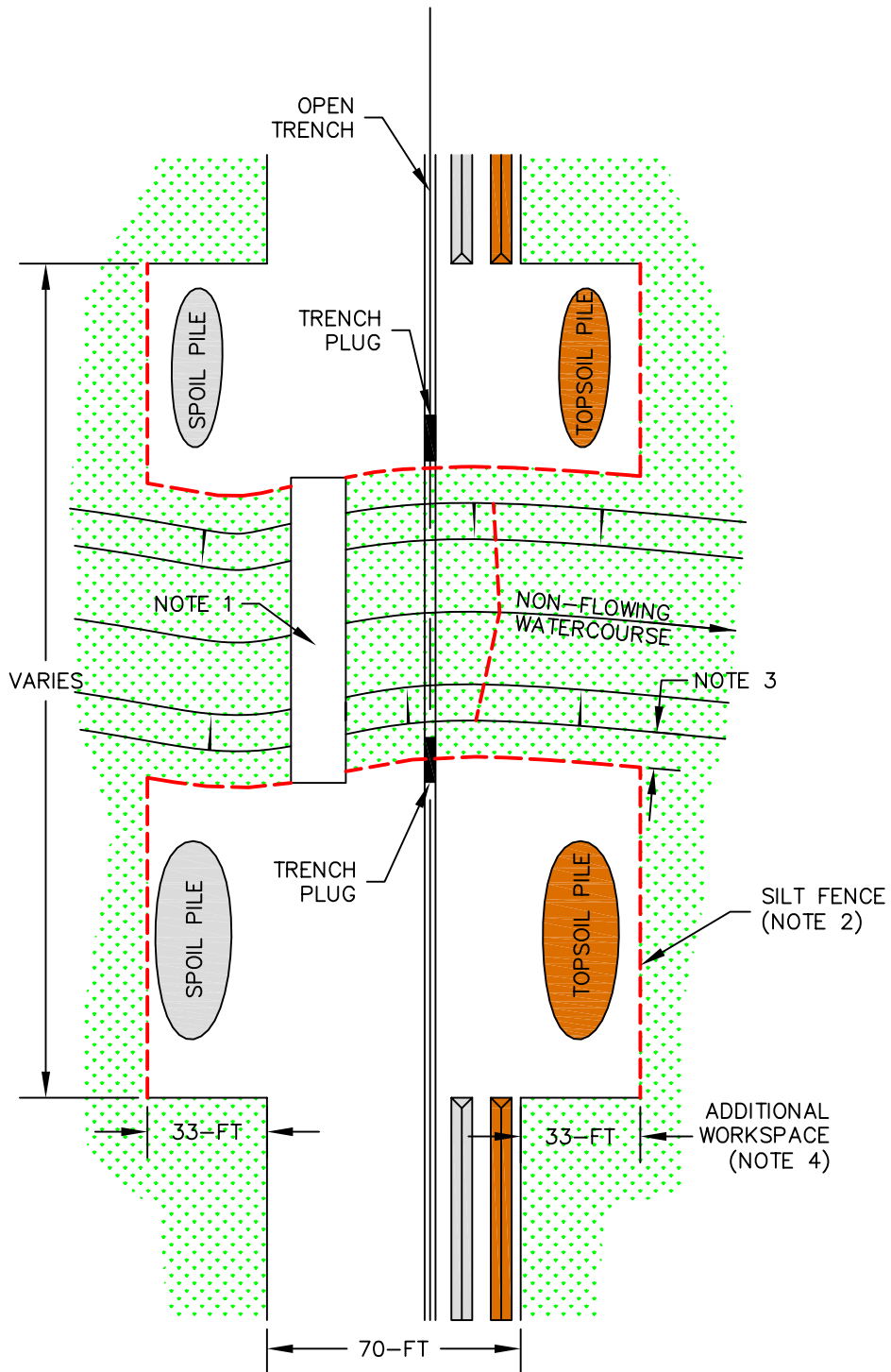
NOTES:

THIS METHOD APPLIES TO FLOWING WATERWAYS.

1. TOPSOIL AND SPOIL SHOULD BE STRIPPED FROM THE TRENCHLINE IN ALL WETLAND AND RIPARIAN AREAS. STOCKPILE WET MATERIALS IN TEMPORARY WORK AREA WITHIN SEDIMENT CONTAINMENT BERM CONSTRUCTED FROM SUBSOILS OBTAINED FROM THE STRIPPED ROW.
2. NO HEAVY SILT LADEN WATER SHALL BE DISCHARGED TO THE WATERBODY. USE STRAW BALE DEWATERING STRUCTURES TO TREAT WATER PUMPED FROM THE TRENCH.
3. DITCH PLUGS MUST REMAIN INPLACE TO SEPARATE THE MAINLINE DITCH FROM THE WATERBODY CROSSING UNTIL BACKFILL IS COMPLETE. CONTRACTOR SHALL EXCAVATE TRENCH IN CROSSING AS EXPEDIENTLY AS POSSIBLE AND INSTALL PIPE TO REDUCE DURATION OF WORK IN WATERBODY. TRENCH PLUGS SHALL BE INSTALLED UP SLOPE FROM SLOPE BREAKERS ADJACENT TO CROSSING.
4. CONTRACTOR SHALL RESTORE WATERBODY CHANNEL AND BANKS TO PRECONSTRUCTION CONTOUR, UNLESS OTHERWISE APPROVED BY THE PROJECT ENGINEER. INSTALL EROSION CONTROLS AT CROSSING AS PROVIDED IN THE SWPP PLAN. MAINTAIN STORMWATER BMPS UNTIL ADJACENT ROW IS STABILIZED.
5. PROVIDE ADDITIONAL WORKSPACE WHEN INDICATED ON THE CONSTRUCTION PLANS FOR STORAGE OF TOPSOIL AND SPOIL EXCAVATED FROM THE CROSSING. DO NOT STOCKPILE TOPSOIL OR SPOIL WITHIN THE WATERWAY.
6. PROVIDE A 10-FT. BUFFER BETWEEN STRIPPED AREA AND TOP OF STREAM BANK. STRIPPING WITHIN WATERCOURSE SHOULD BE LIMITED TO THE AREA OF TEMPORARY CROSSING. PROVIDE SEDIMENT CONTROLS WITHIN THE WATERCOURSE IN ACCORDANCE WITH STORMWATER MANAGEMENT PLAN.
7. INSTALL TEMPORARY CROSSING (OPTIONAL) OVER WATERWAY AS REQUIRED FOR SITE SPECIFIC CONDITIONS.
8. THIS DETAIL HAS BEEN PREPARED FOR ENVIRONMENTAL REVIEW PURPOSES ONLY.

**VANTAGE PIPELINE PROJECT
DETAIL 13 - FLOWING WATERCOURSE CROSSING**





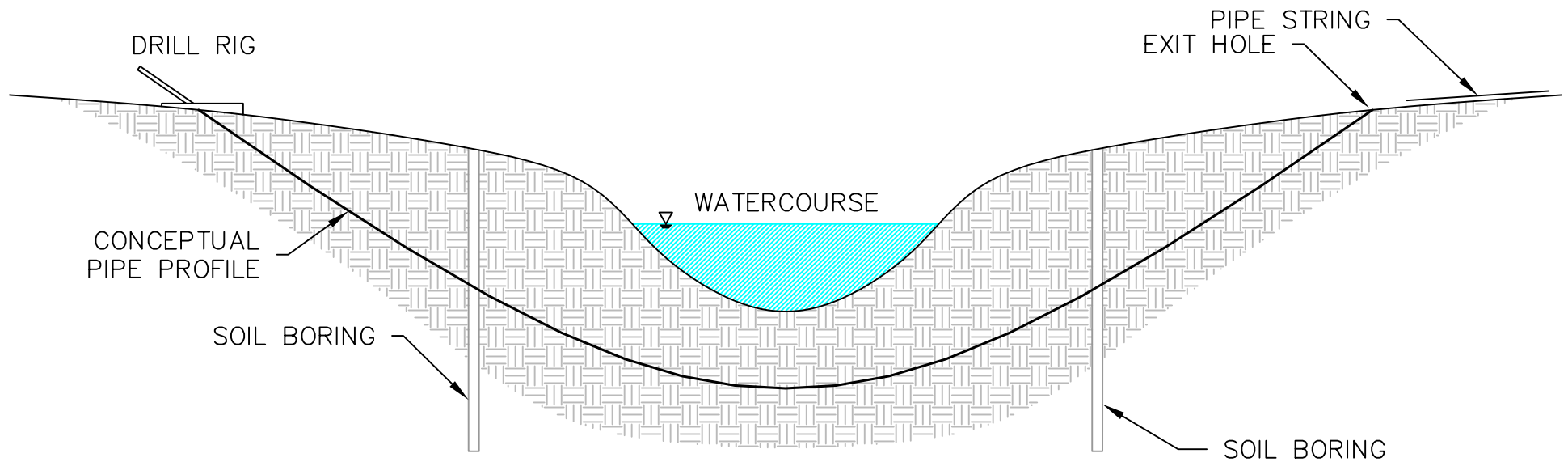
NOTES:

THIS METHOD APPLIES TO NON-FLOWING WATERWAYS.

1. INSTALL TEMPORARY CROSSING (OPTIONAL) OVER WATERWAY AS REQUIRED FOR SITE SPECIFIC CONDITIONS.
2. INSTALL SILT FENCE OR OTHER EROSION CONTROLS IN ACCORDANCE WITH THE STORMWATER MANAGEMENT PLAN. SEDIMENT CONTROLS TO BE INSTALLED ALONG STRIPPING LIMITS TO BE MAINTAINED UNTIL CONSTRUCTION OF THE CROSSING IS COMPLETED. UPON COMPLETION OF CROSSING RECLAMATION REINSTALL AND MAINTAIN SEDIMENT AND EROSION CONTROLS UNTIL CROSSING AREA IS STABILIZED.
3. PROVIDE A 10-FT. BUFFER BETWEEN STRIPPED AREA AND TOP OF STREAM BANK. STRIPPING WITHIN WATERCOURSE SHOULD BE LIMITED TO THE AREA OF TEMPORARY CROSSING. PROVIDE SEDIMENT CONTROLS WITHIN THE WATERCOURSE IN ACCORDANCE WITH STORMWATER MANAGEMENT PLAN.
4. PROVIDE ADDITIONAL WORKSPACE WHEN INDICATED ON THE CONSTRUCTION PLANS FOR STORAGE OF TOPSOIL AND SPOIL EXCAVATED FROM THE CROSSING. DO NOT STOCKPILE TOPSOIL OR SPOIL WITHIN THE WATERWAY.
5. THIS DETAIL HAS BEEN PREPARED FOR ENVIRONMENTAL REVIEW PURPOSES ONLY.

**VANTAGE PIPELINE PROJECT
DETAIL 14 - NON-FLOWING WATERCOURSE CROSSING**





NOTES:

USE DIRECTIONAL BORING METHOD FOR WATERCOURSES AND WETLANDS WHERE OPEN CUT METHOD IS NOT APPROVED. PIPELINE WOULD BE INSTALLED AT CROSSING BY DRILLING A PILOT HOLE, REAMING THE HOLE AND PIPE PULL BACK.

1. CONTRACTOR SHALL PERFORM GEOTECHNICAL INVESTIGATION TO CHARACTERIZE SUBSURFACE CONDITIONS AND DETERMINE FEASIBILITY FOR DIRECTIONAL BORING METHOD. DIRECTIONAL BORING MAY BE PROBLEMATIC IF UNCONSOLIDATED GRAVELS OCCUR.
2. CONTRACTOR SHALL PROVIDE BORE LOCATION PLAN TO PROJECT ENGINEER FOR APPROVAL. THE PLAN SHOULD PROVIDE LOCATIONS OF MUD CONTAINMENT AND STORMWATER BMPS. PLAN SHOULD IDENTIFY EQUIPEMENT AND CONTINGENCIES TO CONTAIN MUD IN THE EVENT OF A RELEASE.
3. MAINTAIN A BUFFER ZONE (10-FT MIN.) BETWEEN BOTH THE BORING LOCATION AND EXIT LOCATIONS AND THE STREAM BANK. PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPP PLAN AS APPROVED. DO NOT STRIP TOPSOIL OR VEGETATION FROM THE BUFFER ZONE.
4. MANAGE DRILL MUD TO PREVENT DISCHARGE TO WATERCOURSE. PROVIDE MUD STOAGE IN TANKS OR PITS, FULL TIME MONITORING SHOULD BE PROVIDED TO DETECT RELEASE TO STREAM. DISCONTINUE BORING IF DISCHARGE IS DETECTED. DRILL MUD SHOULD CONSIST OF BENTONITE WITHOUT ANY ADDITIVES, UNLESS APPROVED.
5. THIS DETAIL HAS BEEN PREPARED FOR ENVIRONMENTAL REVIEW PURPOSES ONLY.

**VANTAGE PIPELINE PROJECT
DETAIL 15 - BORING UNDER A WATERCOURSE**



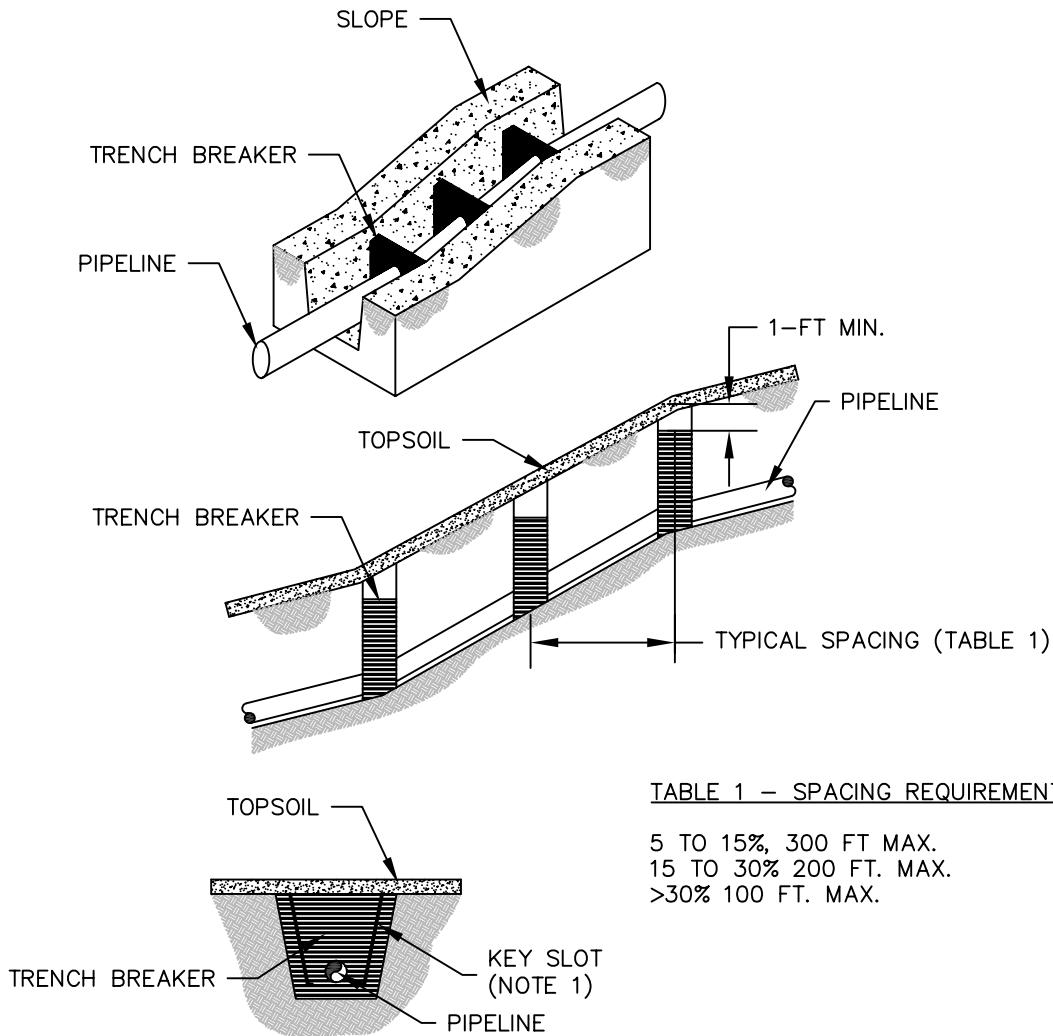


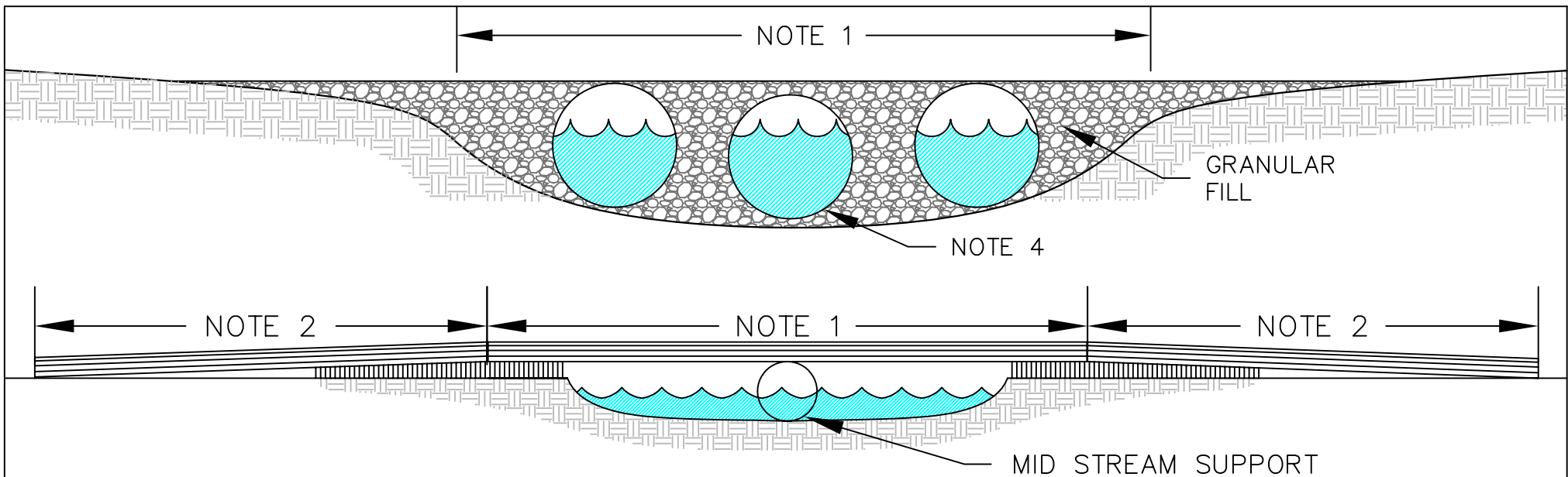
TABLE 1 – SPACING REQUIREMENTS:

5 TO 15%	300 FT. MAX.
15 TO 30%	200 FT. MAX.
>30%	100 FT. MAX.

NOTES:

1. INSTALL TRENCH BREAKERS AT LOCATIONS ALONG THE TRENCH WHERE THE PROFILE IS 5% SLOPE OR GREATER. INSTALL TRENCH BREAKERS AT LOCATIONS AT THE BASE OF SLOPE ADJACENT TO WATERBODIES AND WETLANDS WHERE NEEDED TO AVOID DRAINING OF WETLANDS INTO TRENCH.
2. TRENCH BREAKERS TO BE CONSTRUCTED OF EITHER SANDBAGS (MIXTURE OF SAND AND CEMENT 6:1) OR USING Polyurethane FOAM IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
3. KEY TRENCH BREAKERS A MINIMUM OF 1 FOOT INTO TRENCH WALL.
4. BACKFILL DOWNSLOPE SIDE OF TRENCH BREAKER PRIOR TO PLACING FILL ON UPSLOPE SIDE OF TRENCH BREAKER.
5. FINAL LOCATIONS FOR TRENCH BREAKERS TO BE DETERMINE BY PROJECT ENGINEER BASED ON SITE SPECIFIC CONDITIONS. TYPICAL SPACING REQUIREMENT ARE AS FOLLOWS:
 5 TO 15 % SLOPE – MINIMUM 300 FT SPACING
 15 TO 30 % SLOPE – MINIMUM 200 FT. SPACING
 GREATER THAN 30 % SLOPE – MINIMUM 100 FT SPACING.
6. THIS DETAIL HAS BEEN PREPARED FOR ENVIRONMENTAL REVIEW PURPOSES ONLY.

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NOTES:

1. BRIDGE MUST SPAN FROM TOP OF BANK TO TOP OF BANK. CONSTRUCT BRIDGE IN ACCORDANCE WITH REQUIREMENTS IN EPP. THE CROSSING MAY BE CONSTRUCTED WITH EITHER A WOODEN TIMBER MAT OR USING IN-STREAM CULVERT AND GRANULAR FILL AS APPROVED BY THE PROJECT ENGINEER. THE BRIDGE MUST BE FIRMLY ANCHORED TO PREVENT IT FROM BEING TRANSPORTED OR ERODED DOWNSTREAM DURING HIGH FLOW.
2. CONSTRUCT BRIDGE RAMPS USING TIMBER MATS AND MATCH GRADE AT EDGE OF STREAM BANK BUFFER. IF CONDITIONS PROHIBIT WOOD OR METAL RAMPS, EARTHEN RAMPS MAY BE USED AS APPROVED. SUPPORT MUST BE PROVIDED AT TOP OF BANK AND UNDER SPAN IF SETTLEMENT OCCURS.
3. INSPECT BRIDGE OPENING PERIODICALLY AND FOLLOWING RAINFALLS OF OVER ½". REMOVE ANY DEBRIS RESTRICTING FLOW. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED IN ACCORDANCE WITH THE SWPPP.
4. IF GRANULAR FILL IS USED IN CHANNEL PROVIDE ADEQUATE CULVERT CAPACITY FOR ANTICIPATED FLOW. REMOVE ALL FILL FROM CHANNEL AND RESTORE TO ORIGINAL CONTOUR.
5. THIS DETAIL HAS BEEN PREPARED FOR ENVIRONMENTAL REVIEW PURPOSES ONLY.

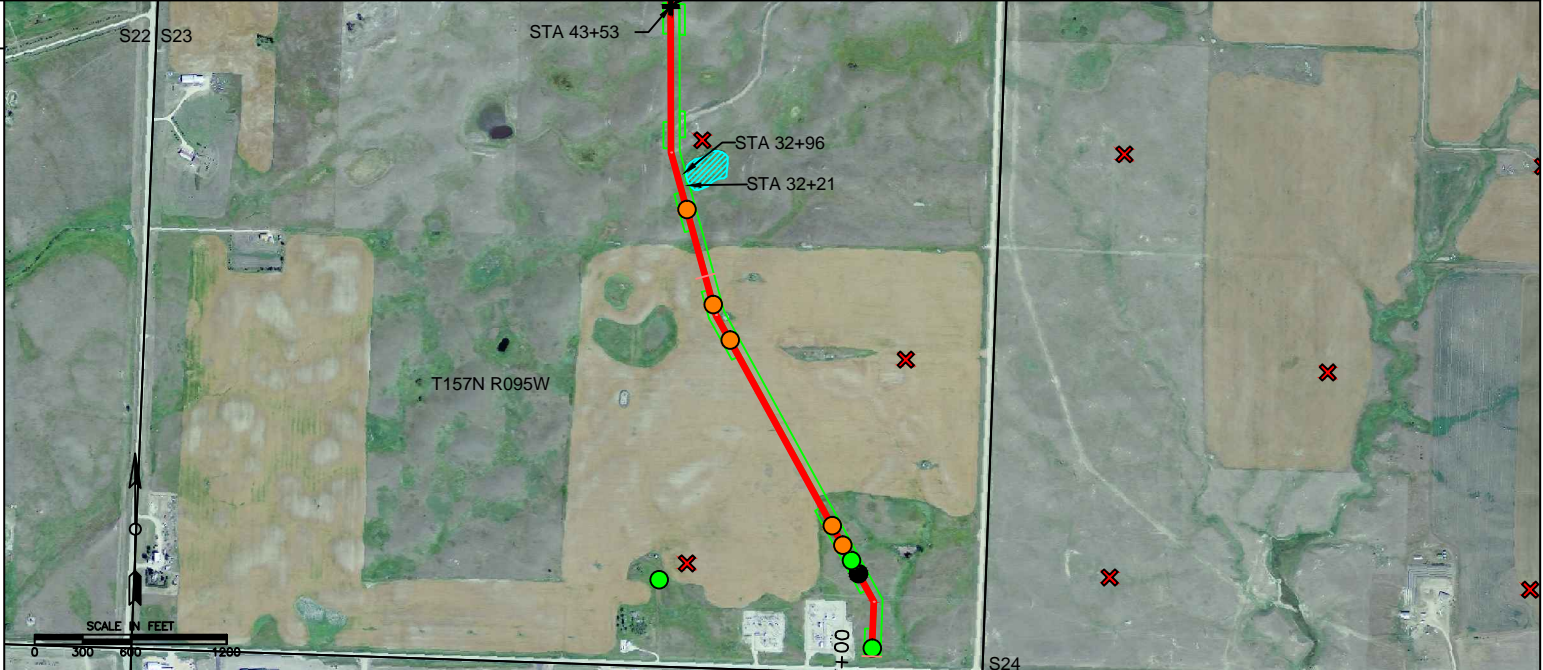
**VANTAGE PIPELINE PROJECT
DETAIL 17 - TYPICAL BRIDGE DETAILS**



Attachment 2
Preliminary Alignment Sheets

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



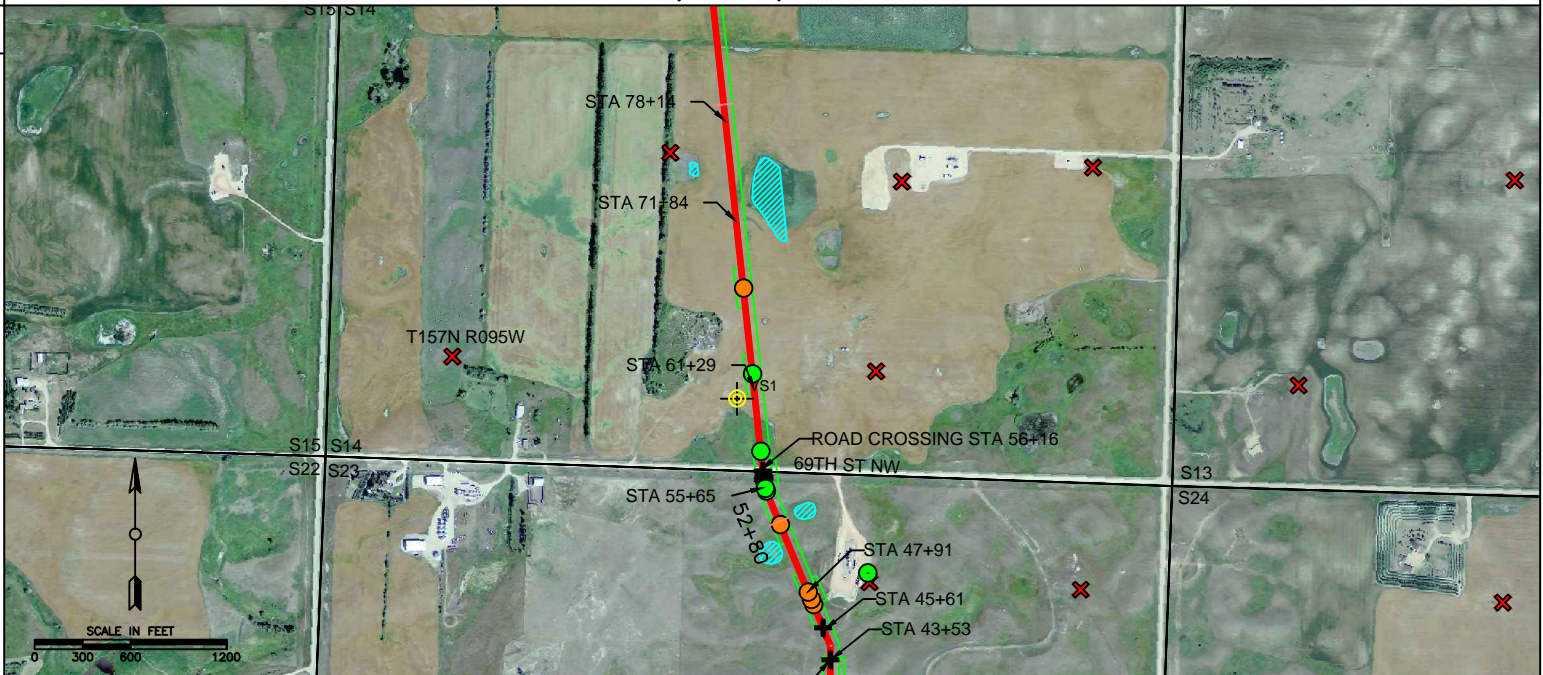
MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	UNIMPROVED TRAIL CROSSING AT STA 43+53.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3 AND FOR GRASSLAND/PASTURE AREAS AS PER DETAIL 5.
	RECLAMATION	RECOMMEND SEED MIX A: NATIVE PRAIRIE FOR GRASSLAND AREAS.
	STORMWATER BMPS	PROVIDE BMPS FOR WETLAND AT STA 32+21 TO STA 32+96 AND ADDITIONAL BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
	RIGHT OF WAY REQUIREMENTS	TEMPORARY RIGHT OF WAY REDUCED TO 30 FT WIDTH FROM STA 32+21 TO STA 32+96.

NOTES: FIELD LOCATE BURIED PIPELINE CROSSINGS ASSOCIATED WITH OIL WELLS IN THE VICINITY. TBD - TO BE DETERMINED.	APPROVED FOR PERMITTING	 	VANTAGE PIPELINE PROJECT ENVIRONMENTAL ALIGNMENT SHEETS
			<small>PROJECTION: STATE PLANE 3301 DATUM: NAD83 SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 1</small>

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND

- PERMANENT ROW
- TEMPORARY ROW BOUNDARY
- SOIL BORING
- DOMESTIC WATER WELL
- ROAD CROSSING
- WETLAND
- OIL WELL
- UNDERGROUND CABLE
- OVERHEAD POWERLINE
- UNDERGROUND PIPELINE
- FENCE CROSSING
- PRIME FARMLAND
- LAND COVER CLASSIFICATION:
 - CULTIVATED CROPS
 - PASTURE/HAY
 - GRASSLAND/HERBACEOUS



C-61

MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	UNIMPROVED ROAD CROSSINGS AT STA 43+53, STA 45+61 AND STA 47+91. GRAVEL ROAD CROSSING PROCEDURES AT STA 56+16 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACTION PRONE AREAS (STA 55+65 TO 61+29 AND 71+84 TO 78+14) AS PER DETAIL 3, GRASSLAND/PASTURE AREAS AS PER DETAIL 5. PARNELL SILTY CLAY LOAM PRESENT.
	RECLAMATION	RECOMMEND SEED MIX A: NATIVE PRAIRIE FOR GRASSLAND AREAS AND SEED MIX C: PASTURE LANDS FOR ROAD CROSSING AT 69TH ST NW.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
FIELD LOCATE BURIED PIPELINE CROSSINGS ASSOCIATED WITH OIL WELLS IN THE VICINITY.

TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

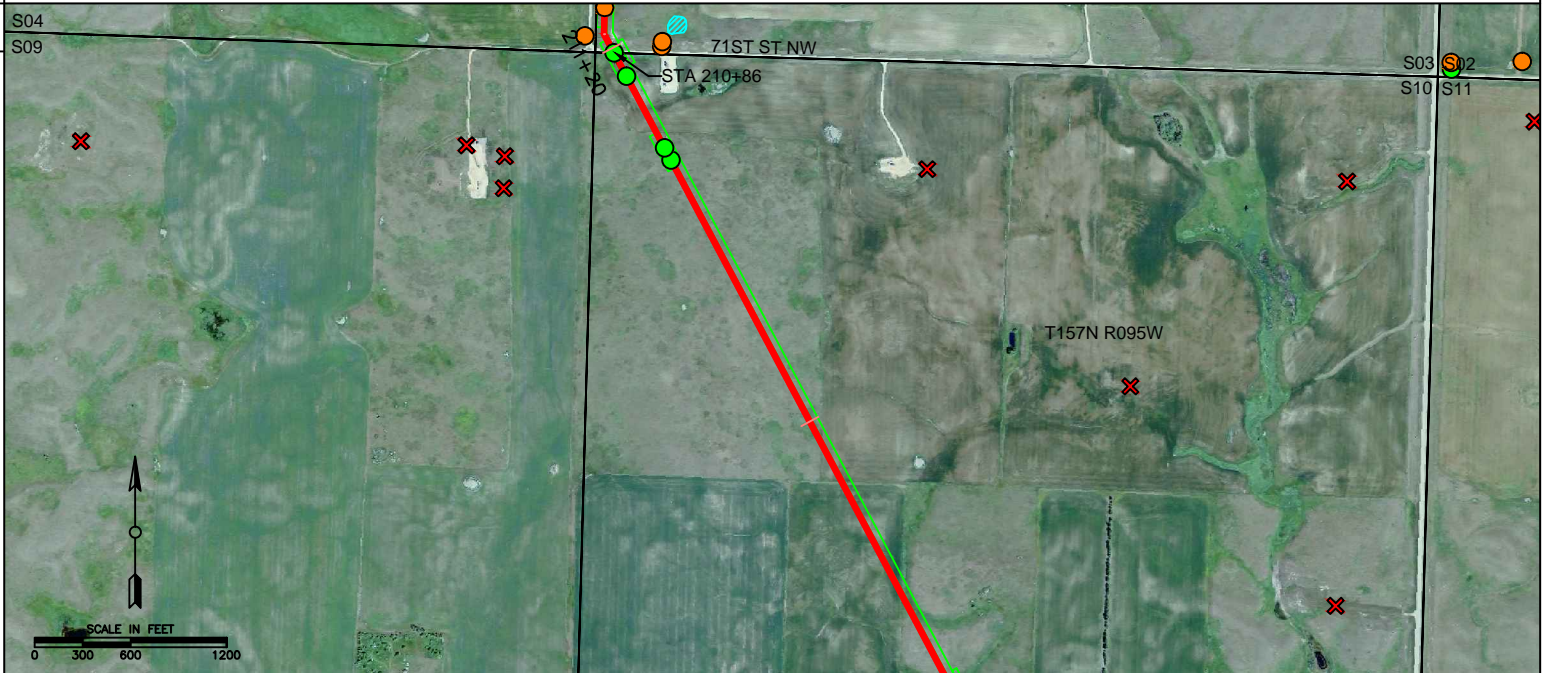
KC HARVEY
ENVIRONMENTAL, LLC

PROJECTION: STATE PLANE 3301 DATUM: NAD83

SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 2

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



C-63

MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING PROCEDURES AT 210+86 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3 AND GRASSLAND AREAS AS PER DETAIL 5.
	RECLAMATION	RECOMMEND SEED MIX A: NATIVE PRAIRIE FOR GRASSLAND AREAS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
FIELD LOCATE BURIED PIPELINE CROSSINGS ASSOCIATED WITH OIL WELLS IN THE VICINITY.

TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

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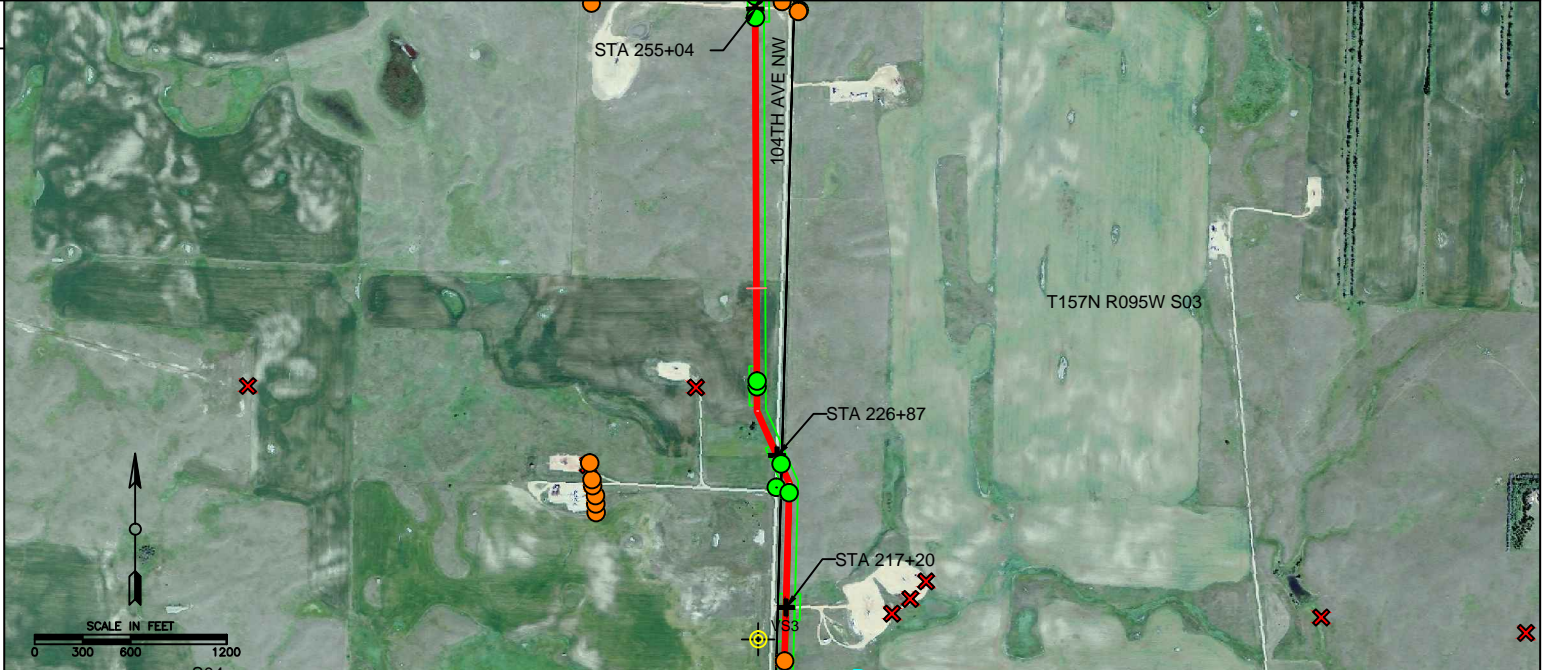
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VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 4

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	OPEN CUT AT ROAD CROSSING STA 217+20 AND STA 255+04. GRAVEL ROAD CROSSING PROCEDURES AT STA 226+87 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR GRASSLAND AREAS AS PER DETAIL 5.
	RECLAMATION	RECOMMEND SEED MIX A: NATIVE PRAIRIE FOR GRASSLAND AREAS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
FIELD LOCATE BURIED PIPELINE CROSSINGS ASSOCIATED WITH OIL WELLS IN THE VICINITY.

TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

KC HARVEY
ENVIRONMENTAL, LLC

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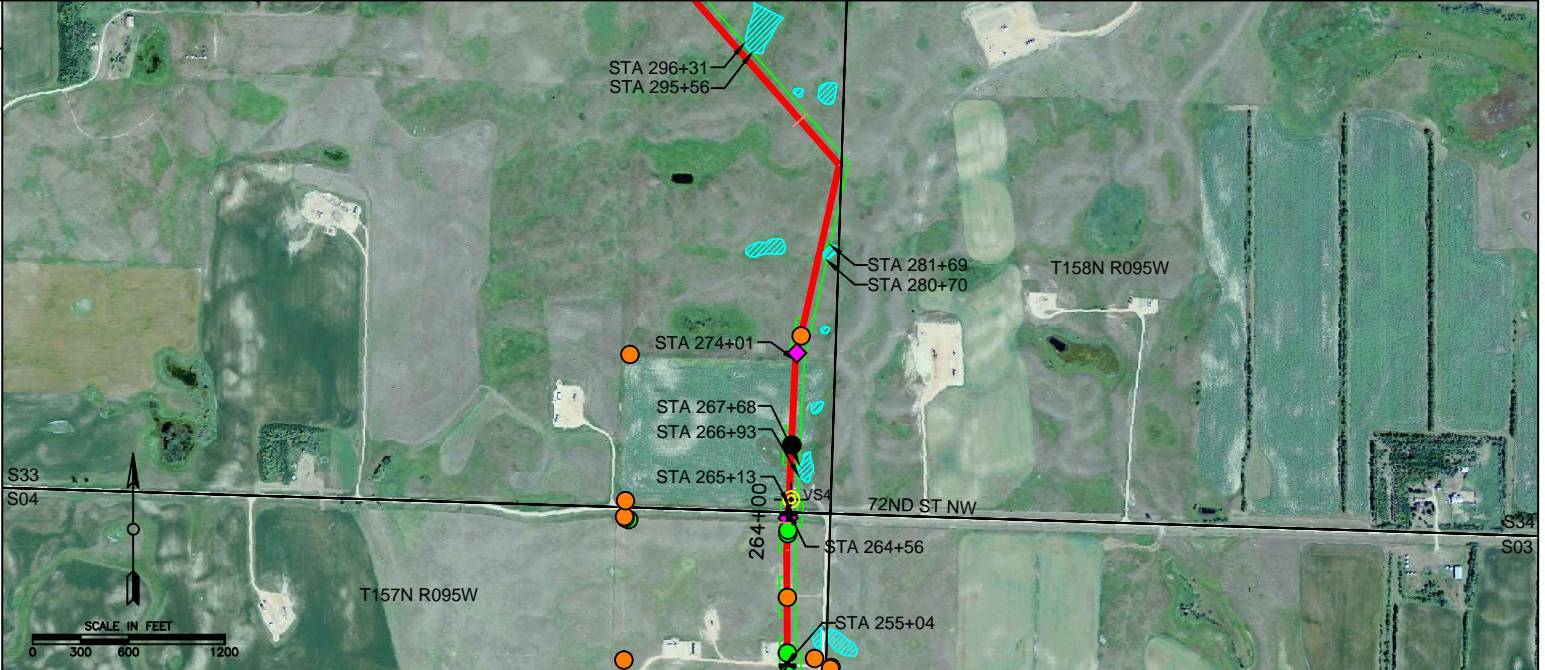
VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 5

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	SEE SHEET 5 FOR ROAD CROSSING PROCEDURES AT STA 255+04. GRAVEL ROAD CROSSING PROCEDURES AT STA 264+56 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR GRASSLAND/PASTURE AREAS AS PER DETAIL 5.
	RECLAMATION	RECOMMEND SEED MIX A: NATIVE PRAIRIE FOR GRASSLAND AREAS AND SEED MIX C: PASTURE LANDS FOR PASTURE AREAS (STA 265+13 TO STA 274+01).
	STORMWATER BMPS	PROVIDE BMPS FOR WETLANDS AT STA 266+93 TO STA 267+68, STA 280+70 TO STA 281+69, AND STA 295+56 TO STA 296+31. PROVIDE ADDITIONAL STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	TEMPORARY ROW REDUCED TO 25' WIDTH FROM STA 266+93 TO STA 267+68, 15' WIDTH FROM STA 280+70 TO STA 281+69, AND 30' WIDTH FROM STA 295+56 TO STA 296+31.	

NOTES:
FIELD LOCATE BURIED PIPELINE CROSSINGS ASSOCIATED WITH OIL WELLS IN THE VICINITY.

TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

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ENVIRONMENTAL, LLC

VANTAGE
PIPELINE US LP

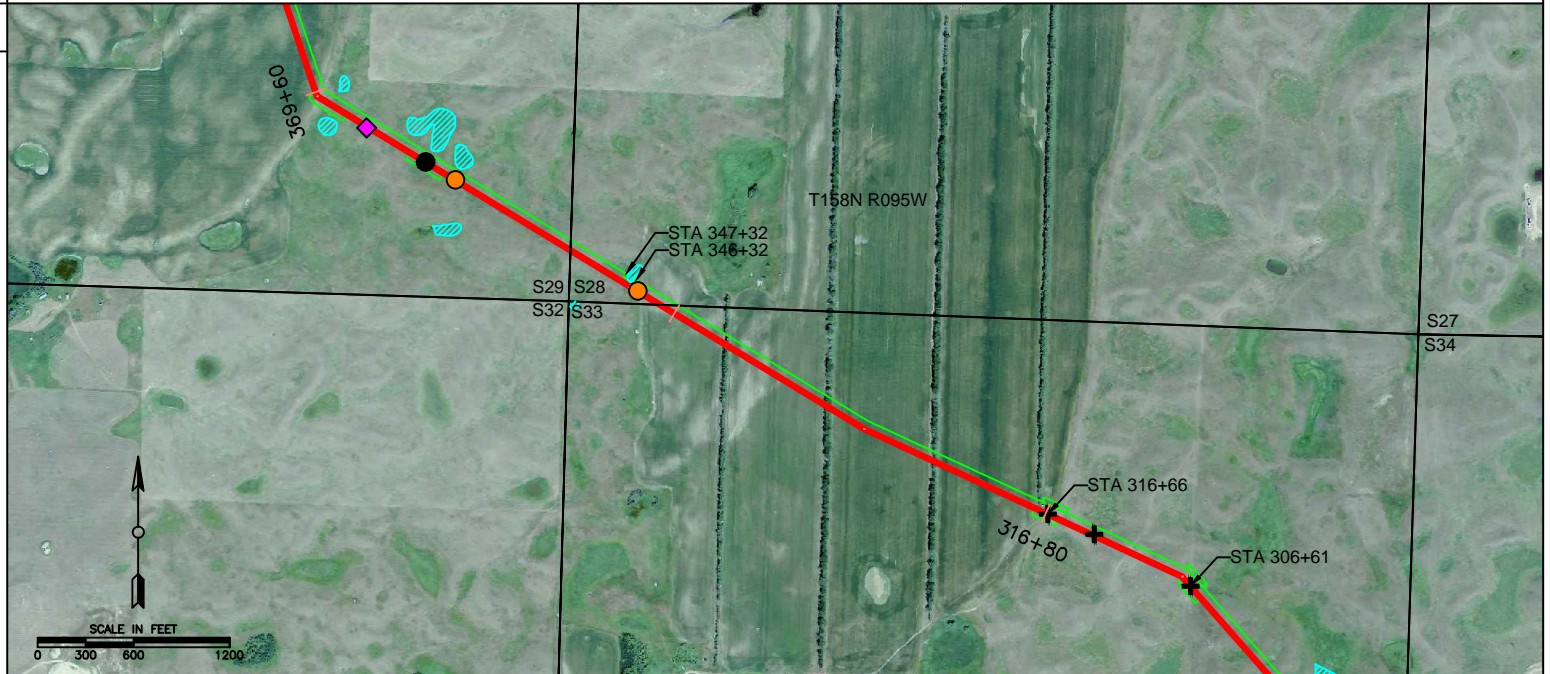
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ENVIRONMENTAL ALIGNMENT SHEETS

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PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 6

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND

- PERMANENT ROW
 - TEMPORARY ROW BOUNDARY
 - SOIL BORING
 - DOMESTIC WATER WELL
 - ROAD CROSSING
 - WETLAND
 - OIL WELL
 - UNDERGROUND CABLE
 - OVERHEAD POWERLINE
 - UNDERGROUND PIPELINE
 - FENCE CROSSING
 - PRIME FARMLAND
- LAND COVER CLASSIFICATION:
- CULTIVATED CROPS
 - PASTURE/HAY
 - GRASSLAND/HERBACEOUS



C-66

MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	OPEN CUT AT UNIMPROVED TRAIL CROSSINGS AT STA 306+61 AND STA 316+66.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACT PRONE AREAS AS PER DETAIL 3, GRASSLAND AREAS AS PER DETAIL 5, AND PRIME FARMLAND AREAS AS PER DETAIL 6.
	RECLAMATION	RECOMMEND SEED MIX A: NATIVE PRAIRIE FOR GRASSLAND AREAS.
	STORMWATER BMPS	PROVIDE BMPS FOR WETLAND FROM STA 346+32 TO 347+32 AND ADDITIONAL STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	TEMPORARY RIGHT OF WAY REDUCED TO 15 FT WIDTH FROM STA 346+32 TO 347+32.	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

KC HARVEY
ENVIRONMENTAL, LLC

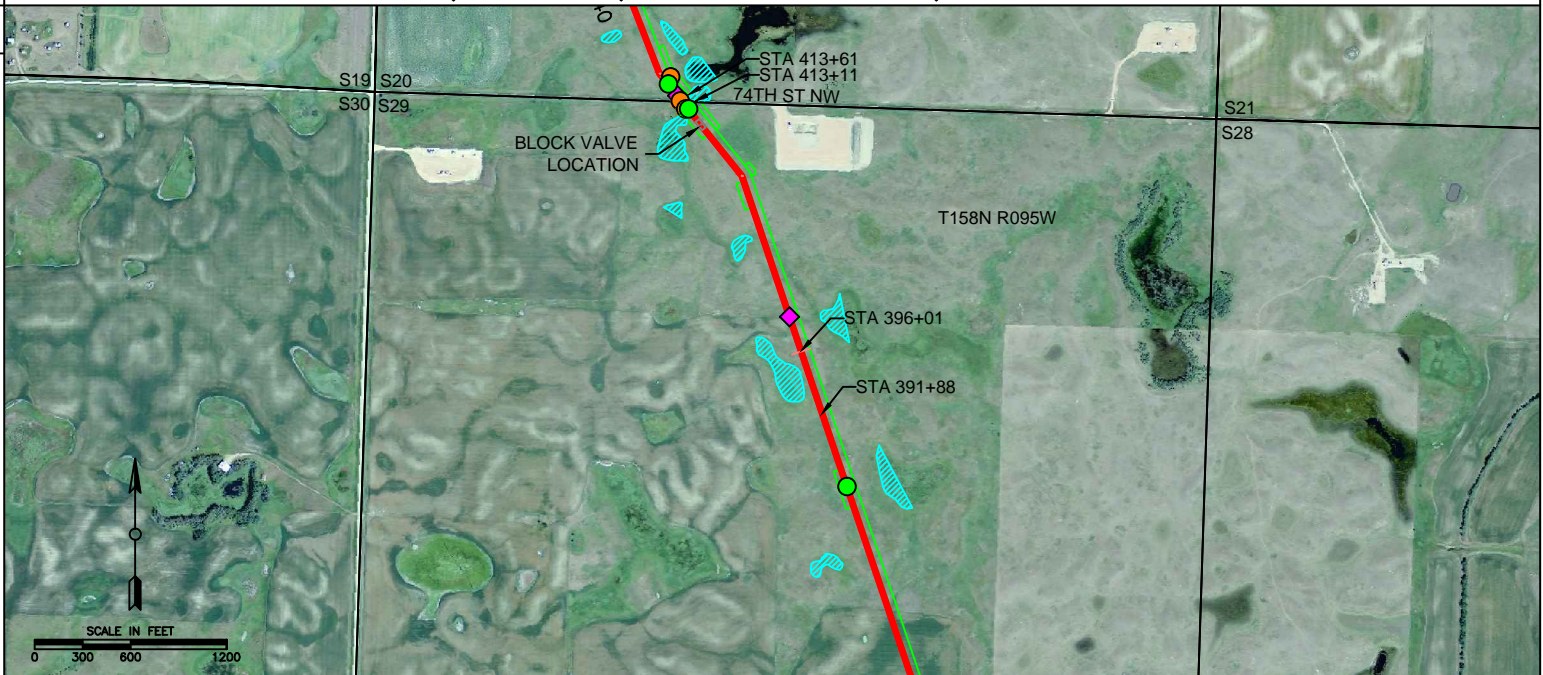
VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

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PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 7

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS

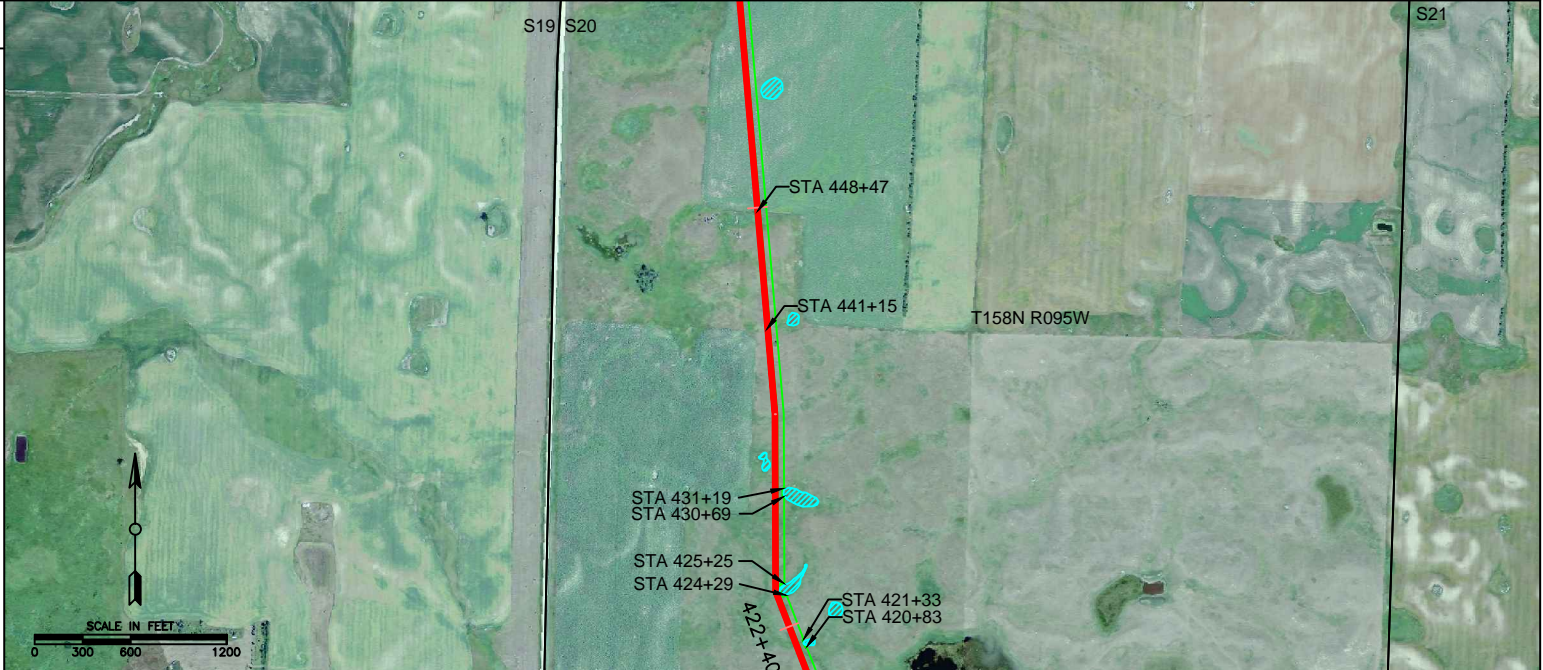


MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	NONE
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH:	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACT PRONE AREAS (STA 391+88 TO 396+01) AS PER DETAIL 3, GRASSLAND AREAS AS PER DETAIL 5. PARNELL SILTY CLAY LOAM PRESENT.
	RECLAMATION	RECOMMEND SEED MIX A: NATIVE PRAIRIE FOR GRASSLAND AREAS.
	STORMWATER BMPS	PROVIDE BMPS FOR WETLAND FROM STA 413+11 TO STA 413+61 AND ADDITIONAL STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
	RIGHT OF WAY REQUIREMENTS	TEMPORARY RIGHT OF WAY REDUCED TO 15 FT WIDTH FROM STA 413+11 TO STA 413+61.

NOTES: FIELD LOCATE BURIED PIPELINE CROSSINGS ASSOCIATED WITH OIL WELLS IN THE VICINITY. TBD - TO BE DETERMINED.	APPROVED FOR PERMITTING	KC HARVEY ENVIRONMENTAL, LLC	VANTAGE PIPELINE US LP	VANTAGE PIPELINE PROJECT ENVIRONMENTAL ALIGNMENT SHEETS
				PROJECTION: STATE PLANE 3301 DATUM: NAD83 SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 8

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	NONE
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3, GRASSLAND/PASTURE AREAS AS PER DETAIL 5.
	RECLAMATION	SEED MIX A: NATIVE PRAIRIE RECOMMENDED FOR GRASSLAND AREAS AND SEED MIX C: PASTURE LANDS FOR PASTURE/HAY AREAS (STA 441+15 TO STA 448+47).
	STORMWATER BMPS	PROVIDE BMPS FOR WETLANDS FROM STA 420+83 TO STA 421+33, STA 424+29 TO STA 425+25, AND STA STA 430+69 TO STA 431+19. PROVIDE ADDITIONAL STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
	RIGHT OF WAY REQUIREMENTS	TEMPORARY RIGHT OF WAY RESTRICTED TO 30 FT WIDTH FROM STA 420+83 TO STA 421+33, 15 FT WIDTH FROM STA 424+29 TO STA 425+25, AND 30 FT WIDTH FROM STA 430+69 TO STA 431+19.

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR
PERMITTING

KC HARVEY
ENVIRONMENTAL, LLC

VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83

SCALE: 1 IN = 1,200 FT

DATE: 02/04/2011

SHEET: 9

REV: 0
FILENAME: Vantage_alignmentsheets.dwg

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	PROCEDURES FOR WETLAND CROSSING FROM STA 494+89 TO STA 495+89 AS PER DETAIL 14 - NON FLOWING WATERCOURSE CROSSING.
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING PROCEDURES AT STA 467+87, STA 478+61 AND STA 530+70 AS PER DETAIL12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3 AND WETLAND CROSSING AS PER DETAIL 7.
	RECLAMATION	SEED MIX B RECOMMENDED FOR WETLAND AREAS AND SEED MIX C RECOMMENDED FOR DISTURBED AREAS AT 75TH ST NW AND 108TH AVE NW ROAD CROSSINGS.
	STORMWATER BMPS	PROVIDE BMPS FOR WETLAND CROSSING AT FROM STA 494+89 TO STA 495+89 AND ADDITIONAL STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
	RIGHT OF WAY REQUIREMENTS	TEMPORARY RIGHT OF WAY REDUCED TO 15 FT WIDTH FROM 494+89 TO STA 495+89.

NOTES:
FIELD LOCATE BURIED PIPELINE CROSSINGS ASSOCIATED WITH OIL WELLS IN THE VICINITY.

TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

KC HARVEY
ENVIRONMENTAL, LLC

VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

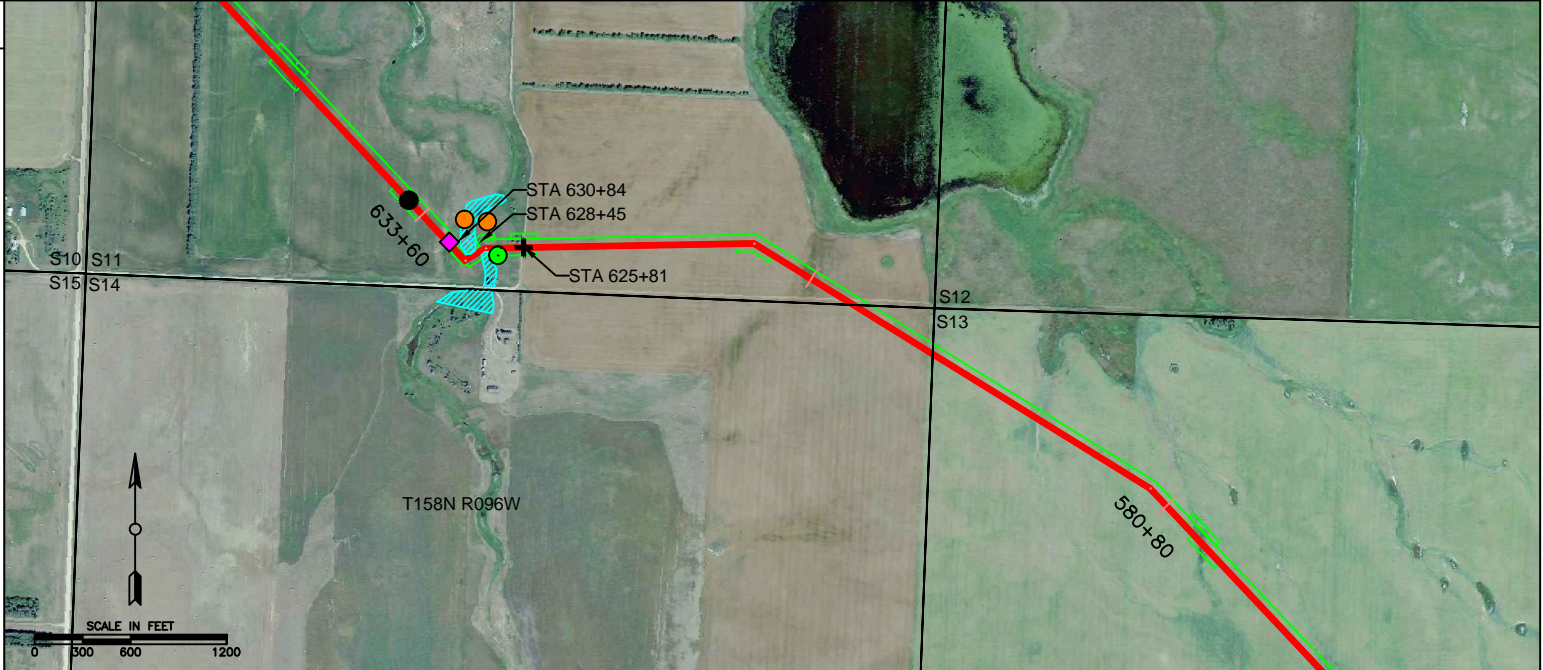
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SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 10

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LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND

- PERMANENT ROW
- TEMPORARY ROW BOUNDARY
- SOIL BORING
- DOMESTIC WATER WELL
- ROAD CROSSING
- WETLAND
- OIL WELL
- UNDERGROUND CABLE
- OVERHEAD POWERLINE
- UNDERGROUND PIPELINE
- FENCE CROSSING
- PRIME FARMLAND
- LAND COVER CLASSIFICATION:
- CULTIVATED CROPS
- PASTURE/HAY
- GRASSLAND/HERBACEOUS



C-70

MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	PROCEDURES FOR WETLAND CROSSING FROM STA 628+45 TO STA 630+84 AS PER DETAIL 14 - NON FLOWING WATERCOURSE CROSSING.
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING PROCEDURES AT STA 625+81 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACT PRONE AREAS AS PER DETAIL 3, PRIME FARMLAND AREAS AS PER DETAIL 6, AND WETLAND CROSSING AS PER DETAIL 7. PARNELL SILTY CLAY LOAM AND VALLERS LOAM PRESENT.
	RECLAMATION	RECOMMEND SEED MIX A: NATIVE PRAIRIE FOR GRASSLAND AREAS AND SEED MIX B FOR WETLAND AREAS.
	STORMWATER BMPS	PROVIDE BMPS FOR WETLAND CROSSING AT FROM STA 628+45 TO STA 630+84 AND ADDITIONAL STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	TEMPORARY RIGHT OF WAY REDUCED TO 15 FT WIDTH FROM STA 628+45 TO STA 630+84.	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

KC HARVEY ENVIRONMENTAL, LLC

REV: 0
FILENAME: Vantage_alignmentsheets.dwg

VANTAGE PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 11

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	PROCEDURES FOR WETLAND CROSSING FROM STA 676+15 TO STA 677+15 AS PER DETAIL 14 - NON FLOWING WATERCOURSE CROSSING.
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING PROCEDURES AT STA 663+61 AND 705+ 61 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3, PASTURE AREAS AS PER DETAIL 5, PRIME FARMLAND AREAS AS PER DETAIL 6, AND WETLAND CROSSINGS AS PER DETAIL 7.
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LANDS FOR PASTURE/HAY AREAS AND DISTURBED AREAS AT 110TH AVE NW AND 77TH ST NW ROAD CROSSINGS AND SEED MIX B FOR WETLAND AREAS.
	STORMWATER BMPS	PROVIDE BMPS FOR WETLAND CROSSING FROM STA 676+15 TO STA 677+15 AND ADDITIONAL STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	TEMPORARY RIGHT OF WAY REDUCED TO 15 FT WIDTH FROM STA 676+15 TO STA 677+15.	

NOTES:
FIELD LOCATE BURIED PIPELINE CROSSINGS ASSOCIATED WITH OIL WELLS IN THE VICINITY.
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

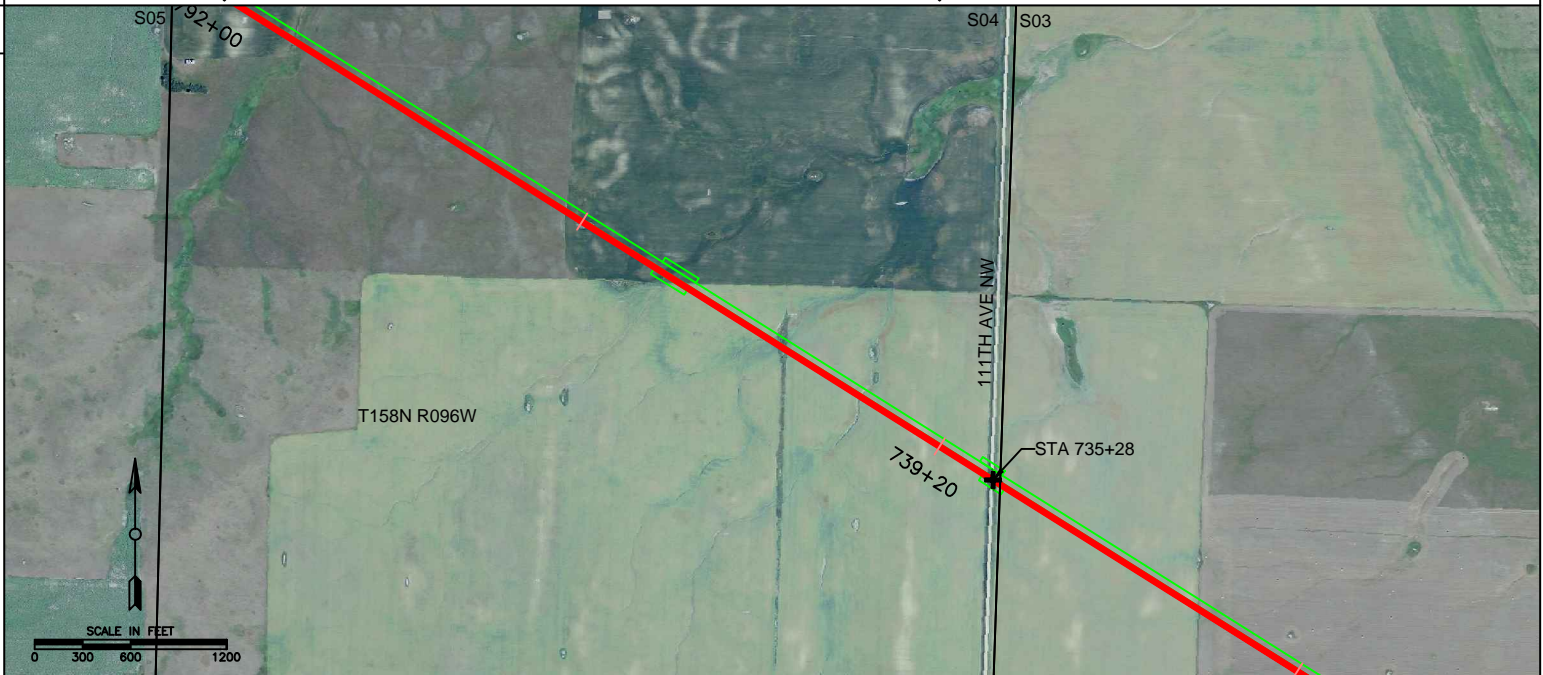
KC HARVEY ENVIRONMENTAL, LLC

VANTAGE PIPELINE US LP

VANTAGE PIPELINE PROJECT ENVIRONMENTAL ALIGNMENT SHEETS	
PROJECTION: STATE PLANE 3301	DATUM: NAD83
SCALE: 1 IN = 1,200 FT	DATE: 02/04/2011
SHEET: 12	

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



C-72

MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING PROCEDURES AT 735+28 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3 AND PASTURE AREAS AS PER DETAIL 5.
	RECLAMATION	RECOMMEND SEED MIX B: PASTURE LANDS FOR PASTURE/HAY AREAS AND DISTURBED AREAS AT 111TH AVE NW ROAD CROSSING.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

KC HARVEY
ENVIRONMENTAL, LLC

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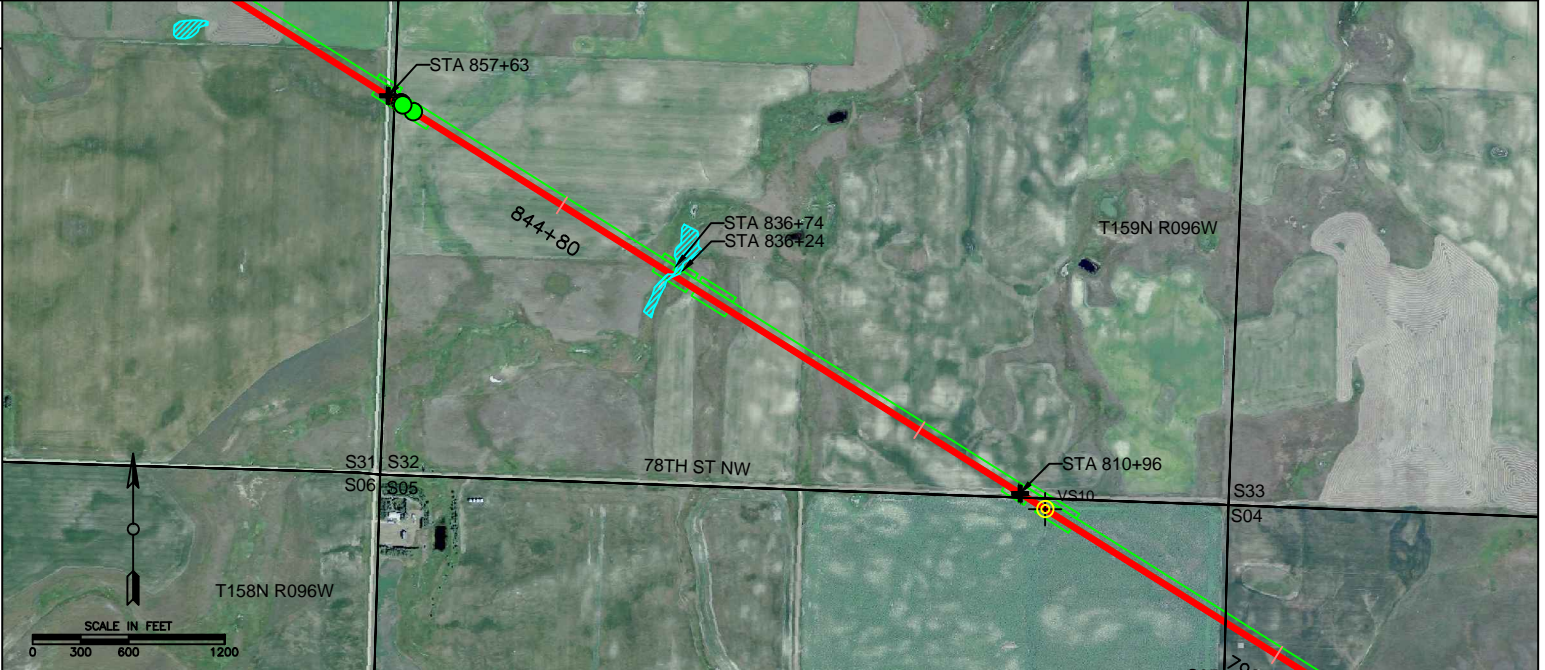
VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 13

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	PRECEDURES FOR WETLAND CROSSING FROM STA 836+24 TO STA 836+74 AS PER DETAIL 14 - NON FLOWING WATERCOURSE CROSSING.
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING PROCEDURES AT STA 810+96 AND AT STA 857+63 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH:	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACT PRONE AREAS AS PER DETAIL 3, PASTURE AREAS AS PER DETAIL 5, AND WETLAND CROSSINGS AS PER DETAIL 7.
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LANDS FOR PASTURE/HAY AREAS AND DISTURBED AREAS AT 78TH ST NW AND 113TH AVE NW ROAD CROSSINGS. RECOMMEND SEED MIX B FOR WETLAND AREAS.
	STORMWATER BMPS	PROVIDE BMPS FOR WETLAND CROSSING AT FROM STA 836+24 TO STA 836+74 AND ADDITIONAL STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE

RIGHT OF WAY REQUIREMENTS	TEMPORARY RIGHT OF WAY REDUCED TO 15 FT WIDTH FROM STA 836+24 TO STA 836+74.
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NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

KC HARVEY ENVIRONMENTAL, LLC

VANTAGE PIPELINE US LP

VANTAGE PIPELINE PROJECT ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83

SCALE: 1 IN = 1,200 FT

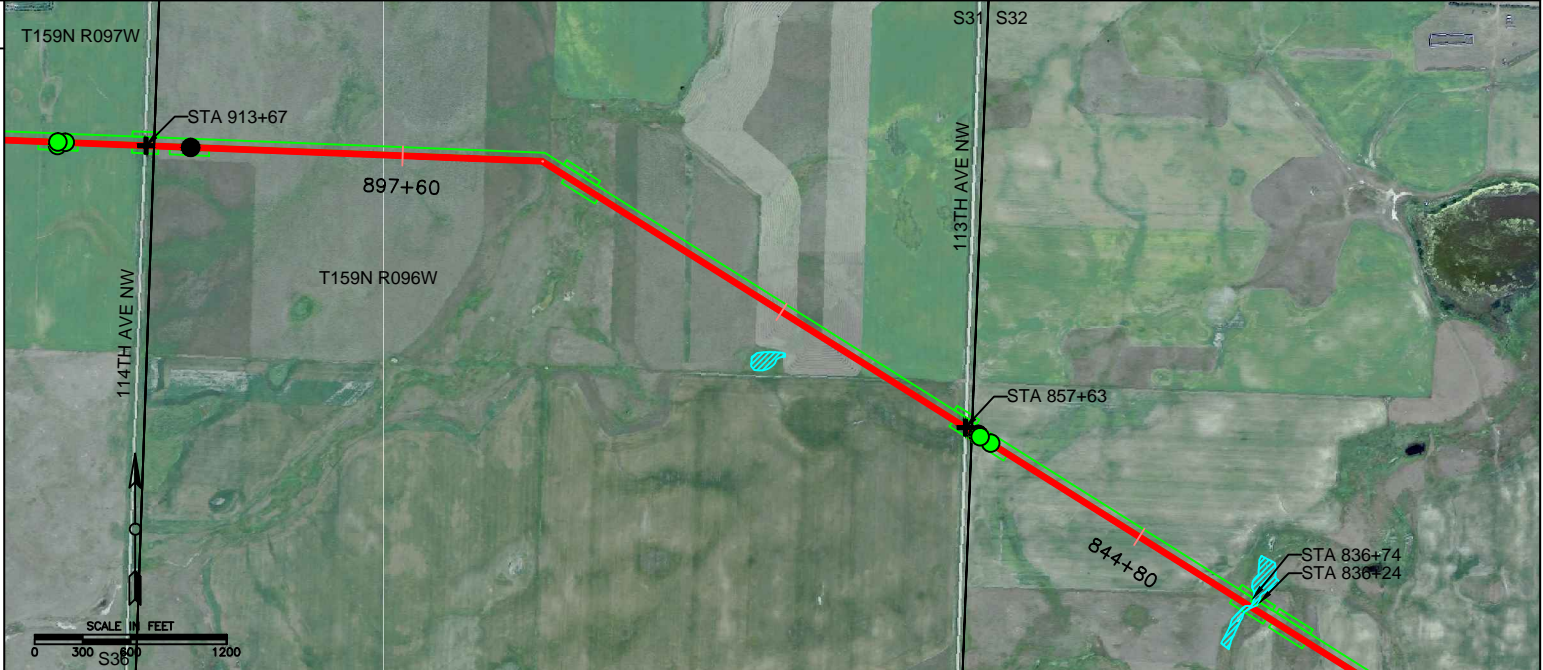
DATE: 02/04/2011

SHEET: 14

REV: 0
FILENAME: Vantage_alignmentsheets.dwg

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	SEE SHEET 14 FOR WETLAND CROSSING PROCEDURES FROM STA 836+24 TO STA 836+74.
	ROAD CROSSING PROCEDURES	BORING AT ROAD CROSSING STA 913+67 AND 857+63 AS PER DETAIL 12 -TYPICAL ROAD BORING. SEE SHEET 14 FOR ROAD CROSSING PROCEDURES AT STA 810+96.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACT PRONE AREAS AS PER DETAIL 3, AND GRASSLAND/PASTURE AREAS AS PER DETAIL 5. SOUTHAM SILTY CLAY LOAM PRESENT.
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LANDS FOR PASTURE/HAY AREAS AND DISTURBED AREAS AT 113TH AND 114TH AVE NW ROAD CROSSINGS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE

RIGHT OF WAY REQUIREMENTS	SEE SHEET 14 FOR TEMPORARY RIGHT OF WAY REQUIREMENTS FROM STA 836+24 TO STA 836+74.
---------------------------	---

NOTES:
TBD - TO BE DETERMINED.

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VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83

SCALE: 1 IN = 1,200 FT

DATE: 02/04/2011

SHEET: 15

REV: 0
FILENAME: Vantage_alignmentsheets.dwg

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	PROCEDURES FOR WETLAND CROSSING FROM STA 948+66 TO STA 949+66 AS PER DETAIL 14 - NON FLOWING WATERCOURSE CROSSING.
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING AT 913+67 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACT PRONE AREAS AS PER DETAIL 3, PASTURE AREAS AS PER DETAIL 5, AND WETLAND CROSSINGS AS PER DETAIL 7. SOUTHAM SILTY CLAY LOAM PRESENT.
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LANDS FOR PASTURE/HAY AREAS AND DISTURBED AREAS AT 114TH AVE NW ROAD CROSSING AND SEED MIX B FOR WETLAND AREAS.
	STORMWATER BMPS	PROVIDE BMPS FOR WETLAND CROSSING FROM STA 948+66 TO STA 949+66 AND ADDITIONAL STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE

RIGHT OF WAY REQUIREMENTS	TEMPORARY RIGHT OF WAY REDUCED TO 15 FT WIDTH FROM STA 948+66 TO STA 949+66.
---------------------------	--

NOTES:
TBD - TO BE DETERMINED.

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VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83

SCALE: 1 IN = 1,200 FT

DATE: 02/04/2011

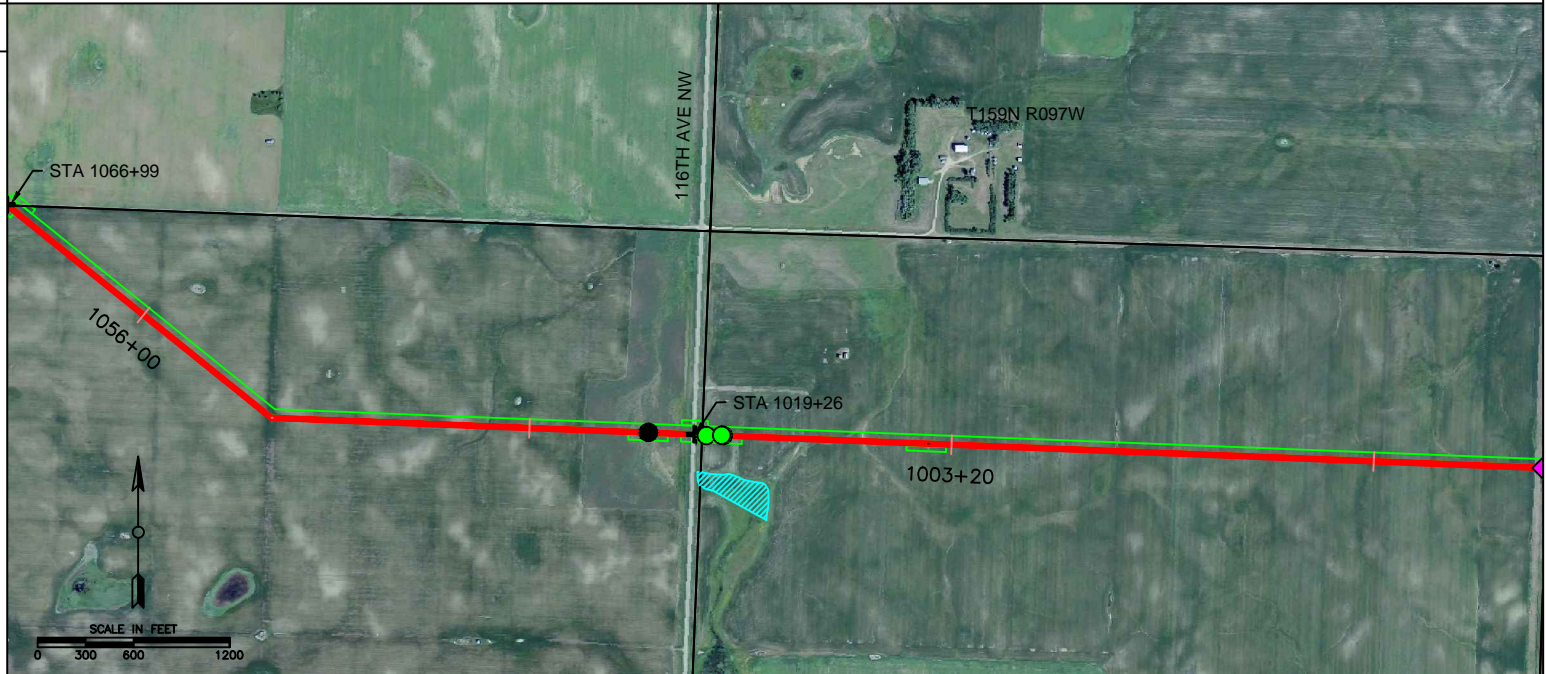
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LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND

- PERMANENT ROW
- TEMPORARY ROW BOUNDARY
- SOIL BORING
- DOMESTIC WATER WELL
- ROAD CROSSING
- WETLAND
- OIL WELL
- UNDERGROUND CABLE
- OVERHEAD POWERLINE
- UNDERGROUND PIPELINE
- FENCE CROSSING
- PRIME FARMLAND
- LAND COVER CLASSIFICATION:
- CULTIVATED CROPS
- PASTURE/HAY
- GRASSLAND/HERBACEOUS



C-76

MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING AT 1019+26 AND 1066+99 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3 AND PASTURE AREAS AS PER DETAIL 5.
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LANDS FOR PASTURE/HAY AREAS AND DISTURBED AREAS AT 116TH AVE NW ROAD CROSSING.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
	RIGHT OF WAY REQUIREMENTS	NONE

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR
PERMITTING

KC HARVEY
ENVIRONMENTAL, LLC

VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83

SCALE: 1 IN = 1,200 FT

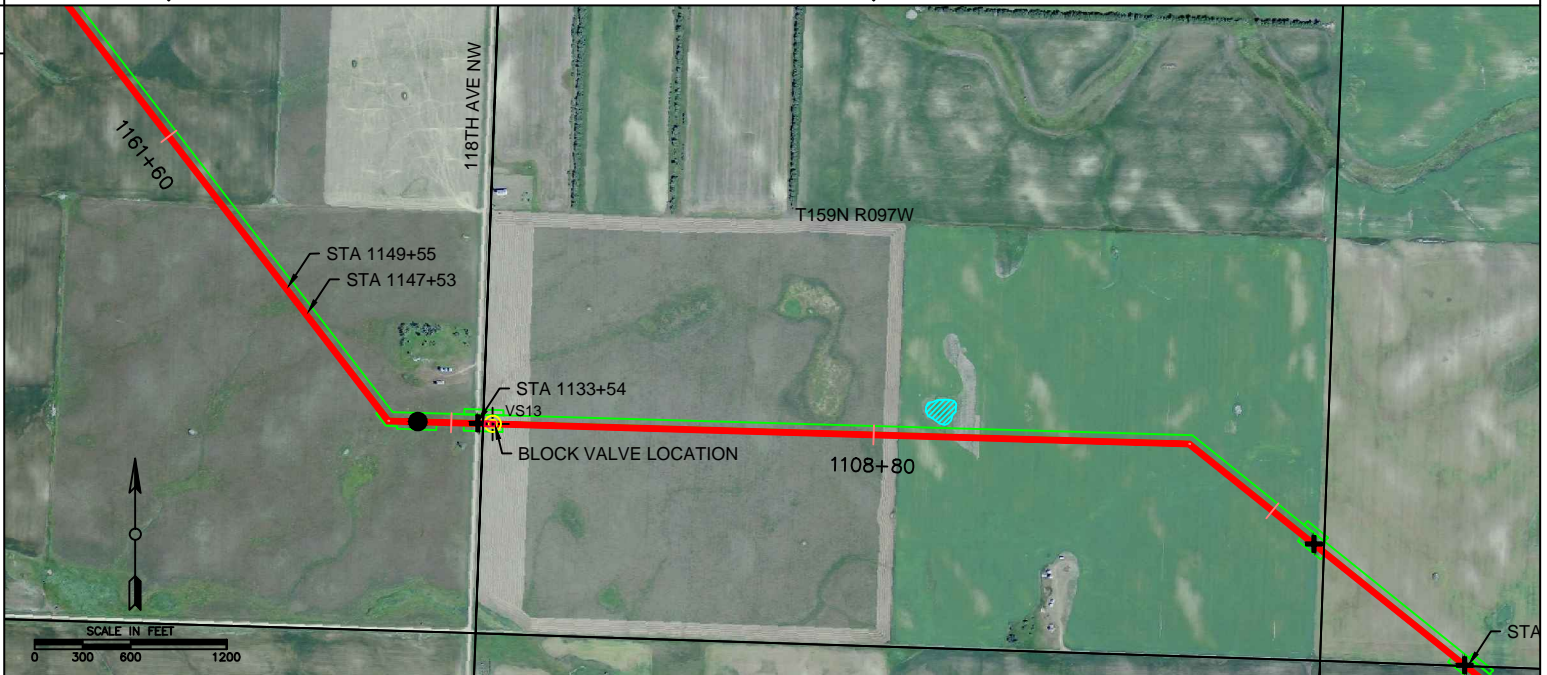
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REV: 0
FILENAME: Vantage_alignmentsheets.dwg

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING AT STA 1133+54 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3, PASTURE AREAS AS PER DETAIL 5, AND PRIME FARMLAND AREAS (STA 1147+53 TO 1149+55) AS PER DETAIL 6.
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LANDS FOR PASTURE/HAY AREAS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR
PERMITTING

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ENVIRONMENTAL ALIGNMENT SHEETS


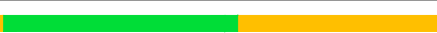





PROJECTION: STATE PLANE 3301 DATUM: NAD83

SCALE: 1 IN = 1,200 FT
















DATE: 02/04/2011

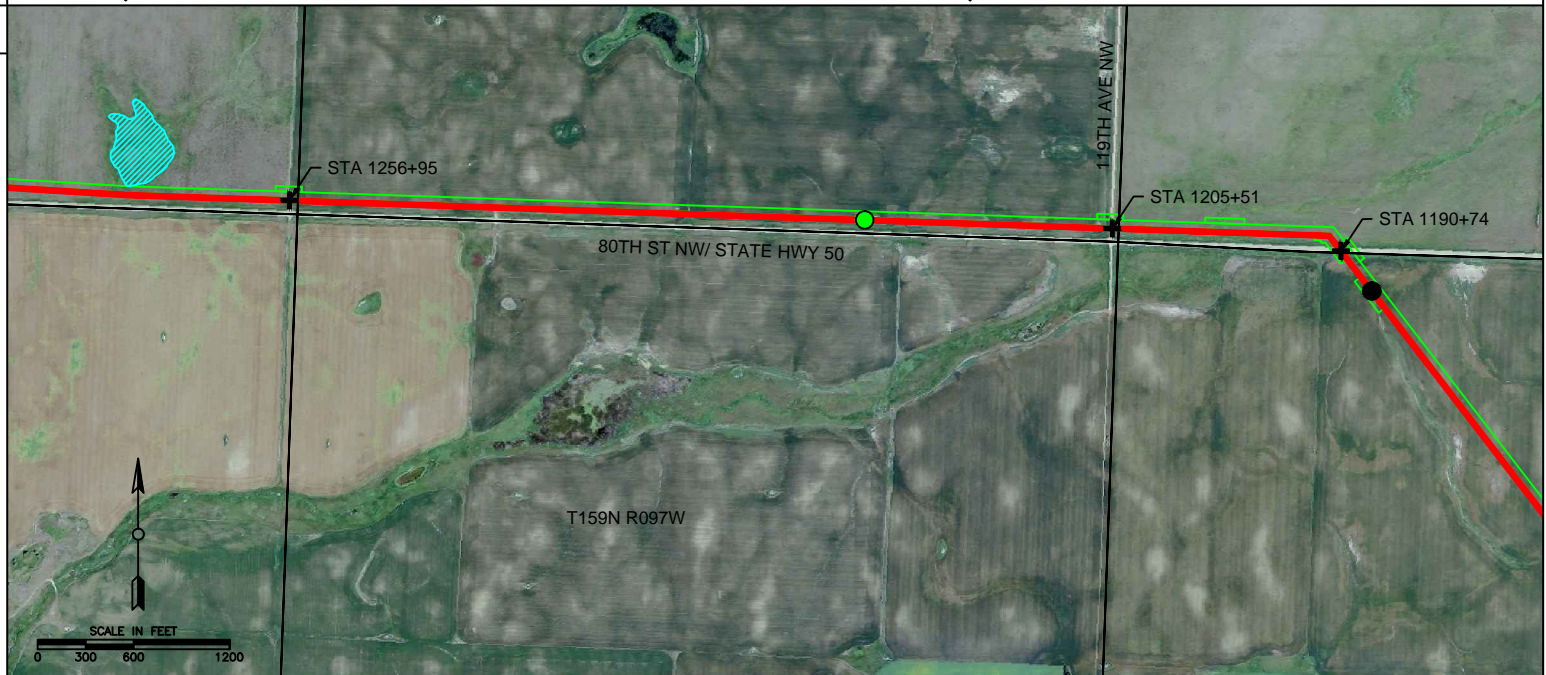
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FILENAME: Vantage_alignmentsheets.dwg



LAND COVER CLASSIFICATION	 
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	 
RIGHT OF WAY REQUIREMENTS	
MILE POST	 

LEGEND

-  PERMANENT ROW
 -  TEMPORARY ROW BOUNDARY
 -  SOIL BORING
 -  DOMESTIC WATER WELL
 -  ROAD CROSSING
 -  WETLAND
 -  OIL WELL
 -  UNDERGROUND CABLE
 -  OVERHEAD POWERLINE
 -  UNDERGROUND PIPELINE
 -  FENCE CROSSING
 -  PRIME FARMLAND
- LAND COVER CLASSIFICATION:
-  CULTIVATED CROPS
 -  PASTURE/HAY
 -  GRASSLAND/HERBACEOUS



C-78

MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	OPEN CUT AT ROAD CROSSING STA 1256+95. GRAVEL ROAD CROSSING AT 1190+74 AND 1205+51 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH:  0-6"  6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACT PRONE AREAS AS PER DETAIL 3 AND GRASSLAND AREAS AS PER DETAIL 5.
	RECLAMATION	RECOMMEND SEED MIX A: NATIVE PRAIRIE FOR GRASSLAND AREAS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR
PERMITTING

KC HARVEY
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VANTAGE
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VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83

SCALE: 1 IN = 1,200 FT

DATE: 02/04/2011

SHEET: 19

REV: 0
FILENAME: Vantage_alignmentsheets.dwg

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	B B B B B B B B B B B C B B B B B B B B B B B B B B B B A A A B B
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	25

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	OPEN CUT AT ROAD CROSSING STA 1283+01, 1282+62, 1309+66. GRAVEL ROAD CROSSING AT 1363+35 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACT PRONE AREAS AS PER DETAIL 3.
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LANDS FOR DISTURBED AREAS AT 122ND AVE NW ROAD CROSSING.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

KC HARVEY ENVIRONMENTAL, LLC

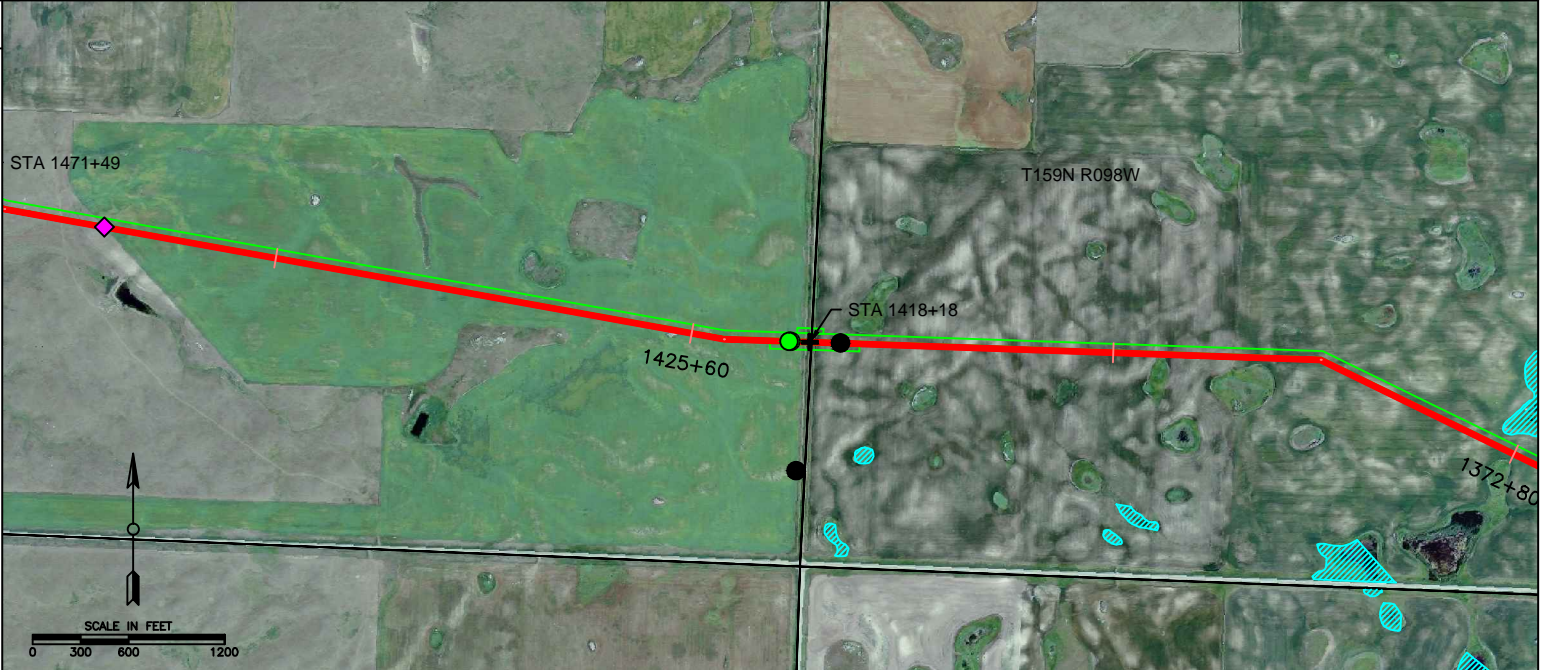
VANTAGE PIPELINE US LP

VANTAGE PIPELINE PROJECT ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 20

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	OPEN CUT AT ROAD CROSSING STA 1418+18.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3 AND GRASSLAND AREAS AS PER DETAIL 5.
	RECLAMATION	RECOMMEND SEED MIX A: NATIVE PRAIRIE FOR GRASSLAND AREAS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE

RIGHT OF WAY REQUIREMENTS	NONE
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NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR
PERMITTING

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VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83

SCALE: 1 IN = 1,200 FT

DATE: 02/04/2011

SHEET: 21

REV: 0
FILENAME: Vantage_alignmentsheets.dwg

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



C-82

MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	PROCEDURES FOR WETLAND CROSSING FROM STA 1555+26 TO STA 1565+76 AS PER DETAIL 14 - NON FLOWING WATERCOURSE CROSSING.
	ROAD CROSSING PROCEDURES	RAILROAD CROSSING AT STA 1564+62 AS PER DETAIL 12 -TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACT PRONE AREAS AS PER DETAIL 3, PASTURE AREAS AS PER DETAIL 5, AND WETLAND CROSSINGS AS PER DETAIL 7. PARNELL SILTY CLAY LOAM AND SOUTHAM SILTY CLAY LOAM PRESENT.
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LANDS FOR PASTURE/HAY AREAS AND SEED MIX B FOR WETLAND AREAS.
	STORMWATER BMPS	PROVIDE BMPS FOR WETLAND CROSSING FROM STA 1555+26 TO STA 1565+76 AND ADDITIONAL STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
	RIGHT OF WAY REQUIREMENTS	TEMPORARY RIGHT OF WAY REDUCED TO 15 FT WIDTH FROM STA 1555+26 TO STA 1565+76.

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

KC HARVEY
ENVIRONMENTAL, LLC

REV: 0
FILENAME: Vantage_alignmentsheets.dwg

VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 23

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING AT STA 1755+92 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3.
	TOPSOIL DEPTH: 0-6" 6-12"	
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LAND FOR DISTURBED AREAS AT 83RD ST NW ROAD CROSSING.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
ACCESS CONTROL	NONE	
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

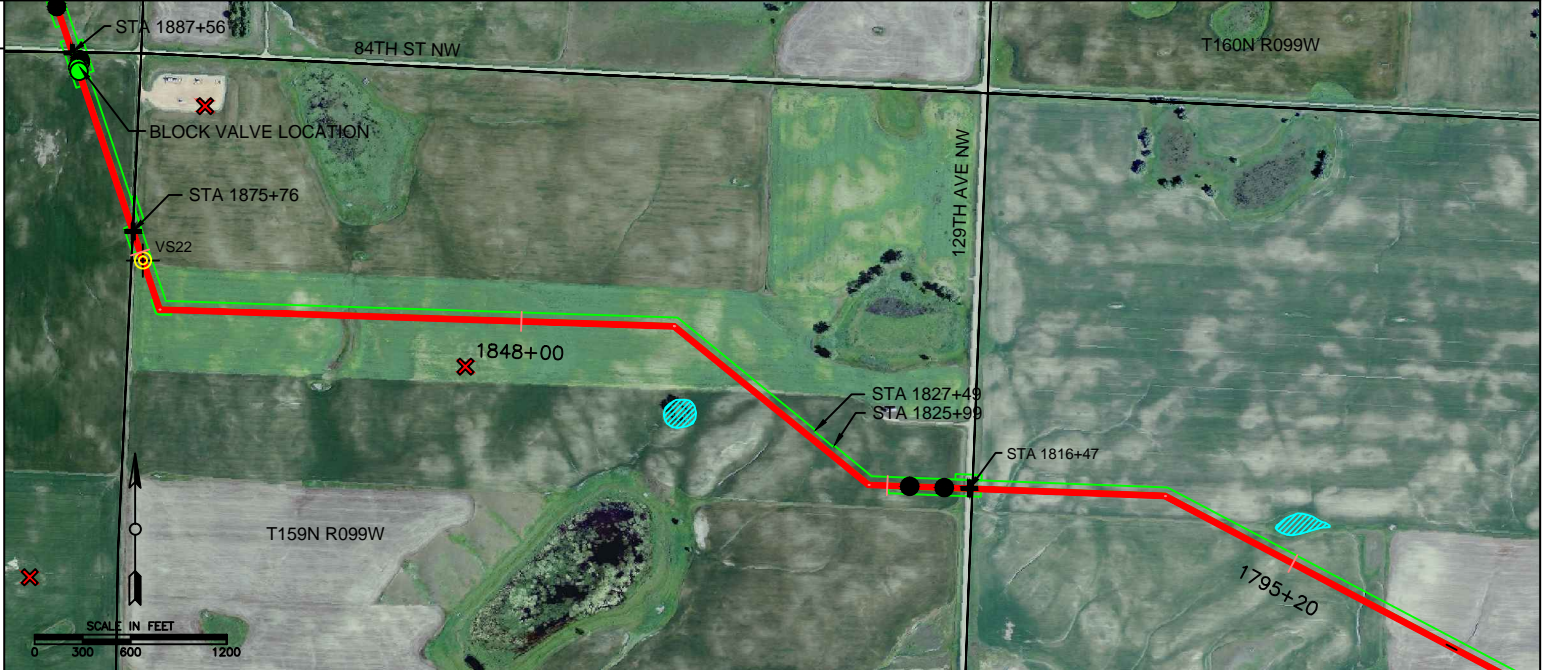
APPROVED FOR PERMITTING

KC HARVEY ENVIRONMENTAL, LLC

VANTAGE PIPELINE US LP

LAND COVER CLASSIFICATION	[Yellow bar]	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	[Orange line with 'B' markers]	
RIGHT OF WAY REQUIREMENTS	[Black bar]	
MILE POST	6	35

LEGEND	
[Red line]	PERMANENT ROW
[Green line]	TEMPORARY ROW BOUNDARY
[Yellow circle with crosshair]	SOIL BORING
[Blue triangle]	DOMESTIC WATER WELL
[Black cross]	ROAD CROSSING
[Blue hatched area]	WETLAND
[Red 'X']	OIL WELL
[Black circle]	UNDERGROUND CABLE
[Green circle]	OVERHEAD POWERLINE
[Orange circle]	UNDERGROUND PIPELINE
[Purple diamond]	FENCE CROSSING
[Red hatched area]	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
[Yellow bar]	CULTIVATED CROPS
[Orange bar]	PASTURE/HAY
[Green bar]	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	OPEN CUT AT ROAD CROSSING STA 1875+76. GRAVEL ROAD CROSSING AT 1816+47 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: [Grey bar] 0-6" [Black bar] 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3, PRIME FARMLAND AREAS AS PER DETAIL 6.
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LAND FOR DISTURBED AREAS AT 129TH AVE NW AND 84TH ST NW ROAD CROSSINGS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE

RIGHT OF WAY REQUIREMENTS	TEMPORARY RIGHT OF WAY REDUCED TO 30 FT WIDTH FROM STA 1825+99 TO STA 1827+49.
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NOTES:
FIELD LOCATE BURIED PIPELINE CROSSINGS ASSOCIATED WITH OIL WELLS IN THE VICINITY.
TBD - TO BE DETERMINED.

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KC HARVEY
ENVIRONMENTAL, LLC

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FILENAME: Vantage_alignmentsheets.dwg

VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 26

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND

- PERMANENT ROW
- TEMPORARY ROW BOUNDARY
- SOIL BORING
- DOMESTIC WATER WELL
- ROAD CROSSING
- WETLAND
- OIL WELL
- UNDERGROUND CABLE
- OVERHEAD POWERLINE
- UNDERGROUND PIPELINE
- FENCE CROSSING
- PRIME FARMLAND
- LAND COVER CLASSIFICATION:
- CULTIVATED CROPS
- PASTURE/HAY
- GRASSLAND/HERBACEOUS



C-88

MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING AT STA 2090+83 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3 AND PASTURE AREAS AS PER DETAIL 5.
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS AND DISTURBED AREAS AT 86TH ST ROAD CROSSING.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR
PERMITTING

KC HARVEY
ENVIRONMENTAL, LLC

VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

REV: 0
FILENAME: Vantage_alignmentsheets.dwg

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011

SHEET: 29

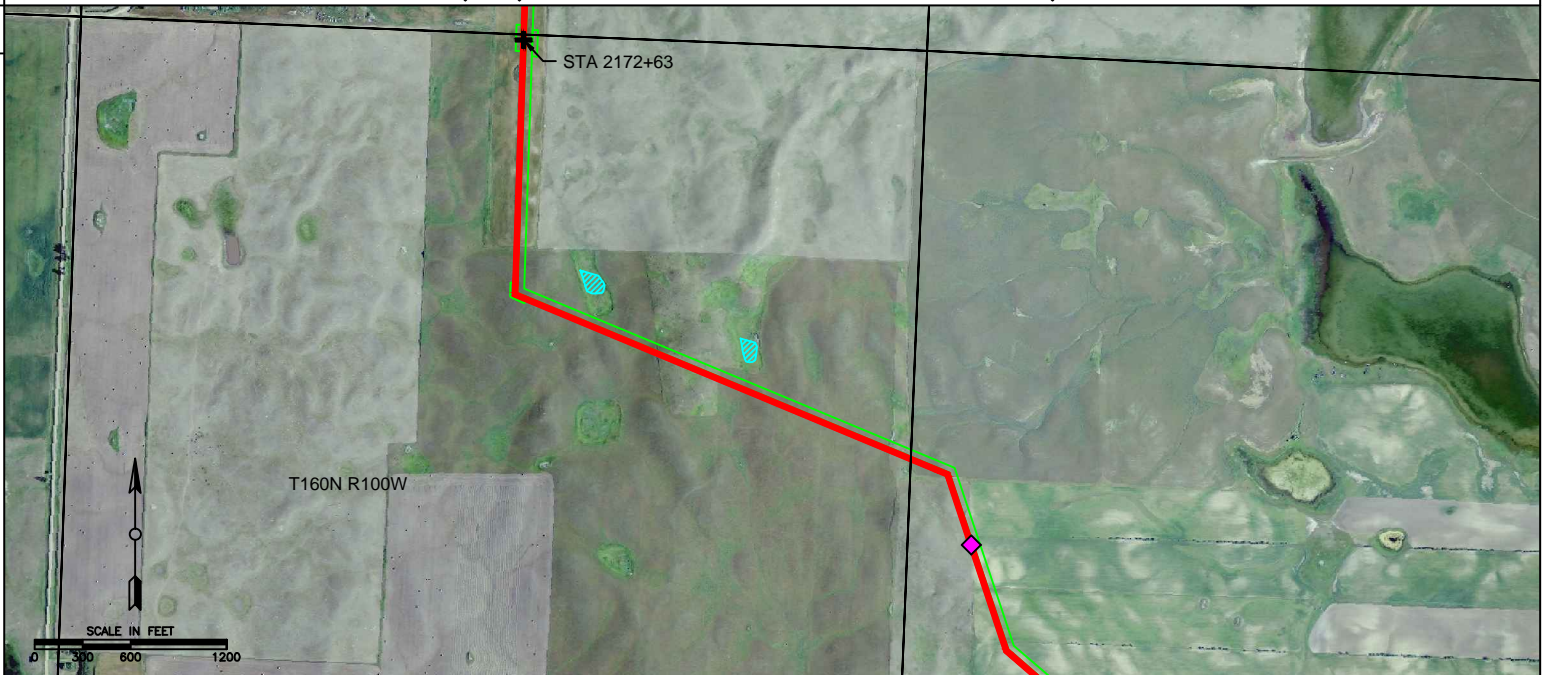
LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	A A B B B B B A A A A A B B B B B B B B B B B B B B B B B B B A A A A
RIGHT OF WAY REQUIREMENTS	
MILE POST	42 41 40

LEGEND

- PERMANENT ROW
- TEMPORARY ROW BOUNDARY
- SOIL BORING
- DOMESTIC WATER WELL
- ROAD CROSSING
- WETLAND
- OIL WELL
- UNDERGROUND CABLE
- OVERHEAD POWERLINE
- UNDERGROUND PIPELINE
- FENCE CROSSING
- PRIME FARMLAND

LAND COVER CLASSIFICATION:

- CULTIVATED CROPS
- PASTURE/HAY
- GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	OPEN CUT AT ROAD CROSSING STA 2172+63.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3 AND PASTURE AREAS AS PER DETAIL 5.
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

KC HARVEY
ENVIRONMENTAL, LLC

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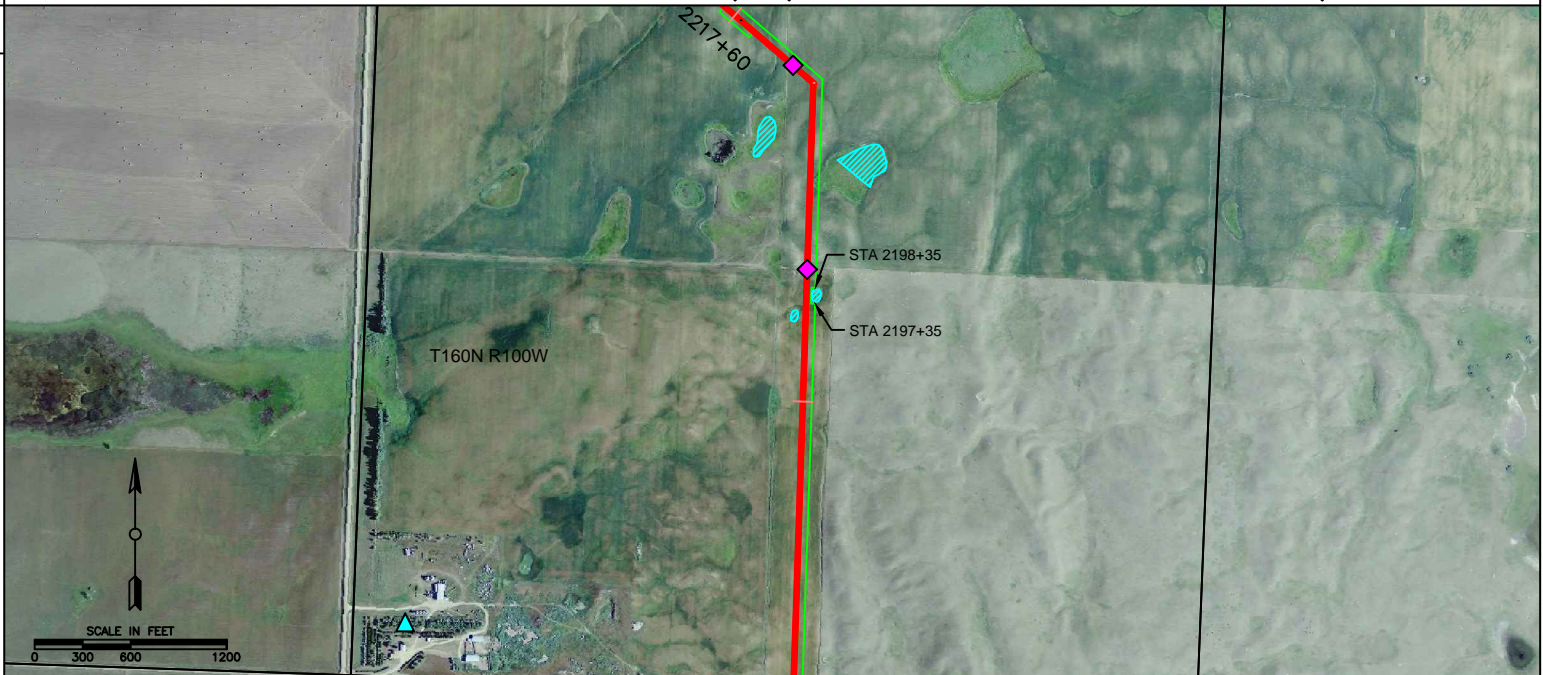
VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 30

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	A A A A A A A A A A B B B B B A A A A A B
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	NONE
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3 AND PASTURE AREAS AS PER DETAIL 5.
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS.
	STORMWATER BMPS	PROVIDE BMPS FOR WETLAND FROM STA 2197+35 TO STA 2198+35 AND ADDITIONAL STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
	RIGHT OF WAY REQUIREMENTS	TEMPORARY RIGHT OF WAY REDUCED TO 15 FT WIDTH FROM STA 2197+35 TO STA 2198+35.

NOTES:
TBD - TO BE DETERMINED.

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ENVIRONMENTAL, LLC

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VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 31

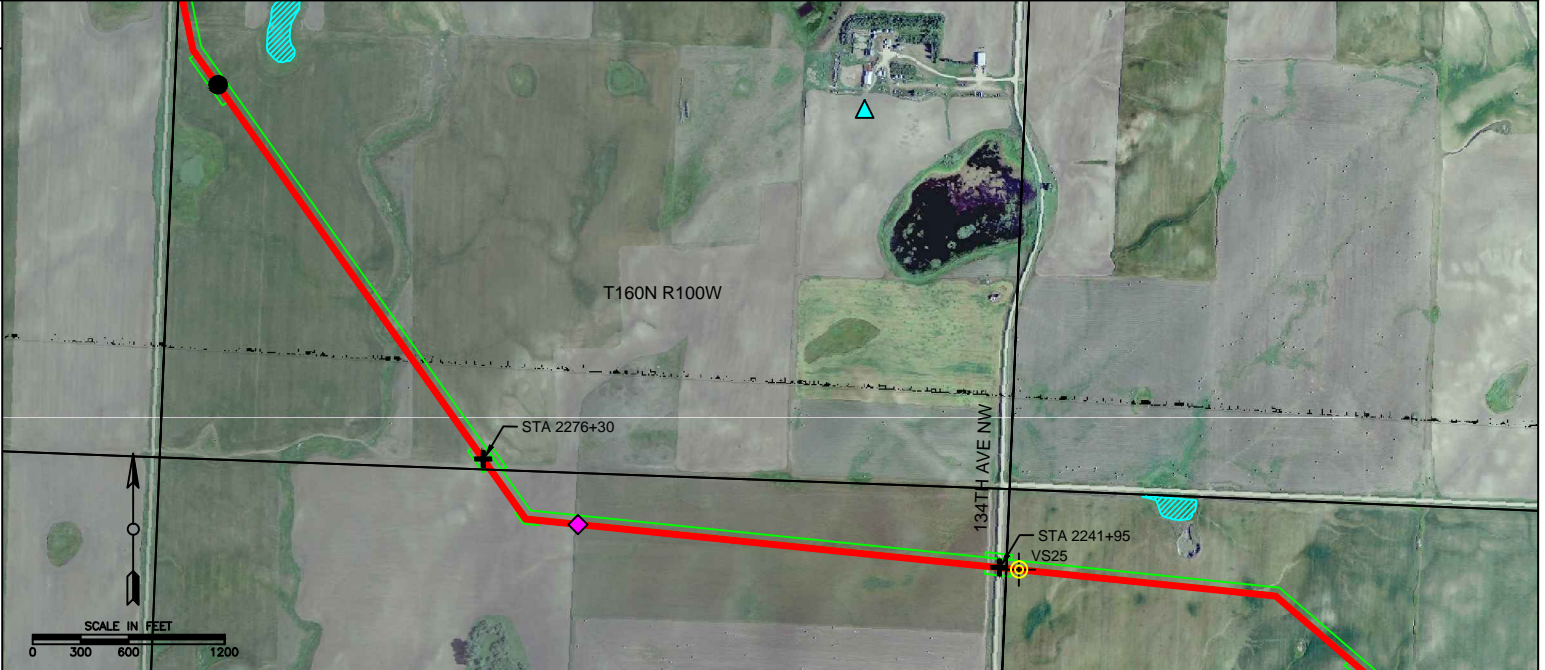
LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	B B B B B B B B B B B B A A A A A A A A A A A A A B B B B B A A A A A B B B B B B B B B B
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	44 43 42 41

LEGEND

- PERMANENT ROW
- TEMPORARY ROW BOUNDARY
- SOIL BORING
- DOMESTIC WATER WELL
- ROAD CROSSING
- WETLAND
- OIL WELL
- UNDERGROUND CABLE
- OVERHEAD POWERLINE
- UNDERGROUND PIPELINE
- FENCE CROSSING
- PRIME FARMLAND

LAND COVER CLASSIFICATION:

- CULTIVATED CROPS
- PASTURE/HAY
- GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS

WETLAND CROSSING PROCEDURES	NONE
ROAD CROSSING PROCEDURES	OPEN CUT AT ROAD CROSSING STA 2276+30. GRAVEL ROAD CROSSING AT 2241+95 AS PER DETAIL 12 - TYPICAL ROAD BORING.
VEGETATION RESTRICTIONS	NONE
WILDLIFE RESTRICTIONS	TBD
SOIL HANDLING/STRIPPING CRITERIA	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3 AND PASTURE AREAS AS PER DETAIL 5.
TOPSOIL DEPTH:	0-6" 6-12"
RECLAMATION	RECOMMEND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS AND DISTURBED AREAS AT 134TH AVE NW ROAD CROSSING.
STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	NONE

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

KC HARVEY ENVIRONMENTAL, LLC

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VANTAGE PIPELINE US LP

VANTAGE PIPELINE PROJECT ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 32

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	B B B B B B B B B B B B B B B B B B A A A A A A A
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	46 45 44 43

LEGEND

- PERMANENT ROW
- TEMPORARY ROW BOUNDARY
- SOIL BORING
- DOMESTIC WATER WELL
- ROAD CROSSING
- WETLAND
- OIL WELL
- UNDERGROUND CABLE
- OVERHEAD POWERLINE
- UNDERGROUND PIPELINE
- FENCE CROSSING
- PRIME FARMLAND

LAND COVER CLASSIFICATION:

- CULTIVATED CROPS
- PASTURE/HAY
- GRASSLAND/HERBACEOUS



C-92

MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING AT 2313 +64 AND 2342+16 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACT PRONE AREAS AS PER DETAIL 3. PARNELL SILTY CLAY LOAM PRESENT.
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS AND FOR DISTURBED AREAS AT 135TH AVE NW AND 89TH ST NW ROAD CROSSINGS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

KC HARVEY
ENVIRONMENTAL, LLC

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FILENAME: Vantage_alignmentsheets.dwg

VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 33

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING AT 2417+69 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACT PRONE AREAS AS PER DETAIL 3, AND GRASSLAND/PASTURE AREAS AS PER DETAIL 5. PARNELL SILTY CLAY LOAM AND TONKA SILT LOAM PRESENT.
	RECLAMATION	RECOMMEND SEED MIX A: NATIVE PRAIRIE FOR GRASSLAND AREAS AND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS AND DISTURBED AREAS AT 136TH AVE NW ROAD CROSSING.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR
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KC HARVEY
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VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83

SCALE: 1 IN = 1,200 FT

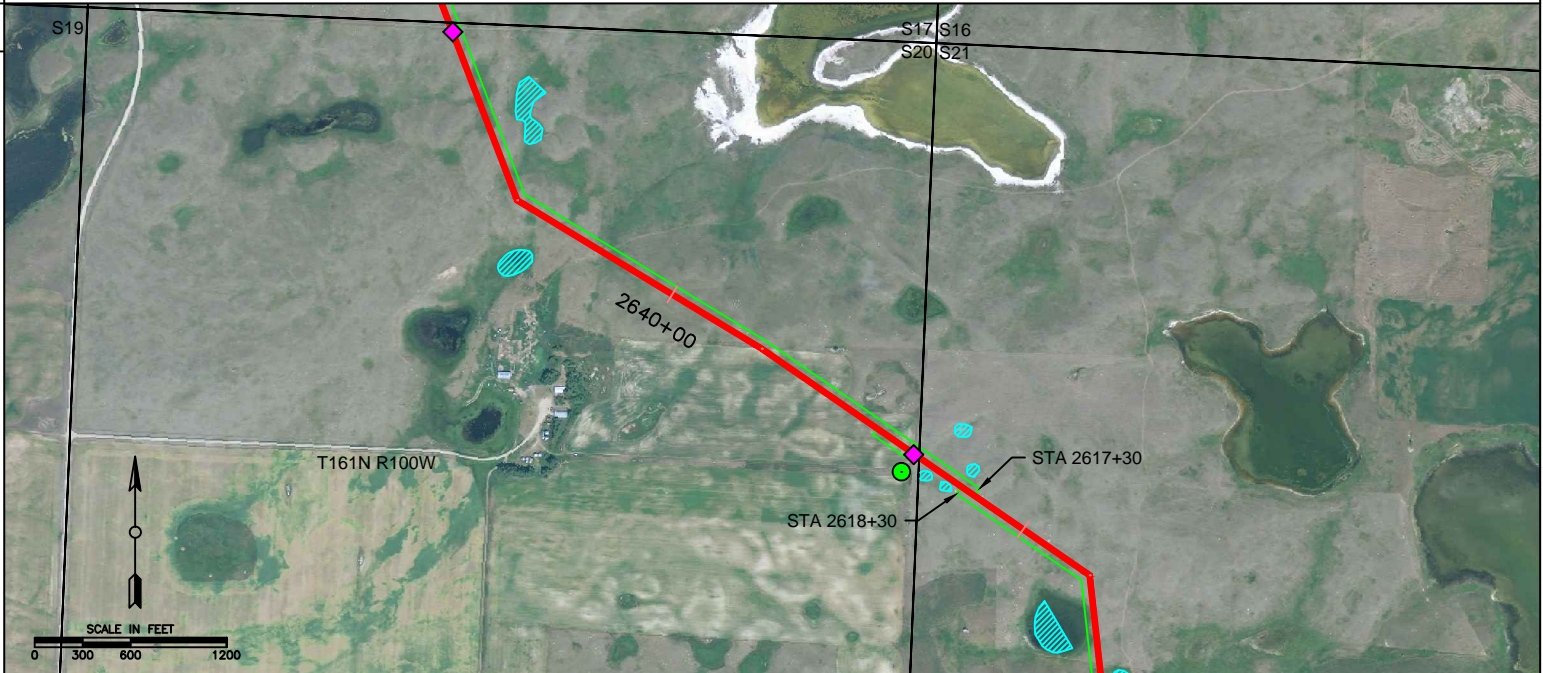
DATE: 02/04/2011

SHEET: 35

REV: 0
FILENAME: Vantage_alignmentsheets.dwg

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	NONE
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3 AND GRASSLAND/PASTURE AREAS AS PER DETAIL 5.
	RECLAMATION	RECOMMEND SEED MIX A: NATIVE PRAIRIE FOR GRASSLAND AREAS AND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	SWITCH TEMPORARY RIGHT OF WAY TO NORTHEAST SIDE OF PIPELINE AT STA 2617+30 WITH 100' OVERLAP.	

NOTES:
TBD - TO BE DETERMINED.

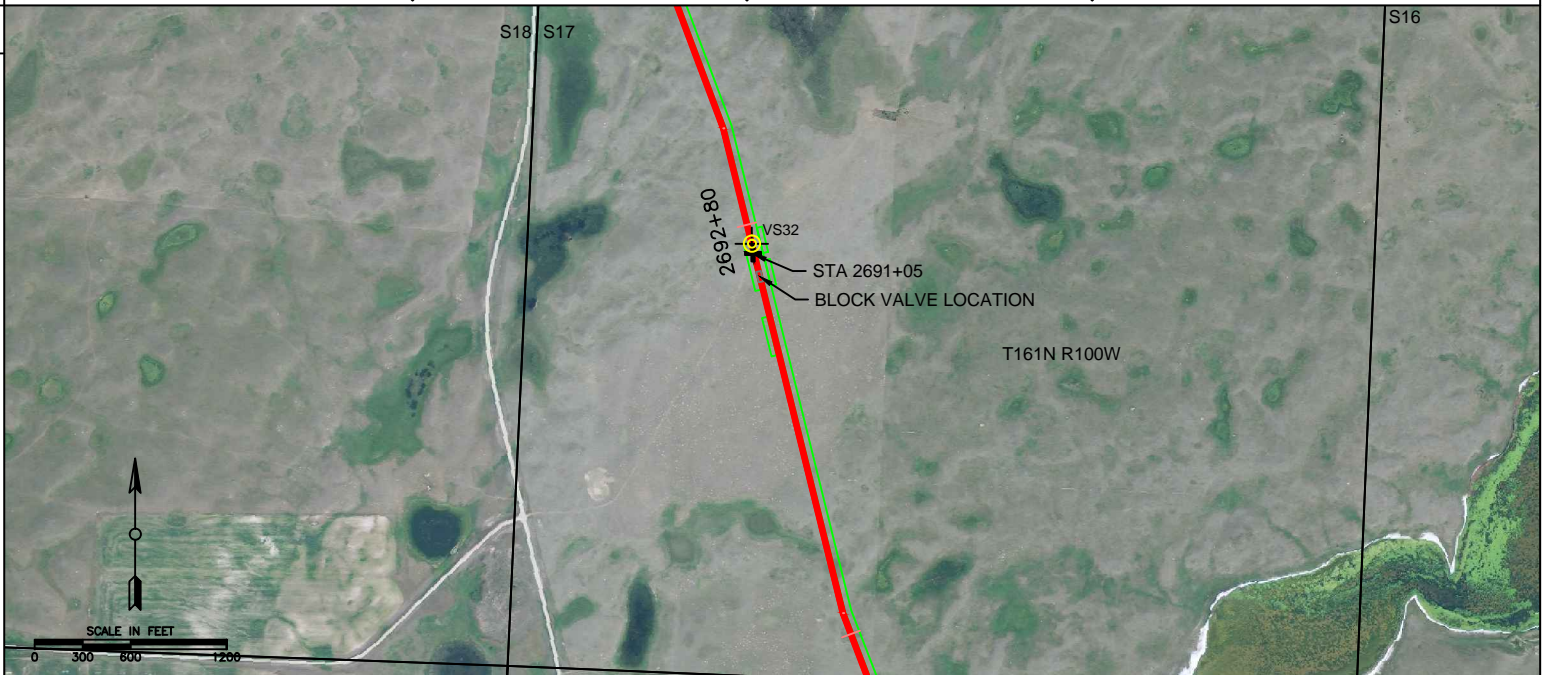
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VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 38

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	54 53 52 51 50

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	OPEN CUT AT ROAD CROSSING STA 2691+05.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3, GRASSLAND AREAS AS PER DETAIL 5.
	TOPSOIL DEPTH: 0-6" 6-12"	
	RECLAMATION	RECOMMEND SEED MIX A: NATIVE PRAIRIE FOR GRASSLAND AREAS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
ACCESS CONTROL	NONE	
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

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VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 39

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	B B B B B B B B B B B B B B B B A A B A A A A A A A B B B B B
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	55 54 53 52 51 50

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING AT STA 2730+17 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR GRASSLAND AREAS AS PER DETAIL 5.
	RECLAMATION	RECOMMEND SEED MIX A: NATIVE PRAIRIE FOR GRASSLAND AREAS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	MOVE TEMPORARY RIGHT OF WAY TO SOUTHWEST SIDE OF PIPELINE BEGINNING AT STA 2730+17.	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

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VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 40

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING AT STA 2835+23 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3, PASTURE AREAS (STA 2798+80 TO STA 2808+58) AS PER DETAIL 5.
	TOPSOIL DEPTH:	0-6" 6-12"
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
ACCESS CONTROL	NONE	
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR
PERMITTING

KC HARVEY
ENVIRONMENTAL, LLC

VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83

SCALE: 1 IN = 1,200 FT

DATE: 02/04/2011

SHEET: 42

REV: 0
FILENAME: Vantage_alignmentsheets.dwg

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND

- PERMANENT ROW
- TEMPORARY ROW BOUNDARY
- SOIL BORING
- DOMESTIC WATER WELL
- ROAD CROSSING
- WETLAND
- OIL WELL
- UNDERGROUND CABLE
- OVERHEAD POWERLINE
- UNDERGROUND PIPELINE
- FENCE CROSSING
- PRIME FARMLAND

LAND COVER CLASSIFICATION:

- CULTIVATED CROPS
- PASTURE/HAY
- GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	NONE
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACT PRONE AREAS AS PER DETAIL 3. PARNELL SILTY CLAY LOAM PRESENT.
	RECLAMATION	NONE
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

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KC HARVEY
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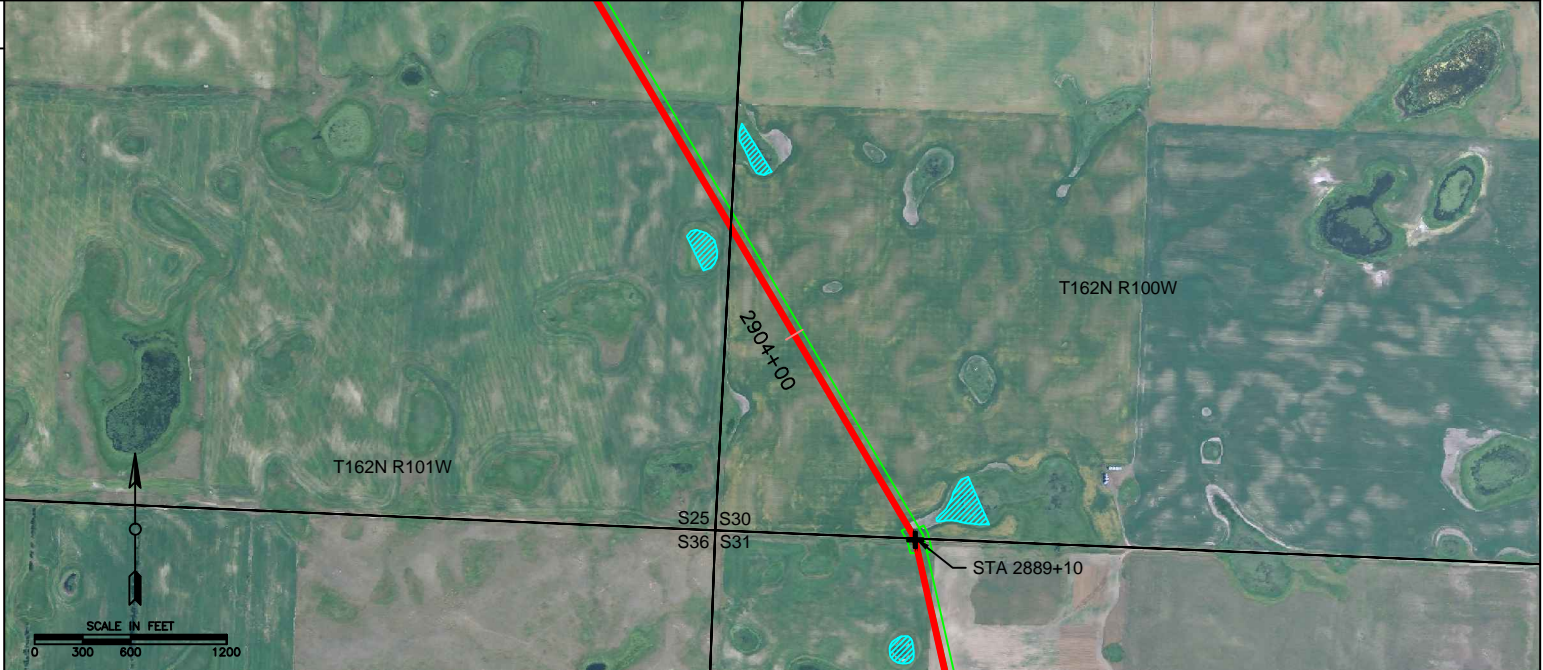
VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 43

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	56 55 54 53 52

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



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MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	OPEN CUT AT ROAD CROSSING STA 2889+10.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3.
	TOPSOIL DEPTH: 0-6" 6-12"	
	RECLAMATION	NONE
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
ACCESS CONTROL	NONE	
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

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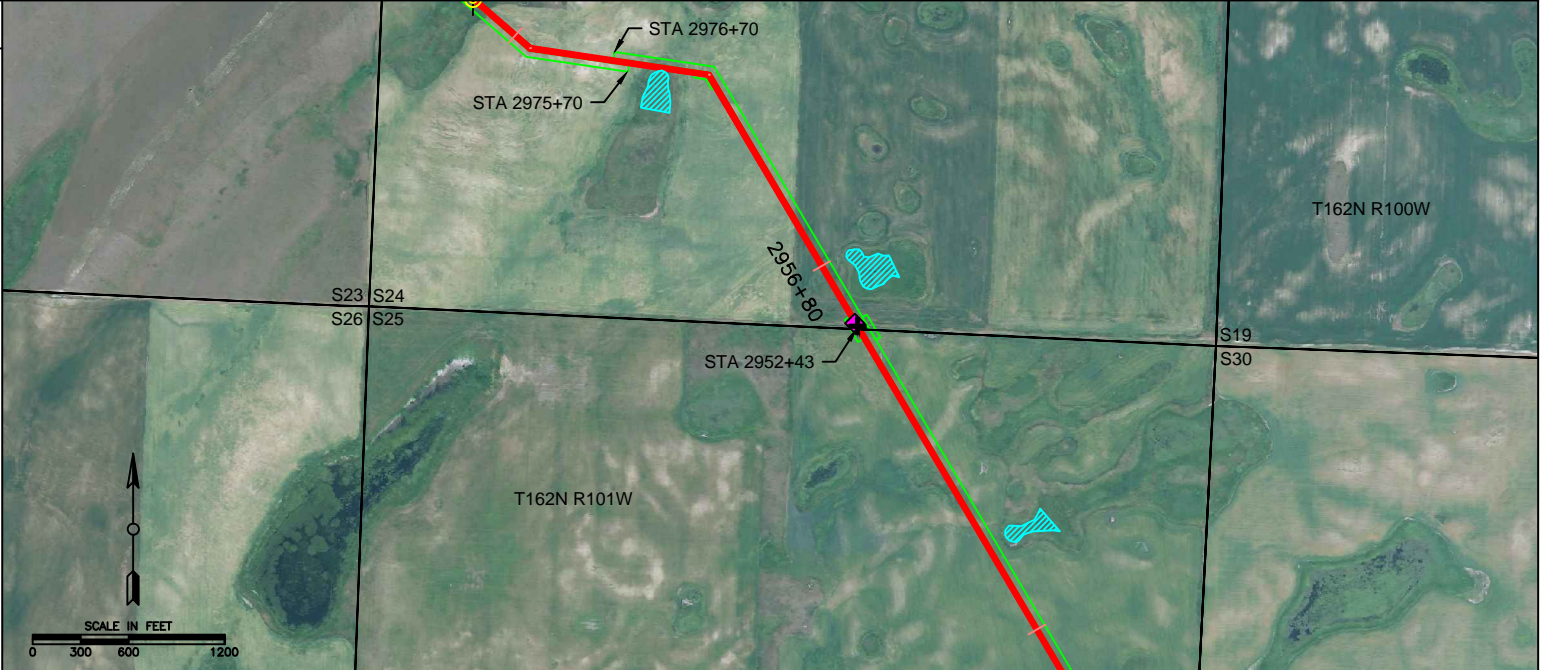
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PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 44

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	OPEN CUT AT ROAD CROSSING STA 2952+43.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACT PRONE AREAS AS PER DETAIL 3. VALLERS-PARNELL COMPLEX AND VALLERS LOAM PRESENT.
	RECLAMATION	NONE
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
	RIGHT OF WAY REQUIREMENTS	MOVE TEMPORARY RIGHT OF WAY TO SOUTHWEST SIDE OF PIPELINE AT STA 2975+70 WITH 100' OVERLAP.

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR
PERMITTING

KC HARVEY
ENVIRONMENTAL, LLC

VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83

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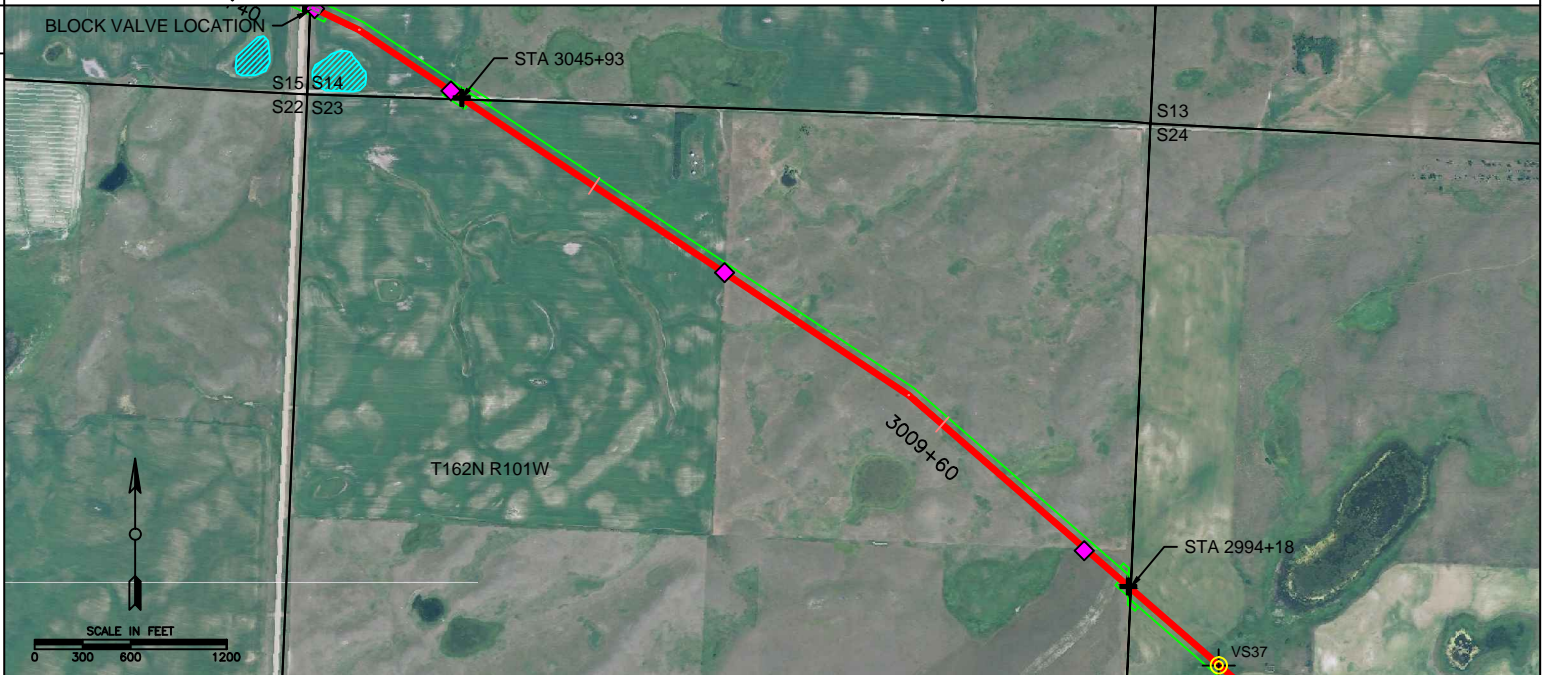
DATE: 02/04/2011

SHEET: 45

REV: 0
FILENAME: Vantage_alignmentsheets.dwg

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	OPEN CUT AT ROAD CROSSING STA 2994+18 AND STA 3045+93.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3, GRASSLAND/PASTURE AREAS AS PER DETAIL 5. VALLERS LOAM PRESENT.
	RECLAMATION	RECOMMEND SEED MIX A: NATIVE PRAIRIE FOR GRASSLAND AREAS AND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
	RIGHT OF WAY REQUIREMENTS	MOVE TEMPORARY RIGHT OF WAY TO NORTHEAST SIDE OF PIPELINE AT STA 2994+18.

NOTES:
TBD - TO BE DETERMINED.

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS
PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 46

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING AT STA 3057+43 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACT PRONE AREAS AS PER DETAIL 3 AND PASTURE AREAS AS PER DETAIL 5.
	TOPSOIL DEPTH: 0-6" 6-12"	
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS AND DISTURBED AREA AT 140TH AVE NW ROAD CROSSING.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
ACCESS CONTROL	NONE	
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

KC HARVEY ENVIRONMENTAL, LLC

VANTAGE PIPELINE US LP

VANTAGE PIPELINE PROJECT ENVIRONMENTAL ALIGNMENT SHEETS
 PROJECTION: STATE PLANE 3301 DATUM: NAD83
 SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 47

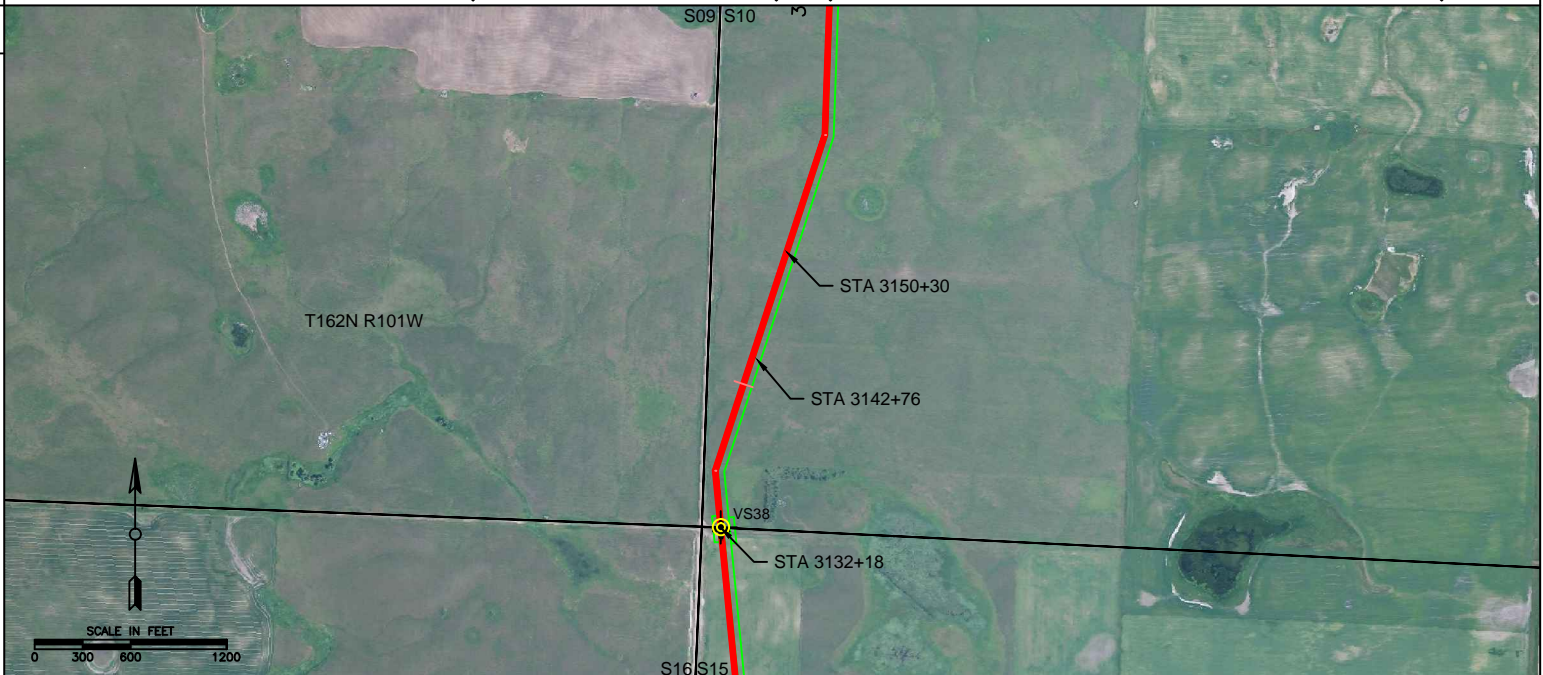
LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	B B B B B B B B B B B B B B B B A A B B B B B B D D B D D B B B D D B B B B B B
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND

- PERMANENT ROW
- TEMPORARY ROW BOUNDARY
- SOIL BORING
- DOMESTIC WATER WELL
- ROAD CROSSING
- WETLAND
- OIL WELL
- UNDERGROUND CABLE
- OVERHEAD POWERLINE
- UNDERGROUND PIPELINE
- FENCE CROSSING
- PRIME FARMLAND

LAND COVER CLASSIFICATION:

- CULTIVATED CROPS
- PASTURE/HAY
- GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS

WETLAND CROSSING PROCEDURES	NONE
ROAD CROSSING PROCEDURES	OPEN CUT AT ROAD CROSSING STA 3132+18.
VEGETATION RESTRICTIONS	NONE
WILDLIFE RESTRICTIONS	TBD
SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR COMPACT PRONE AREAS (STA 3142+76 TO STA 3150+30) AS PER DETAIL 3 AND PASTURE AREAS AS PER DETAIL 5.
RECLAMATION	RECOMMEND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS.
STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	NONE

NOTES:
TBD - TO BE DETERMINED.

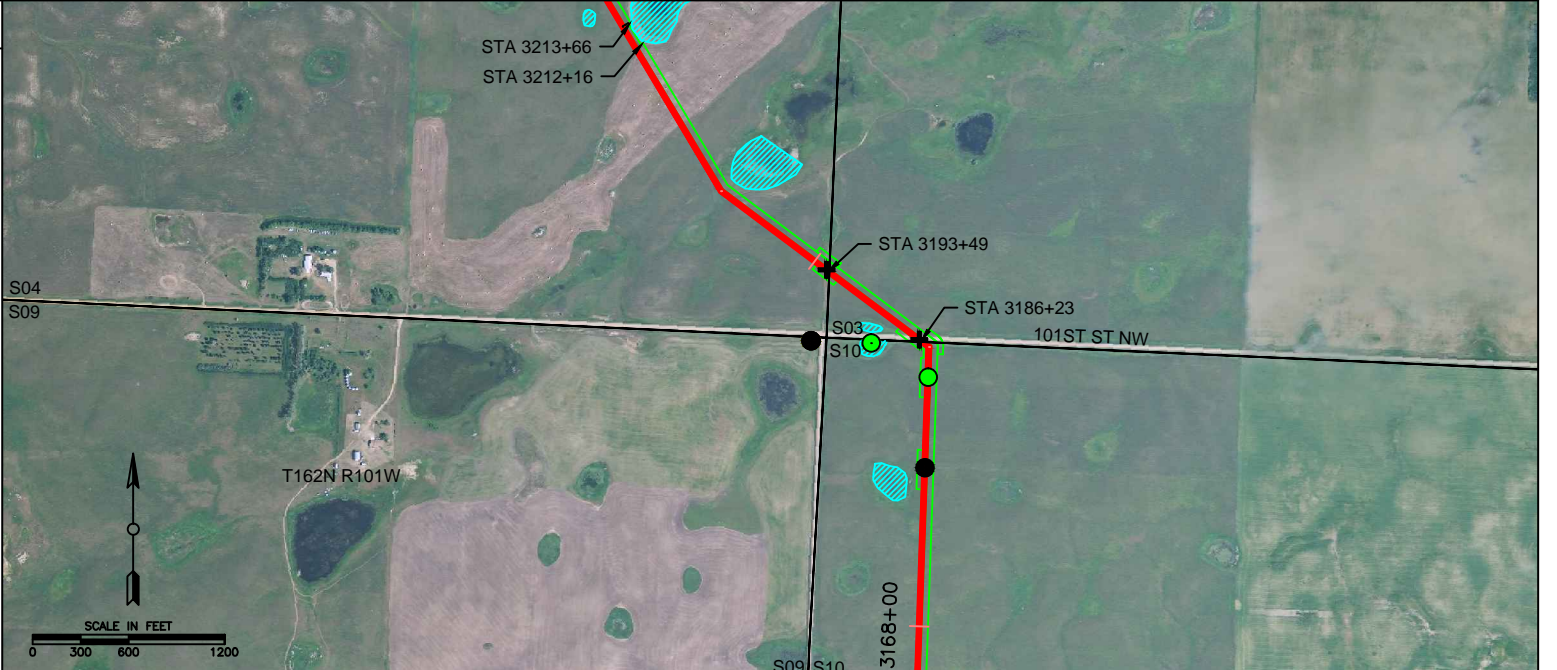
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LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS

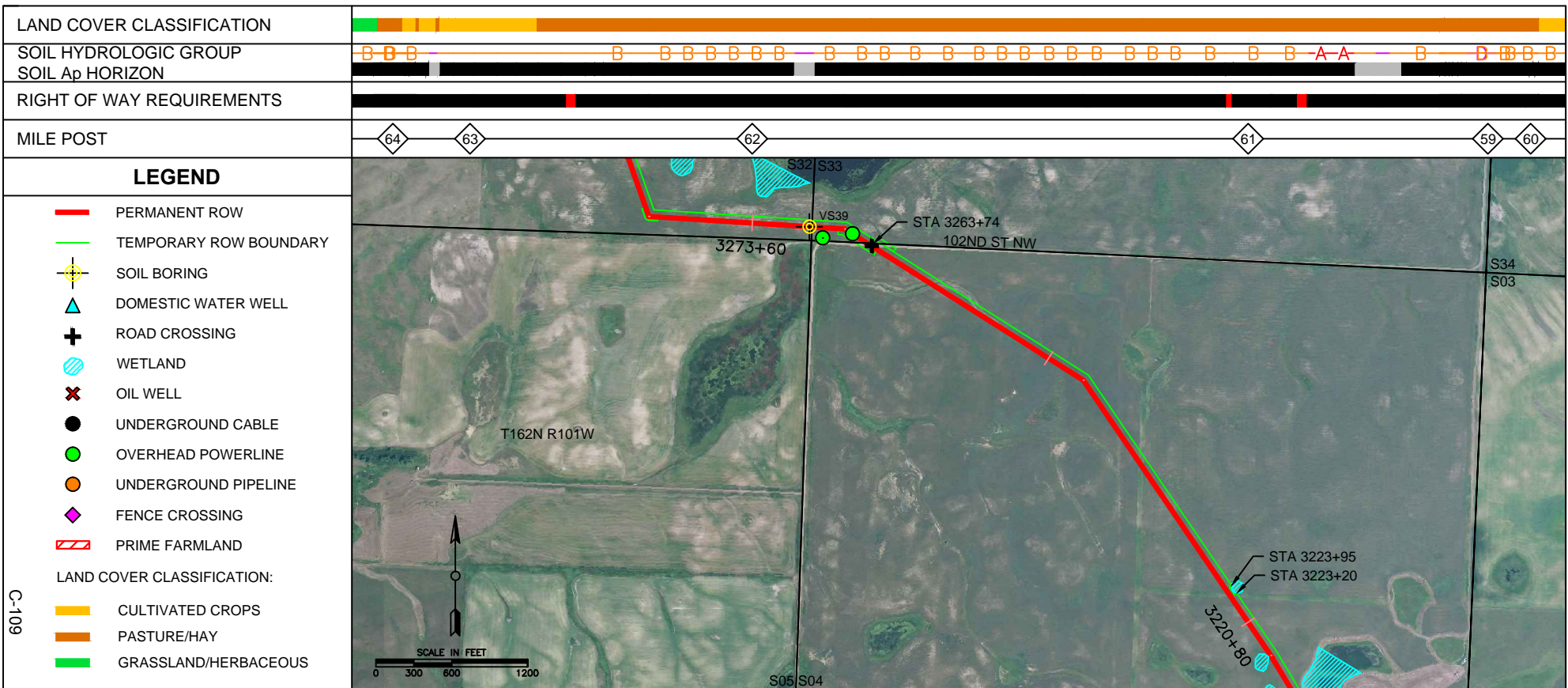


MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	OPEN CUT AT ROAD CROSSING STA 3193+49. GRAVEL ROAD CROSSING AT 3186+23 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACT PRONE AREAS AS PER DETAIL 3, PASTURE AREAS AS PER DETAIL 5, AND WETLAND CROSSINGS AS PER DETAIL 7. PARNELL SILTY CLAY LOAM PRESENT.
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS AND DISTURBED AREAS AT 101ST ST NW ROAD CROSSING.
	STORMWATER BMPS	PROVIDE BMPS FOR WETLAND FROM STA 3212+16 TO STA 3213+66 AND ADDITIONAL STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	TEMPORARY RIGHT OF WAY REDUCED TO 25 FT FROM STA 3212+16 TO STA 3213+66.	

NOTES:
TBD - TO BE DETERMINED.

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
 SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 49



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MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING AT 3263+74 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR COMPACT PRONE AREAS AS PER DETAIL 3 AND PASTURE AREAS AS PER DETAIL 5. PARNELL SILTY CLAY LOAM PRESENT.
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS.
	STORMWATER BMPS	PROVIDE BMPS FOR WETLAND FROM STA 3223+20 TO STA 3223+95 AND ADDITIONAL STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
	RIGHT OF WAY REQUIREMENTS	TEMPORARY RIGHT OF WAY REDUCED TO 25 FT FROM STA 3223+20 TO STA 3223+95.

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

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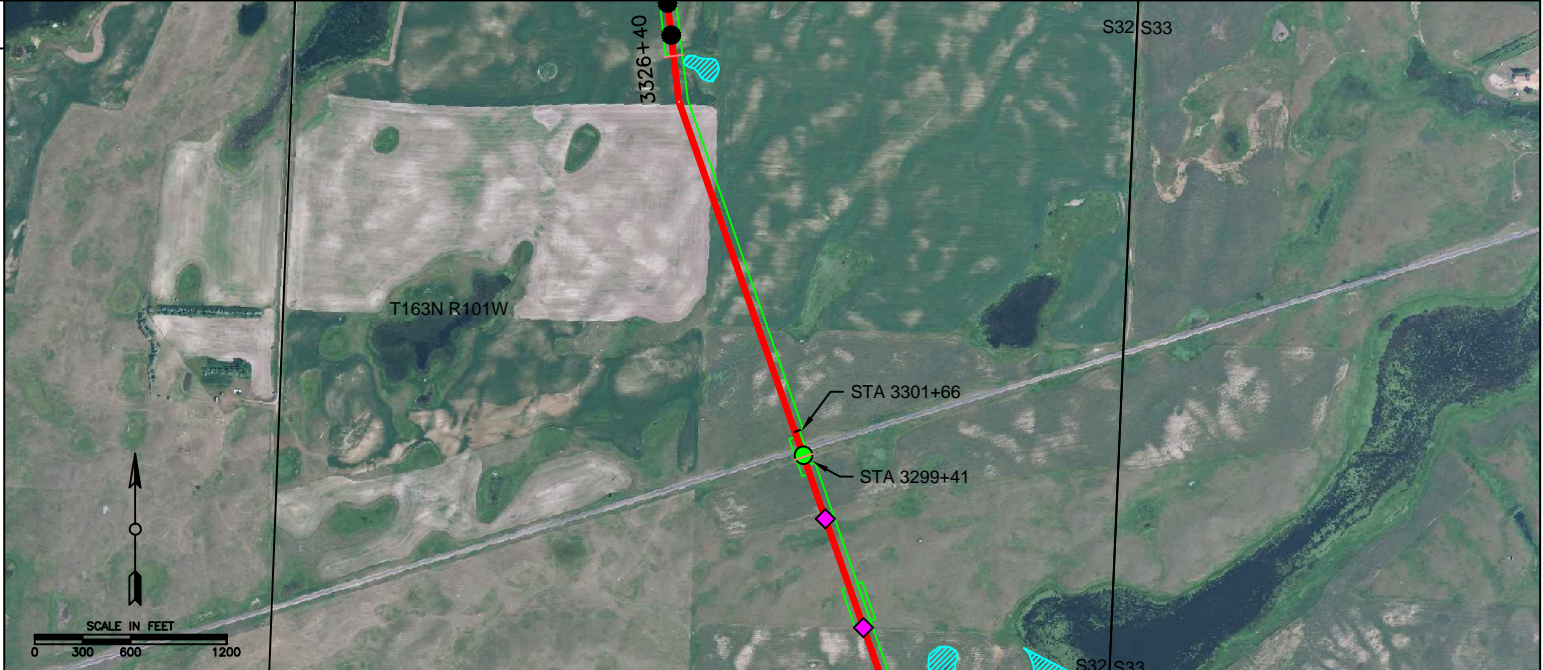
VANTAGE PIPELINE PROJECT ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83

SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 50

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



C-110

MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	RAILROAD CROSSING AT STA 3299+41 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH:	SOIL HANDLING FOR CULTIVATED CROPPAREAS PER DETAIL 3 AND PASTURE AREAS AS PER DETAIL 5.
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	TEMPORARY RIGHT OF WAY REDUCED TO 15 FT FROM STA 3299+41 TO STA 3301+66.	

NOTES:
TBD - TO BE DETERMINED.

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ENVIRONMENTAL, LLC

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VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 51

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING AT STA 3336+15 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACT PRONE AREAS (STA 3348+71 TO STA 3354+63) AS PER DETAIL 3 AND PASTURE AREAS (STA 3347+65 TO 3349+76 AND STA 3361+74 TO 3365+35) AS PER DETAIL 5. PARNELL SILTY CLAY LOAM PRESENT.
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS AND DISTURBED AREAS AT 103RD ST NW ROAD CROSSING.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

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ENVIRONMENTAL, LLC

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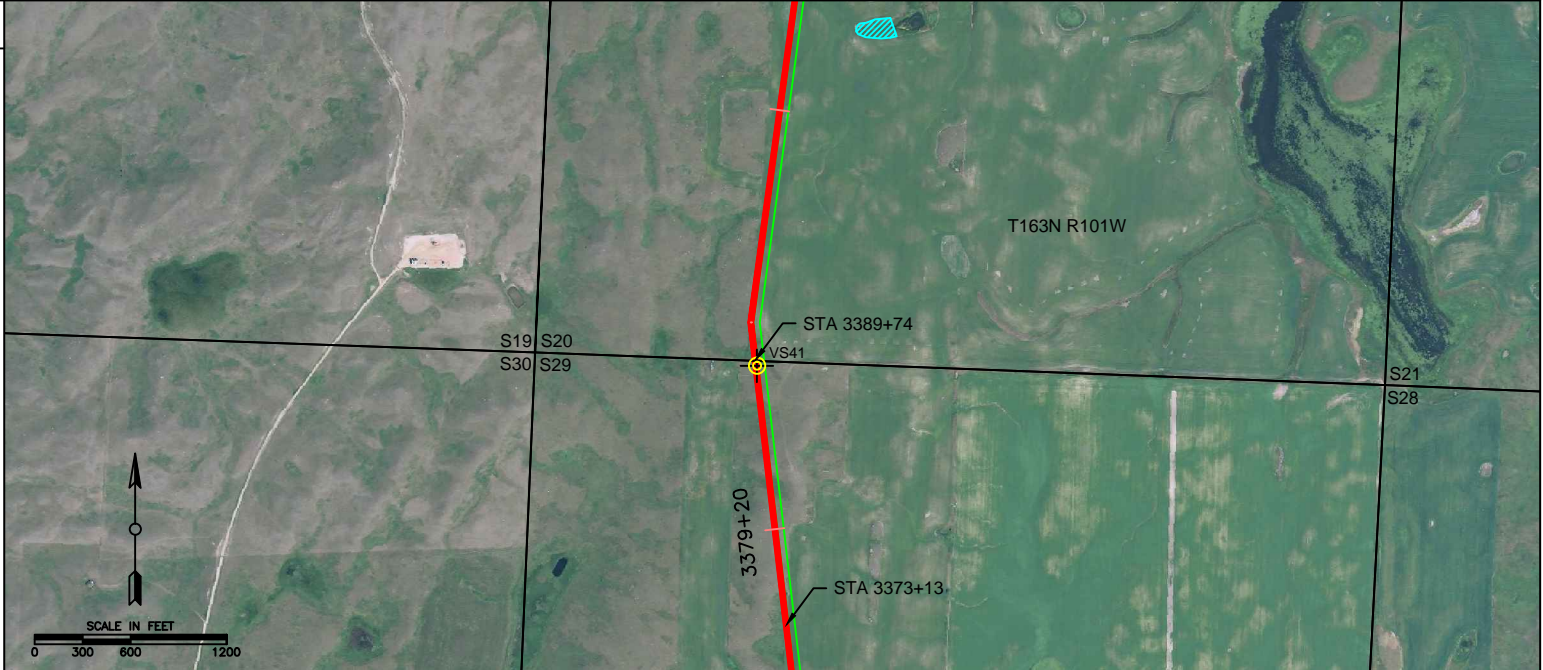
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PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 52

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	65 64 63 62

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	NONE
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACT PRONE AREAS AS PER DETAIL 3 AND PASTURE AREAS (STA 3373+13 TO STA 3389+74) AS PER DETAIL 5.
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE

TOPSOIL DEPTH:	0-6"
	6-12"
RIGHT OF WAY REQUIREMENTS	NONE

NOTES:
FIELD LOCATE BURIED PIPELINE CROSSINGS ASSOCIATED WITH OIL WELLS IN THE VICINITY.

TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

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ENVIRONMENTAL, LLC

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PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 53

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND

- PERMANENT ROW
- TEMPORARY ROW BOUNDARY
- SOIL BORING
- DOMESTIC WATER WELL
- ROAD CROSSING
- WETLAND
- OIL WELL
- UNDERGROUND CABLE
- OVERHEAD POWERLINE
- UNDERGROUND PIPELINE
- FENCE CROSSING
- PRIME FARMLAND

LAND COVER CLASSIFICATION:

- CULTIVATED CROPS
- PASTURE/HAY
- GRASSLAND/HERBACEOUS



C-115

MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	OPEN CUT AT ROAD CROSSING STA 3497+61.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA	SOIL HANDLING FOR PASTURE AREAS AS PER DETAIL 5.
	TOPSOIL DEPTH: 0-6" 6-12"	
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
ACCESS CONTROL	NONE	
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

KC HARVEY ENVIRONMENTAL, LLC

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FILENAME: Vantage_alignmentsheets.dwg

VANTAGE PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 56

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	C B A B B B A A A A A B B B B B B B B
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING AT 3543+00 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3 AND PASTURE AREAS AS PER DETAIL 5.
	TOPSOIL DEPTH:	0-6" 6-12"
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
ACCESS CONTROL	NONE	
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

KC HARVEY ENVIRONMENTAL, LLC

VANTAGE PIPELINE US LP

VANTAGE PIPELINE PROJECT ENVIRONMENTAL ALIGNMENT SHEETS
 PROJECTION: STATE PLANE 3301 DATUM: NAD83
 SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 57

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP	
SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING AT 3608+48 AND 3661+73 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACT PRONE AREAS AS PER DETAIL 3 AND PASTURE AREAS AS PER DETAIL 5.
	TOPSOIL DEPTH: 0-6" 6-12"	
	RECLAMATION	RECOMMEND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS AND DISTURBED AREA AT 145TH AND 146TH AVE NW ROAD CROSSINGS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
ACCESS CONTROL	NONE	
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

KC HARVEY ENVIRONMENTAL, LLC

VANTAGE PIPELINE US LP

VANTAGE PIPELINE PROJECT ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83

SCALE: 1 IN = 1,200 FT

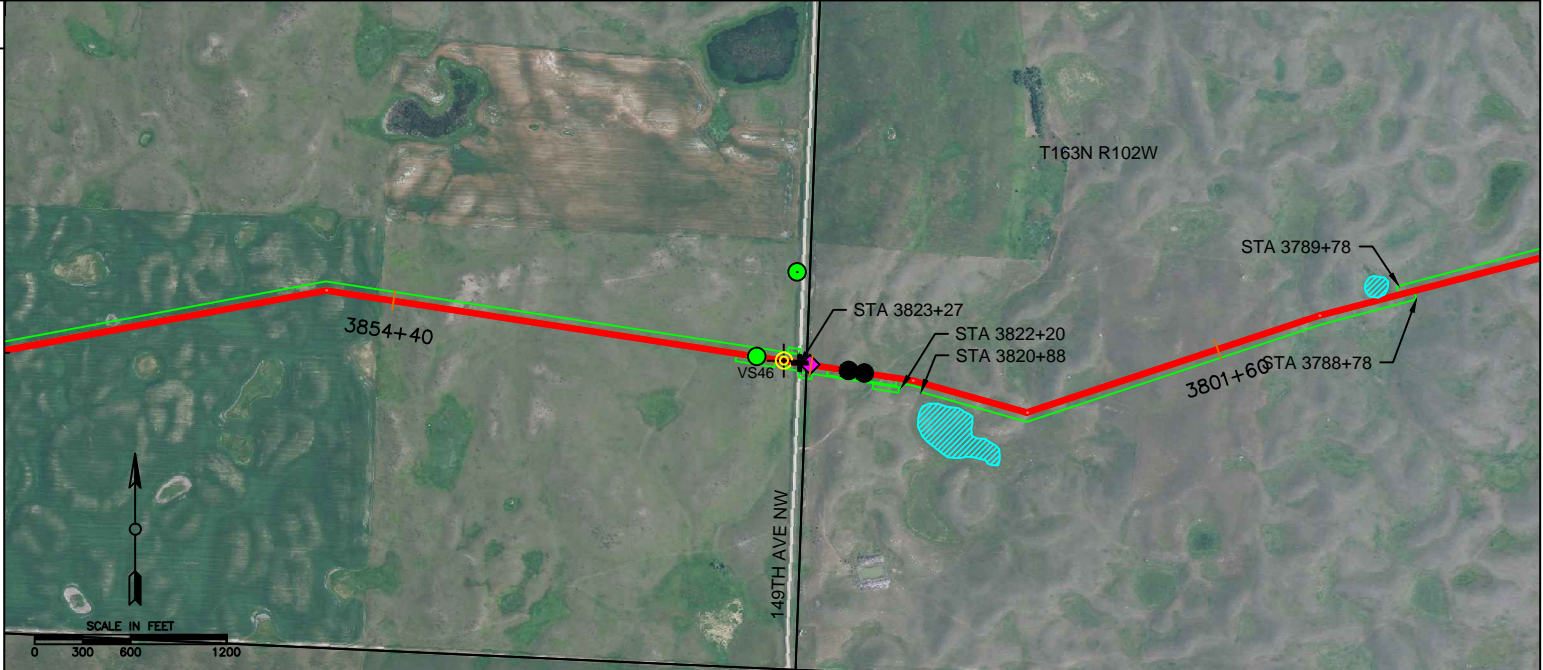
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SHEET: 58

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LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING AT STA 3823+27 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH:	SOIL HANDLING FOR CULTIVATED CROP AREAS AS PER DETAIL 3 AND GRASSLAND/PASTURE AREAS AS PER DETAIL 5.
	RECLAMATION	RECOMMEND SEED MIX A: NATIVE PRAIRIE FOR GRASSLAND AREAS AND SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS.
	STORMWATER BMPS	NONE
	ACCESS CONTROL	NONE

RIGHT OF WAY REQUIREMENTS	MOVE TEMPORARY RIGHT OF WAY TO SOUTH SIDE OF PIPELINE AT STA 3788+78 WITH 100 FT OVERLAP. TEMPORARY RIGHT OF WAY REDUCED TO 15 FT WIDTH FROM STA 3820+88 TO STA 3822+20. MOVE TEMPORARY RIGHT OF WAY TO NORTH SIDE OF PIPELINE AT STA 3823+27.
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NOTES:
TBD - TO BE DETERMINED.

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KC HARVEY ENVIRONMENTAL, LLC

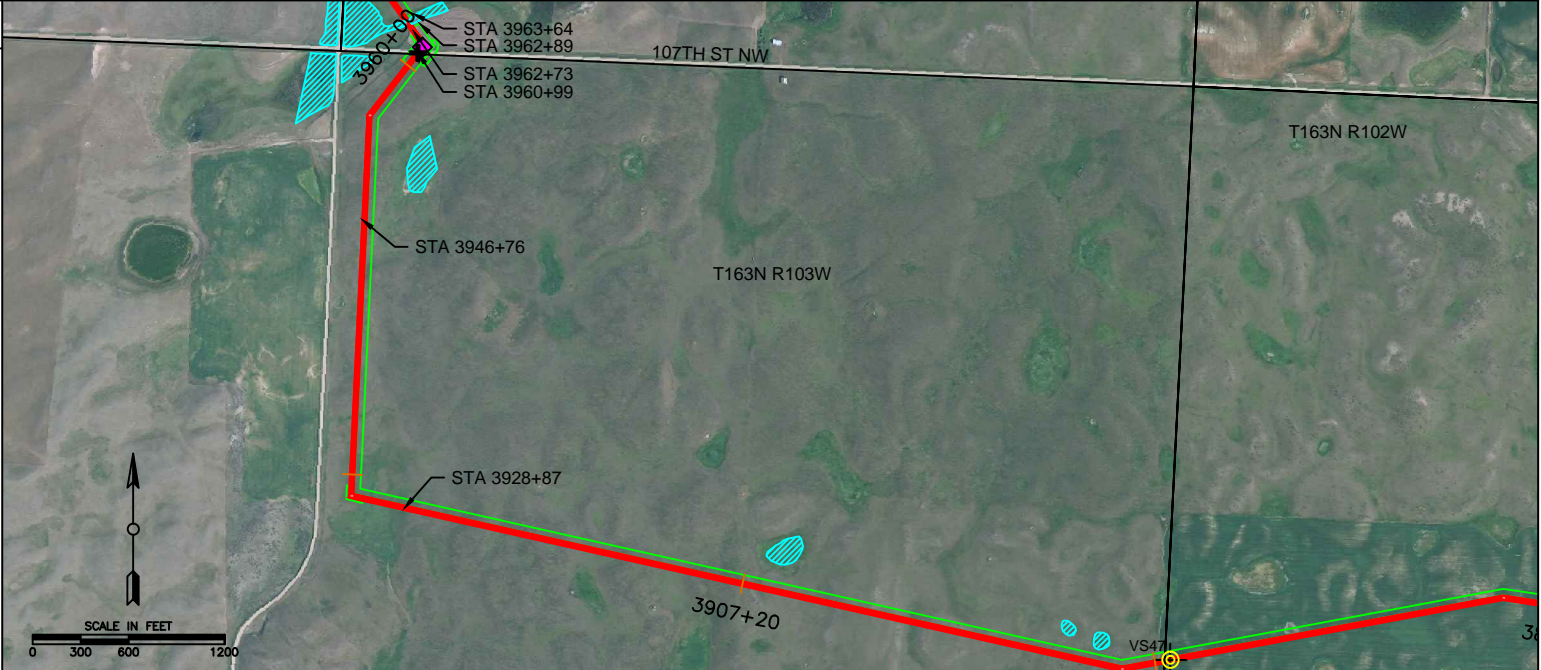
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VANTAGE PIPELINE PROJECT ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301	DATUM: NAD83
SCALE: 1 IN = 1,200 FT	DATE: 02/04/2011
SHEET: 60	

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	77 75 76

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	PROCEDURES FOR WETLAND CROSSING FROM STA 3962+89 TO STA 3963+64 AS PER DETAIL 14 - NON FLOWING WATERCOURSE CROSSING.
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING AT STA 3960+99 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	SOIL HANDLING FOR CULTIVATED CROP AREAS AND COMPACT PRONE AREAS (STA 3928+87 TO STA 3946+76 AND STA 3962+73 TO STA 3966+27 SEE SHEET 62) AS PER DETAIL 3, GRASSLAND/PASTURE AREAS AS PER DETAIL 5, AND WETLAND CROSSINGS AS PER DETAIL 7. PARNELL SILTY CLAY LOAM AND VALLERS LOAM PRESENT.
	RECLAMATION	RECOMMEND SEED MIX A: NATIVE PRAIRIE FOR GRASSLAND AREAS, SEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS, AND SEED MIX B FOR WETLAND AREAS.
	STORMWATER BMPS	PROVIDE BMPS FOR WETLAND CROSSING FROM STA 3962+89 TO STA 3963+64 AND ADDITIONAL STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE

RIGHT OF WAY REQUIREMENTS	NO TEMPORARY RIGHT OF WAY FROM STA 3962+89 TO STA 3963+64.
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NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR
PERMITTING

KC HARVEY
ENVIRONMENTAL, LLC

VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83

SCALE: 1 IN = 1,200 FT

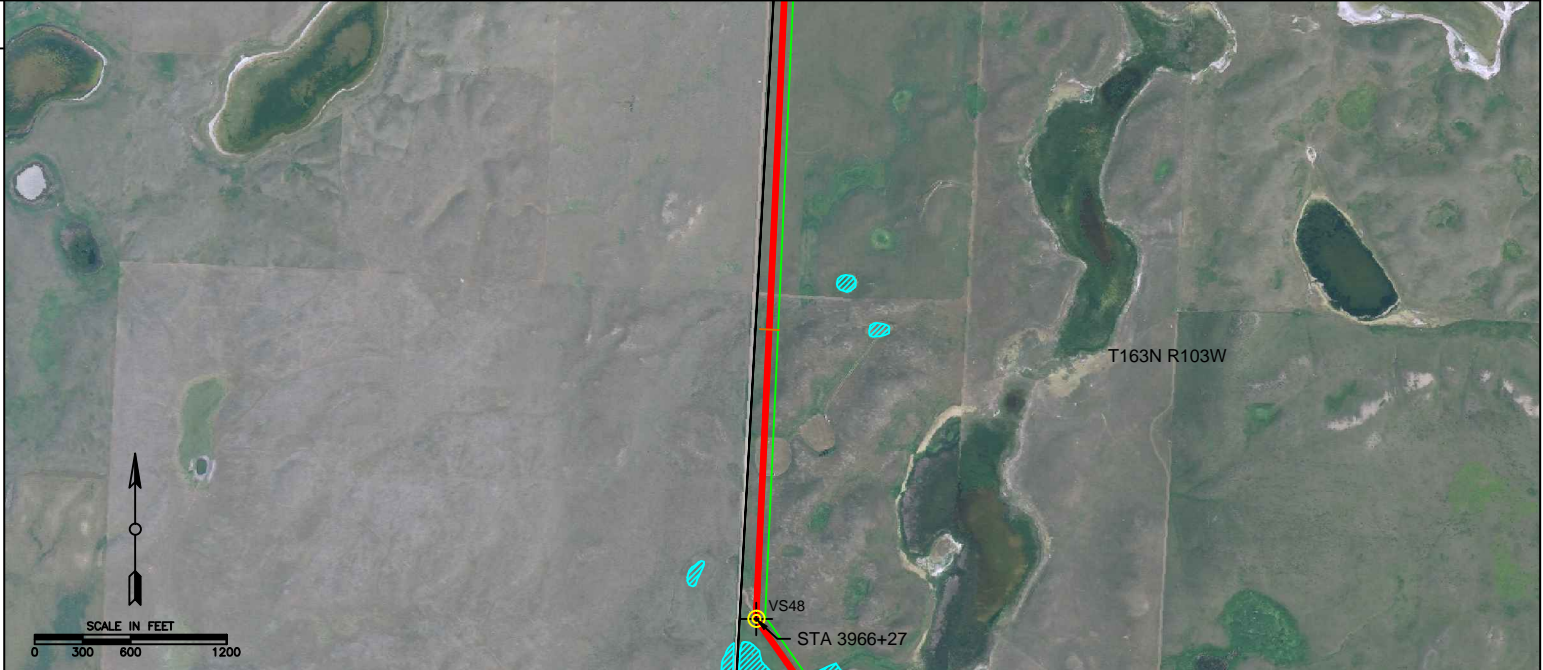
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LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	77 75 76

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	NONE
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	COMPACT PRONE AREAS (STA 3962+73 TO STA 3966+27) AS PER DETAIL 3 AND PASTURE AREAS AS PER DETAIL 5. PARNELL SILTY CLAY LOAM PRESENT.
	RECLAMATION	RECOMMENDSEED MIX C: PASTURE LAND FOR PASTURE/HAY AREAS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

KC HARVEY
ENVIRONMENTAL, LLC

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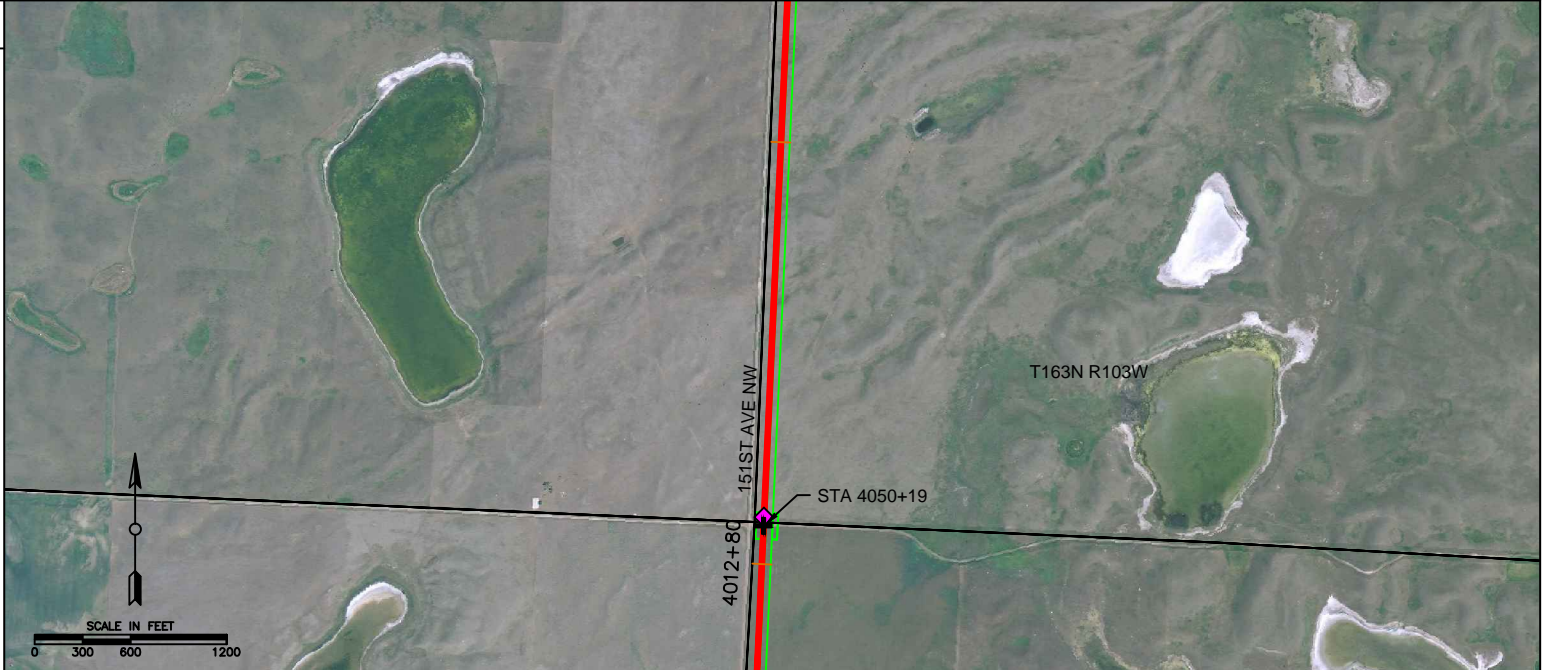
VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 62

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	77 75 76

LEGEND	
	PERMANENT ROW
	TEMPORARY ROW BOUNDARY
	SOIL BORING
	DOMESTIC WATER WELL
	ROAD CROSSING
	WETLAND
	OIL WELL
	UNDERGROUND CABLE
	OVERHEAD POWERLINE
	UNDERGROUND PIPELINE
	FENCE CROSSING
	PRIME FARMLAND
LAND COVER CLASSIFICATION:	
	CULTIVATED CROPS
	PASTURE/HAY
	GRASSLAND/HERBACEOUS



MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	GRAVEL ROAD CROSSING AT STA 4050+19 AS PER DETAIL 12 - TYPICAL ROAD BORING.
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH:	GRASSLAND/PASTURE AREAS AS PER DETAIL 5.
	RECLAMATION	RECOMMEND SEED MIX A: NATIVE PRAIRIE FOR GRASSLAND AREAS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

KC HARVEY
ENVIRONMENTAL, LLC

REV: 0
FILENAME: Vantage_alignmentsheets.dwg

VANTAGE
PIPELINE US LP

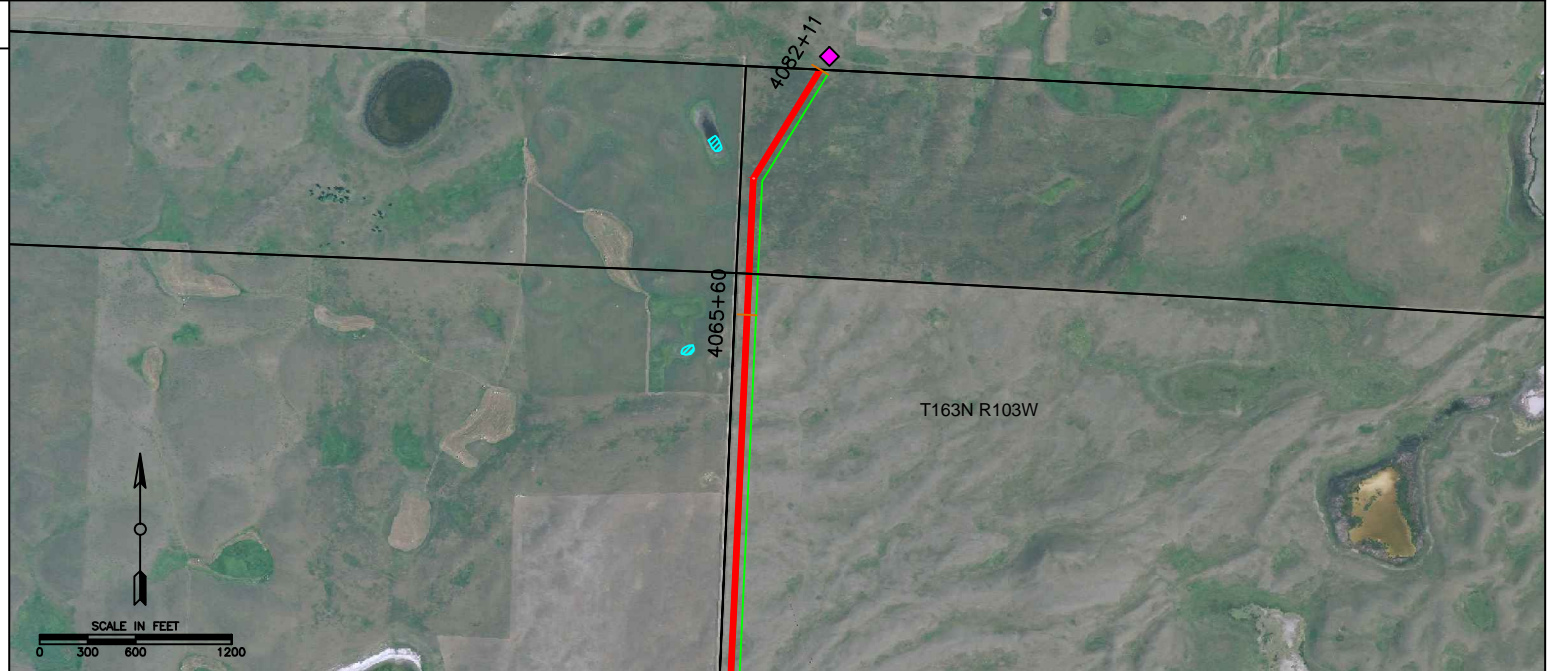
VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 63

LAND COVER CLASSIFICATION	
SOIL HYDROLOGIC GROUP SOIL Ap HORIZON	
RIGHT OF WAY REQUIREMENTS	
MILE POST	

LEGEND

- PERMANENT ROW
- TEMPORARY ROW BOUNDARY
- SOIL BORING
- DOMESTIC WATER WELL
- ROAD CROSSING
- WETLAND
- OIL WELL
- UNDERGROUND CABLE
- OVERHEAD POWERLINE
- UNDERGROUND PIPELINE
- FENCE CROSSING
- PRIME FARMLAND
- LAND COVER CLASSIFICATION:
- CULTIVATED CROPS
- PASTURE/HAY
- GRASSLAND/HERBACEOUS



C-123

MITIGATION REQUIREMENTS	WETLAND CROSSING PROCEDURES	NONE
	ROAD CROSSING PROCEDURES	NONE
	VEGETATION RESTRICTIONS	NONE
	WILDLIFE RESTRICTIONS	TBD
	SOIL HANDLING/STRIPPING CRITERIA TOPSOIL DEPTH: 0-6" 6-12"	GRASSLAND AREAS AS PER DETAIL 5.
	RECLAMATION	RECOMMEND SEED MIX A: NATIVE PRAIRIE FOR GRASSLAND AREAS.
	STORMWATER BMPS	PROVIDE STORMWATER BMPS IN ACCORDANCE WITH THE SWPPP PLAN.
	ACCESS CONTROL	NONE
RIGHT OF WAY REQUIREMENTS	NONE	

NOTES:
TBD - TO BE DETERMINED.

APPROVED FOR PERMITTING

KC HARVEY
ENVIRONMENTAL, LLC

REV: 0
FILENAME: Vantage_alignmentsheets.dwg

VANTAGE
PIPELINE US LP

VANTAGE PIPELINE PROJECT
ENVIRONMENTAL ALIGNMENT SHEETS

PROJECTION: STATE PLANE 3301 DATUM: NAD83
SCALE: 1 IN = 1,200 FT DATE: 02/04/2011 SHEET: 64

Attachment 3
Emergency Response Plan

(Note: ERP Plan to be developed by Vantage prior to construction)

Attachment 4

Fuels and Hazardous Materials Spill Contingency Plan

(Note: To be developed by Vantage prior to construction)

Attachment 5

Spill Prevention, Control and Countermeasures Plan

(Note: SPCC Plan to be developed by the construction contractor)

Attachment 6
Stormwater Pollution Prevention Plan (SWPP Plan)

**(Note: SPCC Plan to be developed by Vantage at the time
of permit application prior to construction)**

**STORMWATER POLLUTION
PREVENTION (SWPP) PLAN**

VANTAGE PIPELINE PROJECT

**WILLIAMS AND DIVIDE COUNTY,
NORTH DAKOTA**

KC HARVEY
ENVIRONMENTAL, LLC



VANTAGE
PIPELINE US LP

STORMWATER POLLUTION PREVENTION PLAN

VANTAGE PIPELINE PROJECT

DIVIDE AND WILLIAMS COUNTY, NORTH DAKOTA

**PREPARED FOR:
MISTRAL ENERGY**

**PREPARED BY:
KC HARVEY ENVIRONMENTAL, LLC
376 GALLATIN PARK DRIVE
BOZEMAN, MT 59715**

APRIL 3, 2013

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Attachment B	Inspection and Maintenance Record
Attachment C	SWPPP Revision Record
Attachment D	Erosion and Sediment Control BMPs
Attachment E	Permit Documents and NDDH Correspondence

Regulatory Cross-Reference

The following table summarizes requirements of the Construction General Permit NDR10-0000 and indicates the location of necessary information in this document.

Permit Section		Requirement	Location
II.C.1: Site Description	II.C.1.a.	Describe the overall project and the type of construction	3.0
	II.C.1.b.	Estimate of the total area of the site and the total area expected to be disturbed	3.0
	II.C.1.c.	Proposed timeline of activities that disturb soils for major portions of site	3.1
	II.C.1.d.	Describe the soil within the disturbed site	3.0
	II.C.1.e.	Names of surface waters and municipal storm sewer systems that may receive discharges	4.0
	II.C.1.f.	Site maps	3.2, Attachment 2 of the EPP
	II.C.1.g.	List of 303(d) listed waterways located within 2000ft of site	4.0
II.C.2: Operational Controls	II.C.2.a	Identify a person knowledgeable and experienced in the application of erosion and sediment control BMPs who is responsible for implementation of SWPPP	7.0, Attachment E
	II.C.2.b	Good housekeeping BMPs	4.1
	II.C.2.c	Preventative maintenance BMPs	4.1
	II.C.2.d	Spill prevention and response procedures	4.1
	II.C.2.e	Employee training	4.1
	II.C.2.f	Describe onsite concrete washout facilities	4.1
	II.C.2.g	Dewatering or basin draining BMPs	4.1
II.C.3: Erosion and Sediment Controls	II.C.3.a.	Sediment control BMPs	4.2, Attachment D, Attachment 1 of EPP
	II.C.3.b.	Temporary erosion control BMPs	4.2, Attachment D, Attachment 1 of EPP
	II.C.3.c.	BMP selection, installation, and maintenance procedures	5.1, 5.2, Attachment D, Attachment 1 of EPP
	II.C.3.d.	Sediment escape cleanup procedures	5.1
	II.C.3.e.	BMPs designed for the 2-year, 24 hour storm event	4.3, Attachment D, Attachment 1 of EPP
	II.C.3.f.	TMDL specified BMPs	N/A
II.C.4: Stormwater Management	II.C.4.a.	Stormwater ponds, natural depressions, infiltration, or sequential systems	4.3
	II.C.4.b.	Velocity/energy dissipation devices	4.3
	II.C.4.c.	Maintenance for on-site stormwater management features	5.1
	II.C.4.d.	BMP design, installation, and use requirements	Attachment D, Attachment 1 of EPP
II.C.5: Maintenance	BMP maintenance procedures	5.1	
II.C.6: Inspections	Site inspection procedures	5.2, Attachment A and B	
II.C.7: Plan Review and Revisions	II.C.7.a.	Plan must be signed in accordance with Part IV.A.6	7.0
	II.C.7.b.	Plan must be made available upon request.	6.0

1.0 Introduction

The North Dakota Department of Health (NDDH) oversees the administration and compliance of Stormwater Permits within the state of North Dakota authorized under the federal National Pollutant Discharge Elimination System (NPDES). The NDDH requires construction projects disturbing five or more acres to obtain a Construction General Permit (Permit No. NDR10-0000) and a Stormwater Pollution Prevention Plan (SWPPP) must be developed, approved, and implemented. The following SWPPP complies with these regulations.

2.0 Permit Coverage

This SWPPP covers Vantage Pipeline US LP's pipeline construction operations in Williams and Divide counties, North Dakota. The owner is responsible for all terms and conditions of the permit, while the construction contractor is jointly responsible for compliance. The owner will provide environmental monitors who will be responsible for conducting the stormwater inspections outlined in the SWPPP. The environmental monitors will provide daily supervision and have the authority to modify the SWPPP.

3.0 Project Description

Vantage Pipeline US LP (Vantage) is proposing construction of the Vantage Pipeline in North Dakota. The Vantage Pipeline will transport ethane from Hess's existing Tioga Gas Plant near Tioga, ND in the Williston Basin, to an existing pipeline, the AEGS, near Empress Alberta for the petrochemical industry in Alberta. AEGS would transport the ethane to NOVA's Joffre Petrochemical Complex. The Vantage Pipeline would provide the capacity needed to transport the growing ethane production from North Dakota's Williston Basin reserves to the market in Alberta.

In North Dakota, the proposed Vantage Pipeline would require construction and operation of the following:

- Approximately 79.8 miles of new 10 inch diameter underground high vapor pressure (HVP) pipeline on Vantage right-of-way from near Tioga, North Dakota to an international border crossing near Beaubier, Saskatchewan;
- Eight mainline valve sites;
- In-line inspection facilities;
- Associated miscellaneous works such as pipeline warning signs and markers.

Figure 1 identifies the location of the proposed pipeline within North Dakota. The proposed Vantage Pipeline would follow Vantage right-of-way along the entire route in North Dakota. The pipeline would cross portions of Williams and Divide counties. Table 1 summarizes the length of pipeline proposed in each county.

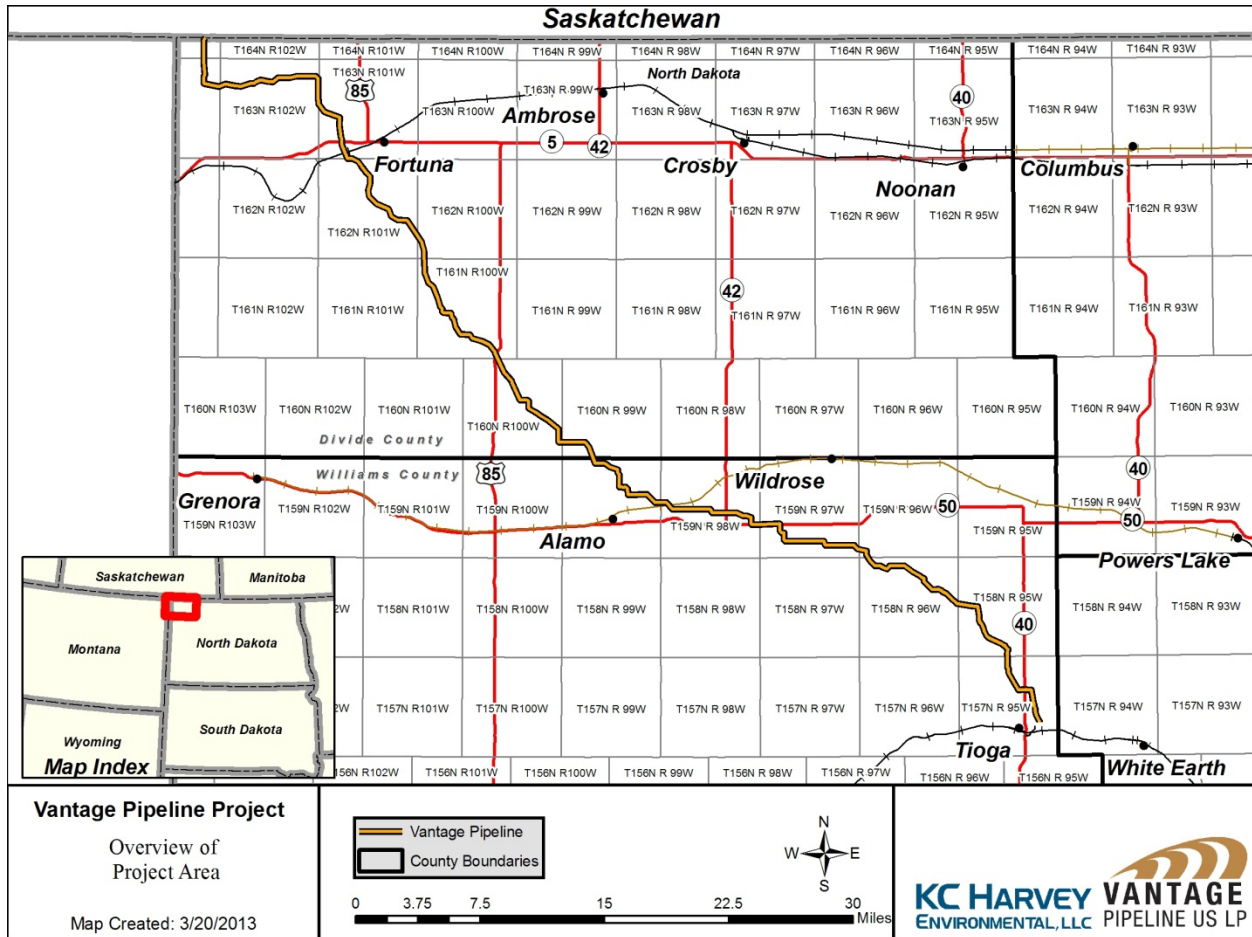


Figure 1. Project Overview Map

Table 1. Location and Length of the Vantage Pipeline Route

County, State	Pipeline Length (miles)
Williams County, ND	37.6
Divide County, ND	42.4

Table 2 summarizes the overall land requirements for the proposed Vantage Project.

Table 2. Approximate Land Requirements for Construction of the Vantage Pipeline

Facility	Approximate Dimensions	Area Affected (acres)
Temporary construction right-of-way	40 feet x 79.8 miles	386.9
Permanent right-of-way	30 feet x 79.8 miles	290.2
Additional temporary workspace	Dimensions vary	51.6
Contractor/pipe yards	400 feet x 200 feet	8.0

Above-ground facilities associated with this project would be constructed entirely within the permanent Vantage right-of-way.

3.1 Soils

Soil data was compiled from the SSURGO database, a database of digitized soil survey maps created by Natural Resources Conservation Service (NRCS) and National Cartography and

Geospatial Center (NCGC). The SSURGO database was compiled using national field mapping standards for the purpose of natural resource planning and management, and remains the most detailed level of soil mapping available from the NRCS (NRCS, 2008). Soil characteristics of interest to the Vantage Pipeline provided by the SSURGO database include prime farmland, farmland of statewide/ local importance, hydric soils, compact prone soils, soil erodibility, texture, and thickness.

The proposed Vantage Pipeline route crosses a total of 49 soil associations. Dominant associations (associations that make up more than 5 percent of total soils crossed by the proposed pipeline route) make up 84 percent of soils in the project area are:

Williams-Zahl loams and Zahl-Williams loams are the most common soil associations bisected by the proposed Vantage Pipeline route. These soils are similar to the Williams Bowbell loams with the exception of some being found in depressions containing very poorly drained soils. In addition, Zahl soils found on knolls and ridges have a prominent “high lime” layer that occurs at plow depth. This light-colored, limey material often is exposed and mixed with dark-colored surface soil by cultivation.

Williams-Bowbells loams are also among the most common soils encountered along the proposed Vantage Pipeline route. They are found on undulating to rolling topography with knolls, ridges, and an occasional drainage-way. These well-drained soils have moderate amounts of surface organic matter (4 percent) and the restrictive layer is moderately low. Available water to a depth of 60 inches is high.

Zahl-Williams-Parnell and Williams-Zahl-Parnell complex are similar to the Williams Zahl loam association except for the inclusion of the Parnell silty clay loam which introduces a poorly drained basin-type soil found on rolling topography.

Appam-Wabek and Wabek-Appam complex is found primarily on 1 to 6 percent slopes on rises on outwash plains. The parent material consists of sandy and gravelly glaciofluvial deposits. There are no root restrictive layers in the upper 60 inches and it is somewhat excessively drained. Organic matter content in the surface horizon is about 3 percent.

Arnegard loam consists of very deep, well-drained soils on level to moderately steep landscapes that formed from a combination of alluvium, calcareous sedimentary beds or glacial till. It is one of the best soils in North Dakota. The majority of prime farmland soils crossed by the proposed Vantage Pipeline route are Arnegard loam.

Vallers loam, saline is deep, poorly drained, moderately saline, highly calcareous and typically associated with drainage ways on till plains. Permeability is moderately slow with cropping and revegetation limited due to severe wind erosion potential.

3.2 Construction Sequence

Vantage proposes to begin construction of the project in the summer of 2013. Construction would occur over approximately 4 months. In general, construction includes the following sequence of activities:

1. Survey and staking
2. Clearing and grading
3. Topsoil stripping
4. Stringing and bending
5. Welding and coating
6. Trenching and dewatering
7. Lowering-in and backfilling
8. Hydrostatic Testing
9. Cleanup
10. Restoration and Revegetation

3.3 Site Maps

The site maps to be used with this SWPPP consist of the Environmental Alignments Sheets attached in the Environmental Protection Plan (EPP) for the Vantage Pipeline. The site maps and associated attachments (in the EPP) for this SWPPP include the following requirements as outlined in section C.II.1.d. of the Construction General Permit:

- Drainage patterns including flow direction, dividing lines, and the existing and final grades (indicated by BMP placements)
- Construction site boundaries and areas of soil disturbance
- Location of major structural and non-structural controls and BMPs identified in the plan
- Location of areas where stabilization practices are expected to occur
- Surface waters, including aerial extent of wetland acreage
- Locations where stormwater is discharged to surface waters (no locations exist for this Project)
- Identify Temporary Work Space (TWS) to be used for equipment and material staging areas. Borrow sites or excavated fill material disposal sites, and off-site concrete/asphalt batch plants are not required for this project.

Pipeline construction will typically not intersect or affect any watercourses or major drainage areas since horizontal directional boring would be used to cross these areas. Drainage patterns and flow direction will be field identified due to the predominant undulating topography throughout the pipeline route. BMPs will be installed specific to each field identified site. Each Environmental Alignment Sheet includes slopes and soil data that represent dividing lines and grades.

The Environmental Alignment Sheets will be reviewed as construction phases and BMP use progresses. When required, the site plan will be updated and appended to the SWPPP.

4.0 Best Management Practices

The following sections provide a general discussion of erosion and sediment control BMPs that may be used at the various locations. BMPs are designed based on site specific characteristics and are chosen with the expectation that they will withstand and function effectively through a 2-year, 24-hour precipitation event (1.9 inches in western North Dakota).

The Typical Details for pipeline construction BMPs are included in Attachment 1 of the EPP and BMP selection, installation, maintenance procedures, and other standard operating procedures are provided in Attachment D of this SWPPP.

No municipal storm sewer systems are located within the area of disturbance. Several unnamed flooded wetlands are located in close proximity to the pipeline, the nearest named surface waters are Hapet Lake (0.13 miles from the disturbance area) and Cottonwood Lake. The alignment will cross the drainage at the eastern end of Cottonwood Lake. This area has been flooded since 2011 and boring will be required in the flooded area.

Temporary dewatering may be required in flooded locations or at locations where groundwater is encountered in the trench. Best management practices (BMPs) to be used during dewatering are covered in section 5.1 and Detail 9 and 18 in Attachment 1 of the EPP. Construction of the Vantage pipeline will not result in discharge to a water body that has a Total Maximum Daily Load (TMDL) allocation for sediment, suspended solids, or turbidity. The disturbance area does not discharge within 2000 feet of, or flow to a water body listed as impaired under section 303(d) of the Federal Clean Water Act.

4.1 Operational Controls

Operational controls are practices that are specifically intended to reduce the amount of pollution entering surface waters. These are generally implemented to address the problem at the source and do not require any structural changes to the facility. The primary goals of this SWPPP are to protect the land surface from erosion, eliminate pollution sources, and stabilize the disturbed areas as soon as practical. Operational controls include the following:

Good Housekeeping: Good housekeeping practices maintain a clean and orderly work site and reduce the potential for materials to come in contact with stormwater. Timely removal of trash and sanitary waste from the site will reduce the potential for pollution. This may include disposal of empty containers and other rubbish generated at individual sites. Vehicle travel on muddy ground surfaces should be minimized when possible to reduce sediment transport onto public/private roads. During construction the ROW used to access the construction should be managed to reduce muddy conditions and tracking of mud from the construction to public roads.

Chemical Storage and Spill Prevention: Chemical or other significant materials used during construction should be properly labeled and stored within secondary containment structures when appropriate. Chemicals may include, but are not limited to, the following: gasoline, diesel fuel, and petroleum products associated with maintenance (hydraulic fluid, lube oil, grease, etc.) of construction equipment. Petroleum products stored in drums and/or storage tanks will be kept in secondary containment areas. If a spill or leak of any chemical occurs, it will be addressed following the procedures outlined in the EPP. Vantage employees and contractors are trained on Vantage's and First Responder responsibilities. If soil contamination occurs, it will be treated according to the procedures in the EPP.

Preventative Maintenance: Temporary or permanent on-site equipment (including vehicles, trailers, pumps, etc.) will be inspected regularly to ensure proper working order and to help reduce the risk of spills or leaks from the equipment. The contractor must ensure proper

installation, operation, inspection and maintenance of stormwater control devices (diversions, sediment traps, silt fences etc.)

Employee Training: The Contractor will be made aware of their responsibilities in implementing and maintaining the BMPs and controls in this plan such as spill response, good housekeeping, and sediment and erosion control. Training will be ongoing as new employees are hired to ensure compliance with the general permit.

Concrete Washouts: No concrete washout areas will be associated with construction of the Vantage pipeline.

Dewatering and Basin Draining: Dewatering and basin draining related to construction activities (if required) will be managed with appropriate BMPs such that receiving waters are not adversely affected. Water discharged through such systems will only be from storm and ground water that has accumulated on the site or in the trench. Water would be pumped into an approved dewatering structure or onto a stable and well-vegetated area at least 100 yards from the watercourse or wetland as per Detail 9 and 18 in Attachment 1 of the EPP. Dewatering sites, associated BMPs, and the discharge location will be inspected daily and records of inspections and any corrective actions will be kept.

Visual Inspections: Routine visual inspections of on-site equipment, machinery, or any stored chemicals will reduce the risk of spills or leaks. Appropriate actions will be taken, as needed, to prevent/reduce the risk of spills or leaks.

Proper Soil Storage: Any topsoil or spoils stockpiled along the ROW will be stored away from surface waters and in areas where runoff from sloped surfaces will not enter surface waters. Breaks will be provided in soil windrows in locations where construction crosses drainage areas. Stockpiles will be maintained to prevent erosion and sediment discharge from the ROW.

Preservation of Existing Vegetation: During construction, controls will be implemented on a site-specific basis to preserve existing vegetation. Such controls may consist of staking, flagging or fencing areas to protect adjacent undisturbed vegetation. Minimal stripping will be used in grasslands as identified on the alignment sheets.

Minimize Area of Disturbance: The most effective sediment control practice is to disturb the smallest area possible. Equipment movement will be limited to the right-of-ways and access roads, when practical.

4.2 Erosion Controls

Erosion controls are measures that prevent concentrated flows of stormwater and reduce flow velocity to prevent sediment transport from unstable surfaces. Erosion controls are designed to increase infiltration and promote sheet flow, as opposed to concentrated flow.

Vantage's SWPPP identifies the appropriate control measures and when they will be implemented. Erosion control practices will comply with the guidelines set forth in the Permit.

Erosion Controls include the following:

Slope Stabilization: Slope stabilization aims to temporarily stabilize a slope or surface so vegetation can be established and become the primary BMP. Slope stabilization structures may include matting natural or synthetic fiber for temporary or permanent placement.

Seeding: After construction is complete, disturbed areas will be seeded as soon as practical. Seeding activities will be scheduled to maximize germination and avoid conditions that may result in excessive exposure to wind and water erosion or other conditions that could reduce re-vegetation success. Seed mixes for grasslands, wetlands, and pasture lands are provided in Section 4.2 of the Environmental Protection Plan (EPP).

Runoff Control: Runoff controls prevent concentrated flows and minimize erosion and sediment transport from disturbed surfaces. Runoff controls include temporary diversions, berms, and dikes.

Diversion Structures: Diversion structures direct stormwater away from erosion prone surfaces, sloped areas, and/or stockpiles. Diversion structures may include ditches, berms, chutes, culverts, and pipes.

Grading: Grading techniques for temporary erosion control can minimize erosion and facilitate infiltration. Grading techniques may include surface roughening, ripping, and use of slope breakers. These techniques are frequently used to reduce slope length and increase surface roughness to slow water movement and promote infiltration.

4.3 Sediment Management BMPs

Sediment management controls are designed to treat stormwater before it leaves the site and reduce the amount of sediment it carries. BMPs capture, store, infiltrate, or delay stormwater runoff from the site. Sediment BMPs are not considered a substitute to erosion control. Prior planning and preparation to minimize erosion is key, and often more effective than using structural BMPs alone.

Stormwater management may include the following:

Sediment basins/sediment traps/infiltrations structures: These structures are BMPs that store stormwater on-site allowing water to infiltrate the soil surface as sediments settle out. Infiltration structures may include retention basins, ditches, berms, or channels. These structures must be properly managed to prevent pollutants from being introduced into the local ground or surface water systems. Use of on-site detention is not anticipated during construction but will be considered if practical.

Sediment Control Structures: Sediment control structures are BMPs that slow water velocity and allow heavier suspended sediment to settle out of the water before storm water leaves the site. Sediment control structures include sediment traps, silt fence, straw bales, straw or rock wattles, rip rap, or check dams (which could be made out of rock, straw bales, wattles, or GeoRidge®).

Vegetation Buffer Zones: Vegetation buffer zones use plants to remove or slow down the transport of pollutants, including sediment, from stormwater. Vegetation buffer zones may be used to treat sheet flow originating from disturbed areas. Established vegetation, whether seeded or recruited, may be used to create buffer zones.

4.4 Post-Construction Controls

Disturbed areas will be reclaimed based on site specific requirements. Seed mixes will contain appropriate perennial species for the native vegetation in the area. If slopes are too steep to use a seeder, those areas will be broadcast seeded and the area will be raked or chained afterwards to cover the seed. Seeding will begin as soon as practical following completion of construction activities. While native vegetation is establishing, stormwater inspections will be completed to assess existing BMPs effectiveness and new BMP needs. The inspections will also identify BMPs in need of maintenance and repair.

5.0 Maintenance and Site Inspections

This section identifies the requirements for inspection, maintenance, and final stabilization. All maintenance and site inspections will be completed in accordance with Section III.A of the Permit.

5.1 Maintenance Requirements

Maintenance activities may include, but are not limited to the following:

Sediment Removal: Sediment build-up behind silt fence, straw bales, wattles, or similar devices will be removed when the sediment has reached approximately one-third (1/3) of the device height. The removed sediment will be placed on-site in an area where it will not be transported to sediment control devices or surface water. Off-site sediment discharge should also be removed as indicated in the general permit (Section II.C.3.e).

Sediment Traps: Outfalls from sediment traps will be inspected for signs of erosion and repaired or modified as needed. Additional BMPs may be added to the sediment trap.

Silt Fence: Silt fence will be inspected for damage and damaged fencing will be repaired as soon as possible.

Fiber Wattles and Straw Bales: Wattles will be inspected for damage and accumulation of excess sediment and will be repaired or maintained as soon as possible.

Down-slope Conveyance BMPs: Down-slope conveyance BMPs, such as culverts or riprap rock chutes, will be checked for erosion, at the top and base of the chute, and proper function. If there is an area of blockage, the blockage will be removed and the rip rap will be reoriented as needed. Any erosion issues will be addressed as appropriate.

Berms & Ditches: These will be checked for damage that could block water flow through the ditch, or breach the berm. If a ditch is blocked or a berm breached, material will be removed or added to make the device function properly.

If a BMP does not effectively reduce erosion, offsite accumulations would be removed in a manner and at a frequency which minimizes offsite impacts and the SWPPP would be modified to prevent further erosion or offsite deposition. Control devices such as silt fence or fiber rolls must be repaired or replaced when sediment reaches 1/3 the height of the device. Repairs must be made within a reasonable period of time after discovery or as soon as conditions allow. The site specific plan will be revised using the SWPPP Monitoring and Inspection Form (Attachment

A) to reflect such changes. Maintenance activities will be documented on the maintenance logs in Attachment B.

5.2 Inspection Requirements

Part III of the General Permit for Stormwater Discharges Associated with Construction Activities, NDR10-0000, outlines the inspection requirements for active and inactive sites. During the construction time period while construction activities are actively occurring along the pipeline, inspections will occur on the intervals outlined below.

- *Active construction sites:* Inspections will occur once every calendar 14 days and within 24 hours of a rainfall or snow melt event of 0.5 inches or greater per 24 hour period. Repairs must be made within 24 hours of discovery, or as soon as field conditions allow access. As per the permit requirements, a rain gauge located within 5 miles of the stormwater discharge point for active construction sites will be used to identify rainfall events.
- *Inactive construction sites:* Inactive sites will be inspected once a month for completed areas that do not meet the 70% perennial vegetative cover criteria for final stabilization. Inspections will not be performed in winter months when the sites are covered by snow or the ground is frozen and melting conditions do not exist. If an inspection is not practical due to severe weather conditions (i.e., lightening, and severe thunderstorms) the inspector will note the condition on the report, and an inspection will be performed as soon as conditions allow. Repairs must be made within 14 days of discovery, or as soon as field conditions allow access.

The inspection schedules for active and inactive construction as described above will be used during the construction period beginning in 2013 until construction is completed in 2014. During the post construction period an alternative monitoring plan will be followed on the revegetated grassland areas along the right-of-way. Areas consisting of active cropland will not be monitored since these areas would be returned to agricultural production following construction. All areas monitored under the alternative monitoring schedule would be monitored until the sites (a site would be defined as a segment of right-of-way) have established vegetation and meet the vegetation cover criteria for final stabilization. Locations will be monitored bi-annually, once in late Spring and once in the Fall. If a site has meet the final stabilization criteria it will be signed off as being in “Final Reclamation” on the last inspection form and monitoring will no longer be required.

If an alternative plan is sought, the permittee may submit an alternative inspection plan for long, narrow, linear construction projects such as pipeline or utility line inspection, and similar projects in remote areas where vehicle traffic is restricted or could compromise native vegetation or stabilization measures. A copy of the SWPPP and proposed inspections plan shall be submitted to the Department 30 days prior to implementing an alternative inspection plan. Any alternative plan must provide for the timely recognition and repair of erosion and sediment damage.

Qualified stormwater monitoring personnel will perform the site inspections at the frequency intervals outlined above. The inspection will complete the following:

- Assessment of the condition and utility of the BMPs on the site;
- Evaluation of BMP effectiveness in erosion prevention and sediment control;
- Examination of stormwater outfall areas for measurable quantities of sediment or other pollutants that may be transported off-site; and
- Visual survey and estimation of vegetative cover onsite as well as at adjacent undisturbed areas.

An inspection report in the format of a monitoring and inspection form will be completed during the site inspection. Attachment A contains the SWPPP Monitoring and Inspection Form that will be used to monitor BMPS during active and inactive construction. The inspection forms will be appended to the SWPPP. Upon request, Vantage can present current inspection records. During construction the SWPPP will be maintained onsite by Vantage's environmental inspector. Each inspection record will, at a minimum:

- Identify the inspector, the inspection date, the inspection time, and the reason for the inspection;
- Report findings of inspections, including recommendations for corrective actions;
- Report the date and amount of all rainfall events greater than 0.50 inches in 24 hours; and
- A drawing of the site indicating erosion issues and maintenance or new BMPs required.

If the inspection does not identify any issues of non-compliance, the inspection report will contain a certification statement that the site is in compliance with this SWPPP and NDR10-0000 issued by NDDH. The report will be signed by an authorized representative or the on-site SWPPP administrator. The SWPPP Monitoring and Inspection Form is included in Attachment A.

If a BMP requires maintenance, it will be documented on the inspection form (Attachment A) and as "maintenance required" in the SWPPP Inspection and Maintenance Record (Attachment B) and corrected as soon as possible. Maintenance completed will be logged in the SWPPP Inspection and Maintenance Record (Attachment B). During construction, the completed SWPPP Monitoring and Inspection Forms and the SWPPP Inspection and Maintenance Records will be kept by Vantage's environmental inspector. Following construction, a record of completed repairs will be stored and maintained at Vantage's Williston, ND office with the SWPPP.

5.3 Final Stabilization

Inspections will be performed until the disturbed area reaches final stabilization (as defined on Page 18; Part V of the Permit) and vegetative canopy cover is equal to 70% of the pre-construction conditions or 70% of the adjacent undisturbed vegetation. After final stabilization occurs and the requirements outlined in Section III.E are met, temporary BMPs are no longer required for sediment or erosion control and the BMPs should be removed, if necessary.

6.0 Record Keeping

The following records will be kept at the construction site:

- A copy of the completed and signed NOI
- The coverage letter from the NDDH

- SWPPP
- Site inspection and maintenance records
- The construction general permit, NDR10-0000

The SWPPP and inspection records will be made available to the NDDH upon request. All records will be maintained for a minimum of three years.

7.0 Signatures

"I certify under penalty of law that I have personally examined and am familiar with the information submitted herein. Based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment."

Printed Name

Title

Signature

Date

In addition, by signing above I authorize Vantage Pipeline US LP's duly authorized representative to sign reports created to satisfy the conditions of this SWPPP. The duly authorized representative is the contact for the NDDH in regards to stormwater management. The duly authorized representative will manage the SWPPP, which may include modifying the SWPPP or delegating individuals to implement, maintain, and/or revise the SWPPP. The current duly authorized representative is identified on the duly authorized representative identification form in Attachment E.

Attachment A
SWPPP Monitoring and Inspection Form

SWPPP Monitoring and Inspection Form

ID #: _____ Owner: _____ Location ID (Station Range): _____ Date: _____ Inspector: _____ Signature: _____	Site Status: <input type="checkbox"/> PCM <input type="checkbox"/> Construction Phase <input type="checkbox"/> Interim Reclamation <input type="checkbox"/> Final Reclamation	Construction Site Assessment: <input type="checkbox"/> N/A <input type="checkbox"/> Wetland/ Watercourse <input type="checkbox"/> Grassland/ Native Prairie <input type="checkbox"/> Cultivated Crop/ Prime Farmland <input type="checkbox"/> Road Location on Pipeline: <input type="checkbox"/> ROW <input type="checkbox"/> PROW <input type="checkbox"/> TWS
Inspection Type: <input type="checkbox"/> Construction 14-Day Inspection (active) <input type="checkbox"/> Rain/Snow Melt Event (active) <input type="checkbox"/> Monthly Inspection (inactive) <input type="checkbox"/> PCM Spring Inspection (inactive) <input type="checkbox"/> PCM Fall Inspection (inactive) <input type="checkbox"/> Other: _____	Rain/ Snow Event: <input type="checkbox"/> N/A Date of Event: _____ Precipitation (in): _____ <input type="checkbox"/> Greater than 0.5 inches <input type="checkbox"/> Snow Melt Event	Reclamation Progress: <input type="checkbox"/> N/A <input type="checkbox"/> Returned to Pre-Disturbed Agricultural State Reclaimed Area Cover (%): _____ ÷ <input type="checkbox"/> > 70% Adjacent Native Cover (%): _____ x 100 = Relative Cover (%): _____
Maintenance Required: <input type="checkbox"/> Yes <input type="checkbox"/> No		

BMP Type	Existing	Maintenance Required	Practice Required	Location/Course of Action <small>(See Map for Details)</small>
Runoff Management				
Diversion Ditch				
Earth Diversion Berms				
Culverts (Dig out, Brace, or Replace?)				
Dewatering Structure				
Other:				
Erosion Controls				
Seeding				
Rolled Erosion Control Product				
Surface Roughing/Terracing				
Vegetation Buffer				
Slope Breakers				
Trench Breaker				
Sediment Controls				
Fiber Wattles				
Straw Bales				
Silt Fence				
Sediment Basin				
Waste Management and Good Housekeeping				
Stockpile Management				
Vehicle Tracking				
Fuel Storage/Secondary Containment				
Solid Waste Materials				

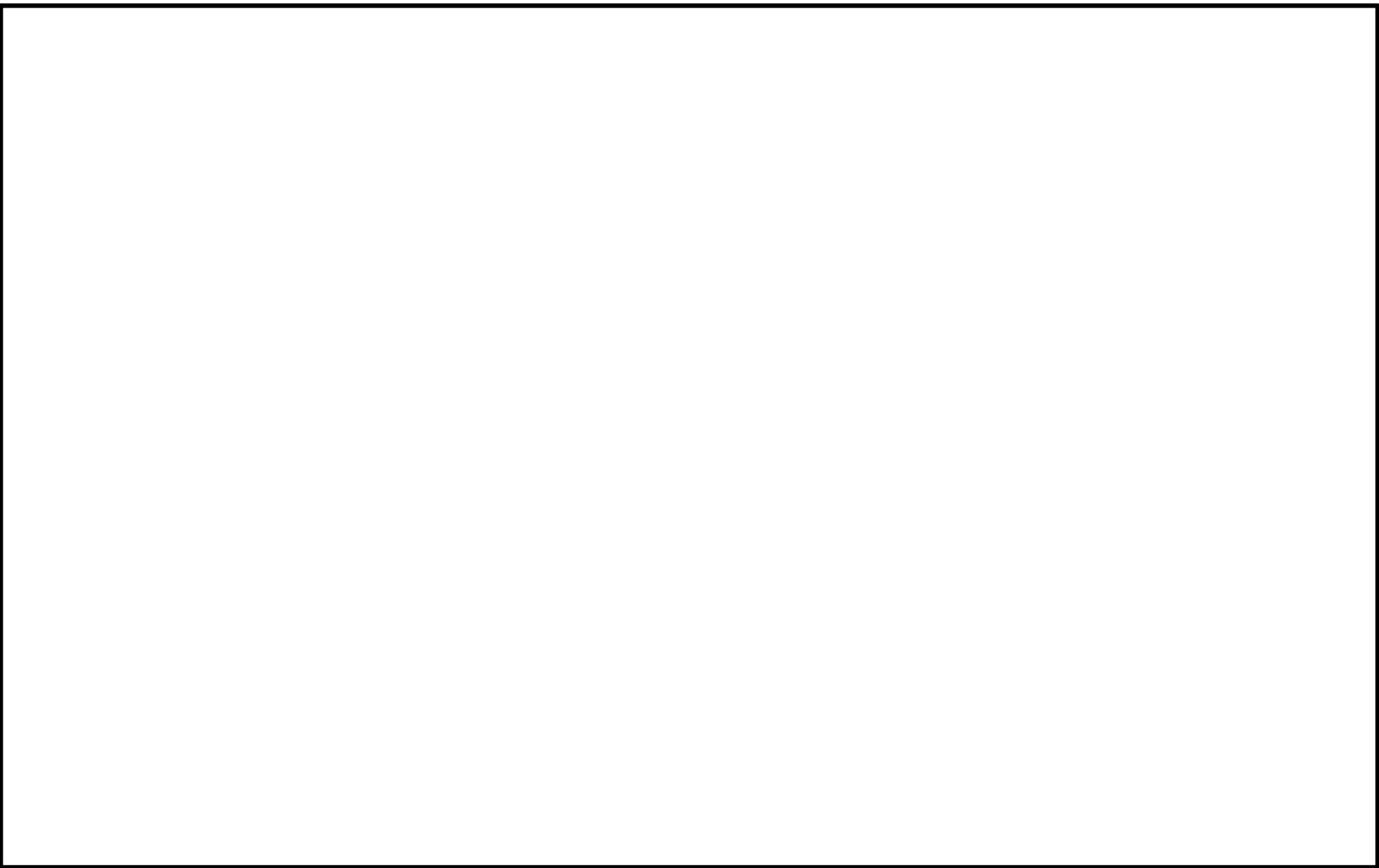
Certification: (To be certified by manager, or duly authorized representative)

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 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.

Representative Name: _____ Title: _____

C-145

Signature: _____ Date: _____



Notes:

Attachment B
Inspection and Maintenance Records

Attachment C
SWPPP Revision Record

Attachment D
BMP Diagrams and Installations

Temporary Seeding

Objectives and Applications

To establish temporary vegetation cover on disturbed areas by seeding with appropriate and rapid growing annual grasses, usually annual ryegrass.

Temporary seeding is used to stabilize the soil and reduce erosion from wind and/or water until the site can be permanently stabilized. Sites that will be bare and susceptible to erosion for more than thirty days are ideal candidates for temporary seeding. The site should be graded prior to seeding. Seed may be applied by hand or with mechanical methods such as hydro-seeding and drill-seeding. If needed, mulch and fertilizer may be used to increase germination and plant growth. If permanent seeding is scheduled later in the growing season, temporary seeding may not be required.

Common Failures - Generally due to faulty installation or maintenance.

Poor seed germination due to inappropriate amounts of water, mulch or fertilizer. Plant growth is poor or spotty due to uneven seed application.

Other Considerations

Proper seedbed preparation and the use of high quality seed are essential to the success of this practice. State certified weed-free seed must be used. Temporary seeding should take place as soon as practicable after the last ground-disturbing activity in an area. Once seeded, protect the area from foot and equipment traffic. Temporary seeding is not recommended if permanent seeding will be completed in the same growing season; in such cases other temporary stabilization measures should be considered.

Relationship to Other ESC Measures

Temporary seeding may occur in conjunction with mulching, fertilizing, surface roughening, and grading practices. Concentrated flows of runoff should be directed away from seeded areas using diversions.

Alternate Sediment Control Measures

Erosion Control Mats

Design

Seed Selection: use native or crop species.

Seed Application Rate: 60 lbs/acre (average rate, adjust based on seed type and site specific conditions).

Fertilizer Application Rate: 600 lbs/acre for a 20N -20P₂O₅-10K fertilizer (average rate, adjust based on site specific conditions).

Materials

Seed, fertilizer, mulch.

Installation

Prior to seeding, the seedbed must be prepared. Material used in the seedbed should be a uniform size, without large clods. Seeding should occur on contour, if possible. Surface roughening techniques, such as disking, are desirable. Mechanical ripping may be

required to alleviate soil compaction. Small depressions may be used to enhance water retention in seeded areas. An ideal seedbed provides adequate soil-seed contact (uniform particle size) and surface roughness (disking or depressions) to prevent runoff and improve moisture retention. Fertilizer can be used to increase plant growth. If the site will be hydro-seeded, mix seed, mulch, fertilizer, and water according to the manufacturer's instructions. Apply the slurry following manufacturer's recommendations.

Inspection

Inspect recently seeded areas on a regular basis and increase inspection frequency when risk of erosion is higher.

Maintenance

Reseed areas where plant growth is absent or inadequate. Provide additional fertilizer if needed. Provide water, if needed, to ensure successful seed germination.

Removal

Removal of temporary vegetation is usually not necessary. Continue inspections and remedial action until the site is stabilized by permanent vegetation.

Mulching

Objectives and Applications

Mulching is the application of a uniform protective layer of straw, wood fiber, wood chips, or other acceptable material on or incorporated into the soil surface of a seeded area to provide immediate protection of the seed bed.

The purpose of mulch is to protect the soil surface from the forces of raindrop impact and overland flow, foster the growth of vegetation, increase infiltration, reduce evaporation, insulate the soil, and suppress weed growth. Mulch also helps hold fertilizer, seed, and topsoil in place in the presence of wind, rain, and runoff, and improves moisture retention. Mulch may be utilized in areas that have been seeded either for temporary or permanent cover.

There are two basic types of mulches, organic mulches and chemical mulches. Organic mulches include straw, hay, wood fiber, paper fiber, wood/paper fiber blends, peat moss, wood chips, bark chips, shredded bark, manure, compost and corn stalks. This type of mulch is usually spread by hand or by machine (mulch blower) after seed, water, and fertilizer have been applied. Chemical mulches, also known as soil binders or tackifiers, are composed of a variety of synthetic materials, including emulsions or dispersions of vinyl compounds, rubber, asphalt, or plastics mixed with water. Chemical mulches are usually mixed with organic mulches as a tacking agent to aid in the stabilization process, and are not used as the only mulch, except in cases where temporary dust and erosion control is required. Hydroseeding, sometimes referred to as hydromulching, consists of mixing a tackifier, specified organic mulch, seed, water, and fertilizer together in a hydrosurry and spraying a layer of the mixture onto a surface or slope with hydraulic application equipment. The choice of materials for mulching should be based on soil conditions, season, type of vegetation, and the size of the area.

Common Failures - Generally due to faulty installation or maintenance.

- Mulches are not properly watered after application, resulting in drying out and possible blowing or washing away of materials.
- Depth of mulching material is either insufficient or excessive, resulting in low seed germination rates.
- Hydroseeding slurry not applied uniformly, resulting in spotty germination and inadequate ground cover.

Other Considerations

- Mulch should be applied immediately after seeding to improve seed germination.
- Hydroseeding can be performed in one step, and is effective provided that materials are properly mixed and equipment is in good working order.
- Depth of the applied mulch should be not less than 1 in. and not more than 2 in.
- Chemical soil stabilizers or soil binders, when used alone, are less effective than other types of mulches. These products are primarily used for tacking organic mulches.

A tackifier may be used in conjunction with seeding, fertilizing, and mulching or hydro-seeding on slopes steeper than 3:1.

Relationship to Other ESC Measures

Mulching may be performed in conjunction with seeding, fertilizing, surface roughening, and grading practices. Concentrated flows of runoff should be directed away from mulched areas.

Alternate Sediment Control Measures

Erosion Control Blankets

Other Names

Hydromulching, chemical stabilization

Design

Design life: 1 season (6 months) or less

Site applicability: Areas that have been disturbed and require temporary or permanent cover

Materials

Most Commonly Specified Mulches – Wood Fiber, Paper Fiber, Wood/Paper Fiber Combination Blends, Peat Moss

Other Mulches – Straw, Hay, Wood Chips, Bark Chips, Shredded Bark, Corn Stalks, Compost, Manure

Tackifiers – Vinyl Compounds, Rubber, Asphalt, or Plastics mixed with water

Installation

Complete the required grading as shown on the plans and ensure that erosion control measures intended to minimize runoff over the area to be mulched are in place. Apply mulch at the rates specified in the special provisions either by hand or by machinery immediately after the seed and fertilizer have been applied (two step method), or as part

of the hydroslurry incorporating seed, fertilizer, mulch, and water (one step method). Apply specified tackifier if not already incorporated into the mulch matrix or hydroslurry. Provide additional watering as specified to ensure optimal seed germination conditions.

Inspection

Inspect mulches on a regular basis and increase inspection frequency when risk of erosion is higher.

Maintenance

Replace mulch that has been loosened or dislodged. In addition, reseed areas if necessary. Water mulched areas periodically to ensure that moisture content is maintained and seed germination and grass growth will continue.

Removal

Mulch is usually left in place to naturally decompose.

Surface Roughening and Terracing

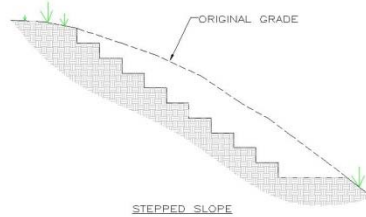
Objectives and Applications

Surface roughening and terracing includes establishing a rough soil surface by creating horizontal grooves, furrows, depressions, steps, or terraces running parallel to the contour over the entire face of the slope. These measures are intended to aid in the establishment of vegetative cover from seed, to reduce runoff velocity and increase infiltration, and to reduce erosion and provide for sediment storage. They provide simple, inexpensive and immediate short-term erosion control for bare soil where vegetative cover is not yet established. A rough, loose soil surface provides more favorable moisture conditions than compacted, smooth surfaces and aids in seed germination. The measure chosen to achieve these goals depends on the grade of the slope, the type of slope (cut or fill), soil and rock characteristics, future mowing and maintenance requirements, and type of equipment available. The most common measures utilized include:

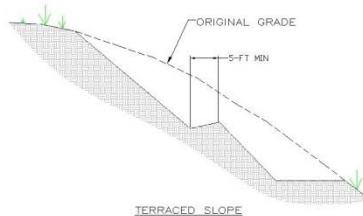
Tracking –run machinery (such as bulldozers) up and down slopes to leave horizontal depressions in the soil, and is generally limited to sandy soils in order to avoid undue compaction of the soil surface.

Contour Furrows –cut furrows (a series of ridges and depressions) along the contour of a slope, and if applicable to any area that will safely accommodate disks, tillers, or a spring harrow.

Stair Step Grading – completed by cutting “steps” along the contour of a slope, and is applicable to slopes with a gradient greater than 3:1 which have material soft enough to be bulldozed and which will not be mowed.



NOTES:
 VERTICAL STEP NOT TO EXCEED HORIZONTAL
 VERTICAL STEP NOT TO EXCEED TWO FOOT IN HEIGHT.



NOTE:
 LIMIT VERTICAL TERRACE HEIGHT TO 20 FEET.

Common Failures - Generally due to faulty installation or maintenance.

Roughening washed away by heavy rain, necessitating additional roughening and possibly reseeding. Failure of upslope control measures (diversions), resulting in soil erosion due to excessive flows on the area.

Other Considerations

Surface roughening techniques are effective for moderate storms; during large storm events surface roughening may not be sufficient. Surface roughening measures may not be suitable for noncohesive or highly erodible soils. Fill material should be appropriately-compacted to reduce erosion, slippage, settlement, subsidence, and other related problems. Use slope breaks, such as diversions, benches, or contour furrows to reduce the length of cut and fill slopes to limit sheet and rill erosion.

Relationship to Other ESC Measures

Diversions at the upper perimeter of the roughened area function to prevent runoff from causing erosion on the exposed soil. Perimeter control and sediment basins at the lower perimeter of the area function to prevent off site sedimentation.

Installation

Cut slope roughening (areas not to be mowed):

On slopes steeper than 3:1 use excavation equipment to create stair steps or grooves on the contour of the slope. Use stair step grading on any erodible material soft enough to be ripped with a bulldozer. Slopes with soft rock and subsoil are particularly well-suited to stair step grading. The vertical cut distance should be less than the horizontal distance; the horizontal position of the step should be slope in toward the vertical wall. Do not make individual vertical cuts more than two feet high in soft materials or more than three feet high in rocky materials. For slopes that are less than 3:1 grooves are suitable. Construction equipment is used to create a series of ridges and depressions, or grooves that run across the slope, on the contour.

Fill slope roughening (areas not to be mowed):

For slopes greater than 3:1, ensure that the face of the slope consists of loose, non-compacted fill four to eight inches deep. Use contour furrows or tracking to roughen the face of the slope on the contour, if necessary. Do not blade or scrape the final slope face.

Cuts, Fills, and Graded Areas (to be mowed):

Slopes in mowed areas are typically less than 3:1. Roughen these areas to create shallow grooves on the contour with tilling, disking, or harrowing implements. Grooves should be close to one another and evenly spaced. Groove should be less than 12 inches wide and at least one inch deep. Avoid excessive roughness on areas to be mowed.

Roughening With Tracked Machinery:

Limit roughening with tracked machinery to sandy soils in order to avoid undue compaction of the soil surface. Operate machinery up and down the slope to leave horizontal depressions in the soil. Do not back blade during the final grading operation.

Inspection

Inspect roughened areas after each significant rainfall event (produces runoff) during construction operations.

Vegetation Buffer Strip

Objectives and Applications

A vegetation buffer strip is an undisturbed or planted area, with sufficient vegetation so that runoff velocities are reduced and sediment is controlled.

Buffer strips are living sediment filters that intercept and detain stormwater runoff. They reduce the velocity of surface runoff, promote infiltration, and reduce pollutant discharge by capturing and holding sediment and other pollutants in the runoff water. They may be natural, or may be graded and planted with grass or other vegetation; and may be placed at many locations between the source of sediment (road surface, side slopes) and a natural or constructed waterway or other drainage area that could be impacted by deposits of sediment. Buffer strips may be used at any site that can support vegetation, but are best suited where soils are well drained and where the bedrock and water table are well below the surface. Buffer strips are particularly effective on flood plains, along stream banks, and at the top and bottom of a slope. Buffer strips may be either temporary or permanent.

Common Failures - Generally due to faulty installation or maintenance.

Introduction of stormwater flows onto buffer strip before vegetation is established.

Other Considerations

Not effective for filtering high velocity flows from large, paved areas, steep slopes, or hilly areas. May be more viable than silt fence where silt fence installation and removal will cause more harm than good. Avoid flow concentration. In general, buffer strips only trap coarse sediments. Depending upon vegetative type, clay and fine silt particles may pass through a buffer strip during periods of heavy rain. Preserve natural vegetation in

clumps, blocks or strips where possible, particularly in areas adjacent to waterways. Do not use planted or seeded ground as a buffer strip until the vegetation is established.

Relationship to Other ESC Measures

Buffer strips are used in conjunction with diversion measures such as earth dikes, diversions, and slope drains for slope protection. Upslope BMPs may prevent sediment overload.

Alternate Sediment Control Measures

Fiber wattles, ditches, earth berms, silt fence

Design

Location: Should be determined by considering slope, soil type, anticipated flow, and vegetation type.

Capacity: 2-year 24-hour storm event

Width: 18 ft. - 60 ft., depending on type of vegetation and length of slope. In North Dakota, vegetative buffer strips must have a minimum width of 25 feet for every 125 feet of disturbed area which drains to the buffer. The width of the buffer shall have a slope of 5% or less and the area draining to the buffer shall have a slope of 6% or less.

Grading: smooth and uniform

Permitting: Wetlands used for a vegetation buffer strip requires approval from the Corps of Engineers.

Flow Distribution: evenly distributed; avoid concentrated flows.

Materials

In North Dakota, buffers shall consist of dense grassy vegetation, 3 to 12 inches tall with uniform coverage over 90% of the buffer. Woody vegetation shall not be counted for the 90% coverage. No more than 10 % of the overall buffer may be comprised of woody vegetation.

Installation

Natural Vegetation:

Delineate undisturbed areas of vegetation with flagging prior to construction activities.

Ensure that other BMPs to be used in conjunction with the buffer strip are in place and functioning properly. Minimize construction activities and traffic on the buffer strip and adjacent areas.

Seeded Buffer Strip:

Ensure that sediment control measures such as wattles and diversions are in place to protect waterways or drainage areas until the buffer strip is established. Clear and grade the land according to the plans. Establish vegetation using specified seed, mulch and fertilizer, irrigate site to establish vegetation if possible.

Inspection

Inspect natural vegetation buffer strip at regular intervals to check for damage. Inspect new buffer strips to assess germination and plant growth. Ensure that water flowing through the area is not forming puddles, rills, or gullies due to erosion within the buffer strip.

Maintenance

Repair any damage by equipment or vehicles. Provide additional seed, fertilizer, and water to ensure adequate establishment of vegetation. Repair and reseed areas damaged by erosion or provide drainage for areas with standing water.

Rolled Erosion Control Products

Objectives and Applications

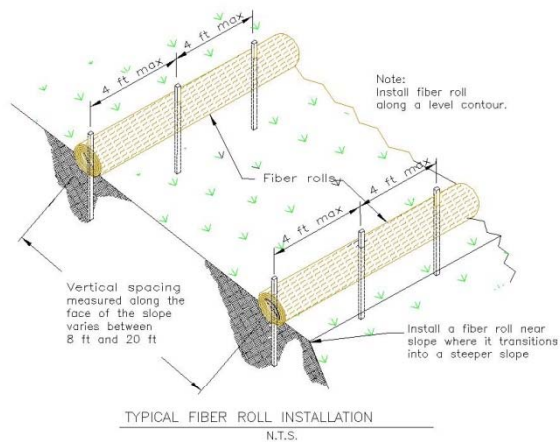
Rolled erosion control products (RECPs) are manufactured sheets or covers that can be installed on slopes where erosion control or soil stabilization is needed. RECPs are used where temporary seeding and mulching alone are inadequate, or where mulch must be anchored and other methods such as crimping or tackifying are not possible. Applications range from covers for temporarily inactive construction sites to long term protection of steep slopes. Long-fibered mulches are woven or held by netting on one or both sides to create RECPs of various sizes. Common RECPs are made from straw, wood shavings (excelsior), flax, coconut fiber (coir) and jute.

Common RECP categories include:

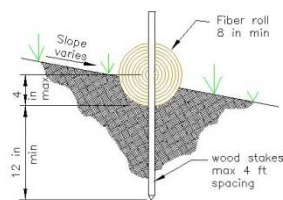
Temporary RECPs are designed for short term use (< 1 year is generally preferred) and made from biodegradable materials. Each fiber has different characteristics and breakdown patterns.

Semi-permanent RECP last 4-8 years and are commonly made from coconut fiber (coir) products

Permanent RECPs do not decompose for 10 years or more and include synthetic turf protection mats, which are made from synthetic polymers to form a continuous mesh. Mats are thick, heavy, and durable. Some products are designed to structurally support vegetation.



TYPICAL FIBER ROLL INSTALLATION
N.T.S.



ENTRENCHMENT DETAIL
N.T.S.

Common Failures - Generally due to faulty installation or maintenance.

- Seed washout/soil erosion due to water flow beneath poorly secured RECPs.
- Failed/inhibited growth of vegetative cover
- The RECP is damaged by equipment, the elements, livestock, or wildlife etc.

Other Considerations

Installation requirements, location, installer experience, and maintenance requirements all factor into the total cost of an RECP. Thus, expensive RECPs aren't necessarily more effective than lower cost RECPs. The strength, durability, and degradation rate of the RECP should be suitable for the intended use. Installed RECPs must also support plant growth, if applicable. Prior to seeding or RECP installation, environmental factors and practical constraints must be addressed to ensure successful seed germination. Environmental factors include: soil physical and chemical characteristics, soil moisture, and soil temperature. Practical constraints may include slope length and grade, seed-bed preparation activities, fertilizer applications, snow or water management systems (i.e. snow fence or other BMPs). Additionally, potential interactions with wildlife (nesting, or grazing) need to be considered.

Relationship to Other ESC Measures

RECPs can complement seeding and revegetation. Decomposed RECP products that remain on the surface, or become incorporated into the soil, may improve moisture retention in the soil. RECPs can be used in conjunction with benches or other BMPs used to reduce slope length. RECPs may aid dust control.

Alternate Sediment Control Measures

Other techniques used to reduce runoff volume and velocity by decreasing slope length or grade. These techniques may include: slope breakers, benches, terraces, diversions ditches, tackifier, and seeding.

Other Names

Terms are often used interchangeably and may include trade names. Examples include: matting, erosion control blankets and erosion control geo-textiles.

Design

Consult product distributors for recommendations regarding RECP selection and performance criteria.

To determine suitability, evaluate the following:

Time frame: temporary, semi-permanent, or permanent.

Slope length and grade

Soil type and erodibility

Plant growth factors, especially where germination conditions are not optimal.

Use RECPs on grades greater than 2:1 subject to high stress. Synthetic turf protection mats may be used to distribute loads across saturated fill slopes and reinforce root systems. Use when slope protection is needed at least 2 years. Permanent or semi-permanent RECPs are best-suited for use on: highly erodible slopes (>3:1), for areas with heavy and/or high velocity runoff, landfills, high elevation areas, drought areas, long cut or fill slopes, bridge abutments, etc.

Nets and Mats: In general, plastic nets do not retain adequate moisture or heat. Straw mulch or other materials are often used in conjunction with plastic nets to create conditions that are more often supportive of plant growth. In areas where runoff velocities are greater than 7 feet per second, plastic nets and wood fiber mulches are not recommended unless additional BMPs are used. Jute mats can be used to increase seed germination and/or control dust. However, jute mats are not suitable in areas with substantial runoff.

Materials

RECP Materials include: burlap, jute mesh fabric, woven paper, Sisal mesh net, knitted straw mat, woven or curled wood blanket. Commonly used anchors include: U-shaped wire staples, and wooden stakes.

Installation

Installation procedures vary for each product, and all products will be installed according to the directions provided by the manufacturer. In general the following procedure is used:

1. Prepare slope for RECP installation. The soil surface should be smooth and free of large obstacles. If applicable, seeding should occur prior to RECP installation. Adequate surface preparation is critical to ensure that the RECP is effective.
2. Excavate an anchor trench on a level area well above the shoulder of the slope.

3. Place RECP into the anchor trench. Backfill and compact the trench to ensure that the RECP is securely anchored in the trench. Gaps must be eliminated to prevent runoff from undercutting the RECP.
4. Lay the RECP on the slope, parallel to the grade and runoff path. Follow the surface contours as closely as possible; do not stretch the RECP too tightly over depressions.
5. If additional layers of RECP are needed to continue down slope, additional anchor trenches must be created; use the procedure described above to install the next section of RECP. A minimum overlap of 16 inches should be provided at the junction of the two sections. If possible, stagger the junctions across the slope.
6. Anchor or staple the RECP perimeter according to the manufacturer's guidelines. Be sure to consider slope length, grade, soil type, and runoff volumes and velocities. Provide adequate overlap between RECP sections. Stagger staple patterns on adjacent sections to increase stability. Additionally, staples and stakes must maintain firm contact with the underlying surface and the RECP.
7. Install an anchor trench on the toe of the slope to secure the ends RECP; use the procedure described above. Ensure that the entire slope has continuous coverage.
8. If necessary provided additional BMPs at the toe of the slope.

Inspection

Check that fastenings are secure. Ensure that the RECP has continuous contact with the soil surface. Look for evidence of runoff, tenting, damaged areas and exposed soil surfaces. Pay special attention to seams and uphill edges.

Maintenance

Repair, re-anchor, or replace RECP as needed. Re-seed if necessary.

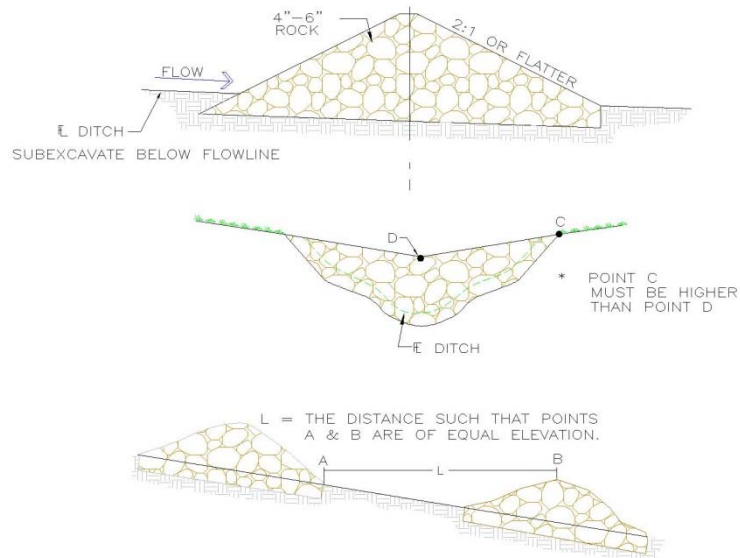
Removal

Non-degradable RECPs must be removed manually when no longer useful and disposed of at an offsite landfill or by other approved methods. Degradable RECPs deteriorate over time and removal is not required. Degradable RECPs may improve moisture retention on the surface.

Rock Check Dam

Objectives and Applications

A rock check dam is a temporary measure to protect narrow erosion-susceptible waterways and/or reduce the sediment loads in channels. Check dams may also be used as permanent measures. Temporary check dams are placed in ditches, swales, gullies, or other minor drainages intended to be filled or stabilized at a later time. Check dams are used to slow stormwater velocities and reduce scour of channel surfaces. When pooled behind the check dam larger-sized sediment falls out from the stormwater to reduce the total sediment load. Small sediment particles may become lodged in the dam's structure. Permanent check dams may be used to decrease the gradient of steep channels, which reduces the potential for erosion and sediment transport. Check dams are commonly used in ditches adjacent to roadways.



Common Failures - Check dams are vulnerable to failure from concentrated flow.

- Undercut or washout of channel banks beside the structure due to improper installation (e.g. dam not built high enough onto the banks).
- Increased bank erosion (e.g. at channel bends) or inadequate protection of channel surfaces due to improper location or installation of check dams.
- Water backup and bank overflow due to overly tall dam structure.
- Rocks washed downstream may clog culverts, misdirect flow, etc.
- Check dams installed in grass lined structures may kill the vegetative lining if siltation is excessive or the vegetation remains submerged for extended periods of time.

Other Considerations

- Depressions in the channel above the check dam allow for more water storage and increased sediment removal.
- In channels with established vegetation, depressions should not be created, because the vegetation also removes sediment.
- Rock check dams are best suited for narrow ditches and gullies. Straw bales are used primarily in wide swales.
- Rock check dams may be more costly to install than straw bale check dams.
- Rocks may interfere with plant growth in the channel and the channel is subject to disturbance when check dams are removed.
- Rock check dams left as permanent structures may prohibit some maintenance (ex: mowing).
- The area downstream of the last dam should be stabilized or flow should be diverted.

Relationship to Other ESC Measures

As part of the perimeter control, check dams are used to protect channels prior to the installation of permanent or temporary erosion controls. Although check dams filter some sediment, they are not intended to replace sediment filters or basins.

Alternate Sediment Control Measures

- Diversion ditches
- Protective channel liners examples include: concrete, rock, RECPs and vegetation.
- Other techniques include: straw bale check dams, sediment settling ponds, permanent ditch blocks, sand bag check dams or combinations of these measures.

Design

Rock check dams are high on the sides and extend up the bank of the channel with a low point in the center to provide an outlet for stormwater. This design directs stormwater flow to the center of the channel to prevent erosion of the channel banks. Check dams are used to reduce flow velocities by decreasing the local slope of the channel (i.e. the slope between check dams). To prevent excessive erosion or channel change, check dams should not be installed near abrupt bends in the channel. Check dams should be sized accommodate the 2-year 24-hour stormwater runoff without flooding or failure. Check dams that are too large may seriously change flow characteristics of the channel and may lead to erosion or channel change. The following dimensions provide guidelines for check dam design—the guidelines should be modified for site-specific conditions.

Standard Check Dam

Maximum drainage area: not to exceed 10 acres.

Normal flow velocity: less than 6 ft/sec.

Maximum height at dam center (low point of dam): half of the channel depth, or 2 feet whichever is less.

Minimum height of the sides: center height plus 6 inches.

Structure slope: do not exceed 2:1.

Distance between check dams: The elevation of the outlet of the downstream check dam should be equal to the base of the upstream check dam to create a local slope of zero percent. Given a channel slope of 2, 4 and 6 % check dams should be spaced 100, 50 and 33 feet, respectively.

Materials

Clean, hard, angular rock usually two to three inches in size. Larger channels may require larger rock. Use only clean materials and avoid fine materials. Alternative materials may include logs, brush, and sandbags.

Installation

Install dams when drainage routes are established. Create a trench across the channel and up the banks to serve as an anchor for the check dam. The trench should be a minimum of 6 inches deep and 1 foot wide; size varies by location. Place rock by hand or mechanical means into the trench and extend to the desired height and width. Place smaller rocks on the upstream side to prevent sediment transport. Extend the dam up the banks beyond the high water mark to prevent erosion and undercutting of the banks. In

unlined channels, a small depression on the upstream side of the dam may increase sediment collection and reduce the need for sediment removal.

Inspection

Observe dam function during or after each rainfall event that produces runoff. Note the condition of channel and dam surfaces. Inspect channel banks for evidence of erosion or undercutting. The dam should be stable and capable of withstanding high flows. Look for dam deterioration and for migration of structural components downstream. Observe level of sediment buildup behind dam. It should not exceed ½ dam height. Compare water velocities at several locations along the channel. Use the observations to determine if other BMPs are necessary.

Maintenance

Repair the check dam and surrounding banks, as needed. Periodically remove sediment deposits. If rocks have been dislodged from the check dam it may be necessary to remove them from the channel to prevent problems (i.e. rocks block culvert).

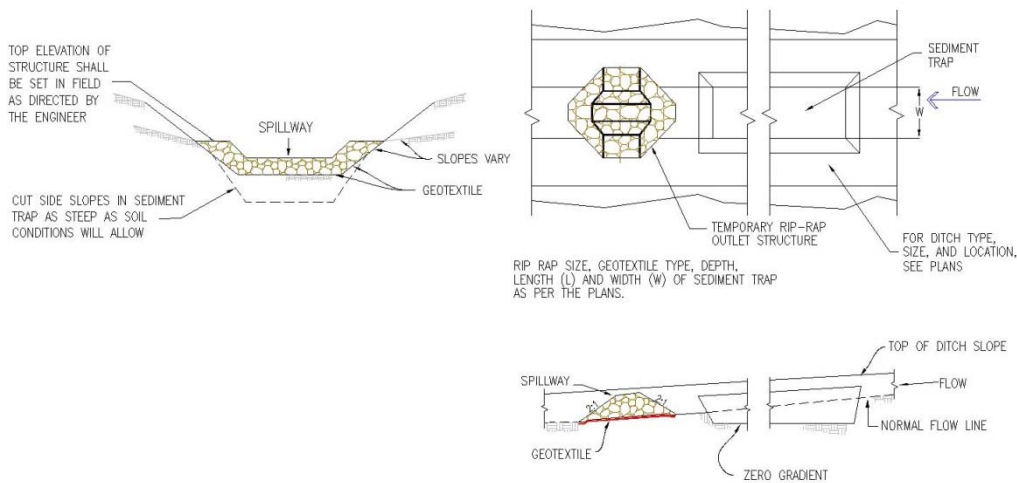
Removal

The waterway surfaces may be damaged when check dams are removed. Extra care should be taken to prevent damage to the waterway and adjacent areas. Unprotected or damaged areas should be seeded (or install another appropriate BMP) immediately after the check dam is removed. Some check dams may be left as permanent control measures.

Temporary Sediment Basin

Objectives and Applications

A sediment basin is a temporary structure that is used to detain runoff from small drainage areas so that sediment can settle out. Runoff from the disturbed site enters the sediment trap through ditches, slope drains, diversion dikes, or other BMPs. An outlet is provided to control runoff exiting the sediment basin. Temporary sediment basins are created by excavating below grade and/or by constructing an earth berm; natural depressions on site may also be used, if sufficiently sized. Sediment basins are generally used for drainage areas less than five acres. The design life is approximately six months. Access to the basin should be provided for sediment removal, if necessary. Sediment basins should be maintained until the site is permanently protected against erosion.



Common Failures - Generally due to faulty installation or maintenance

- Inadequate storage capacity; which reduces sediment removal potential and may lead to failure of the structure.
- Poor basin construction (i.e. berms or basin sides poorly compacted) may result in additional erosion or allow stormwater flow to bypass the basin.
- Poor outlet construction may result in erosion below the dam.
- Sediment accumulation may decrease storage capacity and impair function.

Other Considerations

- Locate sediment traps based on the topography of the site.
- Naturally occurring low spots may be an ideal location for sediment basins; such locations may minimize the need for excavation.
- Provide access for sediment removal.
- Temporary sediment basins remove sand particles, but are less effective at removing silt and clay particles.

Relationship to Other ESC Measures

Temporary sediment basins are usually located at the outlets of stormwater ditches that discharge sediment laden water.

Alternate Sediment Control Measures

An engineered retention pond should be considered if the drainage area exceeds five acres. Retention ponds may be either temporary or permanent.

Design

Design life: 1 season (6 months) or less.

Drainage area: not to exceed 5 acres.

Depth: 2-4 feet.

Ideal shape: rectangular and shallow, with a length to width ratio of 2:1 or greater.

Berm: compacted earth, maximum height 5 feet.

Slopes: 2:1 or less.

Outlet: rock, gravel, or other coarse material.

Materials

Excavation equipment and rock, gravel, or other coarse material to line the outlet

Installation

Clear the area the basin and berm area to reduce debris buildup and facilitate cleanout. Excavate to create the necessary storage volume. Use excavated material to construct a berm on the low side of the basin. Compact the berm frequently during construction to prevent settling after construction. Provide an outlet for stormwater, use coarse materials.

Inspection

Inspect temporary sediment traps after significant storm or melt events. Check for signs of excessive erosion or sediment accumulation.

Maintenance

Remove sediment as needed. Deposit sediment removed from the basin in a suitable area and in such a manner that it will not erode and cause sedimentation problems. Add additional rock or gravel to the spillway, if needed.

Removal

Remove sediment basins after the drainage area is stabilized. Grade the area, if necessary, and seed following removal.

Lined Stormwater Conveyance Channel

Objectives and Applications

A stormwater conveyance channel is lined with vegetation, riprap, or other material designed to convey concentrated surface runoff to a receiving system without creating erosion. The main design considerations are the volume and velocity of the water expected in the channel. Other factors to consider include availability of land, safety, maintenance requirements, and soil characteristics. The channel cross-sections are typically triangular or trapezoidal. Conveyance channels should discharge through a stabilized outlet to prevent erosion. Channel liners, vegetation, riprap or gravel, and mats, protect the drainage channels against erosion. The liner should be selected based upon the design flow.

Common Failures - Generally due to faulty maintenance.

Sediment accumulation may reduce channel capacity and result in flooding or erosion.

Other Considerations

Channels should be located to conform with and use the natural drainage system. Grass lined channels should not receive sediment from disturbed areas. Grass-lined channels may be unsuitable if the average channel slope exceeds five percent, continuous or prolonged flows occur, in areas with traffic, or where soils are erosive. Vegetation should be established before flows are introduced in grass lined channels. When using riprap as a liner, a geotextile blanket or one or more layers of granular material should be installed beneath the riprap.

Relationship to Other ESC Measures

All channels should discharge through a stabilized outlet. The outlet should prevent scour and protect the receiving channel.

Alternate Sediment Control Measures

Rock check dams, Temporary sediment basins, Diversion ditches.

Design

Basic design will include:

1. Establish channel location
2. Determine cross section dimensions, based on expected discharge for design storm
3. Determine channel slope
4. Select channel liner, if needed
6. Stabilize outlet points

Materials

Depends upon the type of channel liner and may include the following: Rock or gravel, geotextile or mat, or seed, mulch and fertilizer.

Installation

Remove unsuitable material. Excavate the channel as shown in the plans. Compact fill material to prevent settling and erosion (do not compact grass lined channels excessively). Remove any excess soil from the channel.

Grass lined channels: seed, mulch and fertilize.

Riprap lined channels: Place a geotextile filter blanket or a granular filter beneath riprap.

Mat lined channels: Install mats according to the manufacturer's instructions. If appropriate, seed and fertilize.

Inspection

Inspect channels after major rainfall events for sediment accumulation, bank failures, and scour.

Maintenance

Grass Lined Channels: during initial establishment, grass lined channels should be repaired, if necessary. After the grass is established, inspect the channel periodically to determine if the grass withstands the flow. The channel should be repaired if scour is present, and any debris or sediment should be removed.

Riprap Lined Channels: should be checked periodically to ensure that scour has not occurred beneath the riprap layer, and that the channel is still intact. Sediment should be removed from the channel if it reduces the capacity of the channel.

Mat Lined Channels: Inspect the channel periodically to determine if the matting is continuous.

Removal

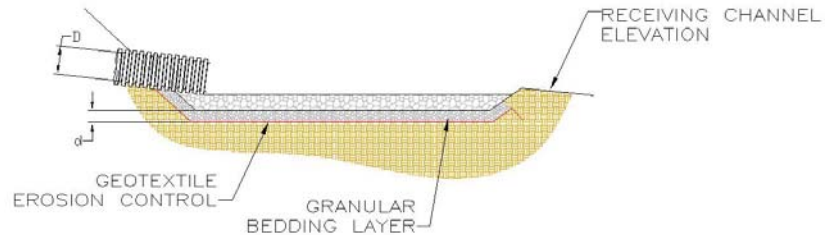
Temporary channels: Fill in channel. Seed the area.

Permanent channels: Remain after reclamation. During reclamation inspect the channel and complete any necessary maintenance.

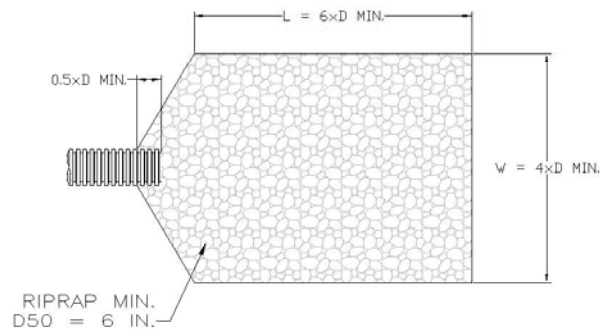
Outlet Protection

Objectives and Applications

Outlet protection structures control erosion at the outlet of a pipe or ditch by reducing flow velocity and dissipating energy. Outlet protection is necessary where discharges may create erosion in the receiving channel or area. A riprap lined spillway is commonly used because of its low cost and ease of installation. Design will vary based on discharge rates and receiving stream conditions. Outlet Protection may be temporary or permanent.



TYPICAL SECTION



PLAN VIEW

NOTE:
LENGTH OF APRON (L) SHALL PROVIDE SUFFICIENT
AREA TO DISSIPATE ENERGY.

Common Failures - Generally due to faulty design, installation or maintenance.

- Inadequate spillway length may result in erosion
- Riprap is too small to reduce water velocity and scour occurs downstream of outlet

Other Considerations

- The spillway should extend far enough downstream to ensure stable, non-erosive conditions.
- If a discharge occurs in a well-defined channel, the side slopes of the channel should not be excessively steep.
- Sediment basins or plunge pools should be considered where outlets are perched above the channel or where high flows would require excessive apron length.

Relationship to Other ESC Measures

Outlet protection may be installed at the discharge points of ditches, stormwater conveyance channels, sediment basins, or other BMPs.

Alternate Sediment Control Measures

Other structural energy dissipaters, such as sediment basins, baffle wall basins or T-fittings for pipe outlets.

Design

Capacity: roughly equal to the design discharge of the water conveyance structure
Spillway length: approximately six times the diameter of the outlet pipe or channel.
Spillway width: approximately four times the diameter of the outlet pipe or channel.
Slope: less than or equal to the receiving channel grade, preferably a flat (0%) slope. Steeper grades may require alternative measures such as sediment basins, or other energy dissipaters.
Alignment: straight throughout the entire length.

Materials

Rock riprap; and geotextile filter cloth.

Installation

Prepare the subgrade for the filter and riprap according to plan specifications. Install the filter cloth before the riprap. Riprap may be placed with excavation equipment, but take care not to damage the filter cloth. Ensure that the riprap consists of a well-graded mixture of stones. On the downstream end, the riprap should be level with, or slightly below, the receiving area. If a curve is needed to fit site conditions, place it in the upper section of the spillway. Stabilize the disturbed areas with vegetation after construction.

Inspection

Inspect outlet protection periodically and after heavy rains for erosion around or below the riprap; also look for sediment accumulation.

Maintenance

Make necessary repairs if erosion has occurred. Sediment should be removed when it fills the voids between rocks.

Removal

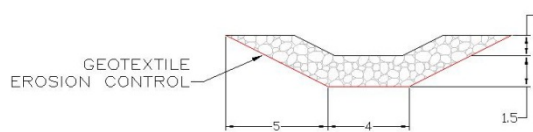
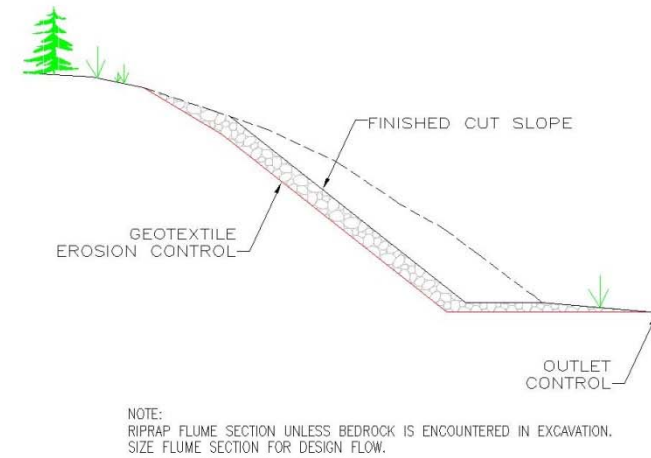
Restore ground to existing or constructed grade. Outlet protection may be left in place if specifications allow.

Rock Flume

Objectives and Applications

A rock flume is a riprap-lined channel to convey water down a relatively steep slope without causing erosion on or below the slope. Flumes serve as permanent elements of a stormwater system that receives drainage from above a relatively steep slope. Typically stormwater is conveyed by diversions, channels, or natural drainage ways to the flume.

Stormwater flows down the rock flume and into a stabilized outlet, sediment trap, or other BMP.



ROCK FLUME

Common Failures - Generally due to faulty installation or maintenance.

Stones may be displaced if the stones are too small or the backslope is too steep, which may lead to erosion. Sediment accumulation reduces capacity. Channel is too narrow, resulting in over topping and erosion.

Other Considerations

Provide both inlet and outlet protection to minimize erosion at these locations. Rock flumes should be used in conjunction with diversion dikes to convey runoff from the drainage area. Consider soil stability and the stability of the downstream channel.

Relationship to Other ESC Measures

Stormwater runoff collected in other BMPs is channeled into rock flumes to direct runoff down slope and prevents erosion.

Alternate Sediment Control Measures

Stormwater conveyance channel

Design

Drainage area: less than 10 acres per rock flume.

Depth: at least 1 foot.

Alignment: straight.

Inlet protection: riprap and geotextile, or flared metal end section.

Outlet protection: riprap and geotextile.

Materials

Riprap, geotextile, flared metal end section (if necessary).

Installation

Remove all unsuitable material, such as trees, brush, roots, or other obstructions prior to installation. Construct the channel according to the plans. To prevent settling compact fill material in the channel. Install geotextile before placing riprap.

Inspection

Inspect rock flumes after major precipitation or snow melt events for sediment accumulation, material displacement, and scour at the inlet or outlet.

Maintenance

Sediment should be removed from the riprap lined channel if it reduces the capacity of the channel.

Removal

Rock flumes will normally be left in place after construction is completed.

Diversion Ditch

Objectives and Applications

A diversion ditch is an excavated channel constructed across a slope, or around the perimeter, that intercepts and diverts run-on to a stabilized area. This measure should be used in construction areas where run-on can be diverted to prevent erosion. Diversion ditches are often used to protect disturbed slopes or to provide a slope break on long slopes. Diversion ditches may also be used to intercept runoff from the construction site. Diversion ditches may be either temporary or permanent.

Common Failures - Generally due to faulty installation or maintenance.

- Berm not properly compacted, resulting in uneven settling.
- Sediment accumulation in the channel or on the berm reduces function.

Other Considerations

- In areas where slopes exceed 10 percent, diversion ditches may require additional BMPs to prevent excessive flow velocities.
- Outlet protection should be provided to prevent sediment from leaving the site.

Relationship to Other ESC Measures

Diverted runoff must be released to a stabilized outlet, such as a sediment basin, or check dam. Outlet protection should be provided following construction of the diversion ditch.

Alternate Sediment Control Measures

Fiber wattles, sandbag berms, slope drain (can also be used in association with this measure).

Design

Location: Commonly follows site boundary. Be sure to consider topography, land use, soil type and outlet conditions.

Size the ditch and or berm based on anticipated flow conditions.

Installation

Diversion Ditch

Remove vegetation or other surface material. Fill and compact any ditches, swales, or gullies that that will be crossed, reinforce ditch and berm in these sections. Excavate, and stabilize the diversion ditch. Assure that berms are compacted to prevent settling and seepage. Seed the areas adjacent to the diversion ditch after construction.

Inspection

Inspect the diversion after large rainfall events. Ensure that the diversion effectively directs stormwater without excessive erosion or sediment accumulation.

Maintenance

Remove any sediment or other obstructions from the diversion channel. Repair outlets as necessary. Reseed areas that fail to establish vegetation.

Removal

Fill in temporary ditches and seed the disturbed area.

Attachment E
Permit Documents and NDDH Correspondence

**Vantage Pipeline US LP North Dakota SWPPP
Duly Authorized Representative Identification**

I hereby certify that I am qualified under the regulatory definition to be the responsible corporate officer for the Vantage Pipeline Operations and stormwater management program for the pipeline route in western North Dakota.

Specifically, I, _____:
(Type or print name)

- () am an officer of the corporation.
My job title is _____.
- () perform policy or decision-making functions similar to that of an officer of the corporation. My job title is _____.

I hereby designate _____ as a duly authorized representative to act in my Stead as SWPPP Administrator for the Vantage Pipeline US LP North Dakota operations.

This individual's job title is: _____

I also certify that this individual will be provided the training and resources to comply with the requirements of the general permit to discharge storm water associated with construction activities under the North Dakota Pollutant Discharge Elimination System permit NDR10-0000.

Signature of Responsible Official

Signature of Duly Authorized Representative

Date

Date

Attachment 7

Waste Management Plan

(Note: To be developed by Vantage prior to construction)

