ROVER PIPELINE
An ENERGY TRANSFER Company

May 16, 2017

Mr. Terry L. Turpin, Director
Federal Energy Regulatory Commission
Office of Energy Projects
888 First Street, N.E.
Washington, D.C. 20426

Re: OEP/DG2E/Gas Branch 4
Rover Pipeline LLC (Rover Pipeline Project)
FERC Docket No. CP15-93-000
Response to Tuscarawas River Horizontal Directional Drill Inadvertent Release Letter

Dear Mr. Turpin:

On May 10, 2017, the Federal Energy Regulatory Commission's ("FERC" or "Commission") Office of Energy Projects ("OEP") staff issued a letter ("Letter") to Rover Pipeline LLC ("Rover") regarding the inadvertent release of non-toxic bentonite clay and water slurry ("Inadvertent Release") that occurred in connection with the Tuscarawas River horizontal directional drill ("HDD"). OEP's letter expressed concern with respect to the Inadvertent Release, which impacted an estimated 6.5 acres of a Category 2[1] wetland in Stark County, Ohio.

At the outset, we share OEP's general concerns. Environmental stewardship is a core value of our organization. We strive in all our construction projects to utilize best practices to protect the environment. From the planning and design stage, to extensive training of our employees and contractors, to the actual construction of any pipeline project, the entire Rover team understands and appreciates the importance of protecting environmental resources. We value having adequate safeguards in place to protect against these type of occurrences. However, as you know, it is impossible to prevent all inadvertent releases when using HDD. That is why we proposed, and the Commission approved, an HDD Contingency Plan. Rover's HDD Contingency Plan sets forth "procedures and steps to address inadvertent release of drilling mud during horizontal directional drilling beneath wetlands and waterbodies." This includes monitoring procedures to identify inadvertent releases as soon as possible when they occur, notification procedures to ensure that the Commission and other stakeholders are aware of the event, corrective actions to immediately begin remediation of the inadvertent release, and contingency plans in the event the HDD cannot be safely maintained. That plan went into immediate effect upon discovery of the Inadvertent Release and Rover took immediate actions to contain the release and begin to remediate the impact to the wetland. Rover is committed to full restoration of the wetland.

1 While your letter characterizes wetland W1M-ST-180 as a Category 3 wetland, the wetland was documented in the Section 401 Water Quality Certification application and accepted by the Ohio Environmental Protection Agency as a Category 2 wetland on February 24, 2017).

Rover is eager to work with the Commission and State and local officials to enhance and use best management practices to try and prevent future inadvertent returns from occurring as we complete the Rover Pipeline. To that end, Rover has taken a number of steps to help safeguard against a similar occurrence in the future. Rover has just recently retained GeoEngineers, an expert HDD engineering firm specializing in geotechnical and environmental issues.[1] GeoEngineers is analyzing geotechnical data and design drawings for each of Rover's remaining HDDs and preparing technical review reports for each proposed HDD. GeoEngineers analysis includes identifying means and methods that can be implemented to further enhance successful installation, including mitigation of possible difficulties that may be encountered during construction. GeoEngineers will also function in an onsite supervisory role for each HDD site, to observe HDD construction operations, assist in the careful monitoring of drilling fluids and pressures, assess the compliance of the construction contractor with HDD design and construction documents, and provide recommendations for adjustments to HDD construction operations if and when necessary.

But given the gravity of the situation, we will not stop there. Rover has also mobilized additional construction/environmental personnel at each HDD site to increase pedestrian surveillance for potential inadvertent returns to ensure that any inadvertent release is observed at the earliest possible time. Rover has also expanded the pedestrian inspection radius to monitor for inadvertent releases on surrounding properties, and is now deploying aerial drones to help monitor for inadvertent releases at each HDD site. Rover has memorialized these enhanced measures and procedures in a Supplemental HDD Contingency Plan that Rover has shared with the Commission and Ohio EPA, and that it has distributed to all its contractors and environmental inspectors. A copy of the supplemental plan is attached here. Rover is *currently* abiding by the supplemental plan's terms on a voluntary basis.

As requested in your Letter, Rover has also prepared a Request for Proposals ("RFP") to obtain a third-party contractor to conduct an analysis of the drilling activity at the Tuscarawas River HDD and the actions taken by Rover's drilling contractor. Rover will provide the responses to the RFP to OEP staff upon receipt. Rover is committed to cooperating fully with OEP staff and State and local officials to help analyze and understand what occurred here, and to identify steps to help avoid such inadvertent releases in the future or minimize their impacts if, and when, they occur.

Your Letter also provides that Rover may not conduct HDD activities at sites where drilling activity has not yet commenced, as identified in a table attached to the Letter. Your Letter, however, prohibits Rover from continuing activities at two sites where Rover had already begun HDD setup and pilot operations: Captina Creek and Middle Island Creek (at milepost ("MP") 23.7). Rover respectfully requests that OEP staff amend the table and allow Rover to continue HDD operations at these two locations for the reasons discussed below, and subject to the additional oversight and safeguards detailed herein, including the Supplemental HDD Contingency Plan, to avoid unnecessarily jeopardizing both the environmental resources at these locations as well as the in-service schedule for the Rover Project.

Captina Creek

Rover has established the HDD location at Captina Creek in Belmont County, Ohio along the proposed Clarington Lateral. The Captina Creek HDD is proposed to avoid direct impacts to the eastern hellbender, a salamander that is a federal species of concern and an Ohio-listed endangered species. FERC, the U.S.

1 http://www.geoengineers.com/ GeoEngineers' complex HDD experience includes serving as the HDD design consultant on a project involving a 7,700 foot HDD under the Mississippi River, including crossing under two United States Army Corps of Engineers levee systems.

Fish and Wildlife Service ("USFWS"), and the Ohio Department of Natural Resources determined that an HDD at this resource would decrease potential impacts to the species compared to an open cut crossing procedure. At the Captina Creek location, Rover did not request an access road to the HDD drill entry site in order to avoid impacts to Captina Creek associated with disturbing the banks while installing a bridge or unavoidable sediment loss from use of the bridge during construction. Because of that, ingress and egress from the drill entry location has occurred from the south end of the right-of-way, over a hill with an approximate 400-foot elevation change (from 770 feet to 1,170 feet above mean sea level) and slopes ranging from 8 to 28 degrees. Transporting the drilling equipment and materials over this hill has been an arduous process, and required extensive grading and two-toning of the hillside to support the equipment and personnel safely. Great consideration has been given to the installation of erosion control devices in this area in order to minimize the potential of sediment from exiting the right-of-way and possibly entering Captina Creek. Any remedial action to withdraw and then re-disturb the area at a later date will greatly increase the likelihood of a release from surface erosion into the creek, which is directly contrary to the intended purpose of the HDD, the careful planning that has occurred, and the expectation of avoidance of impacts. Accordingly, Rover believes that executing this HDD now, in as expeditious a manner as prudent responsible drilling practices will allow, is the most responsible course of action.

Significantly, the Captina Creek HDD is located along the Clarington Lateral, a single, 42-inch pipeline, which is scheduled to be placed in service by July 2017. By allowing Rover to complete the Captina Creek HDD, installation of pipe for the Clarington Lateral could be completed and the area restored immediately. This would minimize environmental impacts and potential extended risks of runoff into the creek

Middle Island Creek

Rover is approximately 60 percent complete with the pilot phase of drilling at the Middle Island Creek HDD, located at MP 23.7 in Tyler County, West Virginia along the proposed Sherwood Lateral. The Middle Island Creek HDD at MP 23.7 is proposed to avoid direct impacts to federally and state-listed threatened and endangered mussel species, including possible occurrences of clubshell, rayed bean, snuffbox, fanshell, pink mucket, and sheepnose mussels. FERC, the USFWS and the West Virginia Department of Natural Resources determined that an HDD, as opposed to an open cut crossing procedure, at this location would decrease potential impacts to these species. Stopping the HDD at this juncture adds additional complexity and unnecessary risk not only to the HDD, but most importantly to the species and the waterbody which the HDD was intended to protect. At this stage, if the work is stopped, the pilot hole could collapse, resulting in the drill stem becoming lodged underground, and loss of the drill head and drill stem at a considerable expense to Rover, in addition to the cost and time to re-drill the hole. This could effectively result in additional costs to Rover, which are not justified as Rover is in compliance with its FERC certificate as well as its state and Federal permits. Moreover, additional environmental impacts could occur if Rover is required to execute a second pilot hole.

Similar to the Captina Creek HDD, the Middle Island Creek HDD at MP 23.7 also involves only a single pipeline, and this area could also be restored immediately after the drill at this location is complete, decreasing potential impacts to the environment.

Implementation of Additional Safeguards and Oversight

As noted, Rover has implemented additional safeguards and oversight to further ensure successful HDD installation at these (and other) crossings. GeoEngineers has analyzed the geotechnical data and design drawings for the Captina Creek and Middle Island Creek HDDs and has prepared technical review reports (attached hereto) for each proposed HDD. As set forth in those reports, GeoEngineers has indicated that in its professional judgement there is a high likelihood for a qualified construction contractor to successfully complete each of these crossings. Rover's construction contractor will implement each of GeoEngineers'

recommendations, as set forth in the technical review reports, to further facilitate successful installation of the HDD at each of these locations. Additionally, as noted, GeoEngineers will provide a supervisory level of onsite control over the drilling process. GeoEngineers will work with the drilling contractor and assist in making decisions to advance the drill or stop the drill based on a careful analysis of the drilling pressures, evaluation of the surface by visual observations for inadvertent releases, both by pedestrian survey and aerial review by drone, and will manage the HDD based upon real time conditions. Rover will also dedicate a minimum of two additional inspection resources to monitor for inadvertent releases as well as for surface erosion. These inspectors will have stop-work authority and the ability to add controls where necessary to avoid and minimize impacts to the environment. Finally, Rover will provide weekly detailed drilling reports to the FERC staff on both HDDs.

For the reasons discussed herein, Rover respectfully requests that FERC allow Rover to continue HDD operations at the Captina Creek and Middle Island Creek HDD locations. Meeting Rover's project schedule is critical to the producers in the region and the many customers across the United States that are making plans and are relying on gas deliveries starting in July 2017. Delaying the Captina Creek drill would delay the Project unnecessarily and have a significant adverse impact on Rover and its customers, and would place Rover's ability to meet its contractual obligations in jeopardy, which is not justified under the circumstances here.

As noted, Rover will provide responses to the RFP upon receipt and respectfully requests that OEP staff expedite its review of such responses to minimize any delay in retaining a third-party contractor and its review and analysis of the Tuscarawas River HDD and Inadvertent Release. Rover also requests that FERC allow it to continue with the remainder of the balance of its drilling operations concurrent with FERC's review and analysis of the Tuscarawas River HDD and Inadvertent Release, and in accordance with the mitigation measures discussed herein, so as not to unduly delay timely completion of the Rover Project. Rover understands and accepts that FERC may require it to make modifications to its HDD plans as necessary as a result of its ongoing review and analysis.

In conclusion, we understand staff's concerns. While we continue to work to determine fully how it happened, we are implementing the steps and actions outlined above can be taken immediately and represent a comprehensive and through response to this incident that should minimize future inadvertent returns from occurring.

Any questions or comments regarding this filing should be directed to the undersigned at (713) 989-2606.

Respectfully submitted,

/s/ Joey Mahmoud

Mr. Joey Mahmoud, Executive VP - Engineering

Attachments

cc: Mr. Rich McGuire - FERC Office of Energy Projects,
Mr. Kevin Bowman - FERC Office of Energy Projects

ROVER PIPELINE
An ENERGY TRANSFER Company

ROVER PIPELINE LLC

Rover Pipeline Project

SUPPLEMENT TO THE HORIZONTAL DIRECTIONAL DRILL CONTINGENCY PLAN OHIO

May 2017

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APPENDICES

1.0 INTRODUCTION

This Horizontal Directional Drill (HDD) Contingency Plan provides procedures and steps to address inadvertent release of a non-toxic clay and water slurry used in horizontal directional drilling beneath wetlands and waterbodies. The non-toxic clay and water slurry consists primarily of fresh water, with high-yield bentonite added to achieve the necessary properties, such as viscosity. Bentonite is composed of clay minerals mined primarily in Wyoming reserves and is not considered a hazardous material by the U.S. Environmental Protection Agency. No chemicals will be added to the non-toxic clay and water slurry. Therefore, in the event of a release into a wetland or waterbody, there will be no adverse environmental impact other than a temporary increase in turbidity from the bentonite and the efforts to contain and collect the release. While drilling parameters will be established to maximize circulation and minimize risk of these inadvertent releases, the possibility of lost circulation and releases cannot be eliminated. This plan has been prepared to address containment procedures in the event of an inadvertent release. It also includes measures that would be implemented in the event that the HDD cannot be successfully completed. Unless otherwise specified, Rover Pipeline LLC (Rover) will implement the following plan for the Rover Pipeline Project (Project) in consultation with the Contractor, Construction Inspector, and Environmental Inspector.

Elements of this plan include:

- Best Management Practices
- Monitoring Procedures
- Notification Procedures
- Corrective Action
- Contingency Plan

Rover will require its HDD contractor(s) to specifically address the general elements of this plan before commencing any HDD operations.

2.0 PLANNED HDD CROSSINGS

The HDD method of construction is utilized to avoid disturbing surface and shallow subsurface features (such as waterbodies, wetlands, vegetation, manmade structures, and public use and protected areas) between two construction areas and is the preferred method proposed by Rover for crossing major waterbodies. The HDD method typically involves establishing workspaces in upland areas on both sides of the feature(s) to be crossed and confining the work and equipment to these areas. The process commences with the drilling of a pilot hole in an arced path beneath the feature, using a drill rig positioned on the entry side of the crossing. When the pilot hole is completed, reamers are attached and are used to enlarge the hole in one or more passes until its diameter is sufficient to accommodate the pipeline. As the hole is being reamed, a pipe section long enough to span the entire crossing is fabricated (staged and welded) on one side of the crossing (typically the exit side) and then hydrostatically tested to ensure the integrity of the welds. When the reaming is complete, the prefabricated pipe section is pulled through the pre-reamed drilled hole back to the entry side.

A drill head equipped with a global positioning system (GPS) may be used to transmit the drill location to an operator in order to help guide the drill through the prescribed path. In cases where the drill head is not equipped with this technology, foot traffic would be required between HDD entry and exit points to place guide wires to track the progress and guide the movement of the drilling cutterheads. These guide wires would be placed in upland and wetland areas but would not be laid on the bed of any waterbodies.

HDD requires prefabricated pipeline, which may necessitate additional workspace if the right-of- way is not directly aligned with the HDD. Between the HDD entry and exit sites, Rover is limited to conducting minor brush clearing, less than 3 feet wide, using hand tools only, to facilitate the use of the HDD tracking system or acquisition of water for the makeup of the HDD slurry. Access paths to the water source in support of drilling operations can typically be routed in a meandering fashion, thereby avoiding trees and any substantial clearing.

Throughout the drilling process, a slurry of naturally occurring, non-toxic bentonite clay and water would be pressurized and pumped through the drilling head to lubricate the drill bit, remove drill cuttings, and hold the hole open. This process is intended to circulate the non-toxic clay and water slurry through the annulus of the bore hole and back to a collection area at the drilling site, where it is reused in the HDD process. This non-toxic clay and water slurry has the potential to be inadvertently released to the surface. The pipeline route would be monitored and the circulation of the non-toxic clay and water slurry would be observed throughout the HDD operation for indications of an inadvertent release. If a release is observed or suspected, Rover would immediately implement corrective actions. The corrective actions that Rover would implement if it uses the HDD method, including the steps it would take to clean-up and dispose of a release, are outlined below.

During the HDD operation, it is possible to encounter an abnormal condition, such as a geologic formation of unconsolidated soils, glaciated material, fractured rock, coal seams, reclaimed grounds, or where a large void is detected etc., where there is a partial or total loss of circulation. During the pilot phase, annular pressures will be monitored during the drilling operations. Once the pilot drilling is complete, no annular pressure is present; however, the flow to the entry/exit pits is closely monitored for fluid returns. The contractor would attempt to regain returns by retracting the drilling apparatus ("swab the bore hole") in an attempt to create a seal along the bore walls to form a closed system to retain the fluid. In the event of loss of pressure during the pilot phase, the HDD contractor will pull back (or "trip") the bottom-hole-assembly out of the hole until pressure is regained or until there is evidence that no inadvertent release has occurred. During the reaming phase of the HDD, the entry and exit pits will be closely monitored for fluid returns.

Additionally, while drilling through unconsolidated materials or glaciated material, a diminished flow of drilling fluid or loss in annular pressure may be presented. If that occurs, the HDD contractor will retract drill stem to a point that previous drilling fluid returns were present, in efforts to clean the bore hole. In this process, the drill stem and drill tools are retracted to clean the hole behind the drilling apparatus in an effort to remove any potential cuttings/material behind the tool that could create a blockage in the bore path, which might be slowing or stopping fluid returns. Upon fluid returns to the entry/exit pit, the drilling activities will then be advanced back through the bore hole to recommence drilling operations. The drilling fluid is closely monitored to ensure the proper bentonite mixture is being used allowing the wall cake to form down hole along the bore path.

During the drilling operations, unconsolidated soils uptake portions of the drilling fluids and water from the bentonite mixture forming a wall cake. The wall cake assist in sealing off the outside area of the bore hole to mitigate infiltration of waters/materials into the bore hole. In addition, in these circumstances, the monitoring procedures detailed below in Section 4.0 below would be executed.

It is possible for HDD operations to fail, primarily due to encountering unexpected geologic conditions during drilling or the pipe becoming lodged in the hole during pullback operations. Potential causes for abandoning a drill hole include the loss of drill bits or pipe down the hole due to a mechanical break or failure, a prolonged release of the non-toxic clay and water slurry that cannot be controlled, failure of the HDD pullback where a section of pipe cannot be retracted and has to be abandoned, or an inability to

correct a severe curvature of the pilot hole drill path. In any event, reasonable attempts would be made to overcome the obstacles preventing successful completion of the drill. Such measures could include re-drilling the pilot hole in a slightly different location or re-conditioning of the pilot hole. Rover would be required to seek approval from the Federal Energy Regulatory Commission (FERC), the U.S. Army Corps of Engineers, the Ohio Environmental Protection Agency (Ohio EPA) and potentially other applicable agencies prior to abandoning any proposed HDD crossing in favor of a new location, or using another construction method should the second attempt fail. If an HDD hole were to be abandoned, Rover would seal and grout with cement the upper 30 feet of the bore hole(s) at a minimum, subject to a site-specific evaluation of the geologic formation to determine the length of the bore hole to be grouted, and with the top 5 feet filled with soil to allow for revegetation. In the event that an HDD crossing cannot be completed at the proposed location, Rover would coordinate with appropriate agencies and propose an alternative location to the FERC.

Extensive geotechnical data testing pertaining to the feasibility of the proposed HDD crossings was conducted during the planning phase of the proposed HDDs. These studies are used to design the HDDs with the highest possible level of success given the observed geologic formations. The location and basic results of the geotechnical reports are identified on the HDD plan and profile drawings included in Appendix B.

The staging areas for the HDDs have been limited to the minimum needed to construct the crossing. Additionally, the entry and exit locations have been sited with maximum design depth clearance to provide the greatest buffer between the sensitive resource and the drilling activity/installed pipe. Further, these layouts have been designed to minimize the potential for impacts to waterbodies and wetlands by providing no less than 50 foot buffers to the sensitive resource, except where the 50-foot buffer cannot be maintained due to topographic or site-specific conditions. The combination of the buffer and the depth of the pipe beneath the sensitive resource is expected to minimize and avoid any adverse impacts.

Please refer to Appendix A for the proposed HDD locations for the Project and specific information pertaining to each.

3.0 BEST MANAGEMENT PRACTICES

Rover will employ a number of best management practices (BMPs) to reduce the probability of and severity of inadvertent returns.

1. Rover approaches HDDs with the mindset of expecting, anticipating, and being fully prepared to immediately respond to an inadvertent return. While the HDDs are designed to maximize their potential for success, inadvertent returns may still occur. Rover will thus be cognizant and prepared to respond quickly to minimize any impacts from the inadvertent return.

2. Rover has identified known resources including, but not limited to wetlands, waterbodies, public drinking water sources, etc. during the planning stages of the project, and has designed the HDDs to avoid impacts to those areas foremost by use of the HDD construction method. Rover has designed the HDDs to maximize the separation between the pipeline path and the features present within the HDD segment, including the proximity to the entry and exit locations of the HDD, to the greatest extent possible given topographic, residential, environmental, technological, and other constraints.

3. These resources are protected secondarily by stormwater BMPs utilized at the HDD entry and exit points to reduce the possibility of off-right-of-way sedimentation into any nearby sensitive areas. These BMPs are also utilized along the pipeline right-of-way, and include, but are not limited to:

- Effective perimeter controls, including the installation of silt fence and other erosion control devices (ECDs) surrounding the perimeter of the entry and exit "drill pads"
- Installation of slope breakers in areas where ground disturbance leading to or from the HDD location may cause sedimentation downslope.
- Installation of silt fence and other ECDs at wetland or waterbody edges near the HDD location to further protect the resources.
- Utilization of sediment ponds or traps when design parameters of perimeter controls are exceeded
- Proper trench dewatering techniques for trenches leading to or from the HDD location, using a filter bag and silt fence/straw bale structure and sediment ponds or traps as dewatering structures do not result in violations of water quality standards. There will be no turbid discharges to waters of the state resulting from dewatering operations.
- Use of secondary containment for pumps or equipment within 50 feet of a wetland or waterbody.
- Knowledge of Rain Water and Land Development Manual
- Timely reclamation and stabilization of the areas following construction, with temporary ECDs maintained and monitored until final stabilization is achieved, at which time any necessary permanent ECDs would be installed

These ECDs as well as others utilized along the pipeline or at aboveground facilities are also detailed in the construction typical drawings included in Appendix C, and in the Rover Upland Erosion Control, Revegetation and Maintenance Plan (Rover Plan) and Rover Wetland and Waterbody construction and Mitigation Procedures (Rover Procedures) included in Appendix D.

4. Rover will have on-site, prior to drilling, an appropriate supply of materials and equipment to contain an inadvertent return at both sides of the HDD. This would include, but not be limited to:

- straw bales
- silt fence
- sand bags
- Hand tools
- pumps and hoses
- vacuum truck(s)
- backhoe
- bulldozer
- equipment mats
- aqua barriers
- sheet piling

5. If these items become necessary, an appropriate number of pumps will be staged to volumetrically control the current release, as well as any further anticipated releases. Additional equipment and supplies will be brought in to supplement and provide for redundancy of critical systems in case of mechanical failure or an increase in the severity of a situation. In addition, pumps or other active relief systems will be continuously monitored while in use.

6. In addition to the overall safety and environmental training required for the Project, which is required for all employees and contractors and documented, Rover will provide training to ensure that personnel associated with the HDD are knowledgeable concerning the plan and other applicable construction plans approved for the Project. All training will occur on-site and the training events and attendees will be documented. This effort will include the third-party monitors on-site, who will be

present and available for questions. In addition, records of occurrences and attendees of job safety analysis meetings will be documented.

7. The utilization of bore path relief wells will be evaluated by a third-party inspection firm for all HDDs where wetlands are within the HDD path.

4.0 MONITORING PROCEDURES

HDD activities will be closely and continually monitored by the Contractor, the Construction Inspector, and the Environmental Inspector, or any combination of the three. Monitoring and sampling procedures will include:

- Visual and pedestrian field inspection along the drill path, to the extent allowable by the terrain, including monitoring the wetlands and waterbodies for evidence of release,
- Use of drones to inspect the area along and adjacent to the HDD drill path when inadvertent returns are suspected,
- Continuous monitoring of the non-toxic clay and water slurry, drilling pressures, and return flows by the Contractor,
- Consistent recording of drill status information regarding drill conditions, pressures, returns, and progress during the course of drilling activities,
- Consistent recording of pedestrian and drone inspections along the drill path and surrounding area including time of inspection, documentation of all observations of sensitive resources, and people conducting the inspection. and
- Continuous, 24-hour monitoring of pumps being utilized on-site.

While performing an HDD, the HDD contractor will closely monitor all down hole pressures during the pilot phase along with the entry/exit pits during the reaming process to ensure fluid returns are returning. While performing an HDD crossing a wetland, waterbody, or ditch, the crew will closely and frequently monitor the right-of-way and surrounding areas with pedestrian search and/or the use of aerial drones. Should an inadvertent return be found in a wetland, waterbody, or ditch; the drilling operations will immediately halt until the inadvertent return is adequately contained. The monitoring of the right-of-way along with all findings will be documented.

In the event that pedestrian searches for inadvertent release are inadequate due to limited traversable terrain, a remote controlled aerial drone will be utilized for ground surveillance. The drone will be flown the length of the HDD drill path with concentrated focus on the areas that pedestrian search is not practical and during daylight hours. The FAA has instituted certain guidelines for the use of drone flights.

- Class G airspace
- Must keep the aircraft in sight (visual line-of-sight)
- Must fly under 400 foot elevation
- Must fly during the day time hours
- Must fly at or below 100 mph
- Must yield right of way to manned aircraft
- Must not fly over persons
- Must not fly from a moving vehicle
- Drones must be registered with the Federal Drone Registration and all guidelines closely adhered to.

Drone flight use and rules can be found at
https://www.faa.gov/uas/getting_started/fly_for_work_business/

During the flight of the drone, the right-of-way and up to .25 mile each side of centerline along the HDD bore path will be flown, provided line-of-sight between the drone and the pilot is obtainable.

In the event an inadvertent return is identified using the drone, all HDD operations will be halted. Providing the inadvertent return is in a location that can be accessed through approved landowners along the permanent easement of the right-of-way, the crew will contain the inadvertent return with silt fence, straw bales and/or sand bags. Provided adequate access can be obtained, the HDD contractor and/or its subcontractor will utilize vacuum trucks, pumps and hand tools as needed to clean-up the inadvertent return. Upon containment of the inadvertent return, the drilling operations will commence as the clean-up efforts continue.

In the event an inadvertent return is located outside of the previously approved right-of-way boundaries, the HDD contractor will work closely with Rover to obtain landowner and agency permission to access the area to begin the clean-up efforts.

Similar investigation techniques will be implemented during nighttime operations, with the exception of drone flights, as long as they can be conducted safely.

In addition, inspection by a third-party firm will be utilized to monitor the drilling process on-site within the drilling equipment cabin along with the contractor for all HDDs that cross wetlands along the Project (see Appendix A). This third-party firm will provide guidance to the contractor and help to ensure that the drilling is conducted cautiously and skillfully to minimize the potential for an inadvertent return. The third-party firm will routinely report to the agencies involved with the HDDs.

5.0 NOTIFICATION PROCEDURES

Rover will contact all landowners within 1 mile of the proposed HDDs to inform them that they are near an HDD location and to request that they inform Rover of any apparent bentonite/water slurry on the surface of the ground or within a wetland or waterbody. Rover will also inform them that they may notice drones in the proximity as inspections are conducted, and Rover will request their permission to perform pedestrian surveys as necessary if an inadvertent return is suspected. Rover has provided all affected and adjacent landowners and local residents with the Rover hotline number (888-844-3718) on multiple occasions in mailings, and via newspapers and local media, and Rover will provide the residents surrounding the HDDs with this number again to facilitate communication. Rover has also provided the Ohio EPA with the Rover hotline number to help facilitate communication if the Ohio EPA receives calls concerning a possible inadvertent return or other concern.

For all inadvertent releases of the non-toxic clay and water slurry, the Construction Inspector or Environmental Inspector will immediately notify Rover's Construction Manager and Environmental Project Manager.

Upon detection of an inadvertent release to ground surface or wetlands/waterbodies, Rover will contain the release as described below (see Section 6.0 - Corrective Action).

Rover's Environmental Project Manager will notify FERC and the Ohio EPA upon discovery by telephone and e-mail of any inadvertent release.

Rover will notify the Ohio EPA immediately as practicable:

- via telephone call to the EPA Spill Hotline (800-282-9378) and
- via telephone call to the Ohio EPA Section 401/Stormwater Manager (614-644-2001).

Rover will also notify FERC via email and phone call to the FERC Project Manager and FERC Compliance Monitor.

If the inadvertent release occurs in a wetland or waterbody, Rover will also notify the U.S. Army Corps of Engineers (Pittsburgh, Huntington, or Buffalo Districts) via email.

Rover will provide details regarding the location and nature of the release, corrective actions being taken, and whether the release poses any threat to public health and safety.

Rover will also immediately contact the landowner(s) affected by the inadvertent release and will continue to coordinate with them concerning actions necessary to contain and remediate the release.

6.0 CORRECTIVE ACTION

Upon discovery of a loss of circulation or sign of a down-hole pressure drop, the contractor shall notify the on-site Rover representative, begin to reduce down-hold pressure as practicable, and conduct a detailed examination of the drill path and adjacent area for evidence of an inadvertent release. At the first sign of release of the non-toxic clay and water slurry, immediate actions to manage and control the release will be implemented as prescribed by this plan. Depending on the location and the amount of fluid being released, corrective actions may include the following:

- If public health and safety are threatened by an inadvertent release, drilling operations will be immediately shut down until the threat is eliminated. Upon discovery of an IR within a sensitive area, a temporary suspension of drilling operations will take place until measures are in place to manage, control, and contain the release.
- Evaluating the release to determine if containment structures are warranted and can effectively contain the release. When making this determination, Rover will also consider if placement of containment structures will cause additional adverse environmental impact. Secondary containment, supporting 110 percent of the primary volume will also be designed and installed as practicable.
- Placing containment structures at the affected area to prevent migration of the release.
- If the amount of the release is large enough to allow collection, collecting the non-toxic clay and water slurry released into containment structures and returning it to either the drilling operations or an approved disposal site by hose or tanker.
- If the amount of the release is not large enough to allow collection, diluting the affected area with fresh water and allowing it to dry. Steps will be taken to prevent silt-laden water from flowing into a wetland or waterbody.
- If a wetland or waterbody release occurs, initiating an inspection to determine the potential movement of released non-toxic clay and water slurry within the wetland or waterbody.
- If a wetland or waterbody release occurs, collecting the non-toxic clay and water slurry returns at the drill entry location for future analysis, as required.
- If a wetland or waterbody release occurs, monitoring of the release will be documented by the Environmental Inspector. Rover will keep photographs of release events on record.
- Upon completion of the drilling operations, consulting with applicable regulatory agencies and

develop a site-specific plan to determine any final clean-up requirements for the inadvertent release.

- Depending upon the type and duration of an inadvertent release, if necessary impacts to benthic and/or aquatic communities will be remediated to restore the function of the community. Additionally, site-specific plans will be developed to offset or mitigate any long-term impacts to the aquatic environmental via mitigation or some other form of mitigation to replace the loss of function or value.
- For any impacts to public or private water supplies, Rover will provide temporary or permanent, short or long-term replacement of the water supply until the water supply is restored to its pre-inadvertent release condition.

The following measures will be implemented to minimize or prevent further release, contain the release, and clean-up the affected area:

- The Contractor will determine and implement any modifications to the drilling technique or composition of non-toxic clay and water slurry (e.g., viscosity of the non-toxic clay and water slurry by increasing mineral content) to minimize or prevent further releases of the non-toxic clay and water slurry.
- If a release occurs within a wetland or waterbody, reasonable measures, within the limitation of directional drilling technology and the Contractor's capability, will be taken to reestablish drilling return circulation.

In the event of an inadvertent release in a waterbody; consideration will be given to a pump-around process to keep the flow of the waterbody from being inundated with the non-toxic clay and water slurry. Should the need arise, a containment ring structure shall be used to contain the inadvertent return and act as a collection point. This method may also be employed in the event that an inadvertent return occurs in an open water area.

In the event a dam and pump is proposed, the upstream portion will be dammed off with sand bags, aqua-barrier, or similar materials to halt the flow of the waterbody. Upon installation of the dam structure, pumps will be utilized to divert the flow of water from the upstream flow around the inadvertent return and the water will be released in the downstream portion of the waterbody via discharge hoses.

While the upstream flow is halted/diverted, a dam will be placed as a containment on the downstream side of the inadvertent return. Once the dams are in place and clean-up commences, a stand pipe will be installed for containment and collection of the inadvertent return. This containment and collection point will allow for pumping of the non-toxic clay and water slurry out of the waterbody should the inadvertent return continue during drilling operations. The use of various pumps such as 3-inch or 4-inch style trash pumps, 6-inch or greater high flow pumps or hydraulic driven submersible pumps will be utilized for pumping of the non-toxic clay and water slurry from the point of the inadvertent return to the drill rig fluid reclaimer, vacuum trucks or portable containment tanks.

7.0 CONTINGENCY PLAN

If the corrective actions described above do not correct the problem, Rover may opt to abandon the drill hole and consider alternate measures. An HDD attempt will be considered failed if:

- circulation is insufficient to maintain the integrity of the borehole,

- circulation losses present an imminent risk to human health or the environment, or
- the borehole location cannot be maintained within the required limits.

In the event of borehole failure, the borehole will be properly abandoned as described in Section 7.1 below, and a decision will be made regarding whether to re-attempt the HDD crossing, or use another crossing method, as described in Section 6.2 below.

7.1 ABANDONMENT

In the event the drill hole is to be abandoned the following procedures will be implemented to seal the abandoned drill hole:

- grout will be pumped into the hole to completely seal and fill the upper 30 feet of hole entirely with grout;
- compacted soil will be placed in the top 5 feet of the hole; and
- the location will be graded to the original contour.

The above abandonment procedures will be discussed with the appropriate permitting and regulatory agencies prior to implementation.

7.2 ALTERNATE CROSSING LOCATIONS

If the HDD cannot be completed at the proposed location, the HDD will be re-attempted at an alternate location. Before a determination is made on an alternate crossing location, an effort will be made to identify and assess the reason for the drill failure. This may be critical for the selection of the alternate crossing.

Considerations of alternative locations include, but are not limited to, the following:

- horizontal relocation of the drill hole,
- changing of the drill profile (depth of hole),
- changing drill procedures (slurry viscosity/pressure/flow velocity, bit rotation/velocity, etc), and/or
- additional soil borings and geo tech evaluation.

If the entry and exit points need to be relocated, consideration will be given to:

- Stream bank type, flow width, depth, velocity and flow volume,
- Surrounding topography,
- Condition of riparian areas,
- Condition and extent of wetlands, if any, on each side of the alternate crossing,
- Aquatic biota,
- Downstream water uses, and/or
- Entry and exit angles for the HDD path.

These and other factors will be considered and discussed with the appropriate regulatory agencies to secure the appropriate approvals. Final selection of the alternate crossing location will be submitted to FERC, along with the required supporting data.

Appendix A

Rover HDD Site Information

Proposed Horizontal Direction Drills

The Rover Pipeline Project (Project) includes 43 horizontal directional drills (HDDs) within Ohio as detailed in the table below. These HDDs will occur at 24 locations, with separate drills proposed for Mainlines A and B, and Supply Connector Lines A and B within the sections of dual pipelines along the Project.

Rover will complete the drills in the dual pipeline areas separately, not as bundles, as the lines will be installed approximately 20 feet apart. The drills for the second line may not be installed immediately after the first as Rover's schedule requires Line A to be in-service prior to Line B. Rover may have as many as 24 drilling rigs on the Project concurrently.

Proposed Horizontal Direction Drills (HDD) Locations - Ohio

Pipeline Segment	Crossing Name	Pipeline Diameter (inches)	Approx. Entry MP	Approx. Exit MP	Total Length (feet)	Anticipated Duration
Burgettstown Lateral	Ohio River	36	16.13	14.78	7,124	6-8 months
Clarington Lateral	Captina Creek	42	5.44	5.82	2,067	4-6 months
Clarington Lateral	Interstate 70	42	18.38	17.93	2,419	4-6 months
Majorsville Lateral	Ohio River	24	12.00	12.50	2,665	4-6 months
Sherwood Lateral	Ohio River	36	36.10	35.01	5,757	6-8 months
Supply Connector Lines A/B[1,2]	Highway 151	42	16.67	16.16	2,660	4-6 months
Mainlines A/B[1,2]	Indian Fork	42	24.75	25.53	4,097	6-8 months
Mainlines A/B[1,2]	Sandy Creek	42	35.59	35.90	1,610	2-3 months
Mainlines A/B[1]	Interstate 77	42	39.88	39.56	1,689	2-3 months
Mainlines A/B[1,2]	Tuscarawas River	42	41.83	42.70	4,616	4-6 months
Mainlines A/B[1]	Stream at Highway 241/UT at Sugar Creek	42	53.51	53.13	2,042	4-6 months
Mainlines A/B[1,2]	Prairie Lane	42	68.22	67.82	2,129	4-6 months
Mainlines A/B[1]	Norfolk Southern Railroad	42	68.80	69.13	1,787	2-3 months
Mainlines A/B[1]	State Highway 3 (S Columbus Road)	42	71.42	71.84	2,198	4-6 months
Mainlines A/B[1]	U.S. Highway 30 (West Lincoln Way)	42	76.84	76.45	2,098	4-6 months
Mainlines A/B[1]	Interstate 71	42	91.82	92.06	1,399	2-3 months
Mainlines A/B[1]	U.S. Highway 42 / Railroad	42	94.68	94.43	1,349	2-3 months
Mainlines A/B[1,2]	Black Fork Mohican River	42	95.60	95.97	1,995	2-3 months
Mainlines A/B[1,2]	UT to Wolf Creek	42	140.50	140.83	1,742	2-3 months
Mainlines A/B[1,2]	Honey Creek	42	135.53	135.88	1,847	2-3 months
Mainlines A/B[1]	Sandusky River	42	142.31	142.66	1,817	2-3 months
Mainlines A/B[1,2]	Interstate 75	42	170.45	169.79	3,484	4-6 months
Mainlines A/B[1]	State Route 109 / S. Fork Turkeyfoot Creek	42	190.58	191.09	2,704	4-6 months
Mainlines A/B[1,2]	Maumee River	42	200.93	200.47	2,399	4-6 months

[1] HDD locations will involve two HDDs for Lines A and B.
[2] HDDs will be monitored by a third-party inspection firm.

Rover will give special consideration and provide additional precautions, including intensified monitoring and inspection, and enlisting the assistance of a third-party inspection firm in areas where sensitive resources are present within the path of the proposed HDDs. The table below describes these resources along the project route.

Rover Pipeline - Wetlands in the Vicinity of the HDDs

HDD	Wetland ID	Enter Mile Post	County	Wetland Type	ORAM Score	ORAM Category	Delineated Acres
Burgettstown Lateral							
Ohio River - West Bank	None	16.0	Jefferson	--	--	--	--
Clarington Lateral							
Captina Creek	None	5.4	Monroe	--	--	--	--
Interstate 70	None	18.4	Belmont	--	--	--	--
Majorsville Lateral							
Ohio River - West bank	None	12.5	Belmont	--	--	--	--
Sherwood Lateral							
Ohio River - West bank	None	36.0	Monroe	--	--	--	--
Supply Connector Lines A and B							
Highway 151	W2ES-HR-260	16.7	Harrison	PEM	30	2	1.21
Mainlines A and B							
Indian Fork	W7H-TU-255	24.8	Tuscarawas	PFO	70.5	3	2.46
Indian Fork	W7H-TU-254	24.8	Tuscarawas	PFO	70.5	3	1.77
Indian Fork	W7H-TU-252	24.8	Tuscarawas	PFO	70.5	3	3.50
Indian Fork	W7H-TU-253	24.8	Tuscarawas	PFO	70.5	3	0.33
Indian Fork	W7H-TU-251	24.8	Tuscarawas	PFO	78	3	1.84
Indian Fork	W7H-TU-247	24.8	Tuscarawas	PFO	60.5	3	0.86
Indian Fork	W7H-TU-246	24.8	Tuscarawas	PEM	12	1	0.03
Indian Fork	W2H-TU-202	24.8	Tuscarawas	PEM	11	1	0.07
Sandy Creek	W1M-TU-195	35.6	Tuscarawas	PFO	54	2	0.72
Sandy Creek	W3H-TU-224	35.6	Tuscarawas	PEM	44	2	0.22
Interstate 77	None	39.9	Stark	--	--	--	--
Tuscarawas River	W1M-ST-180	41.8	Stark	PEM	47	2	6.94
Tuscarawas River	W1M-ST-179	41.8	Stark	PEM	56	2	0.82
UT Sugar Creek	None	53.5	Wayne	--	--	--	--
Prairie Lane	W3H-WA-143	68.2	Wayne	PEM	15	1	29.12
Norfolk Southern Railroad	None	68.8	Wayne	--	--	--	--
State Highway 3	None	71.4	Wayne	--	--	--	--
U.S. Highway 30	None	76.8	Wayne	--	--	--	--
Interstate 71	None	91.8	Wayne	--	--	--	--
U.S. Highway 42	None	94.7	Ashland	--	--	--	--
Black Fork Mohican River	W4H-AS-122	95.6	Ashland	PFO	50.5	2	10.67

Black Fork Mohican River	W4H-RI-131	95.6	Richland	PFO	56	2	9.87
Honey Creek	W7H-SE-220	135.5	Seneca	PFO	52	2	1.48
UT Wolf Creek	W3H-SE-111	140.5	Seneca	PEM	54.5	2	0.20
UT Wolf Creek	W3H-SE-115	140.5	Seneca	PFO	43	2	0.17
UT Wolf Creek	W3H-SE-116	140.5	Seneca	PFO	50	2	0.38
Sandusky River	None	142.3	Seneca	--	--	--	--
Interstate 70	W8H-WO-220	170.5	Wood	PEM	60	3	0.16
Interstate 70	W8H-WO-221	170.5	Wood	PEM			0.16
Interstate 70	W8H-WO-222	170.5	Wood	PEM	53	2	0.07
South Fork Turkey Creek	None	190.6	Henry	--	--	--	--
Maumee River	W8H-HE-123	200.9	Henry	PFO	57	2	0.49
Maumee River	W8H-HE-116	200.9	Henry	PEM	66	3	0.53
Maumee River	W8H-HE-117	200.9	Henry	PFO	66	3	0.70

These sensitive resources will be specifically observed within the inspections conducted in the case of a suspected inadvertent return, with the process described in Section 4 of the *Supplement to the Horizontal Directional Drill Contingency Plan – Ohio* (Supplemental HDD Plan).

Inadvertent Releases

Rover has experienced inadvertent returns within sensitive resources along the Rover Pipeline Project at the following HDD locations:

- Indian Fork HDD
- I-70 HDD
- Black Fork Mohican HDD
- Tuscarawas River HDD
- Prairie Lane HDD
- Highway 151 HDD

Each occurrence is detailed below. Each location has been documented in terms of the conditions and events leading up to the inadvertent release, the containment and clean-up of the location, and the precautions and plans enacted to minimize the potential for future occurrences while recommencing drilling. The extent of the affected areas has been documented as baseline data to use in evaluating restoration of each area.

Equipment On-Site

Each HDD location will have equipment on-site to immediately respond to an inadvertent return as effectively as possible, which would be solely dedicated to the potential occurrence of an inadvertent return and will thus be available at all times. The materials and equipment used would be replaced on-site with equivalent numbers and amounts of materials and equipment to provide redundancy in case of equipment failure or an increase in the release. This equipment includes, but would not be limited to:

- a vacuum truck,
- two 4-inch pumps with secondary containment material,
- a 6-inch pump with secondary containment material,
- at least two light towers,
- a frac tank,
- 4-inch poly pipe,
- 20 feet of suction hose,
- 200 feet of discharge hose,
- four hand shovels and squeegees,
- 100 sand bags,
- 20 straw bales,
- 100 feet of silt fence,
- two rolls of plastic sheeting, and
- a spare submersible hydraulic pit pump, hydraulic drive motor and hoses.

In addition, on each pipeline spread, the following equipment is present and could be rapidly obtained:

- a skid steer,
- a bulldozer
- vacuum trucks ,
- additional frac tanks,
- silt sock,
- silt fence,
- sand bags,
- corrugated pipe,
- additional containment materials,
- truck and/or digging mats, and
- sheet piling.

Further, the following equipment and materials are readily available from local vendors and could also be quickly obtained:

- 6-inch and 8-inch pumps, suction hose and discharge hose,
- additional frac tanks,
- hydraulic drive motors and hydraulic pit pumps,
- small equipment: mini-excavators, skid steers, morookas and small buggies for hauling items,
- sand bags, loads of rock, loads of gravel, loads of sand from local resources,
- silt fence, straw bales, turbidity curtains, plywood for structures, silt bags,
- vacuum trucks,
- boat or pontoon,
- high-density polyethylene pipe, various sizes, and
- additional containment resources (e.g., grain bins).

Indian Fork HDD

While the contractor was drilling on the pilot phase of the crossing (4,118 feet – 133 joints) The crew was shut down due to not being able to access the exit side of the drill due to flood conditions from April 5-8, 2017. The pilot hole drilling parameters were maintaining a mud pump pressure of 550 pounds per square inch (psi) while pumping 651 gallons per minute (gpm). The 8-inch mud motor requires this flow rate for optimum performance while drilling through a rock formation. On April 8th, the crew was able to access the exit side of the drill and a small inadvertent return was located approximate 90 feet from the exit point of the HDD on joint 130 (4,028 feet). The crew halted operations and placed containments around the inadvertent return and began cleaning up the exit side drill pad area to be able to access the area of the inadvertent return with vacuum trucks and equipment.

Upon proper containment and clean-up of the inadvertent return, the crew removed the bottom hole assembly and added a 30-inch reamer. The crew began the back reaming process while monitoring the area of the inadvertent return with no additional issues to the point or inadvertent return.

On April 19, 2017 while pull reaming with the 30-inch reamer, the crew lost returns on joint 63 and the crew lost full returns to the pit. The crew continued to check the right-of-way and the point of inadvertent return with no inadvertent return identified. The crew tripped the 30-inch ream back towards exit side to joint 90, regaining full returns back to the exit pit.

On April 20, 2017 the crew continued the 30-inch pull ream on joint 63 with full returns to the exit pit. In the event returns are lost, the crew will continue to trip the reamer back towards face until returns are gained. The crew and inspection continues to walk the right-of-way to monitor the area for any additional inadvertent returns with no additional inadvertent returns found to date.

The inadvertent return and site has been completely cleaned up and the contractor is monitoring the site as drilling operations continue.

I-70 HDD

On April 07, 2017, a complete loss of circulation occurred on the I-70 HDD. At that time, the contractor extracted all 56 joints of drill pipe (1,797-ft) from the bore path to attempt to regain circulation. While tripping joint 25 out of the hole, approximately 50 percent of the circulation started to come back to the HDD entry. The contractor continued to remove (trip) the drill string all the way out of the hole to attempt to ensure the bore path was clean and reduce downhole pressures. Once extracted, the bottom hole assembly, consisting of an 8-inch mud motor with a 12.25-inch tungsten-carbide-insert drill bit was inspected and advanced back into the bore path. While tripping joint 37 back to bottom, a reduction in circulation was noticed at the entry. While tripping joint 49, a complete loss of circulation was encountered at the entry.

Crew members walked the bore path and did not detect an inadvertent return. The bottom hole assembly was progressed to the bottom of the hole and recommenced the drilling of the pilot hole. After drilling part of joint 58, an inadvertent return was located approximately 300 ft west of the centerline. The pilot hole drilling parameters had been maintaining a mud pump pressure of 550 psi while pumping 651gpm.

The 8-inch mud motor requires this flow rate for optimum performance while drilling through a rock formation. The contractor constructed a hay bale containment around the release to contain the material.

On the morning of April 10, 2017, the contractor started to pump the non-toxic clay and water slurry downhole while crew members watched the centerline and the area that had been contained. Crew members did not find any signs of a release so the pilot hole was recommenced. Upon drilling one additional joint of drill pipe with the same pilot hole drilling parameters as the previous joints drilled, another release of the non-toxic clay and water slurry was located in the same vicinity as the first release, on a sloped area adjacent to I-70, allowing the slurry to migrate to a small stream close to the release point. The stream carried the slurry down the slope to a culvert running under I-70 where the slurry entered a pond on the discharge side of the culvert. The contractor ceased all operations and a sand bag wall was constructed to contain the material that released to the surface. The contractor installed environmental control measures and constructed sand bag dams in order to contain the non-toxic clay and water slurry around the entire perimeter of the release in order to keep any non-toxic clay and water slurry from migrating away from the point of release.

Rover coordinated with the Ohio Department of Transportation (ODOT) and the Ohio Environmental Protection Agency (EPA) to contain and remove the material. The contractor received permission from ODOT District 11 to temporarily divert traffic with a lane closure on I-70 near the release. Vacuum trucks could then safely pull over and park on the shoulder of I-70 while the non-toxic clay and water slurry were pumped into vacuum truck. The vacuum truck was assisted by a 6-inch pump in secondary containment that was placed near the release of fluids.

Once all of the non-toxic clay and water slurry were reasonably contained and pumped into vacuum trucks to be recycled/hauled off, the contractor commenced completion of the pilot hole. The contractor continued the monitoring efforts by walking the centerline and looking for signs of a release. The location of where the bottom hole assembly was located during the release (joint 58) was approximately 119-ft deeper than the HDD entry location. With an elevation change of this nature in a rock formation, it was not anticipated to see a release of the non-toxic clay and water slurry to the surface. The contractor continued to remove the fluids that continue to exit at the surface in the contained area.

Black Fork Mohican HDD

On March 20, 2017, a partial loss of circulation occurred on the Black Fork Mohican River HDD Crossing. At that time, the contractor was drilling on the pilot phase of the crossing. On Joint 59 (1,829 feet), all fluid returns were lost to the rig. The crew halted operations and performed the pedestrian survey of the right-of-way. A small inadvertent return was found on the exit side of the HDD crossing in the very soft soils and with the bottom hole assembly at a shallow point on the bore profile. The crew contained the inadvertent return and worked on cleaning up the inadvertent return as drilling commenced. The crew tripped back 5 joints in an effort to establish returns to the rig. Once back on bottom, the bottom-hole-assembly consisting of an 8-inch mud motor with a 12.25-inch tungsten-carbide-insert drill bit was advanced back along the bore path. The bottom hole assembly was progressed to the bottom of the hole and drilling of the pilot hole was recommenced while crew members and inspection team continually walked along the centerline of the bore path and to the outer limits of the right-of-way. The pilot hole drilling parameters were maintaining a mud pump pressure of 550 psi while pumping 651 gpm. The 8-inch mud motor requires this flow rate for optimum performance while drilling through a rock

formation. The crew completed the pilot hole process while monitoring and cleaning the area of the inadvertent return.

Through the entire back reaming process, the inadvertent return was maintained and cleaned as the non-toxic clay and water slurry presented into this area. On April 4, 2017 upon completion of the back reaming process, the crew moved the rig around to the exit side to pull the product pipe string back through (pulling from southeast to northwest).

From April 5th to April 10, 2017 the crew was on standby as the area was flooded. On April 11, 2017 the crew began transferring joints of drill stem to the pipe side in order to have the adequate number of joints to begin the 48-inch barrel reamer swab pass. Once the swab pass was completed and pipe pull commenced pulling from joint 68, on joint 45 (pulling back to the rig from joint 68 to the end of joint 1) non-toxic clay and water slurry started appearing at the point of the inadvertent return. The inadvertent return was contained and pullback commenced again. While pulling pipe, the pullback was halted periodically to suck up the non-toxic clay and water slurry with vacuum trucks and pit pumps to transfer mud back to the reclaimer. During the pullback, the crew experienced mechanical issues with the self-priming pit pump, which clogged due to debris and heavy drill cuttings and drill fluids (leaves, sticks, etc.). During the pullback operations through an area that had been flooded, with loose soil conditions, and as the product pipe was getting closer to the surface an additional inadvertent return developed due to the heavy fluids and cuttings. This created pressure downhole in front of the barrel reamer leading the pipe, causing the additional inadvertent return. This additional inadvertent return occurred approximately 80 feet closer to the rig (to the northeast of the first inadvertent return) and 10 feet offset to the west of the centerline, 186 feet from the entry pit.

Upon completion of the pullback of the product pipe, the inadvertent return containment was adjusted and total clean-up of the inadvertent return commenced. The HDD of Line A is complete, clean-up at the inadvertent release has been concluded, and the contractor has demobilized from the site, and will return to install Line B at a later date.

Tuscarawas River HDD

On March 19, 2017, a complete loss of circulation occurred on the Tuscarawas River HDD. At that time, the contractor was drilling on the pilot phase of the crossing. On Joint 6 (186 feet), all fluid returns were lost to the rig. The crew extracted the 6 joints out of the hole in efforts to regain the returns. Once extracted, the bottom-hole-assembly, consisting of an 8-inch mud motor with a 12.25-inch tungsten-carbide-insert drill bit, was inspected and advanced back into the bore path. The crew searched the area of the right-of-way in front of the drill rig as well as behind and lateral of the running line, and no surface returns were found.

The bottom hole assembly was progressed to the bottom of the hole and recommenced the drilling of the pilot hole while crew members and inspection team continually walked along the centerline of the bore path and to the outer limits of the right-of-way. The pilot hole drilling parameters were maintaining a mud pump pressure of 550 psi while pumping 651gpm. The 8-inch mud motor requires this flow rate for optimum performance while drilling through a rock formation. Through the completion of the pilot hole process, no returns to the rig or to the surface at any location throughout or along the right-of-way were found.

On the afternoon of March 25, 2017 the pilot hole phase was completed (150 joints). The pilot hole tools were removed and a 30-inch hole opener was installed to begin the back reaming phase upon approval of the bore profile. The bore profile was accepted and the 30-inch back reaming (reaming from joint 150 to joint 1) began the evening of March 25, 2017.

From March 25-26, 2017 as the crew was back reaming the first 16 joints (496 feet), the crew noticed full returns to the exit pit. As the crew continued back reaming, on joint 135 of 150, all returns were lost. The crew halted operations to perform additional pedestrian survey of the right-of-way and area looking for inadvertent returns, none found. The crew began to trip the reamer back to the surface in efforts to regain returns. From joint 136 to 150, returns continued to return to the exit pit. The crew inspected the reamer and all downhole tooling connections and began to trip back to the bottom of the bore path. On joint 135, all returns were lost again. The crew continued to back ream as they also began to increase the thickness of the non-toxic clay and water slurry in efforts to seal off any crack/fissure or crevasses that the returns could have flowed into. The crew continually searched and monitored the right-of-way for signs of inadvertent returns with nothing being found. The crew continued with the back reaming from joint 135 to joint 1 (exit side to the rig side) with no returns and no inadvertent returns found.

On April 3, 2017 the 30-inch reamer was removed and a 42-inch reamer was added to the tail string. As the reamer assembly was entered into the exit pit and bore path, cutting hole from joint 150 to joint 136, the crew experienced full returns to the exit pit. On joint 135, all fluid returns were lost again. The crew continued to monitor the right-of-way and still no returns to the pit or any surface returns were found. The crew continued to back ream from joint 136 to joint 11 with no returns to the entry pit or the exit pit.

On April 13, 2017 all drilling operations halted as an inadvertent return was found near the west bank of the Tuscarawas River. Crews commenced containment and notification efforts.

The use of grain bin panels and reinforced silt fence is being installed as a containment and point of evacuation of returns.

Status of Clean-Up

1. Actions taken for remediation of the inadvertent return:

- A road to access the inadvertent return location was constructed (0.12 mile rock and 0.25 mile of drag line mats) with two turn around and staging points built of drag line mats. The road was started on Friday, April 14th and completed the morning of Sunday, April 16th. While access was being constructed, clean-up equipment and materials were being staged. The last several hundred feet was matted to allow trucks to back into the inadvertent return site as close as possible.
- Clean up of the non-toxic clay and water slurry was started mid-morning Sunday, April 16th after the access road was completed. Six-inch and three-inch trash pumps were in place, assisting vacuum trucks to remove material from the inadvertent return location and continued until near dark. Laborers used brooms, squeegees, and other hand tools to push the non-toxic clay and water slurry to pump suction locations. Supervision continued adjusting the clean-up process as needed, pump set ups, trucking, etc. to maximize efficiency of clean-up activities. Also on this date, a hard plastic line (HDP) was finished, running for approximately 1750 feet, from the drill entry point across the Tuscarawas River, to the inadvertent return location to return reclaimed fluid from the inadvertent return to the drill entry.

- On Monday, April 17th, a company that specializes in the use of centrifuges was brought onsite to determine the feasibility of use of this equipment in the inadvertent return clean-up process. It was determined the set up and equipment footprint is too large to mobilize to the location and would not separate fluids from solids adequately to pass a paint sieve test. In addition, this process would not reduce work, but rather add a step to it. This is determined to not be a viable solution.
- Stand by pumps, vacuum trucks, materials, and equipment were onsite for use as needed, or as replacements, should any be necessary.

2. Continued clean-up procedures:

At this time and for the foreseeable future the plan will be composed of the following elements:

- The contractor has crews manning three 6-inch pumps moving fluids to two vacuum trucks.
- Crew size is 5 laborers and one operator at each pump.
- Additional laborers are manning hoses at each truck being loaded.
- Six-inch trash or hydraulic pumps will be utilized.
- The contractor has a crew manning a 6-inch hydraulic pump at this time.
- The contractor's pump is moving fluids to the small reclaimer on site near the inadvertent return and the reclaimed fluids are pumped across the river to the drill entry side.
- The contractor will continue with grain bin containment and pump set-up.
- The contractor will have at least 10 frac-tanks on site entry and/or exit side to receive the non-toxic clay and water slurry from the reclaimer or brought by trucks.
- The team will monitor progress and assess additional pumps would be viable with limited narrow access with truck hauling. If pumps are added, labor will be added at same number per pump as above.
- Daily morning task assignments will be made and discussed prior to start of work daily.
- Eight vacuum trucks are hauling fluids to disposal facility.
- If disposal turnaround time requires additional trucks to maintain 2 trucks being filled at any given time, trucks will be added.
- A hi-vac rig was added for removing fluids with a 4-inch flexible suction hose.
- Use of the hi-vac truck will continue until deemed unfeasible due to loss of suction capabilities; addition of an in-line 3-inch pump is being considered to lengthen the suction reach.
- Labor will be added if it will speed up the clean-up.
- Daily information regarding numbers of trucks, loads hauled, volumes through reclaimer to rig side, persons assigned to clean-up and other pertinent information will be maintained.
- Consideration is being given to a small office/trailer for base control on site.

Rover will maintain sufficient allocation of resources and will continue with the remediation efforts continuously on a daily basis, weather permitting, until completion.

In addition, Rover has brought in a mini-excavator (e.g. CAT 304E2 CR) with rubber tracks, as used in residential landscapes and golf courses.

A length of 8-in high density polyethylene (HDPE) pipe not to exceed 10 feet (an "HDPE mop board"), will be affixed to the excavator bucket to be used in the manner of a squeegee. The pipe would gather mud towards the excavator by grazing the area over the vegetation, with the idea of minimizing impacts

to vegetation and creating very little impact to topsoil. Using the pipe and the bucket will allow the operator to maneuver the tool safely around trees and efficiently remove the mud while reducing vegetative and soil impacts that might be incurred using a metal blade. This is a similar activity to what is being done by hand at this point. But, the equipment will cover more area efficiently with the length of the pipe, and with the area that can be covered quickly by each reach of the bucket, than could be accomplished by multiple people working by hand. The mud would be guided to areas where intake pipes of collection pumps are located.

Rover believes the mini-excavator will increase the speed of the clean-up while not causing more soil disturbance than the existing foot traffic, since the minimal weight of the mini-excavator is distributed on the tracks, which are rubber to further minimize impacts. The ground pressure will be so minimal that mats will not be necessary. In fact, positioning and moving mats may create more of an impact than the mini-excavator alone. The mini-excavator would be utilized in all areas where it can maneuver around trees. Rover does not intend to cut trees to utilize the mini-excavator. However, if in coordination with the OEPA Inspector, FERC Compliance Monitor, and Rover Environmental Inspector, that removal of trees is necessary, the following U.S. Fish parameters will be utilized:

1. If possible, avoid cutting potential roost trees, especially those 16 inches diameter at breast height and larger which could serve as bat maternity roost trees.
2. If cutting potential roost trees is unavoidable, cut them before May to avoid impacts to non-volant pups. Pregnant bats may begin giving birth to pups as early as May, especially this year due to the warm spring weather. Pups are unable to fly for several weeks after they are born and they would therefore be unable to flee if a tree they were in was cut.

Biologists will be on-site to assess the daily clean-up progress and will also document any damaged or removed trees. These records will also be used to base the progress of recovery of the area after clean-up is complete.

Resuming HDD operations:

A fluid reclaimer is onsite near the inadvertent return. Additional mats were placed near the inadvertent return to allow for the set up and working room needed for this equipment. One mobile tank has also been placed on mats near the reclaimer and can be used for fluids that flow through the reclaimer and provide additional storage capacity.

The current primary containment is constructed out of grain bin wall material consisting of tin walls with sand bag securement on the inside portion of the walls. The height of the walls is four feet tall with a capacity of 192,000 gallons. A secondary containment structure with walls approximately 120 feet by 120 feet and 4 feet tall has been constructed primarily with plywood around the already constructed grain bin containment to use as additional containment space should the initial grain bin fail or over flow. This will provide a containment with the capacity to hold 323,158 gallons. Also, the current annulus of the bore path has a capacity of 287,765 gallons in addition to these containments.

There is great concern with building the structure at a height greater than four feet. Should someone be working within the area of the containment and a significant inadvertent return occur, the person(s) could become trapped, as there would limited access and egress. In addition, there is concern with expanding the secondary containment structure and thereby increasing the potential surface area to be potentially affected by another inadvertent return.

Therefore, the use of 3-4-inch trash pumps, 6-inch high flow pumps (equivalent or larger) or hydraulic submersible pumps is proposed to be utilized in conjunction with the secondary containment and with the pumps in the main containment source. The placement of additional pumps, should they be required, would be placed in a secondary containment for the pump. The pump would utilize discharge hoses to transfer the non-toxic clay and water slurry from the containment to the portable tanks for storage and disposal.

Redundant pumps and extra silt fence, hoses, etc. will be retained on site in case additional containment is required. Additional pumps, equipment, containment boxes and/or portable storage tanks will be obtained from local resources as needed, adding to the equipment and resources on site.

In addition, Rover would adhere to the Supplemental HDD Plan during the remaining drilling operations. Rover will utilize the third-party monitors as described in the Supplemental HDD Plan and will utilize a separate crew for pedestrian inspections of the HDD drill path than the clean-up crews, to not detract from the clean-up activities. If an inadvertent return were to occur within the Tuscarawas River or a tributary thereof, Rover would implement the procedures detailed in Section 6 of the Supplemental HDD Plan. Per those procedures, a containment ring structure will be staged on-site at the Tuscarawas River for use in case an inadvertent return occurs within the river.

Highway 151 HDD

On April 15, 2017, the drilling of the pilot hole was commenced for the Highway 151 HDD. Though anticipating rock, after field verification revealed a discrepancy in the depth of cover an upland drain near the drill entry, the contractor opted to proceed with the Rover approved profile using a jet assembly in an attempt to control the downhole pressures up until the rock interface would be encountered along the bore path, at which point the jet assembly would be tripped out and the rock tooling would be tripped back in. The jetting assembly consisted of a 12.25-inch milled-tooth style drill bit. While drilling the pilot hole, a small inadvertent release occurred approximately 40 feet in front of the drill rig while circulation was maintained at the HDD entry location. The area was contained and the pilot hole was recommenced. Near the end of the shift with joint 5 on the rig, a second release occurred and a small pit was made in order to contain the fluids coming to the surface. The pilot hole drilling parameters were maintaining a mud pressure of 150-200 psi while pumping 305 gpm.

After taking Sunday off, the crew recommenced drilling operations on the morning of April 17, 2017. As joint 5 of the pilot hole was being drilled using the same drilling parameters as before, another fluid release was noticed in a pond outside of the workspace. All drilling operations came to a halt and the project team was notified.

At the first and second inadvertent return locations, a small sump was made in order to collect the fluids coming to the surface. A pump (in secondary containment) was placed near the sump and the material was pumped back to the drill rig to be recycled. Silt fence was installed to help prevent fluids from traveling along the surface and into the pond. Also, a pump in secondary containment was positioned near the release and used to pump the material that is on the bottom of the pond.

In order to continue operations, the contractor believed the best efforts to mitigate the inadvertent release was to install wash-over casing. The contractor mobilized a load of 16-inch steel casing to the Hwy 151 HDD. Prior to installing the casing, the jet assembly would have to be extracted from the bore path and

an 8-inch mud motor with a 12.25-inch tungsten-carbide-insert drill bit would be added to make up the bottom hole assembly. This bottom hole assembly would be progressed back to the bottom of the hole and drilling would be recommenced until the rock interface is encountered along the bore path. Based on the Geotechnical Data Report prepared by Terracon Consultants, Inc. specifically for the Hwy 151 HDD, the contractor estimated that the rock interface would be encountered within the next 100 feet drilled in accordance to bore log D1-D, which was taken near the HDD entry location. Drilling parameters with the bottom hole assembly were estimated to be pumping 651-GPM with 550-psi of mud pressure. Once the bottom hole assembly drilled through a competent rock; the contractor would temporarily stop drilling and install the casing.

The plan was enacted as described above. The casing was installed by welding each joint of 16-inch casing (each joint is approximately 40-ft in length) together, then the drill rig rotated the casing and applied the required forces to "wash-over" the drill string. As the casing was installed, the non-toxic clay and water slurry was pumped at about 300 gpm in order to lubricate the casing and prevent it from hanging-up as it is progressed along the bore path. The process continued until the casing progressed to the rock, with the intention of it acting as a sleeve and conductor for the non-toxic clay and water slurry during the pilot hole phase of drilling.

As the casing was installed, non-toxic clay and water slurry presented in the pond. The pressures created by installing the casing caused the inadvertent return to migrate to another location in the pond. It was determined that the casing would not be installed further and drilling resumed. Once pilot drilling recommenced, there was an initial flow of non-toxic clay and water slurry to the entry pit and the original inadvertent return point and the second point of release in the pond stopped flowing. Currently there is no flow coming through the casing to the entry point and it is all flowing into the containment around the original point of inadvertent and is being systematically pumped back to the entry point for cleaning and reuse down hole.

Prairie Lane HDD

On Wednesday April 19, 2017, while drilling the pilot hole with the bottom hole assembly, consisting of an 6 3/4-inch mud motor with a 10 5/8-inch tungsten-carbide-insert drill bit, a partial loss of circulation occurred on the Prairie Lane HDD. At station 3584+00, Joint 65 (2,015 feet) approximately 110 feet from the exit point. The crew halted operations and performed the pedestrian survey of the right-of-way. A small inadvertent return was found on the exit side of the HDD crossing in the very soft soils and with the bottom hole assembly at a shallow point on the bore profile. The crew contained the inadvertent return within 20 minutes of the surfacing of the inadvertent return. The crew utilized erosion control devices including wattles, straw bales, sand bags, and installed silt fence around the inadvertent return.

On Thursday April 20, 2017, removal of the non-toxic clay and water slurry began, and drilling recommenced. The bottom hole assembly was progressed to the bottom of the hole while crew members and inspection team continually walked along the centerline of the bore path and to the outer limits of the right-of-way to ensure no further inadvertent returns were surfaced.

On Saturday April 22, 2017 drilling continued with the pilot and ongoing recovery of the non-toxic clay and water slurry. At 13:50, a small amount of non-toxic clay and water slurry had migrated to the stream and all drilling activities halted. The crew constructed two plastic-wrapped portable dams to start the evacuation of the non-toxic clay and water slurry from the stream.

While completing the clean-up of the inadvertent return and maintaining recovery, the pilot pass was completed. Once pilot pass was completed and the back reaming began, the circulation of the non-toxic clay and water slurry returned to the rig.

A second inadvertent return occurred during the second reaming pass of the drill on May 4, 2017. The containment structure had been retained in place within the channelized stream as a precaution against such an occurrence and the release was completely contained. Rover intends to retain the containment structure within the channelized stream until drilling is complete in case another inadvertent return should occur.

Inadvertent Releases in Upland Areas

Inadvertent releases have also occurred within upland areas in the following locations.

1. An inadvertent release occurred at the Sugar Creek HDD (Stream at Highway 241 HDD) along the Mainlines near Station Number 2826+00 in Wayne County, Ohio. The contractor was performing pilot drilling operations with a jetting assembly. The contractor had just began the pilot hole drilling operations and the assembly was shallow. The release was discovered in an upland area adjacent to the drill box on May 3, 2017. The contractor responded immediately and tripped out of the hole to relieve pressure before proceeding forward. The area was immediately contained and cleaned.

2. An inadvertent release occurred at the Sherwood Lateral Ohio River HDD on the west side in Monroe County, Ohio near Station Number 1905+00. The contractor was performing pilot drilling operations with a jetting assembly. The release occurred on May 3, 2017 at the edge of State Route 7 within the drill path. The contractor responded immediately and tripped out of the hole to relieve pressure before proceeding forward. The area was immediately contained and cleaned.

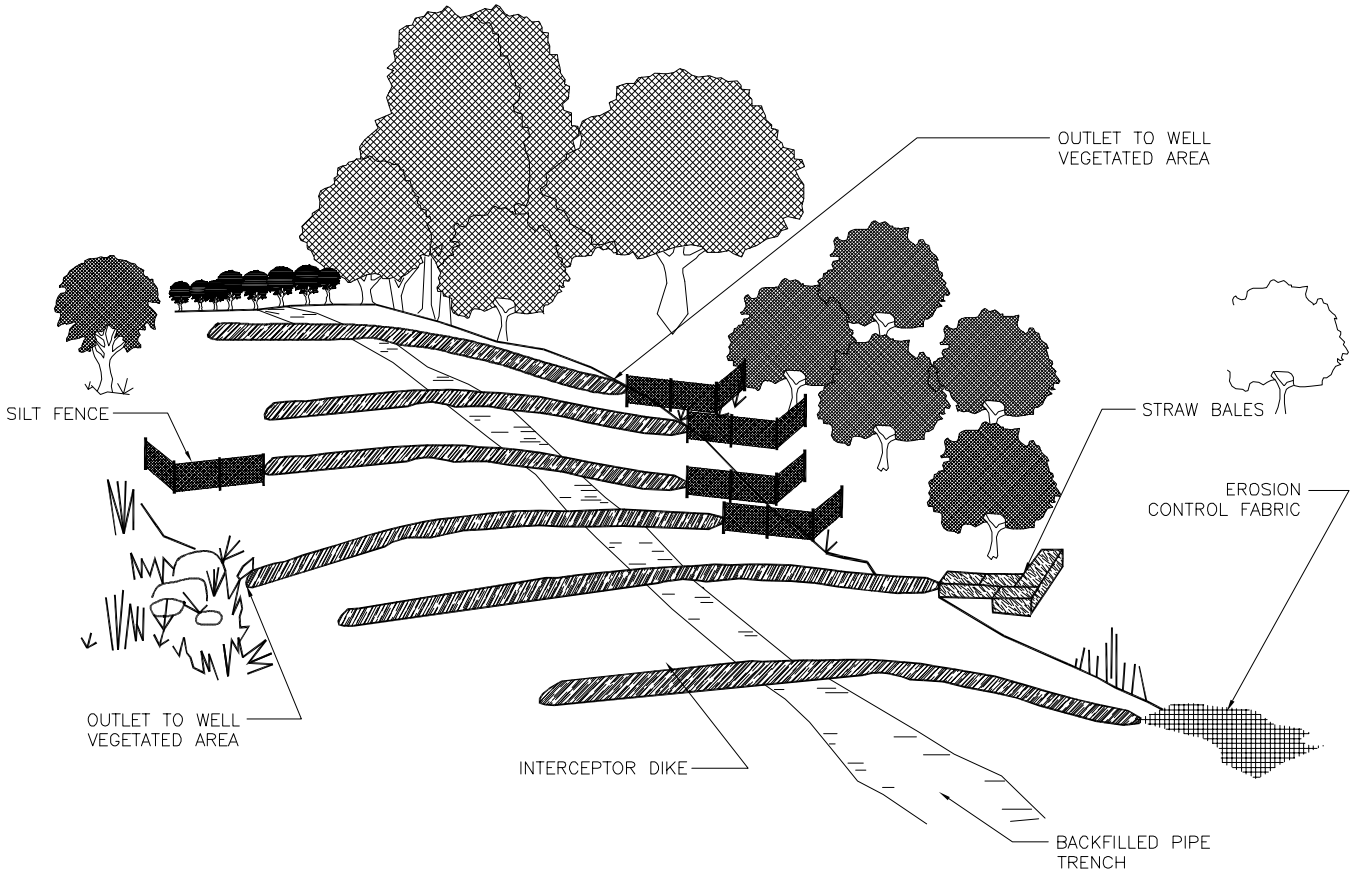
3. An inadvertent release occurred at the Interstate 71 HDD along the Mainlines near Station 4859+40 in Ashland County, Ohio on May 4, 2017. The occurrence was located approximately 20 feet off of the centerline in an upland, cultivated field. The contractor installed silt fence and sandbags around area. The contractor recommenced drilling on the second reaming pass.

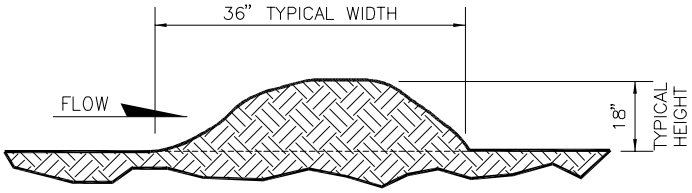
Appendix B

HDD Plan and Profile Drawings

Appendix C

Erosion and Sedimentation Control Typical Drawings





CROSS SECTION
SCALE: NOT TO SCALE

MAINTENANCE REQUIREMENTS:

- INSPECT DURING AND FOLLOWING CONSTRUCTION AND MAKE REPAIRS AS NEEDED AFTER SIGNIFICANT RAIN.
- KEEP THE CHANNEL FREE OF DEBRIS AND OBSTRUCTIONS.
- SEED AND MULCH PERMANENT INTERCEPTOR DIKES FOLLOWING CONSTRUCTION.

INSTALLATION REQUIREMENTS:

- INSTALL PERMANENT INTERCEPTOR DIKES IN ALL AREAS EXCEPT RESIDENTIAL OR AGRICULTURAL AS NECESSARY TO AVOID EXCESSIVE EROSION (UNLESS AUTHORIZED BY LANDOWNER OR LAND MANAGING AGENCY IN AGRICULTURAL OR RESIDENTIAL AREA).
- CONSTRUCT USING EARTH FILLED SACKS, STAKED STRAW BALES, SILT FENCE, OR SOIL FOR TEMPORARY OR COMPACTED EARTH AND ROCK TO PERMANENT.
- INSTALL WITH A 2 – 8% OUTFALL ANGLE.
- FOR TEMPORARY INTERCEPTOR DIKES, POSITION OUTFALL TO PREVENT SEDIMENT DISCHARGE INTO WETLANDS, WATERBODIES, OR OTHER SENSITIVE RESOURCES.
- FILTER RUN–OFF WATER BY CONSTRUCTING AN OUTLET BY USING AN ENERGY DISSIPATING DEVICE (SILT FENCE, STRAW BALES, EROSION CONTROL FABRIC), AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.

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C FERC FILING	KMA	1–15–15	JHR

ROVER PIPELINE PROJECT
FIGURE 6
TYPICAL CONSTRUCTION
INTERCEPTOR DIKE

PREVIOUS DWG. NO.
SHT. OF

DWG. NO.
FIGURE–6
SHT. OF
C

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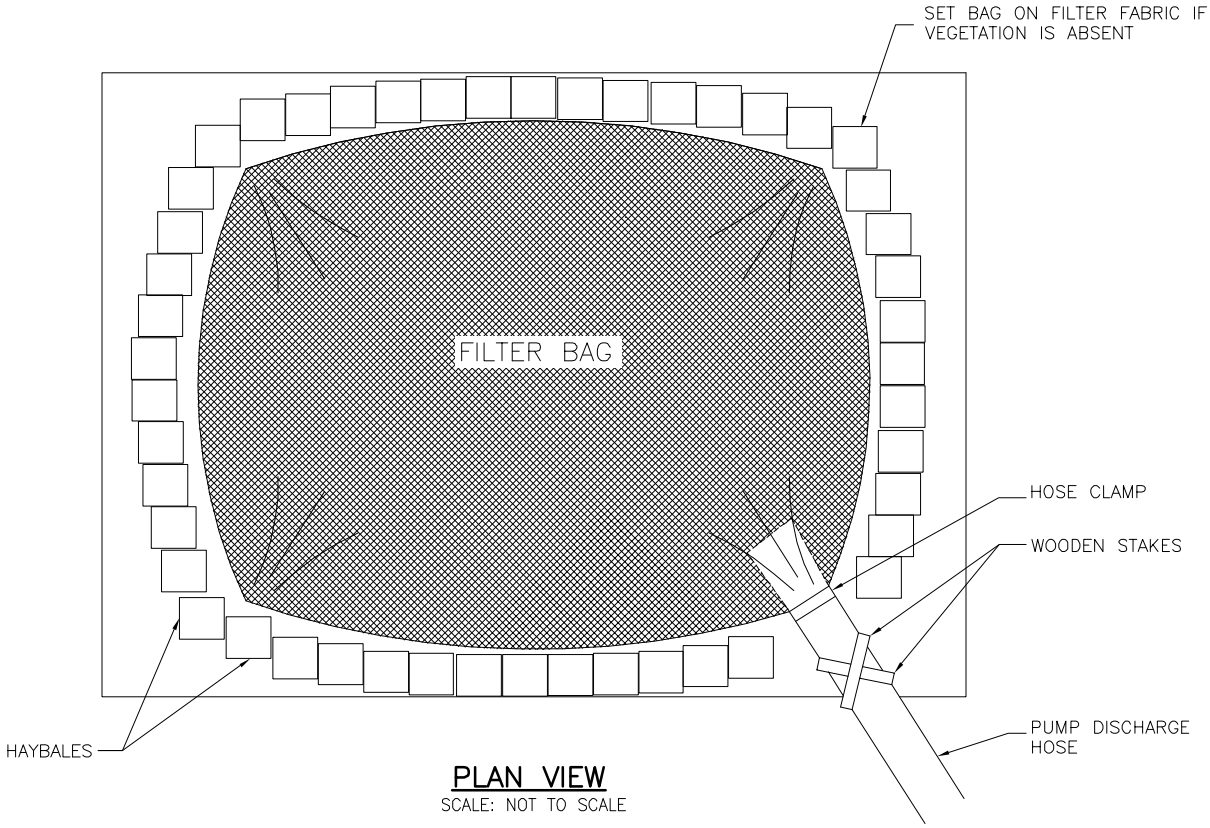
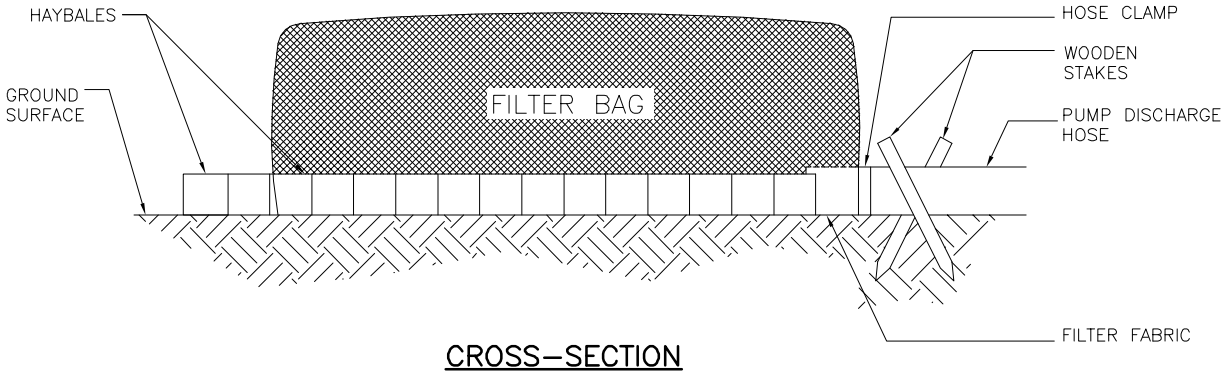


PLAN VIEW
SCALE: NOT TO SCALE



CROSS–SECTION
SCALE: NOT TO SCALE

NOTES:

1. LIMIT ONE (1) DISCHARGE HOSE PER BAG.
2. REMOVE DEWATERING STRUCTURE AS SOON AS POSSIBLE AFTER COMPLETION OF DEWATERING ACTIVITIES.

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C	FERC FILING	KMA	1–15–15	JHR

ROVER PIPELINE PROJECT
FIGURE 15
TYPICAL CONSTRUCTION
FILTER BAG

PREVIOUS DWG. NO.
SHT. OF

DWG. NO.
FIGURE–15
SHT. OF
C

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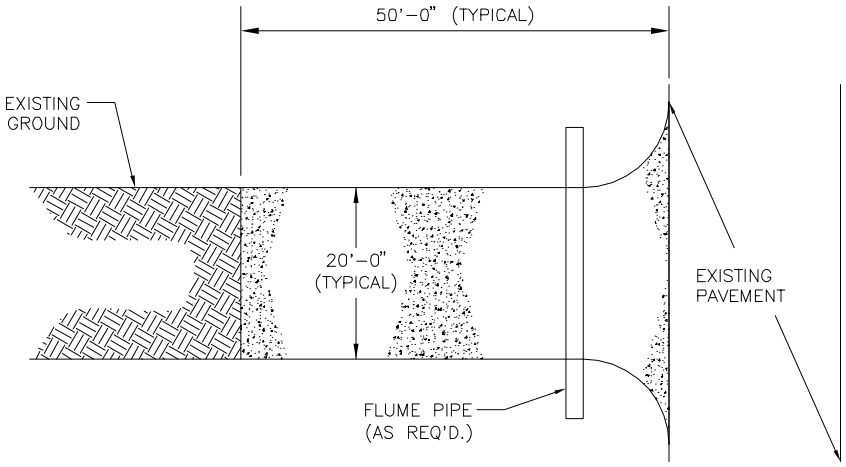
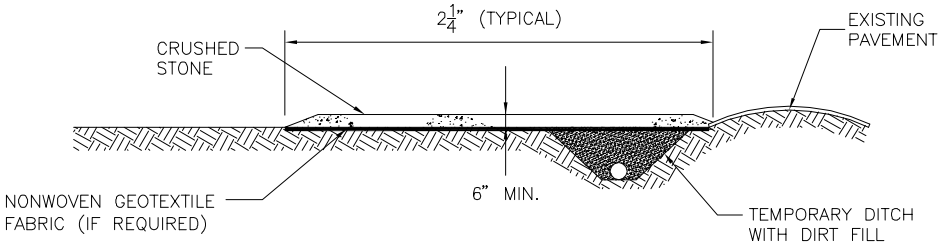


PLAN VIEW
SCALE: NOT TO SCALE



CROSS SECTION
SCALE: NOT TO SCALE

CONSTRUCTION SPECIFICATIONS:

1. STONE SIZE = 4"-6" (AVG.) CRUSHED STONE.
2. ALL STONE MUST BE PLACED ON NON-WOVEN GEOTEXTILE FABRIC IF USED IN RESIDENTIAL OR ACTIVE AGRICULTURAL AREAS.
3. LENGTH: FIFTY (50) FEET TYPICAL (IF SITE CONDITIONS ALLOW).
   WIDTH: TWENTY (20) FEET TYPICAL.
   THICKNESS: SIX (6) INCHES MINIMUM.
4. ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A DRIVABLE BERM OR OTHER TEMPORARY EROSION CONTROL DEVICE CAN BE USED.
5. THE ENTRANCE SHALL BE PERIODICALLY INSPECTED AND MAINTAINED IN A CONDITION THAT MINIMIZES TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. MAINTENANCE MAY INCLUDE PERIODIC TOP DRESSING WITH AN ADDITIONAL STONE OR THE REPAIR/CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ANY SEDIMENT THAT IS SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED AS SOON AS PRACTICAL.

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C FERC FILING	KMA	1-15-15	JHR

ROVER PIPELINE PROJECT
FIGURE 16
TYPICAL CONSTRUCTION
ROCK ACCESS PAD

PREVIOUS DWG. NO.
SHT. OF

DWG. NO.
FIGURE-16
SHT. OF
C

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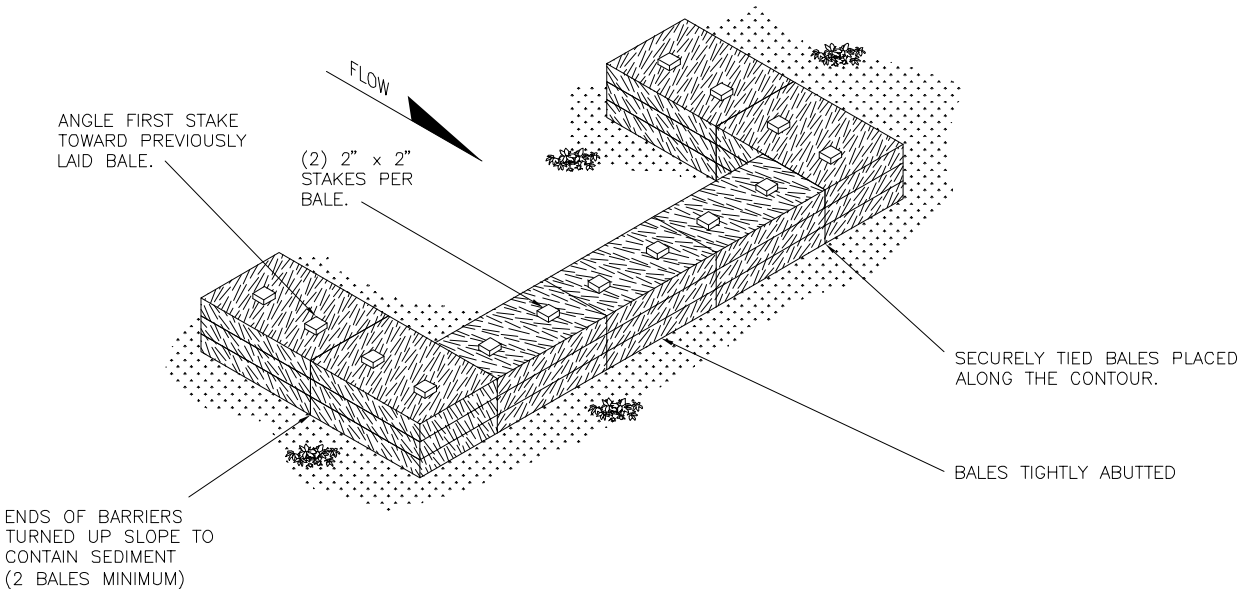


PERSPECTIVE VIEW

SCALE: NOT TO SCALE

INSTALLATION REQUIREMENTS:

WHEN USING STRAW BALES, PLACE THEM:

- WITH THEIR ENDS TIGHTLY ABUTTING EITHER PLACED AT THE SURFACE OR EMBEDDED INTO THE SOIL AT A MAXIMUM OF 4".
- BETWEEN DISTURBED AREAS AND DOWN-SLOPE ENVIRONMENTAL RESOURCE AREAS.
- AT THE BASE OF ALL SLOPES NEXT TO WETLANDS, WATERBODIES, AND ROAD CROSSINGS.
- AT THE INLET AND OUTLET OF OPEN DRAINAGE STRUCTURES.
- APPROXIMATELY 6 FEET BEYOND THE TOE OF THE SLOPE TO GIVE THE SEDIMENT ROOM TO COLLECT.

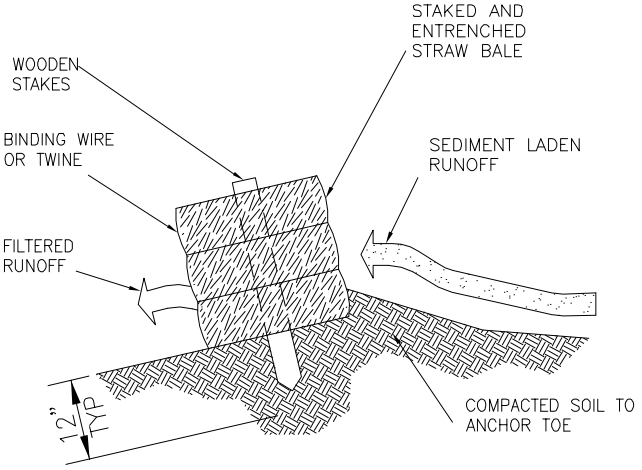
PLACE AT SURFACE OR, KEY IN THE BOTTOM OF THE BALE. IN AREAS WHERE IT IS NOT FEASIBLE TO TRENCH IT IN (LEDGES, ROCKY SOIL, LARGE TREE ROOTS, ETC), USE NATIVE SOIL AS BACKFILL UP-SLOPE OF THE BALE.

IF USED IN CONJUNCTIION WITH SILT FENCE, BALES ARE PLACED UP-SLOPE OF THE SILT FENCE AND DO NOT NEED TO BE TRENCHED IN.

MAINTENANCE REQUIREMENTS:

INSPECT BALES:

- DAILY IN AREAS OF ACTIVE CONSTRUCTION.
- WEEKLY IN AREAS WITH NO CONSTRUCTION.
- WITHIN 24 HOURS FOLLOWING EACH MAJOR RAIN EVENT.
- REPAIR OR REPLACE BALES AS NEEDED.
- REMOVE ACUMULATED SEDIMENTS TO AN UPLAND AREA AS NEEDED.



CROSS-SECTION

SCALE: NOT TO SCALE

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C	FERC FILING	KMA	1-15-15	JHR

ROVER PIPELINE PROJECT
FIGURE 20
TYPICAL CONSTRUCTION
STRAW BALE

PROJECT NO.

PREVIOUS DWG. NO.

SHT. OF

DWG. NO.
FIGURE-20
SHT. OF

C

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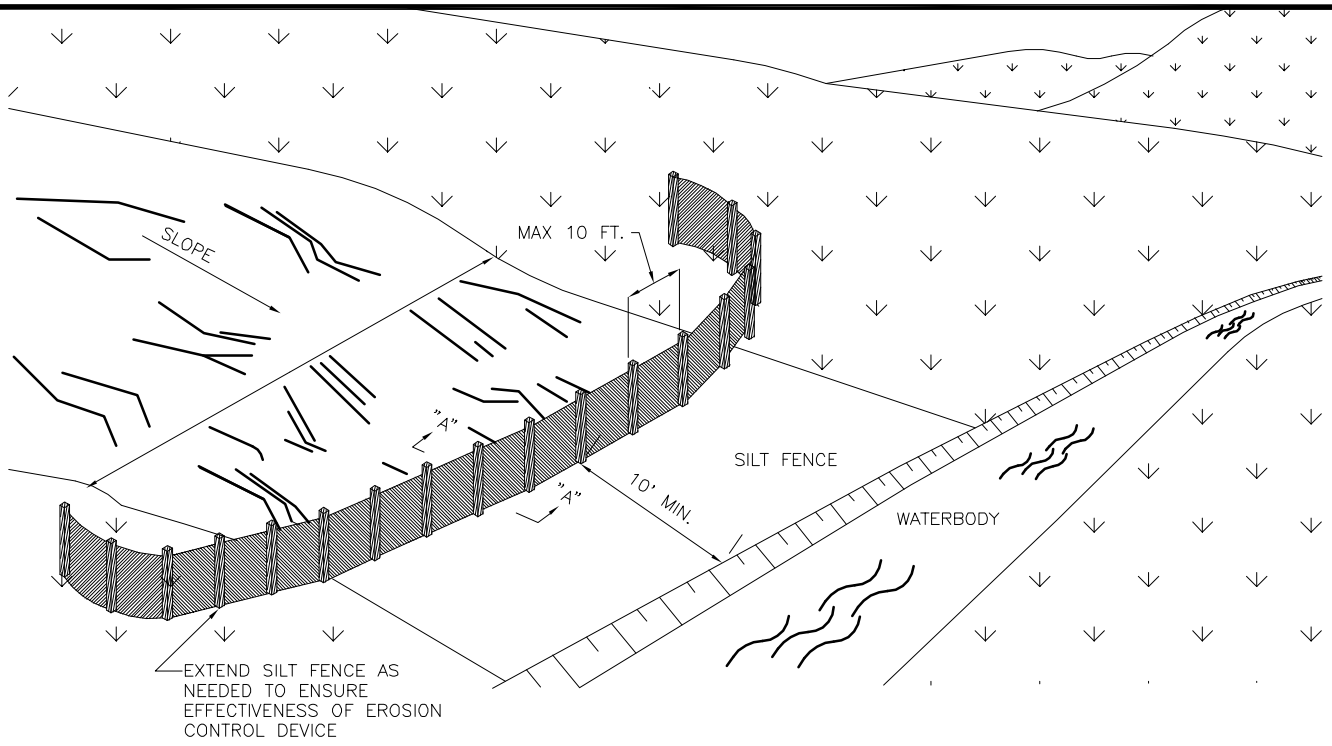

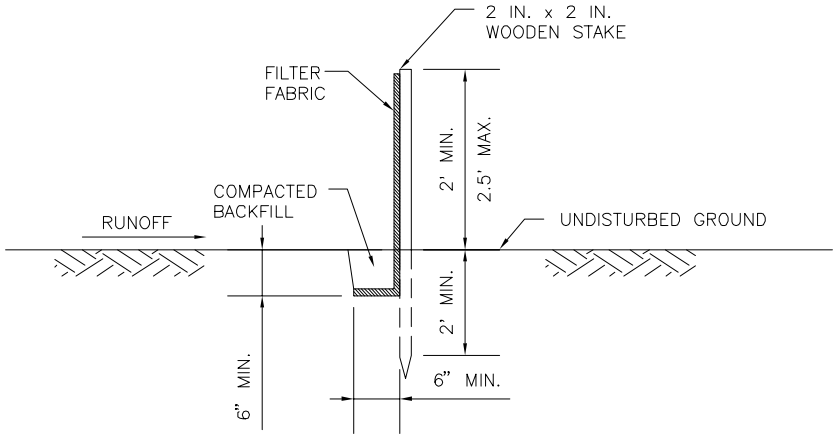

SECTION–"A"–"A"

SCALE: NOT TO SCALE

NOTES:

1. SILT FENCES ARE TO BE USED IN AREAS WHERE SHEET FLOW OR RELATIVELY SMALL VOLUMES OF WATER CAN BE EXPECTED TO OCCUR. FOR LARGER VOLUMES SUCH AS WITHIN A DEFINED CHANNEL, A CHECK DAM WILL BE REQUIRED.
2. STAKES ARE TO BE PLACED A MAXIMUM OF TEN (10) FT. OR CLOSER AS CONDITIONS REQUIRE.
3. ATTACH FILTER FABRIC AT EACH POST AT A MINIMUM OF THREE (3) LOCATIONS.
4. THE FILTER FABRIC (MIN. OF 1 FT.) IS TO BE ANCHORED IN A 6 INCH X 6 INCH TRENCH WITH WELL COMPACTED BACKFILL OVER THE FABRIC TO PREVENT UNDERMINING.
5. TO ELIMINATE POSSIBLE END FLOW, BOTH ENDS OF THE SILT FENCE SHALL BE TURNED AND EXTENDED UPSLOPE.
6. SILT FENCES ARE TO BE CHECKED AND MAINTAINED ON A REGULAR BASIS. REMOVE ANY BUILD UP OF SEDIMENT WHEN THE HEIGHT OF SEDIMENT EXCEEDS APPROXIMATELY 20% OF THE HEIGHT OF THE BARRIER.
7. MATERIAL SHOULD BE WOVEN GEOTEXTILE FABRIC SUCH AS EXXON GTF 180 OR MOBILE 600X, OR AN APPROVED EQUIVALENT. SECONDARY REINFORCEMENT SUCH AS A CONSTRUCTION BARRIER FENCE OR WIRE MESH CAN ALSO BE USED BEHIND THE FILTER FABRIC.
8. WHERE ANCHORING CONDITIONS FOR THE SILT FENCE ARE POOR, PLACE ANCHORED STRAW BALES ON DOWNSTREAM SIDE OF THE SILT FENCE
9. MAINTENANCE REQUIREMENTS:
   INSPECT SILT FENCE:
   - DAILY IN AREAS OF ACTIVE CONSTRUCTION
   - WEEKLY IN AREAS OF NO CONSTRUCTION
   - WITHIN 24 HOURS FOLLOWING MAJOR RAIN EVENT
   - REPAIR OR REPLACE SILT FENCE AS NEEDED
   - REMOVE ACCUMULATED SEDIMENTS TO AN UPLAND AREA AS NEEDED

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C FERC FILING	KMA	1–15–15	JHR

ROVER PIPELINE PROJECT
FIGURE 21
TYPICAL CONSTRUCTION
SILT FENCE
BARRIER

PREVIOUS DWG. NO.
SHT. OF

DWG. NO.
FIGURE–21
SHT. OF
C

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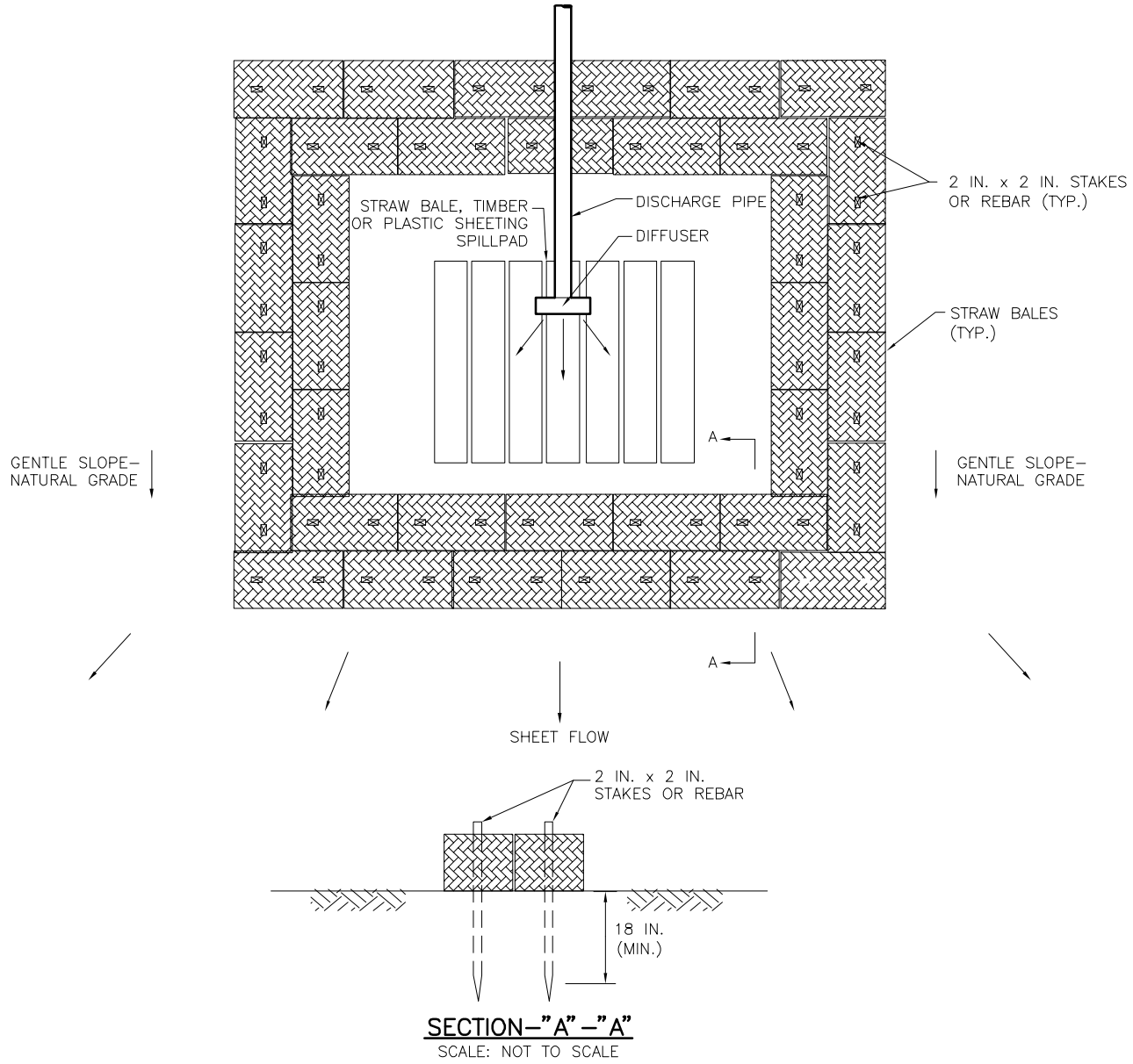

SECTION–"A"–"A"

SCALE: NOT TO SCALE

NOTES:

1. INSTALL A STRAW BALE DEWATERING STRUCTURE WHEREVER IT IS NECESSARY AND AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR TO PREVENT THE FLOW OF HEAVILY SILT LADEN WATER INTO WATER BODIES OR WETLANDS. ALL DEWATERING ACTIVITIES SHALL BE IN ACCORDANCE WITH ENVIRONMENTAL SPECIFICATION AND RELEVANT PERMITS.

2. DISCHARGE SITE SHOULD BE WELL VEGETATED AND LOCATED AT LEAST 50 FEET FROM ANY WATERCOURSE. THE TOPOGRAPHY OF THE SITE SHOULD BE SUCH THAT WATER WILL FLOW INTO THE DEWATERING STRUCTURE AND AWAY FROM ANY WORK AREAS. THE AREA DOWN SLOPE FROM THE DEWATERING SITE MUST BE REASONABLY FLAT OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.

3. DIRECT THE PUMPED WATER ONTO A STABLE SPILL PAD CONSTRUCTED OF ROCKFILL. WEIGHTED TIMBERS, OR A WOVEN GEOTEXTILE STAKED TO THE GROUND SURFACE, SUCH AS MIRAGI 600X, TERRAFIX 400W, OR A COMPANY APPROVED EQUIVALENT.

4. DISCHARGE RATES SHOULD BE SUCH THAT THE CAPACITY OF THE STRUCTURE WILL NOT BE EXCEEDED.

5. DISCHARGE WATER SHALL BE FORCED INTO SHEET FLOW IMMEDIATELY BEYOND THE SPILL PAD USING A COMBINATION OF STRAW BALES AND THE NATURAL TOPOGRAPHY. DRIVE TWO (2) STAKES OR REBAR INTO EACH BALE TO ANCHOR THEM IN PLACE.

6. MANUFACTURED FILTER BAGS ARE A SUITABLE ALTERNATIVE TO STRAW BALE STRUCTURES FOR TRENCH DEWATERING. FILTER BAGS SHALL BE INSTALLED AS SPECIFIED BY THE MANUFACTURER. DISPOSE OF FULL FILTER BAGS AT AN APPROVED OFF–SITE FACILITY.

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C FERC FILING	KMA	1–15–15	JHR

ROVER PIPELINE PROJECT
FIGURE 22
TYPICAL CONSTRUCTION
STRAW BALE
DEWATERING STRUCTURE

PREVIOUS DWG. NO.
SHT. OF

DWG. NO.
FIGURE–22
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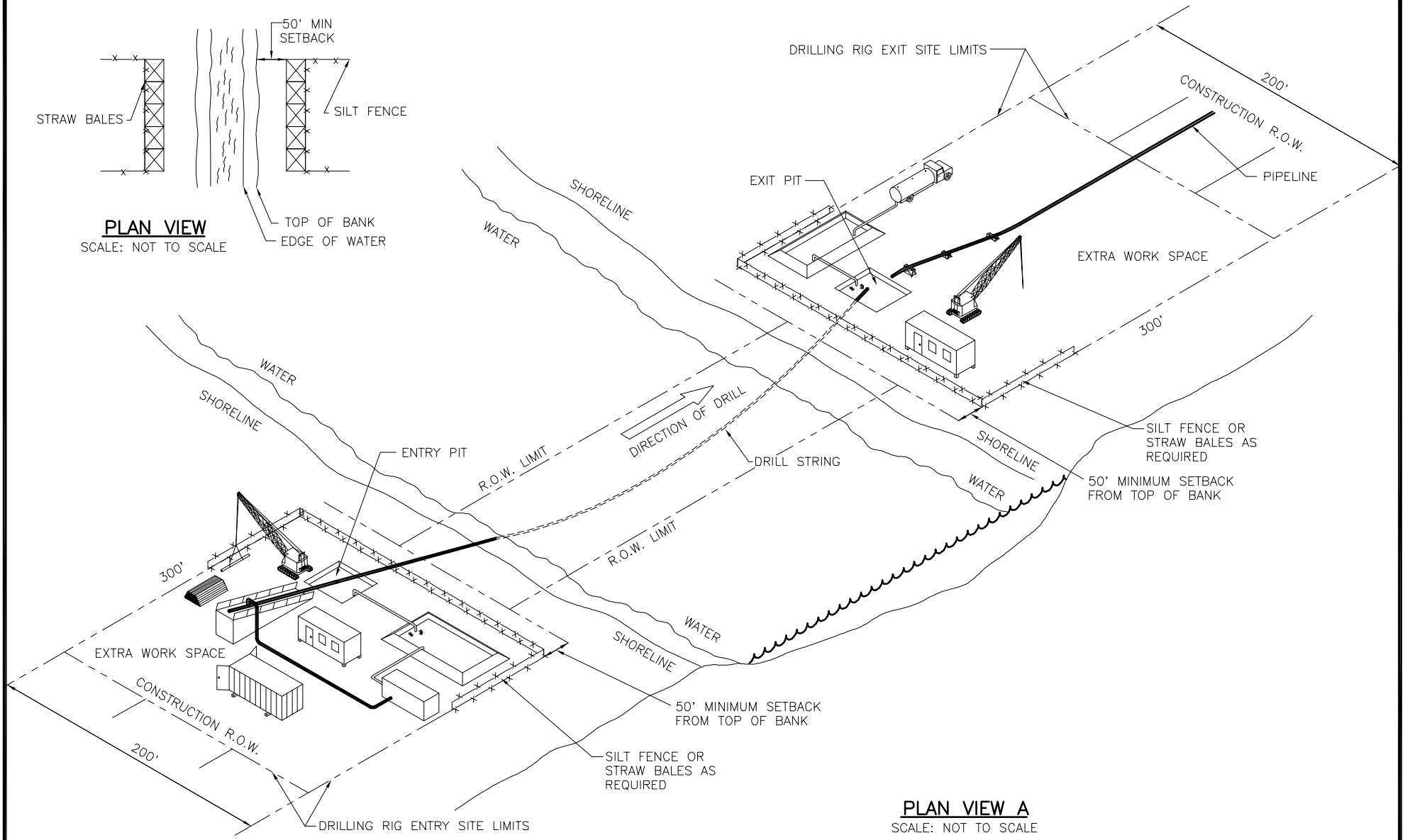

NOTES:

1. EXTRA WORK SPACE NOT LOCATED IN WETLANDS WHEN POSSIBLE.
2. RIGHT-OF-WAY LIMITS AS SHOWN ON ALIGNMENT SHEETS.

PIPELINE, STATION, OR ACCOUNT NUMBER	SCALE NTS	CONST. YR.
FILENUMBER / CADD FILENAME	DRAWN NLM	DATE 8-26

REV. NO. – DESCRIPTION	BY	DATE	APP.
A ISSUED FOR REVIEW	NLM	8-26-14	JHR
B FERC DRAFT FILING	KMA	11-5-14	JHR
C FERC FILING	KMA	1-15-15	JHR

ROVER PIPELINE PROJECT
FIGURE 23
TYPICAL CONSTRUCTION
WATERBODY CROSSING
WITH HDD PLAN

PROJECT NO.

PREVIOUS DWG. NO.

SHT. OF

DWG. NO.
FIGURE-23
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Appendix D

Rover Upland Erosion Control, Revegetation and Maintenance Plan and Rover Wetland and Waterbody Construction and Mitigation Procedures

ROVER PIPELINE
An ENERGY TRANSFER Company

ROVER PIPELINE LLC

Rover Pipeline Project

PROJECT SPECIFIC

UPLAND EROSION CONTROL, REVEGETATION AND MAINTENANCE PLAN

February 2015

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NOTE: Text boxes have been inserted into this document to identify specific areas where Rover Pipeline LLC (Rover) is proposing modifications to the Federal Energy Regulatory Commission (FERC) Upland Erosion Control, Revegetation and Maintenance Plan, May 2013 (Plan) due to site-specific conditions in the Rover Pipeline Project area.

I. APPLICABILITY

A. The intent of this Plan is to assist project sponsors by identifying baseline mitigation measures for minimizing erosion and enhancing revegetation. Project sponsors shall specify in their applications for a new FERC authorization and in prior notice and advance notice filings, any individual measures in this Plan they consider unnecessary, technically infeasible, or unsuitable due to local conitions and fully describe any alternative measures they would use. Project sponsors shall also explain how those alternative measures would achieve a comparable level of mitigation.

Once a project is authorized, project sponsors can request further changes as variances to the measures in this Plan (or the applicant's approved plan). The Director of the Office of Energy Projects (Director) will consider approval of variances upon the project sponsor's written request, if the Director agrees that a variance:

1. provides equal or better environmental protection;

2. is necessary because a portion of this Plan is infeasible or unworkable based on project-specific conditions; or

3. is specifically required in writing by another federal, state, or Native American land management agency for the portion of the project on its land or under its jurisdiction.

Sponsors of projects planned for construction under the automatic authorization provisions in the FERC's regulations must receive written approval for any variances in advance of construction.

Project-related impacts on wetland and waterbody systems are addressed in the staff's Wetland and Waterbody Construction and Mitigation Procedures (Procedures).

II. SUPERVISION AND INSPECTION

A. ENVIRONMENTAL INSPECTION

1. At least one Environmental Inspector is required for each construction spread during construction and restoration (as defined by section V). The number and experience of Environmental Inspectors assigned to each construction spread shall be appropriate for the length of the construction spread and the number/significance of resources affected.

2. Environmental Inspectors shall have peer status with all other activity inspectors.

3 Environmental Inspectors shall have the authority to stop activities that violate

the environmental conditions of the FERC's Orders, stipulations of other environmental permits or approvals, or landowner easement agreements; and to order appropriate corrective action.

B. RESPONSIBILITIES OF ENVIRONMENTAL INSPECTORS

At a minimum, the Environmental Inspector(s) shall be responsible for:

1. Inspecting construction activities for compliance with the requirements of this Plan, the Procedures, the environmental conditions of the FERC's Orders, the mitigation measures proposed by the project sponsor (as approved and/or modified by the Order), other environmental permits and approvals, and environmental requirements in landowner easement agreements.

2. Identifying, documenting, and overseeing corrective actions, as necessary to bring an activity back into compliance;

3. Verifying that the limits of authorized construction work areas and locations of access roads are visibly marked before clearing, and maintained throughout construction;

4. Verifying the location of signs and highly visible flagging marking the boundaries of sensitive resource areas, waterbodies, wetlands, or areas with special requirements along the construction work area;

5. Identifying erosion/sediment control and soil stabilization needs in all areas;

6. Ensuring that the design of slope breakers will not cause erosion or direct water into sensitive environmental resource areas, including cultural resource sites, wetlands, waterbodies, and sensitive species habitats;

7. Verifying that dewatering activities are properly monitored and do not result in the deposition of sand, silt, and/or sediment into sensitive environmental resource areas, including wetlands, waterbodies, cultural resource sites, and sensitive species habitats; stopping dewatering activities if such deposition is occurring and ensuring the design of the discharge is changed to prevent reoccurrence; and verifying that dewatering structures are removed after completion of dewatering activities;

8. Ensuring that subsoil and topsoil are tested in agricultural and residential areas to measure compaction and determine the need for corrective action;

9. Advising the Chief Construction Inspector when environmental conditions (such as wet weather or frozen soils) make it advisable to restrict or delay construction activities to avoid topsoil mixing or excessive compaction;

10. Ensuring restoration of contours and topsoil;

11. Verifying that the soils imported for agricultural or residential use are certified as free of noxious weeds and soil pests, unless otherwise approved by the landowner;

12. Ensuring that erosion control devices are properly installed to prevent sediment flow into sensitive environmental resource areas (e.g., wetlands, waterbodies, cultural resource sites, and sensitive species habitats) and onto roads, and determining the need for additional erosion control devices;

13. Inspecting and ensuring the maintenance of temporary erosion control measures at least:

    a. on a daily basis in areas of active construction or equipment operation;
    b. on a weekly basis in areas with no construction or equipment operation; and
    c. within 24 hours of each 0.5 inch of rainfall;

14. Ensuring the repair of all ineffective temporary erosion control measures within 24 hours of identification, or as soon as conditions allow if compliance with this time frame would result in greater environmental impacts;

15. Keeping records of compliance with the environmental conditions of the FERC's Orders, and the mitigation measures proposed by the project sponsor in the application submitted to the FERC, and other federal or state environmental permits during active construction and restoration;

16. Identifying areas that should be given special attention to ensure stabilization and restoration after the construction phase; and

17. Verifying that locations for any disposal of excess construction materials for beneficial reuse comply with section III.E.

III. PRECONSTRUCTION PLANNING

The project sponsor shall do the following before construction:

A. CONSTRUCTION WORK AREAS

1 Identify all construction work areas (e.g., construction right-of-way, extra work space areas, pipe storage and contractor yards, borrow and disposal areas, access roads) that would be needed for safe construction. The project sponsor must ensure that appropriate cultural resources and biological surveys are conducted, as determined necessary by the appropriate federal and state agencies.

2 Project sponsors are encouraged to consider expanding any required cultural resources and endangered species surveys in anticipation of the need for activities outside of authorized work areas.

3 Plan construction sequencing to limit the amount and duration of open trench sections, as necessary, to prevent excessive erosion or sediment flow into sensitive environmental resource areas.

B. DRAIN TILE AND IRRIGATION SYSTEMS

1. Attempt to locate existing drain tiles and irrigation systems.

2. Contact landowners and local soil conservation authorities to determine the locations of future drain tiles that are likely to be installed within 3 years of the authorized construction.

3. Develop procedures for constructing through drain-tiled areas, maintaining irrigation systems during construction, and repairing drain tiles and irrigation systems after construction.

4. Engage qualified drain tile specialists, as needed to conduct or monitor repairs to drain tile systems affected by construction. Use drain tile specialists from the project area, if available.

C. GRAZING DEFERMENT

Develop grazing deferment plans with willing landowners, grazing permittees, and land management agencies to minimize grazing disturbance of revegetation efforts.

D. ROAD CROSSINGS AND ACCESS POINTS

Plan for safe and accessible conditions at all roadway crossings and access points during construction and restoration.

E. DISPOSAL PLANNING

Determine methods and locations for the regular collection, containment, and disposal of excess construction materials and debris (e.g., timber, slash, mats, garbage, drill cuttings and fluids, excess rock) throughout the construction process. Disposal of materials for beneficial reuse must not result in adverse environmental impact and is subject to compliance with all applicable survey, landowner or land management agency approval, and permit requirements.

F. AGENCY COORDINATION

The project sponsor must coordinate with the appropriate local, state, and federal agencies as outlined in this Plan and/or required by the FERC's Orders.

1. Obtain written recommendations from the local soil conservation authorities or land management agencies regarding permanent erosion control and revegetation specifications.

2. Develop specific procedures in coordination with the appropriate agencies to prevent the introduction or spread of invasive species, noxious weeds, and soil pests resulting from construction and restoration activities.

3. Develop specific procedures in coordination with the appropriate agencies and landowners, as necessary, to allow for livestock and wildlife movement and protection during construction.

4. Develop specific blasting procedures in coordination with the appropriate agencies that address pre-and post-blast inspections; advanced public notification; and mitigation measures for building foundations, groundwater wells, and springs. Use appropriate methods (e.g., blasting mats) to prevent damage to nearby structures and to prevent debris from entering sensitive environmental resource areas.

G. SPILL PREVENTION AND RESPONSE PROCEDURES

The project sponsor shall develop project-specific Spill Prevention and Response Procedures, as specified in section IV of the staff's Procedures. A copy must be filed with the Secretary of the FERC (Secretary) prior to construction and made available in the field on each construction spread. The filing requirement does not apply to projects constructed under the automatic authorization provisions in the FERC's regulations.

H. RESIDENTIAL CONSTRUCTION

For all properties with residences located within 50 feet of construction work areas, project sponsors shall: avoid removal of mature trees and landscaping within the construction work area unless necessary for safe operation of construction equipment, or as specified in landowner agreements; fence the edge of the construction work area for a distance of 100 feet on either side of the residence; and restore all lawn areas and landscaping immediately following clean up operations, or as specified in landowner agreements. If seasonal or other weather conditions prevent compliance with these time frames, maintain and monitor temporary erosion controls (sediment barriers and mulch) until conditions allow completion of restoration.

I. WINTER CONSTRUCTION PLANS

If construction is planned to occur during winter weather conditions, project sponsors shall develop and file a project-specific winter construction plan with the FERC application. This filing requirement does not apply to projects constructed under the automatic authorization provisions of the FERC's regulations.

The plan shall address:

1. winter construction procedures (e.g., snow handling and removal, access road construction and maintenance, soil handling under saturated or frozen conditions, topsoil stripping);

2. stabilization and monitoring procedures if ground conditions will delay restoration until the following spring (e.g., mulching and erosion controls, inspection and reporting, stormwater control during spring thaw conditions); and

3. final restoration procedures (e.g., subsidence and compaction repair, topsoil replacement, seeding).

IV. INSTALLATION

A. APPROVED AREAS OF DISTURBANCE

1. Project-related ground disturbance shall be limited to the construction right-of-way, extra work space areas, pipe storage yards, borrow and disposal areas, access roads, and other areas approved in the FERC's Orders. Any project-related ground disturbing activities outside these areas will require prior Director approval. This requirement does not apply to activities needed to comply with the Plan and Procedures (i.e., slope breakers, energy-dissipating devices, dewatering structures, drain tile system repairs) or minor field realignments and workspace shifts per landowner needs and requirements that do not affect other landowners or sensitive environmental resource areas. All construction or restoration activities outside of authorized areas are subject to all applicable survey and permit requirements, and landowner easement agreements.

2. The construction right-of-way width for a project shall not exceed 75 feet or that described in the FERC application unless otherwise modified by a FERC Order. However, in limited, non-wetland areas, this construction right-ofway width may be expanded by up to 25 feet without Director approval to accommodate full construction right-of-way topsoil segregation and to ensure safe construction where topographic conditions (e.g., side-slopes) or soil limitations require it. Twenty-five feet of extra construction right-of-way width may also be used in limited, non-wetland or non-forested areas for truck turn-arounds where no reasonable alternative access exists.

   Project use of these additional limited areas is subject to landowner or land management agency approval and compliance with all applicable survey and permit requirements. When additional areas are used, each one shall be identified and the need explained in the weekly or biweekly construction reports to the FERC, if required. The following material shall be included in the reports:

   a. the location of each additional area by station number and reference to previously filed alignment sheets, or updated alignment sheets showing the additional areas;
   b. identification of the filing at FERC containing evidence that the additional areas were previously surveyed; and
   c. a statement that landowner approval has been obtained and is available in project files.

   Prior written approval of the Director is required when the authorized construction right-of-way width would be expanded by more than 25 feet.

B. TOPSOIL SEGREGATION

1. Unless the landowner or land management agency specifically approves otherwise, prevent the mixing of topsoil with subsoil by stripping topsoil from either the full work area or from the trench and subsoil storage area (ditch plus spoil side method) in:

a. cultivated or rotated croplands, and managed pastures;
b. residential areas;
c. hayfields; and
d. other areas at the landowner's or land managing agency's request.

2. In residential areas, importation of topsoil is an acceptable alternative to topsoil segregation.

3. Where topsoil segregation is required, the project sponsor must:

   a. segregate at least 12 inches of topsoil in deep soils (more than 12 inches of topsoil); and
   b. make every effort to segregate the entire topsoil layer in soils with less than 12 inches of topsoil.

4. Maintain separation of salvaged topsoil and subsoil throughout all construction activities.

5. Segregated topsoil may not be used for padding the pipe, constructing temporary slope breakers or trench plugs, improving or maintaining roads, or as a fill material.

6. Stabilize topsoil piles and minimize loss due to wind and water erosion with use of sediment barriers, mulch, temporary seeding, tackifiers, or functional equivalents, where necessary.

C. DRAIN TILES

1. Mark locations of drain tiles damaged during construction.

2. Probe all drainage tile systems within the area of disturbance to check for damage.

3. Repair damaged drain tiles to their original or better condition. Do not use filter-covered drain tiles unless the local soil conservation authorities and the landowner agree. Use qualified specialists for testing and repairs.

4. For new pipelines in areas where drain tiles exist or are planned, ensure that the depth of cover over the pipeline is sufficient to avoid interference with drain tile systems. For adjacent pipeline loops in agricultural areas, install the new pipeline with at least the same depth of cover as the existing pipeline(s).

D. IRRIGATION

Maintain water flow in crop irrigation systems, unless shutoff is coordinated with affected parties.

E. ROAD CROSSINGS AND ACCESS POINTS

1. Maintain safe and accessible conditions at all road crossings and access points during construction.

2. If crushed stone access pads are used in residential or agricultural areas, place the stone on synthetic fabric to facilitate removal.

3. Minimize the use of tracked equipment on public roadways. Remove any soil or gravel spilled or tracked onto roadways daily or more frequent as necessary to maintain safe road conditions. Repair any damages to roadway surfaces, shoulders, and bar ditches.

F. TEMPORARY EROSION CONTROL

Install temporary erosion controls immediately after initial disturbance of the soil. Temporary erosion controls must be properly maintained throughout construction (on a daily basis) and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration is complete.

1. Temporary Slope Breakers

   a. Temporary slope breakers are intended to reduce runoff velocity and divert water off the construction right-of-way. Temporary slope breakers may be constructed of materials such as soil, silt fence, staked hay or straw bales, or sand bags.
   b. Install temporary slope breakers on all disturbed areas, as necessary to avoid excessive erosion. Temporary slope breakers must be installed on slopes greater than 5 percent where the base of the slope is less than 50 feet from waterbody, wetland, and road crossings at the following spacing (closer spacing shall be used if necessary):

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

   c. Direct the outfall of each temporary slope breaker to a stable, well vegetated area or construct an energy-dissipating device at the end of the slope breaker and off the construction right-of-way.
   d. Position the outfall of each temporary slope breaker to prevent sediment discharge into wetlands, waterbodies, or other sensitive environmental resource areas.

2. Temporary Trench Plugs

   Temporary trench plugs are intended to segment a continuous open trench prior to backfill.

   a. Temporary trench plugs may consist of unexcavated portions of the trench, compacted subsoil, sandbags, or some functional equivalent.
   b. Position temporary trench plugs, as necessary, to reduce trenchline erosion and minimize the volume and velocity of trench water flow at the base of slopes.

3. Sediment Barriers

Sediment barriers are intended to stop the flow of sediments and to prevent the deposition of sediments beyond approved workspaces or into sensitive resources.

a. Sediment barriers may be constructed of materials such as silt fence, staked hay or straw bales, compacted earth (e.g., driveable berms across travelways), sand bags, or other appropriate materials.
b. At a minimum, install and maintain temporary sediment barriers across the entire construction right-of-way at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody, wetland, or road crossing until revegetation is successful as defined in this Plan. Leave adequate room between the base of the slope and the sediment barrier to accommodate ponding of water and sediment deposition.
c. Where wetlands or waterbodies are adjacent to and downslope of construction work areas, install sediment barriers along the edge of these areas, as necessary to prevent sediment flow into the wetland or waterbody.

4. Mulch

a. Apply mulch on all slopes (except in cultivated cropland) concurrent with or immediately after seeding, where necessary to stabilize the soil surface and to reduce wind and water erosion. Spread mulch uniformly over the area to cover at least 75 percent of the ground surface at a rate of 2 tons/acre of straw or its equivalent, unless the local soil conservation authority, landowner, or land managing agency approves otherwise in writing.
b. Mulch can consist of weed-free straw or hay, wood fiber hydromulch, erosion control fabric, or some functional equivalent.
c. Mulch all disturbed upland areas (except cultivated cropland) before seeding if:
   (1) final grading and installation of permanent erosion control measures will not be completed in an area within 20 days after the trench in that area is backfilled (10 days in residential areas), as required in section V.A.1; or
   (2) construction or restoration activity is interrupted for extended periods, such as when seeding cannot be completed due to seeding period restrictions.
d. If mulching before seeding, increase mulch application on all slopes within 100 feet of waterbodies and wetlands to a rate of 3 tons/acre of straw or equivalent.
e. If wood chips are used as mulch, do not use more than 1 ton/acre and add the equivalent of 11 lbs/acre available nitrogen (at least 50 percent of which is slow release).
f. Ensure that mulch is adequately anchored to minimize loss due to wind and water.
g. When anchoring with liquid mulch binders, use rates recommended by the manufacturer. Do not use liquid mulch binders within 100 feet of

wetlands or waterbodies, except where the product is certified environmentally non-toxic by the appropriate state or federal agency or independent standards-setting organization.

h. Do not use synthetic monofilament mesh/netted erosion control materials in areas designated as sensitive wildlife habitat, unless the product is specifically designed to minimize harm to wildlife. Anchor erosion control fabric with staples or other appropriate devices.

V. RESTORATION

A. CLEANUP

1. Commence cleanup operations immediately following backfill operations. Complete final grading, topsoil replacement, and installation of permanent erosion control structures within 20 days after backfilling the trench (10 days in residential areas). If seasonal or other weather conditions prevent compliance with these time frames, maintain temporary erosion controls (i.e., temporary slope breakers, sediment barriers, and mulch) until conditions allow completion of cleanup. If construction or restoration unexpectedly continues into the winter season when conditions could delay successful decompaction, topsoil replacement, or seeding until the following spring, file with the Secretary for the review and written approval of the Director, a winter construction plan (as specified in section III.I). This filing requirement does not apply to projects constructed under the automatic authorization provisions of the FERC's regulations.

In areas where dual pipelines will be installed, Rover will complete final grading, topsoil replacement, and installation of permanent erosion control structures within 20 days after backfilling the second pipeline trench (10 days in residential areas).

2. A travel lane may be left open temporarily to allow access by construction traffic if the temporary erosion control structures are installed as specified in section IV.F. and inspected and maintained as specified in sections II.B.12 through 14. When access is no longer required the travel lane must be removed and the right-of-way restored.

3. Rock excavated from the trench may be used to backfill the trench only to the top of the existing bedrock profile. Rock that is not returned to the trench shall be considered construction debris, unless approved for use as mulch or for some other use on the construction work areas by the landowner or land managing agency.

4. Remove excess rock from at least the top 12 inches of soil in all cultivated or rotated cropland, managed pastures, hayfields, and residential areas, as well as other areas at the landowner's request. The size, density, and distribution of rock on the construction work area shall be similar to adjacent areas not disturbed by construction. The landowner or land management agency may approve other provisions in writing.

5. Grade the construction right-of-way to restore pre-construction contours and leave the soil in the proper condition for planting.

6. Remove construction debris from all construction work areas unless the landowner or land managing agency approves leaving materials onsite for beneficial reuse, stabilization, or habitat restoration.

7. Remove temporary sediment barriers when replaced by permanent erosion control measures or when revegetation is successful.

B. PERMANENT EROSION CONTROL DEVICES

1. Trench Breakers

   a. Trench breakers are intended to slow the flow of subsurface water along the trench. Trench breakers may be constructed of materials such as sand bags or polyurethane foam. Do not use topsoil in trench breakers.
   b. An engineer or similarly qualified professional shall determine the need for and spacing of trench breakers. Otherwise, trench breakers shall be installed at the same spacing as and upslope of permanent slope breakers.
   c. In agricultural fields and residential areas where slope breakers are not typically required, install trench breakers at the same spacing as if permanent slope breakers were required.
   d. At a minimum, install a trench breaker at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody or wetland and where needed to avoid draining a waterbody or wetland. Install trench breakers at wetland boundaries, as specified in the Procedures. Do not install trench breakers within a wetland.

2. Permanent Slope Breakers

   a. Permanent slope breakers are intended to reduce runoff velocity, divert water off the construction right-of-way, and prevent sediment deposition into sensitive resources. Permanent slope breakers may be constructed of materials such as soil, stone, or some functional equivalent.
   b. Construct and maintain permanent slope breakers in all areas, except cultivated areas and lawns, unless requested by the landowner, using spacing recommendations obtained from the local soil conservation authority or land managing agency.

      In the absence of written recommendations, use the following spacing unless closer spacing is necessary to avoid excessive erosion on the construction right-of-way:

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

   c. Construct slope breakers to divert surface flow to a stable area without causing water to pool or erode behind the breaker. In the absence of a stable area, construct appropriate energy-dissipating devices at the end of

the breaker.

d. Slope breakers may extend slightly (about 4 feet) beyond the edge of the construction right-of-way to effectively drain water off the disturbed area. Where slope breakers extend beyond the edge of the construction right-of-way, they are subject to compliance with all applicable survey requirements.

C. SOIL COMPACTION MITIGATION

1. Test topsoil and subsoil for compaction at regular intervals in agricultural and residential areas disturbed by construction activities. Conduct tests on the same soil type under similar moisture conditions in undisturbed areas to approximate preconstruction conditions. Use penetrometers or other appropriate devices to conduct tests.

2. Plow severely compacted agricultural areas with a paraplow or other deep tillage implement. In areas where topsoil has been segregated, plow the subsoil before replacing the segregated topsoil. If subsequent construction and cleanup activities result in further compaction, conduct additional tilling.

3. Perform appropriate soil compaction mitigation in severely compacted residential areas.

D. REVEGETATION

1. General

a. The project sponsor is responsible for ensuring successful revegetation of soils disturbed by project-related activities, except as noted in section V.D.1.b.

b. Restore all turf, ornamental shrubs, and specialized landscaping in accordance with the landowner's request, or compensate the landowner. Restoration work must be performed by personnel familiar with local horticultural and turf establishment practices.

2. Soil Additives

Fertilize and add soil pH modifiers in accordance with written recommendations obtained from the local soil conservation authority, land management agencies, or landowner. Incorporate recommended soil pH modifier and fertilizer into the top 2 inches of soil as soon as practicable after application.

3. Seeding Requirements

a. Prepare a seedbed in disturbed areas to a depth of 3 to 4 inches using appropriate equipment to provide a firm seedbed. When hydroseeding, scarify the seedbed to facilitate lodging and germination of seed.

b. Seed disturbed areas in accordance with written recommendations for seed mixes, rates, and dates obtained from the local soil conservation authority or the request of the landowner or land management agency. Seeding is not required in cultivated croplands unless requested by the

landowner.

c. Perform seeding of permanent vegetation within the recommended seeding dates. If seeding cannot be done within those dates, use appropriate temporary erosion control measures discussed in section IV.F and perform seeding of permanent vegetation at the beginning of the next recommended seeding season. Dormant seeding or temporary seeding of annual species may also be used, if necessary, to establish cover, as approved by the Environmental Inspector. Lawns may be seeded on a schedule established with the landowner.

d. In the absence of written recommendations from the local soil conservation authorities, seed all disturbed soils within 6 working days of final grading, weather and soil conditions permitting, subject to the specifications in section V.D.3.a through V.D.3.c.

e. Base seeding rates on Pure Live Seed. Use seed within 12 months of seed testing.

f. Treat legume seed with an inoculant specific to the species using the manufacturer's recommended rate of inoculant appropriate for the seeding method (broadcast, drill, or hydro).

g. In the absence of written recommendations from the local soil conservation authorities, landowner, or land managing agency to the contrary, a seed drill equipped with a cultipacker is preferred for seed application.

Broadcast or hydroseeding can be used in lieu of drilling at double the recommended seeding rates. Where seed is broadcast, firm the seedbed with a cultipacker or roller after seeding. In rocky soils or where site conditions may limit the effectiveness of this equipment, other alternatives may be appropriate (e.g., use of a chain drag) to lightly cover seed after application, as approved by the Environmental Inspector.

VI. OFF-ROAD VEHICLE CONTROL

To each owner or manager of forested lands, offer to install and maintain measures to control unauthorized vehicle access to the right-of-way. These measures may include:

A. signs;

B. fences with locking gates;

C. slash and timber barriers, pipe barriers, or a line of boulders across the right-of-way; and

D. conifers or other appropriate trees or shrubs across the right-of-way.

VII. POST-CONSTRUCTION ACTIVITIES AND REPORTING

A. MONITORING AND MAINTENANCE

1. Conduct follow-up inspections of all disturbed areas, as necessary, to determine the success of revegetation and address landowner concerns. At a minimum, conduct inspections after the first and second growing seasons.

2. Revegetation in non-agricultural areas shall be considered successful if upon visual survey the density and cover of non-nuisance vegetation are similar in density and cover to adjacent undisturbed lands. In agricultural areas, revegetation shall be considered successful when upon visual survey, crop growth and vigor are similar to adjacent undisturbed portions of the same field, unless the easement agreement specifies otherwise. Continue revegetation efforts until revegetation is successful.

3. Monitor and correct problems with drainage and irrigation systems resulting from pipeline construction in agricultural areas until restoration is successful.

4. Restoration shall be considered successful if the right-of-way surface condition is similar to adjacent undisturbed lands, construction debris is removed (unless otherwise approved by the landowner or land managing agency per section V.A.6), revegetation is successful, and proper drainage has been restored.

5. Routine vegetation mowing or clearing over the full width of the permanent right-of-way in uplands shall not be done more frequently than every 3 years. However, to facilitate periodic corrosion/leak surveys, a corridor not exceeding 10 feet in width centered on the pipeline may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state. In no case shall routine vegetation mowing or clearing occur during the migratory bird nesting season between April 15 and August 1 of any year unless specifically approved in writing by the responsible land management agency or the U.S. Fish and Wildlife Service.

6. Efforts to control unauthorized off-road vehicle use, in cooperation with the landowner, shall continue throughout the life of the project. Maintain signs, gates, and permanent access roads as necessary.

B. REPORTING

1. The project sponsor shall maintain records that identify by milepost:

   a. method of application, application rate, and type of fertilizer, pH modifying agent, seed, and mulch used;
   b. acreage treated;
   c. dates of backfilling and seeding;
   d. names of landowners requesting special seeding treatment and a description of the follow-up actions;
   e. the location of any subsurface drainage repairs or improvements made during restoration; and
   f. any problem areas and how they were addressed.

2. The project sponsor shall file with the Secretary quarterly activity reports documenting the results of follow-up inspections required by section VII.A.1; any problem areas, including those identified by the landowner; and corrective actions taken for at least 2 years following construction.

   The requirement to file quarterly activity reports with the Secretary does not apply to projects constructed under the automatic authorization, prior notice, or

advanced notice provisions in the FERC's regulations.

ROVER PIPELINE
An ENERGY TRANSFER Company

ROVER PIPELINE LLC

Rover Pipeline Project

PROJECT SPECIFIC

WETLAND AND WATERBODY CONSTRUCTION AND MITIGATION PROCEDURES

February 2015

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LIST OF TABLES

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I. APPLICABILITY

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Once a project is authorized, project sponsors can request further changes as variances to the measures in these Procedures (or the applicant's approved procedures). The Director of the Office of Energy Projects (Director) will consider approval of variances upon the project sponsor's written request, if the Director agrees that a variance:

1. provides equal or better environmental protection;

2. is necessary because a portion of these Procedures is infeasible or unworkable based on project-specific conditions; or

3. is specifically required in writing by another federal, state, or Native American land management agency for the portion of the project on its land or under its jurisdiction.

Sponsors of projects planned for construction under the automatic authorization provisions in the FERC's regulations must receive written approval for any variances in advance of construction.

Project-related impacts on non-wetland areas are addressed in the staff's Upland Erosion Control, Revegetation, and Maintenance Plan (Plan).

B. DEFINITIONS

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

   a. "minor waterbody" includes all waterbodies less than or equal to 10 feet wide at the water's edge at the time of crossing;

   b. "intermediate waterbody" includes all waterbodies greater than 10 feet wide but less than or equal to 100 feet wide at the water's edge at the time of crossing; and

   c. "major waterbody" includes all waterbodies greater than 100 feet wide at the water's edge at the time of crossing.

   d. "ditches" are primarily man-made drainage features that include agricultural ditches and canals in fields and pastures and roadside drainage ditches. Ditches are not considered part of stream systems mapped in the USGS hydrographic database and are not intermittent or perennial stream systems or channelized portions of these stream systems. As such, they typically do not fall under the jurisdiction of the U.S. Army Corps of Engineers (COE). Ditches are temporary in nature and are used to facilitate agriculture practices.

2. "Wetland" includes any area that is not in actively cultivated or rotated cropland and that satisfies the requirements of the current federal methodology for identifying and delineating wetlands.

II. PRECONSTRUCTION FILING

A. The following information must be filed with the Secretary of the FERC (Secretary) prior to the beginning of construction, for the review and written approval by the Director:

1. site-specific justifications for extra work areas that would be closer than 50 feet from a waterbody or wetland; and

2. site-specific justifications for the use of a construction right-of-way greater than 75-feet-wide in wetlands.

B. The following information must be filed with the Secretary prior to the beginning of construction. These filing requirements do not apply to projects constructed under the automatic authorization provisions in the FERC's regulations:

1. Spill Prevention and Response Procedures specified in section IV.A;

2. a schedule identifying when trenching or blasting will occur within each waterbody greater than 10 feet wide, within any designated coldwater fishery, and within any waterbody identified as habitat for federally-listed threatened or endangered species. The project sponsor will revise the schedule as necessary to provide FERC staff at least 14 days advance notice. Changes within this last 14-day period must provide for at least 48 hours advance notice;

3. plans for horizontal directional drills (HDD) under wetlands or waterbodies, specified in section V.B.6.d;

4. site-specific plans for major waterbody crossings, described in section V.B.9;

5. a wetland delineation report as described in section VI.A.1, if applicable; and

6. the hydrostatic testing information specified in section VII.B.3.

III. ENVIRONMENTAL INSPECTORS

A. At least one Environmental Inspector having knowledge of the wetland and waterbody conditions in the project area is required for each construction spread. The number and experience of Environmental Inspectors assigned to each construction spread shall be appropriate for the length of the construction spread and the number/significance of resources affected.

B. The Environmental Inspector's responsibilities are outlined in the Upland Erosion Control, Revegetation, and Maintenance Plan (Plan).

IV. PRECONSTRUCTION PLANNING

A. The project sponsor shall develop project-specific Spill Prevention and Response Procedures that meet applicable requirements of state and federal agencies. A copy must be filed with the Secretary prior to construction and made available in the field on each construction spread. This filing requirement does not apply to projects constructed under the automatic authorization provisions in the FERC's regulations.

1. It shall be the responsibility of the project sponsor and its contractors to structure their operations in a manner that reduces the risk of spills or the accidental exposure of fuels or hazardous materials to waterbodies or wetlands. The project sponsor and its contractors must, at a minimum, ensure that:

   a. all employees handling fuels and other hazardous materials are properly trained;

   b. all equipment is in good operating order and inspected on a regular basis;

   c. fuel trucks transporting fuel to on-site equipment travel only on approved access roads;

   d. all equipment is parked overnight and/or fueled at least 100 feet from a waterbody or in an upland area at least 100 feet from a wetland boundary. These activities can occur closer only if the Environmental Inspector determines that there is no reasonable alternative, and the project sponsor and its contractors have taken appropriate steps (including secondary containment structures) to prevent spills and provide for prompt cleanup in the event of a spill;

   e. hazardous materials, including chemicals, fuels, and lubricating oils, are not stored within 100 feet of a wetland, waterbody, or designated municipal watershed area, unless the location is designated for such use by an appropriate governmental authority. This applies to storage of these materials and does not apply to normal operation or use of equipment in these areas;

f. concrete coating activities are not performed within 100 feet of a wetland or waterbody boundary, unless the location is an existing industrial site designated for such use. These activities can occur closer only if the Environmental Inspector determines that there is no reasonable alternative, and the project sponsor and its contractors have taken appropriate steps (including secondary containment structures) to prevent spills and provide for prompt cleanup in the event of a spill;

g. pumps operating within 100 feet of a waterbody or wetland boundary utilize appropriate secondary containment systems to prevent spills; and

h. bulk storage of hazardous materials, including chemicals, fuels, and lubricating oils have appropriate secondary containment systems to prevent spills.

2. The project sponsor and its contractors must structure their operations in a manner that provides for the prompt and effective cleanup of spills of fuel and other hazardous materials. At a minimum, the project sponsor and its contractors must:

a. ensure that each construction crew (including cleanup crews) has on hand sufficient supplies of absorbent and barrier materials to allow the rapid containment and recovery of spilled materials and knows the procedure for reporting spills and unanticipated discoveries of contamination;

b. ensure that each construction crew has on hand sufficient tools and material to stop leaks;

c. know the contact names and telephone numbers for all local, state, and federal agencies (including, if necessary, the U. S. Coast Guard and the National Response Center) that must be notified of a spill; and

d. follow the requirements of those agencies in cleaning up the spill, in excavating and disposing of soils or other materials contaminated by a spill, and in collecting and disposing of waste generated during spill cleanup.

B. AGENCY COORDINATION

The project sponsor must coordinate with the appropriate local, state, and federal agencies as outlined in these Procedures and in the FERC's Orders.

V. WATERBODY CROSSINGS

A. NOTIFICATION PROCEDURES AND PERMITS

1. Apply to the U.S. Army Corps of Engineers (COE), or its delegated agency, for the appropriate wetland and waterbody crossing permits.

2. Provide written notification to authorities responsible for potable surface water supply intakes located within 3 miles downstream of the crossing at least 1 week before beginning work in the waterbody, or as otherwise specified by that authority.

3. Apply for state-issued waterbody crossing permits and obtain individual or generic section 401 water quality certification or waiver.

4. Notify appropriate federal and state authorities at least 48 hours before beginning trenching or blasting within the waterbody, or as specified in applicable permits.

B. INSTALLATION

1. Time Window for Construction

Unless expressly permitted or further restricted by the appropriate federal or state agency in writing on a site-specific basis, instream work, except that required to install or remove equipment bridges, must occur during the following time windows:

a. coldwater fisheries - June 1 through September 30; and

b. coolwater and warmwater fisheries - June 1 through November 30.

2. Extra Work Areas

a. Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from water's edge, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land.

b. The project sponsor shall file with the Secretary for review and written approval by the Director, site-specific justification for each extra work area with a less than 50-foot setback from the water's edge, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land. The justification must specify the conditions that will not permit a 50-foot setback and measures to ensure the waterbody is adequately protected.

Table 1 identifies locations where site-specific conditions at certain waterbody crossings require that extra work areas (referred to as additional temporary work space or ATWS) be located less than 50 feet from the water's edge. Rover will implement all applicable protection measures, such as installation of silt fencing and hay bales along ATWS limits to prevent off-site sedimentation, and any other measures appropriate for stabilizing the ATWS during and after construction.

c. Limit the size of extra work areas to the minimum needed to construct the waterbody crossing.

3. General Crossing Procedures

a. Comply with the COE, or its delegated agency, permit terms and conditions.

b. Construct crossings as close to perpendicular to the axis of the waterbody channel as engineering and routing conditions permit.

c. Where pipelines parallel a waterbody, maintain at least 15 feet of undisturbed vegetation between the waterbody (and any adjacent wetland) and the construction right-of-way, except where maintaining this offset will result in greater environmental impact.

d. Where waterbodies meander or have multiple channels, route the pipeline to minimize the number of waterbody crossings.

e. Maintain adequate waterbody flow rates to protect aquatic life, and prevent the interruption of existing downstream uses.

f. Waterbody buffers (e.g., extra work area setbacks, refueling restrictions) must be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete.

g. Crossing of waterbodies when they are dry or frozen and not flowing may proceed using standard upland construction techniques in accordance with the Plan, provided that the Environmental Inspector verifies that water is unlikely to flow between initial disturbance and final stabilization of the feature. In the event of perceptible flow, the project sponsor must comply with all applicable Procedure requirements for "waterbodies" as defined in section I.B.1.

4. Spoil Pile Placement and Control

a. All spoil from minor and intermediate waterbody crossings, and upland spoil from major waterbody crossings, must be placed in the construction right-of-way at least 10 feet from the water's edge or in additional extra work areas as described in section V.B.2.

b. Use sediment barriers to prevent the flow of spoil or silt-laden water into any waterbody.

5. Equipment Bridges

a. Only clearing equipment and equipment necessary for installation of equipment bridges may cross waterbodies prior to bridge installation. Limit the number of such crossings of each waterbody to one per piece of clearing equipment.

b. Construct and maintain equipment bridges to allow unrestricted flow and to prevent soil from entering the waterbody. Examples of such bridges include:

(1) equipment pads and culvert(s);
(2) equipment pads or railroad car bridges without culverts;
(3) clean rock fill and culvert(s); and
(4) flexi-float or portable bridges.

Additional options for equipment bridges may be utilized that achieve the performance objectives noted above. Do not use soil to construct or stabilize equipment bridges.

c. Design and maintain each equipment bridge to withstand and pass the highest flow expected to occur while the bridge is in place. Align culverts to prevent bank erosion or streambed scour. If necessary, install energy dissipating devices downstream of the culverts.

d. Design and maintain equipment bridges to prevent soil from entering the waterbody.

e. Remove temporary equipment bridges as soon as practicable after permanent seeding.

f. If there will be more than 1 month between final cleanup and the beginning of permanent seeding and reasonable alternative access to the right-of-way is available, remove temporary equipment bridges as soon as practicable after final cleanup.

g. Obtain any necessary approval from the COE, or the appropriate state agency for permanent bridges.

6. Dry-Ditch Crossing Methods

a. Unless approved otherwise by the appropriate federal or state agency, install the pipeline using one of the dry-ditch methods outlined below for crossings of waterbodies up to 30 feet wide (at the water's edge at the time of construction) that are state-designated as either coldwater or significant coolwater or warmwater fisheries, or federally-designated as critical habitat.

b. Dam and Pump

(1) The dam-and-pump method may be used without prior approval for crossings of waterbodies where pumps can adequately transfer streamflow volumes around the work area, and there are no concerns about sensitive species passage.

(2) Implementation of the dam-and-pump crossing method must meet the following performance criteria:

(i) use sufficient pumps, including on-site backup pumps, to maintain downstream flows;
(ii) construct dams with materials that prevent sediment and other pollutants from entering the waterbody (e.g., sandbags or clean gravel with plastic liner);
(iii) screen pump intakes to minimize entrainment of fish;
(iv) prevent streambed scour at pump discharge; and
(v) continuously monitor the dam and pumps to ensure proper operation throughout the waterbody crossing.

c. Flume Crossing

The flume crossing method requires implementation of the following steps:

(1) install flume pipe after blasting (if necessary), but before any trenching;

(2) use sand bag or sand bag and plastic sheeting diversion structure or equivalent to develop an effective seal and to divert stream flow through the flume pipe (some modifications to the stream bottom may be required to achieve an effective seal);

(3) properly align flume pipe(s) to prevent bank erosion and streambed scour;

(4) do not remove flume pipe during trenching, pipelaying, or backfilling activities, or initial streambed restoration efforts; and

(5) remove all flume pipes and dams that are not also part of the equipment bridge as soon as final cleanup of the stream bed and bank is complete.

d. Horizontal Directional Drill

For each waterbody or wetland that would be crossed using the HDD method, file with the Secretary for the review and written approval by the Director, a plan that includes:

(1) site-specific construction diagrams that show the location of mud pits, pipe assembly areas, and all areas to be disturbed or cleared for construction;

(2) justification that disturbed areas are limited to the minimum needed to construct the crossing;

(3) identificationn of any aboveground disturbance or clearing between the HDD entry and exit workspaces during construction;

(4) a description of how an inadvertent release of drilling mud would be contained and cleaned up; and

(5) a contingency plan for crossing the waterbody or wetland in the event the HDD is unsuccessful and how the abandoned drill hole would be sealed, if necessary.

The requirement to file HDD plans does not apply to projects constructed under the automatic authorization provisions in the FERC's regulations.

7. Crossings of Minor Waterbodies

Where a dry-ditch crossing is not required, minor waterbodies may be crossed using the open-cut crossing method, with the following restrictions:

a. except for blasting and other rock breaking measures, complete instream construction activities (including trenching, pipe installation, backfill, and restoration of the streambed contours) within 24 hours. Streambanks and unconsolidated streambeds may require additional restoration after this period;

b. limit use of equipment operating in the waterbody to that needed to construct the crossing; and

c. equipment bridges are not required at minor waterbodies that do not have a state-designated fishery classification or protected status (e.g., agricultural or intermittent drainage ditches). However, if an equipment bridge is used it must be constructed as described in section V.B.5.

8. Crossings of Intermediate Waterbodies

Where a dry-ditch crossing is not required, intermediate waterbodies may be crossed using the open-cut crossing method, with the following restrictions:

a. complete instream construction activities (not including blasting and other rock breaking measures) within 48 hours, unless site-specific conditions make completion within 48 hours infeasible;

b. limit use of equipment operating in the waterbody to that needed to construct the crossing; and

c. all other construction equipment must cross on an equipment bridge as specified in section V.B.5.

9. Crossings of Major Waterbodies

Before construction, the project sponsor shall file with the Secretary for the review and written approval by the Director a detailed, site-specific construction plan and scaled drawings identifying all areas to be disturbed by construction for each major waterbody crossing (the scaled drawings are not required for any offshore portions of pipeline projects). This plan must be developed in consultation with the appropriate state and federal agencies and shall include extra work areas, spoil storage areas, sediment control structures, etc., as well as mitigation for navigational issues. The requirement to file major waterbody crossing plans does not apply to projects constructed under the automatic authorization provisions of the FERC's regulations.

The Environmental Inspector may adjust the final placement of the erosion and sediment control structures in the field to maximize effectiveness.

10. Temporary Erosion and Sediment Control

Install sediment barriers (as defined in section IV.F.3.a of the Plan) immediately after initial disturbance of the waterbody or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. Temporary erosion and sediment control measures are addressed in more detail in the Plan; however, the following specific measures must be implemented at stream crossings:

a. install sediment barriers across the entire construction right-of-way at all waterbody crossings, where necessary to prevent the flow of sediments into the waterbody. Removable sediment barriers (or driveable berms) must be installed across the travel lane. These removable sediment barriers can be removed during the construction day, but must be re-installed after construction has stopped for the day and/or when heavy precipitation is imminent;

b. where waterbodies are adjacent to the construction right-of-way and the right-of-way slopes toward the waterbody, install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil within the construction right-of-way and prevent sediment flow into the waterbody; and

c. use temporary trench plugs at all waterbody crossings, as necessary, to prevent diversion of water into upland portions of the pipeline trench and to keep any accumulated trench water out of the waterbody.

11. Trench Dewatering

    Dewater the trench (either on or off the construction right-of-way) in a manner that does not cause erosion and does not result in silt-laden water flowing into any waterbody. Remove the dewatering structures as soon as practicable after the completion of dewatering activities.

C. RESTORATION

1. Use clean gravel or native cobbles for the upper 1 foot of trench backfill in all waterbodies that contain coldwater fisheries.

2. For open-cut crossings, stabilize waterbody banks and install temporary sediment barriers within 24 hours of completing instream construction activities. For dry-ditch crossings, complete streambed and bank stabilization before returning flow to the waterbody channel.

3. Return all waterbody banks to preconstruction contours or to a stable angle of repose as approved by the Environmental Inspector.

4. Install erosion control fabric or a functional equivalent on waterbody banks at the time of final bank recontouring. Do not use synthetic monofilament mesh/netted erosion control materials in areas designated as sensitive wildlife habitat unless the product is specifically designed to minimize harm to wildlife. Anchor erosion control fabric with staples or other appropriate devices.

5. Application of riprap for bank stabilization must comply with COE, or its delegated agency, permit terms and conditions.

6. Unless otherwise specified by state permit, limit the use of riprap to areas where flow conditions preclude effective vegetative stabilization techniques such as seeding and erosion control fabric.

7. Revegetate disturbed riparian areas with native species of conservation grasses, legumes, and woody species, similar in density to adjacent undisturbed lands.

8. Install a permanent slope breaker across the construction right-of-way at the base of slopes greater than 5 percent that are less than 50 feet from the waterbody, or as needed to prevent sediment transport into the waterbody. In addition, install sediment barriers as outlined in the Plan.

   In some areas, with the approval of the Environmental Inspector, an earthen berm may be suitable as a sediment barrier adjacent to the waterbody.

9. Sections V.C.3 through V.C.7 above also apply to those perennial or intermittent streams not flowing at the time of construction.

D. POST-CONSTRUCTION MAINTENANCE

1. Limit routine vegetation mowing or clearing adjacent to waterbodies to allow a riparian strip at least 25 feet wide, as measured from the waterbody's mean high water mark, to permanently revegetate with native plant species across the entire construction right-of-way. However, to facilitate periodic corrosion/leak surveys, a corridor centered on the pipeline and up to 10 feet wide may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state. In addition, trees that are located within 15 feet of the pipeline that have roots that could compromise the integrity of the pipeline coating may be cut and removed from the permanent right-of-way. Do not conduct any routine vegetation mowing or clearing in riparian areas that are between HDD entry and exit points.

In areas where dual pipelines will be installed, Rover will maintain the 20 feet between the pipeline centerlines plus an additional 5 feet on the outside portion of the centerlines for a total of 30 feet.

2. Do not use herbicides or pesticides in or within 100 feet of a waterbody except as allowed by the appropriate land management or state agency.

3. Time of year restrictions specified in section VII.A.5 of the Plan (April 15 – August 1 of any year) apply to routine mowing and clearing of riparian areas.

VI. WETLAND CROSSINGS

A. GENERAL

1. The project sponsor shall conduct a wetland delineation using the current federal methodology and file a wetland delineation report with the Secretary before construction. The requirement to file a wetland delineation report does not apply to projects constructed under the automatic authorization provisions in the FERC's regulations.

This report shall identify:

a. by milepost all wetlands that would be affected;

b. the National Wetlands Inventory (NWI) classification for each wetland;

c. the crossing length of each wetland in feet; and

d. the area of permanent and temporary disturbance that would occur in each wetland by NWI classification type.

The requirements outlined in this section do not apply to wetlands in actively cultivated or rotated cropland. Standard upland protective measures, including workspace and topsoiling requirements, apply to these agricultural wetlands.

2. Route the pipeline to avoid wetland areas to the maximum extent possible. If a wetland cannot be avoided or crossed by following an existing right-of-way, route the new pipeline in a manner that minimizes disturbance to wetlands. Where looping an existing pipeline, overlap the existing pipeline right-of-way with the new construction right-of-way. In addition, locate the loop line no more than 25 feet away from the existing pipeline unless site-specific constraints would adversely affect the stability of the existing pipeline.

3. Limit the width of the construction right-of-way to 75 feet or less. Prior written approval of the Director is required where topographic conditions or soil limitations require that the construction right-of-way width within the boundaries of a federally delineated wetland be expanded beyond 75 feet. Early in the planning process the project sponsor is encouraged to identify site-specific areas where excessively wide trenches could occur and/or where spoil piles could be difficult to maintain because existing soils lack adequate unconfined compressive strength.

Table 2 identifies locations where Rover is requesting approval for a construction right-of-way of greater than 75 feet in wetlands. Installation of large-diameter pipelines requires a construction right-of-way of more than 75 feet due to workspace requirements associated with installing large diameter pipelines, the associated larger equipment size, and soil conditions found in the Project area which tend to slump resulting in wider trenches to achieve adequate depth of cover and difficulty in containing spoil piles. A reduced construction right-of-way would require the pipe and equipment to be located closer to the ditch line posing a safety concern for construction personnel.

4. Wetland boundaries and buffers must be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete.

5. Implement the measures of sections V and VI in the event a waterbody crossing is located within or adjacent to a wetland crossing. If all measures of sections V and VI cannot be met, the project sponsor must file with the Secretary a site-specific crossing plan for review and written approval by the Director before construction. This crossing plan shall address at a minimum:

a. spoil control;

b. equipment bridges;

c. restoration of waterbody banks and wetland hydrology;

d. timing of the waterbody crossing;

e. method of crossing; and

f. size and location of all extra work areas.

6. Do not locate aboveground facilities in any wetland, except where the location of such facilities outside of wetlands would prohibit compliance with U.S. Department of Transportation regulations.

B. INSTALLATION

1. Extra Work Areas and Access Roads

a. Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from wetland boundaries, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land.

Table 1 identifies locations where site-specific conditions at certain wetlands require that extra work areas (referred to as additional temporary work space or ATWS) be located less than 50 feet from the wetland edge or within the wetland. Rover will implement all applicable protection measures, such as installation of silt fencing and hay bales along ATWS limits to prevent off-site sedimentation, and any other measures appropriate for stabilizing the ATWS during and after construction.

b. The project sponsor shall file with the Secretary for review and written approval by the Director, site-specific justification for each extra work area with a less than 50-foot setback from wetland boundaries, except where adjacent upland consists of cultivated or rotated cropland or other disturbed land. The justification must specify the site-specific conditions that will not permit a 50-foot setback and measures to ensure the wetland is adequately protected.

c. The construction right-of-way may be used for access when the wetland soil is firm enough to avoid rutting or the construction right-of-way has been appropriately stabilized to avoid rutting (e.g., with timber riprap, prefabricated equipment mats, or terra mats).

In wetlands that cannot be appropriately stabilized, all construction equipment other than that needed to install the wetland crossing shall

use access roads located in upland areas. Where access roads in upland areas do not provide reasonable access, limit all other construction equipment to one pass through the wetland using the construction right-of-way.

d. The only access roads, other than the construction right-of-way, that can be used in wetlands are those existing roads that can be used with no modifications or improvements, other than routine repair, and no impact on the wetland.

2. Crossing Procedures

a. Comply with COE, or its delegated agency, permit terms and conditions.

b. Assemble the pipeline in an upland area unless the wetland is dry enough to adequately support skids and pipe.

c. Use "push-pull" or "float" techniques to place the pipe in the trench where water and other site conditions allow.

d. Minimize the length of time that topsoil is segregated and the trench is open. Do not trench the wetland until the pipeline is assembled and ready for lowering in.

If conditions allow, such as low flow or unsaturated soils, the trench will be excavated through the wetland before pipe assembly. This will allow for proper topsoil segregation and adequate workspace to safely excavate the trench.

e. Limit construction equipment operating in wetland areas to that needed to clear the construction right-of-way, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the construction right-of-way.

f. Cut vegetation just above ground level, leaving existing root systems in place, and remove it from the wetland for disposal.

The project sponsor can burn woody debris in wetlands, if approved by the COE and in accordance with state and local regulations, ensuring that all remaining woody debris is removed for disposal.

g. Limit pulling of tree stumps and grading activities to directly over the trenchline. Do not grade or remove stumps or root systems from the rest of the construction right-of-way in wetlands unless the Chief Inspector and Environmental Inspector determine that safety-related

construction constraints require grading or the removal of tree stumps from under the working side of the construction right-of-way.

h. Segregate the top 1 foot of topsoil from the area disturbed by trenching, except in areas where standing water is present or soils are saturated. Immediately after backfilling is complete, restore the segregated topsoil to its original location.

i. Do not use rock, soil imported from outside the wetland, tree stumps, or brush riprap to support equipment on the construction right-of-way.

j. If standing water or saturated soils are present, or if construction equipment causes ruts or mixing of the topsoil and subsoil in wetlands, use low-ground-weight construction equipment, or operate normal equipment on timber riprap, prefabricated equipment mats, or terra mats.

k. Remove all project-related material used to support equipment on the construction right-of-way upon completion of construction.

3. Temporary Sediment Control

Install sediment barriers (as defined in section IV.F.3.a of the Plan) immediately after initial disturbance of the wetland or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench). Except as noted below in section VI.B.3.c, maintain sediment barriers until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. Temporary erosion and sediment control measures are addressed in more detail in the Plan.

a. Install sediment barriers across the entire construction right-of-way immediately upslope of the wetland boundary at all wetland crossings where necessary to prevent sediment flow into the wetland.

b. Where wetlands are adjacent to the construction right-of-way and the right-of-way slopes toward the wetland, install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil within the construction right-of-way and prevent sediment flow into the wetland.

c. Install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil and sediment within the construction right-of-way through wetlands. Remove these sediment barriers during right-of-way cleanup.

4. Trench Dewatering

   Dewater the trench (either on or off the construction right-of-way) in a manner that does not cause erosion and does not result in silt-laden water flowing into any wetland. Remove the dewatering structures as soon as practicable after the completion of dewatering activities.

C. RESTORATION

1. Where the pipeline trench may drain a wetland, construct trench breakers at the wetland boundaries and/or seal the trench bottom as necessary to maintain the original wetland hydrology.

2. Restore pre-construction wetland contours to maintain the original wetland hydrology.

3. For each wetland crossed, install a trench breaker at the base of slopes near the boundary between the wetland and adjacent upland areas. Install a permanent slope breaker across the construction right-of-way at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from the wetland, or as needed to prevent sediment transport into the wetland. In addition, install sediment barriers as outlined in the Plan. In some areas, with the approval of the Environmental Inspector, an earthen berm may be suitable as a sediment barrier adjacent to the wetland.

4. Do not use fertilizer, lime, or mulch unless required in writing by the appropriate federal or state agency.

5. Consult with the appropriate federal or state agencies to develop a project-specific wetland restoration plan. The restoration plan shall include measures for re-establishing herbaceous and/or woody species, controlling the invasion and spread of invasive species and noxious weeds (e.g., purple loosestrife and phragmites), and monitoring the success of the revegetation and weed control efforts. Provide this plan to the FERC staff upon request.

6. Until a project-specific wetland restoration plan is developed and/or implemented, temporarily revegetate the construction right-of-way with annual ryegrass at a rate of 40 pounds/acre (unless standing water is present).

7. Ensure that all disturbed areas successfully revegetate with wetland herbaceous and/or woody plant species.

8. Remove temporary sediment barriers located at the boundary between wetland and adjacent upland areas after revegetation and stabilization of

adjacent upland areas are judged to be successful as specified in section VII.A.4 of the Plan.

D. POST-CONSTRUCTION MAINTENANCE AND REPORTING

1. Do not conduct routine vegetation mowing or clearing over the full width of the permanent right-of-way in wetlands. However, to facilitate periodic corrosion/leak surveys, a corridor centered on the pipeline and up to 10 feet wide may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state. In addition, trees within 15 feet of the pipeline with roots that could compromise the integrity of pipeline coating may be selectively cut and removed from the permanent right-of-way. Do not conduct any routine vegetation mowing or clearing in wetlands that are between HDD entry and exit points.

2. Do not use herbicides or pesticides in or within 100 feet of a wetland, except as allowed by the appropriate federal or state agency.

3. Time of year restrictions specified in section VII.A.5 of the Plan (April 15 – August 1 of any year) apply to routine mowing and clearing of wetland areas.

4. Monitor and record the success of wetland revegetation annually until wetland revegetation is successful.

5. Wetland revegetation shall be considered successful if all of the following criteria are satisfied:

   a. the affected wetland satisfies the current federal definition for a wetland (i.e., soils, hydrology, and vegetation);

   b. vegetation is at least 80 percent of either the cover documented for the wetland prior to construction, or at least 80 percent of the cover in adjacent wetland areas that were not disturbed by construction;

   c. if natural rather than active revegetation was used, the plant species composition is consistent with early successional wetland plant communities in the affected ecoregion; and

   d. invasive species and noxious weeds are absent, unless they are abundant in adjacent areas that were not disturbed by construction.

6. Within 3 years after construction, file a report with the Secretary identifying the status of the wetland revegetation efforts and documenting success as defined in section VI.D.5, above. The requirement to file wetland restoration reports with the Secretary does not apply to projects constructed under the

automatic authorization, prior notice, or advance notice provisions in the FERC's regulations.

For any wetland where revegetation is not successful at the end of 3 years after construction, develop and implement (in consultation with a professional wetland ecologist) a remedial revegetation plan to actively revegetate wetlands. Continue revegetation efforts and file a report annually documenting progress in these wetlands until wetland revegetation is successful.

VII. HYDROSTATIC TESTING

A. NOTIFICATION PROCEDURES AND PERMITS

1. Apply for state-issued water withdrawal permits, as required.

2. Apply for National Pollutant Discharge Elimination System (NPDES) or state-issued discharge permits, as required.

3. Notify appropriate state agencies of intent to use specific sources at least 48 hours before testing activities unless they waive this requirement in writing.

B. GENERAL

1. Perform 100 percent radiographic inspection of all pipeline section welds or hydrotest the pipeline sections, before installation under waterbodies or wetlands.

2. If pumps used for hydrostatic testing are within 100 feet of any waterbody or wetland, address secondary containment and refueling of these pumps in the project's Spill Prevention and Response Procedures.

3. The project sponsor shall file with the Secretary before construction a list identifying the location of all waterbodies proposed for use as a hydrostatic test water source or discharge location. This filing requirement does not apply to projects constructed under the automatic authorization provisions of the FERC's regulations.

C. INTAKE SOURCE AND RATE

1. Screen the intake hose to minimize the potential for entrainment of fish.

2. Do not use state-designated exceptional value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or

waterbodies designated as public water supplies, unless appropriate federal, state, and/or local permitting agencies grant written permission.

3. Maintain adequate flow rates to protect aquatic life, provide for all waterbody uses, and provide for downstream withdrawals of water by existing users.

4. Locate hydrostatic test manifolds outside wetlands and riparian areas to the maximum extent practicable.

D. DISCHARGE LOCATION, METHOD, AND RATE

1. Regulate discharge rate, use energy dissipation device(s), and install sediment barriers, as necessary, to prevent erosion, streambed scour, suspension of sediments, or excessive streamflow.

2. Do not discharge into state-designated exceptional value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate federal, state, and local permitting agencies grant written permission.

TABLE 1-11
Justification for Additional Temporary Workspace (ATWS) Within 50 feet of a Waterbody or Wetland

Revised MP [1]	Old MP [1]	Approximate Dimensions		Acres	Reason for ATWS	Waterbody / Wetland ID	Flow / Wetland Type [2]	Location of ATWS [3]	Justification
		Width	Length						
Laterals:									
Berne Lateral									
0.55	0.55	25	370	0.21	WETLANDS / STREAM CROSSING	WB4H-MO-655	Pond	BE-P3-1001	ATWS required for optimal crossing of wetlands and stream.
1.89	1.39	25	370	0.21	ST HWY 78 / STREAM CROSSING	S3ES-MO-238	Ephemeral	BE-P3-1002	Only upland location available to facilitate road and stream crossing. ATWS located in uplands primarily consisting of croplands.
3.51	3.01	25	300	0.17	TEXAS EASTERN PIPELINES CROSSING	W7H-NO-424	PEM	BE-P3-1004	Only upland location available between road and wetland crossings.
Burgettstown Lateral									
8.62	8.85	10	115	0.03	STREAM CROSSING	S4H-WA-725	Perennial	BG-P3-1010	ATWS required for 15-foot wide stream crossing at base of slopes on either side.
8.63	8.85	15	120	0.04	STREAM CROSSING	S4H-WA-725	Perennial	BG-P3-1010	ATWS required for 15-foot wide stream crossing at base of slopes on either side.
8.66	8.89	10	75	0.02	STREAM CROSSING	S4H-WA-725	Perennial	BG-P3-1010	ATWS required for 15-foot wide stream crossing at base of slopes on either side.
14.19	14.42	25	205	0.12	SHADY GLEN RD CROSSING	S2ES-HA-212	Intermittent	BG-P3-1016	ATWS required for optimal road crossing.
14.77	14.99	30	300	0.21	OHIO RIVER HDD	WB4ES-HA-686	Pond	BG-P3-1018	ATWS required for HDD crossing
14.77	14.99	75	300	0.52	OHIO RIVER HDD	W4ES-HA-687	Intermittent	BG-P3-1018	ATWS required for HDD crossing
17.79	17.77	10	50	0.01	STREAM CROSSING	S4ES-JE-183	Perennial	BG-P3-1020	AWTS located for optimal crossing of waterbody.
17.8	17.78	15	85	0.03	STREAM CROSSING	S4ES-JE-183	Perennial	BG-P3-1020	ATWS located for optimal crossing of waterbody.
18.25	18.23	25	100	0.06	STREAM CROSSING	S4ES-JE-178	Intermittent	BG-P3-1020	ATWS located for optimal crossing of waterbody.

TABLE 1-11
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Revised MP [1]	Old MP [1]	Approximate Dimensions		Acres	Reason for ATWS	Waterbody / Wetland ID	Flow / Wetland Type [2]	Location of ATWS [3]	Justification
19.42	19.4	15	95	0.03	STREAM CROSSING	S2ES-JE-201	Ephemeral	BG-P3-1022	AWTS located for optimal crossing of waterbody.
20.67	20.65	10	65	0.01	STREAM CROSSING	S2ES-JE-208	Ephemeral	BG-P3-1023	AWTS located for optimal crossing of waterbody.
20.75	20.73	15	115	0.04	STREAM CROSSING	S2ES-JE-206	Intermittent	BG-P3-1023	AWTS located for optimal crossing of waterbody.
22.71	22.69	10	60	0.01	WAGGONER ROAD / STREAM CROSSING	ST2B-JE-296	Ephemeral	BG-P3-1025	ATWS needed to support Waggonner road crossing and waterbody.
23.24	23.22	25	100	0.06	WETLAND / STREAM CROSSING	S4ES-JE-170	Intermittent	BG-P3-1025	Only available upland location to facilitate crossing of a waterbody and large wetland.
	28.94	15	95	0.03	SIDE SLOPE	S2ST-JE-106	Perennial	BG-P3-1031	ATWS needed to support pipeline construction in steep area.
	28.96	10	100	0.02	SIDE SLOPE	S2ST-JE-106	Perennial	BG-P3-1031	ATWS needed to support pipeline construction in steep area.
33.81		25	190	0.11	WETLAND CROSSING	W4ES-JE-160	PSS	BG-P3-1037	ATWS needed in area of slope leading to large wetland/stream complex in valley.
33.96		25	160	0.09	WETLAND / OHIO RAIL CORP RR CROSSING	W4ES-JE-160	PSS	BG-P3-1037	ATWS needed in area of slope leading to large wetland/stream complex in valley and to for railroad bore.
33.97		25	85	0.05	WETLAND / OHIO RAIL CORP RR CROSSING	W4ES-JE-153	PEM	BG-P3-1037	ATWS needed in area of slope leading to large wetland/stream complex in valley and to for railroad bore.
36.06	36.05	15	100	0.03	WETLAND / STREAM CROSSING	S2TB-CA-273	Perennial	BG-P3-1039	AWTS located for optimal crossing of waterbody.
37.32	37.3	25	100	0.06	STREAM CROSSING	ST2B-CA-229	Perennial	BG-P3-1040	ATWS located for optimal crossing of waterbody.
37.37	37.35	25	100	0.06	STREAM CROSSING	S2TB-CA-229	Perennial	BG-P3-1041	ATWS located for optimal crossing of waterbody.
38.35	38.33	25	100	0.06	WETLAND / STREAM CROSSING	W2ES-CA-154	PSS	BG-P3-1042	ATWS located for optimal crossing of two waterbodies.
38.72	38.7	25	100	0.06	STREAM CROSSING	W4ES-CA-127	PEM	BG-P3-1042	ATWS located for optimal crossing of waterbody.
38.81	38.79	25	100	0.06	WETLAND CROSSING	W4ES-CA-120	PSS	BG-P3-1042	ATWS located for optimal crossing of wetland.
39.65	39.63	25	100	0.06	WETLAND / STREAM CROSSING	S4ES-CA-116	Ephemeral	BG-P3-1043	ATWS located for optimal crossing of two waterbodies.

TABLE 1-11
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Revised MP [1]	Old MP [1]	Approximate Dimensions		Acres	Reason for ATWS	Waterbody / Wetland ID	Flow / Wetland Type [2]	Location of ATWS [3]	Justification
40.45	40.43	10	100	0.02	STREAM CROSSING	S2TB-CA-238	Perennial	BG-P3-1044	ATWS located for optimal crossing of two waterbodies.
46.97	46.94	10	75	0.02	WETLANDS / STREAM CROSSING	W4ES-CA-151	PEM	BG-P3-1051	ATWS located for optimal crossing of waterbody and wetland.
47.47	47.44	25	425	0.24	STREAM / ACCESS MIDSTREAM PIPELINE CROSSING	S2ES-CA-219	Ephemeral	BG-P3-1051	ATWS located for optimal crossing of a series of waterbodies.
47.69		25	50	0.03	WETLAND CROSSING	W4ES-CA-134	PEM	BG-P3-1051	ATWS needed for crossing of wetland/ stream complex at base on slopes.
47.72		25	50	0.03	STREAM CROSSING	S4ES-CA-133	Intermittent	BG-P3-1051	ATWS needed for crossing of wetland/ stream complex at base on slopes.
Cadiz Lateral - None									
CGT Lateral - None									
Clarington Lateral									
2.96	3.51	10	100	0.02	STREAM CROSSING	S4ES-BE-204	Ephemeral	CL-P3-1004	ATWS needed to support pipeline crossing of a waterbody in steep area.
3.57	4.11	15	350	0.12	PEA VINE CREEK / TWP 106 (E. BROWN PEAVINE RD) CROSSING	S4ES-BE-201	Perennial	CL-P3-1005	ATWS needed to support pipeline crossing of Pea Vine Creek and county road.
3.81	4.36	25	2760	1.58	SIDE SLOPE	S4ES-BE-201	Perennial	CL-P3-1005	ATWS needed to support pipeline construction in steep area.
4.24	4.8	10	130	0.03	STREAM CROSSING	S1ES-BE-215	Intermittent	CL-P3-1006	ATWS needed to support pipeline construction in steep area.
7.07	7.6	25	140	0.08	STREAM CROSSING / SIDE SLOPE	S3ES-BE-179	Ephemeral	CL-P3-1009	ATWS needed to support pipeline crossing of a waterbody in steep area.
						S3ES-BE-176	Ephemeral		
7.71	8.24	25	180	0.1	STREAM CROSSING	S2ES-BE-205	Ephemeral	CL-P3-1009	ATWS needed to support pipeline crossing of a waterbody in steep area.
9.23	9.76	15	300	0.1	STREAM CROSSING	S4H-BE-361	Intermittent	CL-P3-1011	ATWS needed to support pipeline crossing of a waterbody in steep area.
26.58		15	160	0.06	WETLAND CROSSING	W3H-HA-254	PEM	CL-P3-1030	ATWS needed to stage wetland crossing.
26.62		15	50	0.02	TWP 254 (JOCKEY HOLLOW RD) / WETLAND / STREAM CROSSING	W3H-HA-254	PEM	CL-P3-1030	ATWS needed for road and wetland crossing.
26.67		15	140	0.05	TWP 254 (JOCKEY HOLLOW RD) / WETLAND / STREAM CROSSING	W3H-HA-257	PEM	CL-P3-1030	ATWS needed for road and wetland crossing.
Majorsville Lateral									
3.29	3.24	10	100	0.02	STREAM CROSSING	S1ES-MA-179	Ephemeral	MJ-P3-1004	AWTS located for optimal crossing of waterbody.

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Revised MP [1]	Old MP [1]	Approximate Dimensions		Acres	Reason for ATWS	Waterbody / Wetland ID	Flow / Wetland Type [2]	Location of ATWS [3]	Justification
3.29	3.25	15	110	0.04	STREAM CROSSING	S1ES-MA-179	Ephemeral	MJ-P3-1004	AWTS located for optimal crossing of waterbodies in a relatively steep area.
4.02	3.98	25	125	0.07	CR 7/3 (LOWER STULL ROAD) / STULL RUN CROSSING	S4H-MA-338	Intermittent	MJ-P3-1005	AWTS located for optimal crossing of waterbodies in a relatively steep area.
						S4H-MA-336	Perennial		
9.28	9.26	10	685	0.16	STREAM CROSSING / SIDE SLOPE	S7H-MA-379	Ephemeral	MJ-P3-1010	AWTS located for optimal crossing of waterbodies in a relatively steep area.
15.28	15.2	15	1630	0.56	SIDE SLOPE / CR 46 (NEW CUT RD) CROSSING	S4H-BE-297	Perennial	MJ-P3-1017	ATWS required to facilitate road and stream crossings. Space limited overall due to steep side slopes.
15.44	15.44	25	270	0.15	SIDE SLOPE	S4H-BE-295	Intermittent	MJ-P3-1017	AWTS located for optimal crossing of waterbodies in an area with steep side slopes.
15.47	15.47	15	100	0.03	STREAM CROSSING	S4H-BE-295	Intermittent	MJ-P3-1017	AWTS located for optimal crossing of waterbodies in an area with steep side slopes.
17.27	17.27	10	100	0.02	WETLAND / STREAM CROSSING	W5ES-BE-145	PEM	MJ –P3-1019	ATWS required for stream and wetland crossing. ATWS located in upland area.
17.6	17.59	10	110	0.03	STREAM CROSSING	S5ES-BE-146	Ephemeral	MJ-P3-1019	ATWS required for stream crossing. ATWS is located within upland areas consisting of primarily within cropland, minimizing impacts to forested uplands.
18.81	18.81	25	390	0.22	STREAM / WETLAND / PRIVATE ROAD CROSSING	W4H-BE-312	PEM	MJ-P3-1021	ATWS required for optimal crossing of wetland.
Seneca Lateral									
0.74	0.68	25	290	0.17	TEXAS EASTERN TRANSMISSION PIPELINE / ST HWY 513 (BATESVILLE RD) CROSSING	W7H-NO-424	PEM	SN-P3-1002	Only upland available location between waterbody crossings.
3.29	3.23	25	105	0.06	STREAM CROSSING	S2TB-MO-108	Intermittent	SN-P3-1005	Only upland location available between waterbody and wetland crossings. ATWS required for optimal crossing of wetland.
5.51	5.43	25	290	0.17	SIDE SLOPE	S1H-MO-160	Ephemeral	SN-P3-1007	Only upland location available to facilitate road, wetland, and stream crossings in an area with steep side slopes.
7.85	7.77	25	1310	0.75	SIDE SLOPE	S1TB-MO-140	Intermittent	SN-P3-1009	ATWS required for side slope construction. Stream crosses at a diagonal

TABLE 1-11
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10.91	10.79	25	205	0.12	STREAMS CROSSING	S4H-MO-205	Intermittent	SN-P3-1013	Only upland location available between a series of waterbody crossings.
11.0	10.89	25	355	0.2	STREAMS CROSSING	S4H-MO-208	Intermittent	SN-P3-1013	ATWS required for optimal waterbody crossing.
14.32	14.2	25	225	0.13	STREAM CROSSING	S2TB-MO-124	Ephemeral	SN-P3-1016	AWTS required for optimal crossing of a waterbody in an area with steep side slopes.
15.71	15.58	25	665	0.38	SIDE SLOPE	S1TB-MO-147	Ephemeral	SN-P3-1018	AWTS required for optimal crossing of a waterbody in an area with steep side slopes.
16.55	16.42	25	350	0.2	STREAMS / WETLAND CROSSING	S2TB-MO-132	Ephemeral	SN-P3-1018	Only upland location available between waterbody crossings.
17.15	17.02	25	990	0.57	SIDE SLOPE / STREAM CROSSING	S1TB-MO-164	Ephemeral	SN-P3-1019	AWTS required for optimal crossing of a waterbody in an area with steep side slopes.
22.23	22.1	25	190	0.11	STREAM CROSSING	S7H-MO-446	Ephemeral	SN-P3-1025	ATWS required for optimal crossing of a waterbody.
Sherwood Lateral									
1.8	1.64	15	250	0.09	CONSOLE PIPELINE CROSSING	S1ES-DO-219	Ephemeral	SW-P3-1001	ATWS required to facilitate crossing of Console Pipeline.
3.44	2.29	15	230	0.08	EQUITABLE PRODUCTION CO. PIPELINE CROSSING	S4H-DO-249	Intermittent	SW-P3-1003	ATWS required to facilitate crossing of Equitable Production Co. Pipeline Crossing.
3.59	2.44	10	795	0.18	CR 30/3 (JOCKEY CAMP RD) / STREAM / UNKNOWN FOREIGN PIPELINES CROSSING	S1ES-DO-126	Ephemeral	SW-P3-1003	ATWS required to facilitate waterbody crossings in an area of steep side slopes.
4.59	3.48	15	140	0.05	STREAM CROSSING	S2ES-DO-122	Ephemeral	SW-P3-1004	ATWS required to facilitate waterbody crossings in an area of steep side slopes.
4.63	3.52	15	65	0.02	STREAM CROSSING	S2ES-DO-122	Ephemeral	SW-P3-1004	ATWS required to facilitate waterbody crossings in an area of steep side slopes.
5.21	4.11	10	100	0.02	NATURAL DRAINAGE CROSSING	S2ES-DO-124	Ephemeral	SW-P3-1005	ATWS required for optimal crossing of a series of waterbodies.
5.64	4.53	15	320	0.11	STREAM / EQT PIPELINE CROSSING	S4ES-DO-103	Ephemeral	SW-P3-1005	ATWS required to facilitate waterbody crossing in an area of steep side slopes.
5.9	4.76	15	595	0.2	CR 34 (PIGGIN RUN RD) / STREAMS CROSSING	S2ES-DO-108	Intermittent	SW-P3-1005	ATWS required for optimal crossing of a series of waterbodies.

TABLE 1-11
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Revised MP [1]	Old MP [1]	Approximate Dimensions		Acres	Reason for ATWS	Waterbody / Wetland ID	Flow / Wetland Type [2]	Location of ATWS [3]	Justification
5.91	4.77	10	660	0.15	CR 34 (PIGGIN RUN RD) / STREAMS CROSSING	S1ES-DO-109	Intermittent	SW-P3-1005	ATWS required for optimal crossing of a series of waterbodies.
6.89	5.78	10	385	0.09	STREAM / WETLAND CROSSING	W4H-DO-252	PEM	SW-P3-1006	Only upland location available between waterbody and wetland crossings.
7.73	6.62	15	295	0.1	STREAM CROSSING	S2ES-DO-136	Perennial	SW-P3-1008	ATWS required for optimal crossing of large waterbody in an area of steep side slopes.
7.73	6.62	10	295	0.07	STREAM CROSSING	S2ES-DO-137	Ephemeral	SW-P3-1008	ATWS required for optimal crossing of large waterbody in an area of steep side slopes.
						S2ES-DO-136	Perennial		
7.82	6.71	15	390	0.13	STREAM / EQUITRANS PIPELINE CROSSING	S2ES-DO-136	Perennial	SW-P3-1008	ATWS required for optimal crossing of large waterbody in an area of steep side slopes.
7.82	6.71	10	385	0.09	STREAM / EQUITRANS PIPELINE CROSSING	S2ES-DO-135	Ephemeral	SW-P3-1008	ATWS required for optimal crossing of large waterbody in an area of steep side slopes.
						S2ES-DO-136	Perennial		
8.12	7.02	15	190	0.07	CR 22 (WOLFPEN RUN RD) / STREAM CROSSING	S2ES-DO-131	Ephemeral	SW-P3-1008	ATWS required for optimal crossing of a series of waterbodies.
9.16	8.05	10	295	0.07	STREAM / CR 24 (CAMP MISTAKE RD) CROSSING	S1ES-DO-121	Perennial	SW-P3-1009	ATWS required for optimal crossing of large waterbody in an area of steep side slopes.
9.24	8.13	10	300	0.07	STREAM / CR 24 (CAMP MISTAKE RD) CROSSING	S1ES-DO-121	Perennial	SW-P3-1009	ATWS required for optimal crossing of large waterbody in an area of steep side slopes.
9.24	8.13	15	300	0.1	STREAM / CR 24 (CAMP MISTAKE RD) CROSSING	S1ES-DO-121	Perennial	SW-P3-1009	ATWS required for optimal crossing of large waterbody in an area of steep side slopes.
9.69	8.59	10	55	0.01	STREAM / UNKNOWN FOREIGN PIPELINE CROSSING	S3ES-DO-103	Ephemeral	SW-P3-1010	Only upland location available to facilitate the crossing of several waterbodies and a pipeline in an area of steep side slopes.
10.87	9.75	10	515	0.12	CR 60/2 (SANDY CREEK RD) / EQT PIPELINE / STREAM CROSSING	S3ES-TY-115	Ephemeral	SW-P3-1011	ATWS required for optimal crossing of a series of waterbodies in an area of steep side slopes.
11.08	9.98	15	235	0.08	STREAMS / EQT PIPELINE CROSSING	S3ES-TY-121	Ephemeral	SW-P3-1011	Only upland location available between waterbody crossings.
11.17	10.07	25	440	0.25	STREAM CROSSING / SIDE SLOPE	S3ES-TY-123	Ephemeral	SW-P3-1011	Only upland location available between waterbody crossings.
14.05	12.94	50	300	0.34	PRIVATE ROAD & MIDDLE ISLAND CREEK HDD	S4ES-TY-244	Ephemeral	SW-P3-1014	ATWS required for HDD crossing.

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15.15	14.07	10	100	0.02	CR 18/8 (PURGATORY RUN RD) / STREAM CROSSING	S4ES-TY-114	Ephemeral	SW-P3-1015	AWTS required for optimal crossing of a waterbody.
17.65	16.57	15	75	0.03	CR 30/1 (LAUGH RUN RD) CROSSING	S7H-TY-265	Ephemeral	SW-P3-1018	Only available location without interferring with residential property.
19.75	18.67	25	1040	0.6	SIDE SLOPE	S4H-TY-284	Ephemeral	SW-P3-1020	AWTS required for optimal crossing of a waterbody.
23.35	22.27	25	300	0.17	STREAM / CR 10/1 (MARTIN HILL RD) CROSSING	S2ES-TY-115	Intermittent	SW-P3-1024	ATWS required to facilitate waterbody and road crossing.
24.77	23.69	25	285	0.16	MIDDLE ISLAND CREEK HDD	S4H-TY-288	Intermittent	SW-P3-1026	ATWS required for HDD crossing.
24.77	23.69	50	310	0.36	MIDDLE ISLAND CREEK HDD	S4H-TY-288	Intermittent	SW-P3-1026	ATWS required for HDD crossing.
27.82	26.73	25	2300	1.32	SIDE SLOPE	S5ES-TY-127	Ephemeral	SW-P3-1029	ATWS required for pipeline construction in an area of steep side slopes.
34.76	33.67	15	145	0.05	CR 26/1 (DUTCH CAMP ROAD) CROSSING / SIDE SLOPE	W3H-WE-196	PEM	SW-P3-1036	ATWS needed for road crossing. Only 0.0007 of wetland affected.
34.98	33.89	300	200	1.38	OHIO RIVER HDD	WB3H-WE-189	Pond, Manmade	SW-P3-1036	ATWS required for HDD crossing.
39.14	37.41	15	180	0.06	WETLAND / TWP 490 (BREY HOLLOW ROAD) CROSSING	W4H-MO-276	PFO	SW-P3-1040	ATWS required to facilitate the crossing of a wetland complex in an area of steep side slopes.
39.15	37.43	10	180	0.04	WETLAND / TWP 490 (BREY HOLLOW ROAD) CROSSING	W4H-MO-276	PFO	SW-P3-1040	ATWS required to facilitate the crossing of a wetland complex in an area of steep side slopes.
49.24	47.49	25	75	0.04	CR 6 (ALTITUDE MILLER HILL RD) CROSSING	W4H-MO-271	PEM	SW-P3-1051	ATWS required to facilitate the crossing of a waterbody and wetland.
						S4H-MO-270	Perennial		
53.2		10	250	0.05	MARKWEST PIPELINE CROSSING	S2H-MO-247	Ephemeral	SW-P3-1055	ATWS required for pipeline crossing. Stream is along outer edge but not crossed.
53.64	51.95	25	665	0.38	SIDE SLOPE	S9H-MO-136	Ephemeral	SW-P3-1056	ATWS required to facilitate the crossing of two waterbodies.
Mainlines:									
Supply Connector Lines A and B									
7.22	7.47	15	310	0.11	CR 22 (LOWER CLEARFORK ROAD) CROSSING	W4ES-HR-223	PEM	ML-P3-1009	ATWS required for road crossing. No other upland location available. ATWS is located in uplands consistis primarily of croplands and road.
Mainlines A and B									

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Justification for Additional Temporary Workspace (ATWS) Within 50 feet of a Waterbody or Wetland

Revised MP [1]	Old MP [1]	Approximate Dimensions		Acres	Reason for ATWS	Waterbody / Wetland ID	Flow / Wetland Type [2]	Location of ATWS [3]	Justification
21.52	21.61	15	70	0.02	WATERBODY / WETLAND CROSSING	W2ST-CA-141	PEM	ML-P3-2003	Only available upland location for optimal crossing of wetland and waterbody.
24.74	24.83	50	300	0.34	INDIAN FORK HDD	W7H-TU-255	PFO	ML-P3-2007	ATWS required for HDD crossing.
32.81	32.85	15	195	0.07	STREAM CROSSING	S4H-TU-381	Intermittent	ML-P3-2015	ATWS required for optimal crossing of multiple streams.
51.84	51.85	15	405	0.14	CR 105 / DOMINION PIPELINE / STREAM CROSSING	S2H-WA-125	Ephemeral	ML-P3-2013	Only available upland location between waterbodies, residences, and cropland.
53.53	53.53	145	300	1	STREAM AT HIGHWAY 241 HDD	W7H-WA-176	PEM	ML-P3-2014	ATWS required for HDD crossing.
67.81	67.92	50	300	0.34	PRAIRIE LANE HDD / CR 176 / PRIVATE ROAD / WATERBODY / WETLAND / LEVEE CROSSING	S1M-WA-144	Intermittent	ML-P3-3029	ATWS required for HDD crossing.
						W1M-WA-143	PEM		
68.21	68.32	50	100	0.11	PRAIRIE LANE HDD	S1M-WA-147	Perennial	ML-P3-3029	ATWS required for HDD crossing.
68.23	68.34	200	140	0.64	PRAIRIE LANE HDD	S1M-WA-153	Perennial	ML-P3-3029	ATWS required for HDD crossing.
68.79	68.9	25	300	0.17	NORFOLK SOUTHERN RAILROAD HDD	S1M-WA-147	Perennial	ML-P3-3030	ATWS required for HDD crossing.
76.85	76.95	200	300	0.67	US HIGHWAY 30 HDD	S1TB-WA-116	Perennial	ML-P3-3038	ATWS required for HDD crossing.
85.01	84.87	15	150	0.05	CR 1575 CROSSING	W7H-AS-105	PEM	ML-P3-4008	ATWS required for road crossing.
93.75	93.6	15	715	0.25	STREAM CROSSING	S1H-AS-131	Perennial	ML-P3-4017	Only available upland location to facilitate stream crossing without interferring with croplands.
94.69	94.57	75	190	0.33	US HIGHWAY 42 HDD	W4H-AS-120	PEM	ML-P3-4018	ATWS required for HDD crossing.
95.98	95.86	50	300	0.34	BLACK FORK MOCHICAN RIVER HDD	W4H-RI-130	PEM	ML-P3-4019	ATWS required for HDD crossing.
						W4H-RI-131	PFO		
135.51	135.29	80	230	0.42	COUNTY ROAD 12 HDD	W7H-SE-219	PEM	ML-P3-5008	ATWS required for HDD crossing.
135.54	135.31	50	150	0.17	COUNTY ROAD 12 HDD	W7H-SE-219	PEM	ML-P3-5008	ATWS required for HDD crossing.
Market Segment									
2.97	2.92	25	505	0.29	CR 166 CROSSING	W4H-DF-229	PFO	MK-P3-7003	Only available location to facilitate crossover without interferring with croplands.
57.47	56.91	25	815	0.47	WETLAND CROSSING	S1K-WA-293	Perennial	MK-P3-8001	ATWS required due to terrain.
						W1K-WA-292	PSS		

TABLE 1-11
Justification for Additional Temporary Workspace (ATWS) Within 50 feet of a Waterbody or Wetland

Revised MP [1]	Old MP [1]	Approximate Dimensions		Acres	Reason for ATWS	Waterbody / Wetland ID	Flow / Wetland Type [2]	Location of ATWS [3]	Justification
61.14	60.58	60	150	0.21	CROSSOVER / WETLAND CROSSING	W2K-WA-167	PEM	MK-P3-8005	ATWS required for wetland crossing. ATWS is located within cropland, minimizing impacts to forested areas.
71.52		25	100	0.06	STREAM CROSSING	W7K-WA-162	PEM	MK-P3-8016	ATWS within wetland needed for 1350-foot crossing of saturated wetland and for perennial stream crossing.
71.57		25	100	0.06	STREAM CROSSING	W7K-WA-162	PEM	MK-P3-8016	ATWS within wetland needed for 1350-foot crossing of saturated wetland and for perennial stream crossing.
71.63		25	100	0.06	STREAM CROSSING	W7K-WA-162	PEM	MK-P3-8016	ATWS within wetland needed for 1350-foot crossing of saturated wetland and for perennial stream crossing.
71.66		25	100	0.06	STREAM CROSSING	W7K-WA-162	PEM	MK-P3-8016	ATWS within wetland needed for 1350-foot crossing of saturated wetland and for perennial stream crossing.
72.35		25	70	0.04	S LIMA CENTER RD / WETLAND CROSSSING	W2K-WA-193	PEM	MK-P3-8017	ATWS within wetland needed as wetland is on both sides of the road and there is no upland workspace available for bored road crossing.
72.38		25	105	0.06	S LIMA CENTER RD / WETLAND CROSSSING	W2K-WA-193	PEM	MK-P3-8017	ATWS within wetland needed as wetland is on both sides of the road and there is no upland workspace available for bored road crossing.
87.05	87.14	45	345	0.36	CROSSOVER	W2K-LI-238	PSS	MK-P3-8033	Only available upland location to facilitate crossover and optimal crossing of large wetland complex and perennial stream.
87.12		25	435	0.25	STREAM CROSSING	W2K-LI-238	PSS	MK-P3-8033	ATWS within wetland needed for 340-foot-long saturated wetland crossing and for crossing of 28-foot-wide stream within the wetland.
						S2K-LI-239	Perennial		
90.94	91.03	25	95	0.05	SPEARS ROAD CROSSING	W5K-LI-419	PEM	MK-P3-8038	Only available upland location for road crossing.

1 Approximate enter milepost (MP). Revised MPs are current based on length; Old MPs correspond to previous submittals.
2 Wetland classification according to Cowardin et al. 1979: PEM = Palustrine Emergent Wetland; PSS = Palustrine Scrub-Shrub Wetland; PFO = Palustrine Forested Wetland.
3 Identifies the drawing number associated with the alignment sheet where the ATWS is located.

TABLE 2. Justification for Construction Right-of-Way Width in Wetlands

Approx. Enter MP	Crossing Length (feet)	Wetland ID	Wetland Type[1]	Construction Right-of-Way Width (feet)	Justification
Market Segment					
87.09	245.46	W2K-LI-238	PSS	100	Rover requests to maintain the previously proposed construction workspace within this wetland. This is the only wetland area that Rover believes it will not be able to construct in a reduced workspace. This wetland includes an open cut crossing of Honey Creek, which is a perennial stream approximately 28 feet wide at the pipeline centerline. The wetland is a saturated floodplain of Honey Creek and is bordered on the south side by the ITC corridor with multiple overhead lines. A portion of the temporary workspace within the ITC corridor was reduced to avoid an overhead power pole. To accommodate the reduced workspace as well as a 46 degree points of inflection on both sides of the ITC corridor, Rover previously requested a 45' x 205' ATWS just south of the ITC corridor. The wetland is bordered to the north by the tract MI-LI-021.500, which is addressed in Environmental Condition 35 below. This tract is proposed for development and Rover has reduced the workspace within the tract to accommodate the storage buildings and retainage pond installed by the landowner within the previously proposed workspace. Rover would not be able to increase the workspace to the north within this tract. Please refer to Comparison Drawing MK-P3-8033-C.
87.12	46.23	W2K-LI-238a	PSS	100	

GeoEngineers
3050 South Delaware Avenue
Springfield, Missouri 65804
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May 12, 2017

Rover Pipeline, LLC
7015 Sunset Strip Avenue NW
North Canton, Ohio 44720

Attention: Leon Banta, Project Director

Subject: Horizontal Directional Drill Technical Review
42-Inch Captina Creek HDD Design Review
Belmont County, Ohio
File No. 18782-017-01

INTRODUCTION AND PROJECT UNDERSTANDING

This report provides the independent, third-party, Horizontal Directional Drill (HDD) design review by GeoEngineers, Inc. (GeoEngineers) for the planned HDD crossing of Captina Creek in Belmont County, Ohio. The design of the crossing is shown on the attached design drawing.

The Captina Creek HDD consists of a new 42-inch-diameter steel pipeline that will cross beneath Captina Creek, a railroad line, State Highway 148, and a total of three existing pipelines. Rover Pipeline, LLC (Rover) requested GeoEngineers perform an independent, third-party, HDD design review and provide an opinion of the hydraulic fracture and drilling fluid surface release potential by reviewing the design documentation. Terracon Consulting Engineers and Scientists (Terracon) provided the geotechnical engineering services for the project (report dated May 8, 2015), and Project Consulting Services (PCS) completed the HDD design for the crossing (design drawing dated July 25, 2016).

GeoEngineers reviewed the above-referenced geotechnical report and design drawing provided by Rover and the project team. Based on the provided information, it is our opinion the proposed HDD presents Rover with an conventionally acceptable level of risk if proper construction techniques are used. We anticipate the likelihood to be high for a prepared, qualified HDD contractor to successfully complete this crossing. However, this opinion is based upon limited geotechnical information and the HDD contractor implementing plans and procedures that are in accordance with generally accepted construction practices of the HDD industry. The contractor should address means and methods during the preconstruction and construction phases of the project to facilitate a successful installation of the HDD and attempt to mitigate possible difficulties arising during construction.

HDD DESIGN PARAMETERS

We reviewed the Issued for Construction (IFC) Captina Creek HDD design drawing prepared by PCS, dated July 25, 2016. The HDD has a horizontal length of approximately 2,067 feet. The HDD entry point is located approximately 700 feet south of Captina Creek at an approximate elevation of 769 feet. The exit point is located approximately 1,250 feet north of Captina Creek at an approximate elevation of 754 feet. The elevation of the deepest portion of the HDD profile is approximately 671 feet.

For this design, the entry angle is 10 degrees and the exit angle is 9 degrees. The design radii of curvature for the entry/exit vertical curve is 4,200 feet. Based on the HDD design drawing provided, this design geometry yields a depth of cover of approximately 57 feet beneath Captina Creek, which is the shallowest depth beneath the significant features being crossed. The design parameters for this crossing follow generally accepted design priciples for HDD installations of this type.

Subsurface Conditions

Based on the geotechnical data report provided by Terracon, the subsurface conditions generally consist of fill and native soils to depths up to approximately 19 feet below ground surface (bgs). Below the soils, sedimentary bedrock was encountered to the termination depths of the borings. The units of bedrock consisted of siltstone, shale, sandstone, limestone and coal.

Based on the design profile provided by PCS, the majority of the HDD profile is located within very good to excellent quality sandstone and good quality siltstone units with Rock Quality Designation (RQD) values generally greater than 90 percent in the sandstone units and greater than 60 percent in the siltstone units. The shallow portions of the HDD profile will pass through the overburden soils near the entry and exit points. We anticipate that the HDD profile may encounter poor to good quality limestone and shale, and coal beds below the soil overburden and above the previously described sandstone and siltsone units on the entry (south) side of the crossing. An additional boring on the south side of the crossing would allow for a better characterization of the subsurface conditions on the south side of the creek.

Within the depths of the designed HDD profile, the unconfined compressinve strengths of the rock samples tested were over 4,000 pounds per square inch (psi). We expect that some of the shallower rock units consisting of limestone, shale and siltstone that were not tested for unconfined compressive strength may have lower shear strengths, but we anticipate these units will have shear strengths of several hundred psi.

Estimated Hole Opening Process

Based on our experience with similar HDD projects of this length and diameter, we anticipate the pilot bit diameter will likely be 9⅞ to 12¼ inches. We also anticipate the pilot hole will be advanced using a mud motor.

Upon the completion of the pilot hole, a reaming tool is used to enlarge the pilot hole to a diameter that will accommodate the product pipe. Based on the subsurface conditions reported from the exploratory borings completed at the site, this project will require the use of rock hole opening tools (reamers) to enlarge the pilot hole.

The diameter of each pass will increase in incremental steps (multiple reaming passes) until the desired diameter is reached, typically 12 inches or 1.5 times larger than the diameter of the product pipe. The final

hole diameter for this crossing should be a minimum of 54 inches. Depending on conditions encountered during construction, the HDD contractor may elect to increase the final diameter of the hole.

Provided the contractor uses sound construction practices and proper tooling, good to excellent quality sedimentary rock formations, such as those anticipated along much of the proposed HDD path at this site are typically favorable for relatively low risk HDD installations. A unit of coal may be encountered along the HDD profile on entry side of the crossing. Drilling through coal beds can lead to degraded drilling fluid properites and a buildup of cuttings in the hole. We recommend the drilling fluid rheology be tested regularly during drilling operations to check that the drilling fliud properties are appropriate for removing cuttings from the hole.

HYDRAULIC FRACTURE AND DRILLING FLUID SURFACE RELEASE POTENTIAL

During HDD installation, drilling fluid is transported under pressure through the drill pipe string to the cutting tool. The total drilling fluid pressure at the cutting tool is a function of pumping pressures, the elevation difference between the drill rig and the cutting tool and friction losses. Soil and rock formations along the drill path experience maximum drilling fluid pressures in the immediate proximity of the drill bit or reaming tools. The energy (pressure) of the drilling fluid is steadily diminished along its path from the drill rig to the cutting tool and back to the rig. Thus, the pumping pressure required to circulate the drilling fluid increases as the drill bit advances farther from the drill rig. Typically, the annular drilling fluid pressure at the cutting tool can range from 15 to 25 percent of the pump pressure.

Drilling fluid circulation may be reduced or lost during HDD operations by drilling fluid loss to the surrounding soil or rock (formational fluid loss) or by the accumulation of cuttings downhole that create a blockage, which may result in hydraulic fracture. These processes are discussed below.

Formational Fluid Loss

Formational drilling fluid losses typically occur when the drilling fluid flows through the pore spaces in the soil through which the HDD profile passes, or within fractures contained in rock masses. Thus, a soil formation with a higher porosity, or a highly fractured bedrock, can potentially absorb a larger volume of drilling fluid than a soil formation with a lower porosity or a relatively unfractured bedrock formation. Silty sands, silts, clays and rock with RQD greater than 50 percent typically have a low susceptibility to formational drilling fluid losses. Coarse sand and gravel units with low percentages of silt and clay or rock with RQDs less than about 50 percent have a moderate to high susceptibility for drilling fluid loss. Infilling within fractures in bedrock can reduce the risk of formational fluid loss within bedrock units. The proper management of the drilling fluid properties can reduce the volume of formational drilling fluid loss.

Hydraulic Fracture

Hydraulic fracture is a term typically used to describe the condition in which the downhole drilling fluid pressure exceeds the overburden pressure and shear strength of the soil surrounding a drill path. Drilling fluid pressures used for HDD construction are not typically high enough to cause hydraualic fracture of intact bedrock because the shear strength of the rock far exceeds the drilling fluid pressures downhole. Soils that are most vulnerable to hydraulic fracture include relatively weak cohesive soils or loose granular soils with low shear strength. Medium dense to very dense sands and very stiff to hard silts and clays have a low to moderate hydraulic fracture potential. HDD installations with greater depth or drill paths in formations with higher shear strength, or intact rock formations may reduce the potential for hydraulic fracturing.

Drilling Fluids Surface Release

Drilling fluid surface release, commonly referred to as frac outs, occur when drilling fluid emerges at the ground surface. Drilling fluid surface releases, whether by formational fluid loss or hydraulic fracture, have the potential for releasing relatively large volumes of drilling fluid over a short period of time, particularly if the drill rig's high-pressure drilling fluid pumps are not immediately disengaged.

In practice, drilling fluid surface release most often occurs in close proximity to the entry and exit points where soil cover is thin. Drilling fluid surface release can also occur at locations along a drill path where there are low shear strength soils, or along preexisting fractures or voids in a rock formation. Other locations where drilling fluid surface releases can occur include exploratory boring locations, or along the sides of existing structures such as piles or utility poles. In some instances, drilling fluid can surface a significant distance from the HDD alignment as a result of drilling fluid flowing laterally through fractures and voids in rock formations.

Hydraulic Fracture and Drilling Fluid Surface Release Considerations

In order to provide an opinion of the potential for hydraulic fracture and drilling fluid surface release, we reviewed the subsurface soil and bedrock conditions along the proposed HDD profile. Our review considers soil and rock types reportedly encountered by the exploratory borings completed along the proposed drill path, and the susceptibility of those soil and rock types to hydraulic fracture or formational fluid loss. We also considered the drilling fluid pressures that will be required to move solids laden drilling fluid from the cutting tools to the entry point. Based on these considerations, and our HDD construction experience, we developed a qualitative opinion of the relative risk of drilling fluid surface release along the proposed HDD alignment.

We estimate the risk of hydraulic fracture is relatively low along much of the HDD alignment. This includes the portions of the alignment that cross the railroad line, Captina Creek and State Highway 148. This opinion is based on the relatively good quality sandstone and siltstone rock units expected along the majority of the HDD profile. It is our opinion the risk of drilling fluid surface release is moderate where the HDD profile is located within the overburden soils and lower quality limestone and shale units along the shallower portions of the HDD profile.

The evaluation of the hydraulic fracture potential in soil is defined by cavity expansion theory. However, cavity expansion theory cannot be applied to bedrock conditions. Currently, there are no widely accepted methods for calculating the safety factor against hydraulically fracturing bedrock during HDD operations. This is primarily because the annular drilling fluid pressures associated with HDD operations are well below that which is required to fracture even relatively weak/soft bedrock. In bedrock, the mechanism by which drilling fluid can be released to the ground surface during HDD activities is by following preexisting voids or fractures in the bedrock.

As with any HDD installation, drilling fluid surface releases are a possibility. As such, we recommend that contractor contingency and mitigation plans be implemented to help prevent drilling fluid surface releases and to respond to them in a timely manner should they occur. Contractor mitigation plans should include frequent monitoring of the HDD alignment for drilling fluid releases. During pilot hole operations, downhole annular drilling fluid pressures should be monitored to determine if downhole pressures exceed anticipated pressures. If downhole pressures substantially exceed the anticipated pressures, HDD drilling proceedures should be implemented to reduce the downhole pressures to the extent pactical.

HDD CONSTRUCTION CONSIDERATIONS

General

The HDD contractor's means and methods during construction are critical to the successful completion of the HDD. Specifically, while completing the pilot hole, only small deviations from the design for horizontal and vertical curvature should be allowed so that manageable pull load forces can be maintained. The HDD contractor's ability to maintain proper drilling fluid properties with appropriate penetration and drilling fluid flow rates will also be important factors to consider during HDD operations, because hole conditions and annular drilling fluid pressures will be directly affected by these operations.

Pilot Hole Considerations

The design drawing includes the necessary geometric information required to complete the pilot hole and should be provided to the selected HDD contractor along with this report.

We recommend that a secondary survey system (TruTracker, ParaTrack or equivalent) be used along the entire length of the HDD. The design radii of the entry and exit vertical curves of the HDD profile are 4,200 feet. We recommend a horizontal tolerance of 5 feet left and 5 feet right of the designed alignment. We recommend a vertical tolerance of 2 feet above and 10 feet below the designed profile.

Drill Hole Stability

In general, we do not expect the subsurface conditions to present uncontrollable hole stability problems; however, proper management of drilling fluid properties throughout the HDD installation process should help maintain the stability of the drilled hole. Care should be taken to remove the cuttings from the drilled hole through the soil sections to prevent an accumulation that might constrict or block the drilled hole.

Cuttings Removal and Annular Solids

If cuttings are not effectively removed from the hole during HDD operations, pullback forces could be excessively high during pullback of the product pipe. The product pipes could become lodged in the hole, or the product pipe could become damaged. The failure to effectively remove cuttings from the hole could potentially result in failure of the HDD installation. Therefore, we recommend the drilling contractor maintain drilling fluid returns at all times, and use appropriate means and methods (appropriate penetration rates, drilling fluid management, mechanical methods) to adequately remove the cuttings from the hole during the HDD process. In order to reduce the potential for down hole blockage during HDD operations, the annular solids in the drilling fluid should be maintained within acceptable limits, which is typically less than 30 percent.

Reaming Considerations

During the reaming operations, the rate of penetration and drilling fluid flow rates should be evaluated to reduce potential problems with inadequate removal of cuttings, hydraulic fracturing and drilling fluid surface releases. An annular solids percentage of 30 percent or less is generally considered acceptable; this requires pumping drilling fluid downhole at a flow rate such that the volume of drilling fluid is roughly three times the volume of soil cuttings being generated.

TECHNICAL REVIEW RESULTS, RISK DISCUSSION AND CONSIDERATIONS

Based on the information available at this time, and our evaluation of the geotechnical engineering and HDD design provided by the project team, it is our opinion the proposed Captina Creek HDD presents Rover with a conventionally acceptable level of risk if proper construction techniques are used. We anticipate the likelihood to be high for a prepared, qualified HDD contractor to successfully complete this crossing.

The contractor's means and methods during construction are critical to the successful completion of the HDD. The HDD contractor's ability to maintain proper drilling fluid properties with appropriate penetration and drilling fluid flow rates will be critical factors to consider during drilling, because hole conditions and annular drilling fluid pressures will be directly affected by these factors.

At the request of Rover, we anticipate that we (GeoEngineers) will provide on-site representation during the construction of the Captina Creek HDD to observe HDD construction operations; assess the compliance of the contractor with the design and contract documents; and provide recommendations for adjustments to construction operations, if/as necessary.

LIMITATIONS

We have prepared this review for use by Rover and the project team, their authorized agents and other approved members of the design team involved with this project. Our review is not intended for use by others, and the information contained herein is not applicable to other sites.

The geotechnical engineering services and HDD design drawings were completed by others for this phase of the project. The validity of our review is contingent upon the accuracy of the provded data.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in this area at the time the report was prepared. No warranty or other conditions, express or implied, should be understood.

CLOSING

We appreciate the opportunity to be of continued service to Rover. Please call if you have any questions concerning this report or if we can be of further assistance.

Sincerely,
GeoEngineers, Inc.

Jonathan L. Robison
Principal

Mark A. Miller
Principal

Daniel J. Campbell, PE
Senior Principal

STATE OF OHIO
DANIEL
CAMPBELL
E-76129
REGISTERED
PROFESSIONAL ENGINEER

5/12/17

MAM:JLR:DJC:kjb

Attachments:
Captina Creek HDD Issued For Construction Drawing

One copy submitted electronically

GeoEngineers
3050 South Delaware Avenue
Springfield, Missouri 65804
417.831.9700

May 12, 2017

Rover Pipeline, LLC
7015 Sunset Strip Avenue NW
N. Canton, Ohio 44720

Attention: Leon Banta, Project Director

Subject: Horizontal Directional Drill Technical Review
36-Inch Middle Island Creek HDD Design Review
Tyler County, West Vriginia
File No. 18782-017-01

INTRODUCTION AND PROJECT UNDERSTANDING

This report provides the independent third-party Horizontal Directional Drill (HDD) design review by GeoEngineers, Inc. (GeoEngineers) for the planned HDD crossing of Middle Island Creek in Tyler County, West Virginia. The design of the crossing is shown on the attached design drawing.

The Middle Island Creek HDD consists of a new 36-inch-diameter steel pipeline which will cross beneath Middle Island Creek and an existing pipeline. Rover Pipeline, LLC (Rover) has requested GeoEngineers to perform an independent third-party HDD design review, and provide an opinion of the hydraulic fracture and drilling fluid surface release potential by reviewing the design documentation. Terracon Consulting Engineers and Scientists (Terracon) provided the geotechnical engineering services for the project (report dated February 22, 2015) and Project Consulting Services (PCS) performed the HDD design for the crossing (design drawing dated July 25,2016).

GeoEngineers has reviewed the above-referenced geotechnical report and design drawing provided by Rover and the project team. Based on the provided information, it is our opinion that the proposed HDD presents Rover with a conventionally acceptable level of risk if proper construction techniques are used. We anticipate the likelihood to be high for a prepared, qualified HDD contractor to successfully complete this crossing. However, this opinion is based upon limited geotechnical information and the HDD contractor implementing plans and procedures that are in accordance with the generally accepted construction practices of the HDD industry. The contractor should address means and methods during the preconstruction and construction phases of the project to facilitate a successful installation of the HDD and attempt to mitigate possible difficulties arising during construction.

HDD DESIGN PARAMETERS

We reviewed the Issued for Construction (IFC) Middle Island Creek HDD design drawing prepared by PCS, dated July 25, 2016. The HDD has a horizontal length of approximately 2,744 feet. The HDD entry point is located approximately 1,100 feet southeast of Middle Island Creek at an approximate elevation of 756 feet. The exit point is located approximately 1,500 feet northwest of Middle Island Creek at an approximate elevation of 796 feet. The elevation of the deepest portion of the HDD profile is approximately 575 feet.

For this design, the entry angle is 14 degrees and the exit angle is 6 degrees. The design radii of curvature for the entry/exit vertical curve is 3,600 feet. Based on the HDD design drawing provided, this design geometry yields a depth of cover of approximately 60 feet beneath Middle Island Creek, which is the shallowest depth beneath the significant features being crossed. The design parameters for this crossing follow generally accepted design priciples for HDD installations of this type.

Subsurface Conditions

Based on the geotechnical data report provided by Terracon, the subsurface conditions generally consist of native soils to depths up to approximately 27 feet below ground surface (bgs). Below the soils, sedimentary bedrock was encountered to the termination depths of the borings. The units of bedrock consisted of sandstone, claystone, and shale with thin beds of siltstone (less than 5 feet thick) limestone (less than 4 feet thick) and coal (less than1 foot thick).

Based on the design profile provided by PCS, the majority of the HDD profile is located within good to excellent quality sandstone and claystone with Rock Quality Designation (RQD) values generally greater than 50 percent. The shallow portions of the HDD profile will pass through the overburden soils near the entry and exit points. We anticipate that the HDD profile will encounter relatively thin units of poor to good quality siltstone, shale and claystone interbedded within the previously described better quality sandstone and claystone units.

Within the depths of the designed HDD profile, the unconfined compressinve strengths of the rock samples tested ranged from about 750 pounds per square inch (psi) to approximately 20,700. We expect that some of the siltstone, claystone and shale units that were not tested for unconfined compressive strength may have lower shear strengths but these units will likely have shear strengths of several hundred psi.

Estimated Hole Opening Process

Based on our experience with similar HDD projects of this length and diameter, we anticipate that the pilot bit diameter will likely be 9⅞ to 12¼ inches. We also anticipate that the pilot hole will be advanced using a mud motor.

Upon the completion of the pilot hole, a reaming tool is used to enlarge the pilot hole to a diameter that will accommodate the product pipe. Based on the subsurface conditions observed in the exploratory borings completed at the site, this project will require the use of rock hole opening tools (reamers) to enlarge the pilot hole.

The diameter of each pass will increase in incremental steps (multiple reaming passes) until the desired diameter is reached, typically 12 inches. The final hole diameter for this crossing should be a minimum of 48 inches. Depending on conditions encountered during construction, the HDD contractor may elect to increase the final diameter of the hole.

Provided the contractor uses sound construction practices and proper tooling, good to excellent quality sedimentary rock formations, such as those anticipated along much of the proposed HDD path at this site are typically favorable for relatively low risk HDD installations.

HYDRAULIC FRACTURE AND DRILLING FLUID SURFACE RELEASE POTENTIAL

During HDD installation, drilling fluid is transported under pressure through the drill pipe string to the cutting tool. The total drilling fluid pressure at the cutting tool is a function of pumping pressures, the elevation difference between the drill rig and the cutting tool and friction losses. Soil and rock formations along the drill path experience maximum drilling fluid pressures in the immediate proximity of the drill bit or reaming tools. The energy (pressure) of the drilling fluid is steadily diminished along its path from the drill rig to the cutting tool and back to the rig. Thus, the pumping pressure required to circulate the drilling fluid increases as the drill bit advances farther from the drill rig. Typically, the annular drilling fluid pressure at the cutting tool can range from 15 to 25 percent of the pump pressure.

Drilling fluid circulation may be reduced or lost during HDD operations by drilling fluid loss to the surrounding soil or rock (formational fluid loss) or by the accumulation of cuttings downhole that create a blockage, which may result in hydraulic fracture. These processes are discussed below.

Formational Fluid Loss

Formational drilling fluid losses typically occur when the drilling fluid flows through the pore spaces in the soil through which the HDD profile passes, or within fractures contained in rock masses. Thus, a soil formation with a higher porosity, or a highly fractured bedrock, can potentially absorb a larger volume of drilling fluid than a soil formation with a lower porosity or a relatively unfractured bedrock formation. Silty sands, silts, clays and rock with RQD greater than 50 percent typically have a low susceptibility to formational drilling fluid losses. Coarse sand and gravel units with low percentages of silt and clay or rock with RQDs less than about 50 percent have a moderate to high susceptibility for drilling fluid loss. Infilling within fractures in bedrock can reduce the risk of formational fluid loss within bedrock units. The proper management of the drilling fluid properties can reduce the volume of formational drilling fluid loss.

Hydraulic Fracture

Hydraulic fracture is a term typically used to describe the condition in which the downhole drilling fluid pressure exceeds the overburden pressure and shear strength of the soil surrounding a drill path. Drilling fluid pressures used for HDD construction are not typically high enough to cause hydrauaulic fracture of intact redrock because the shear strength of the rock far exceeds the drilling fluid pressures downhole. Soils that are most vulnerable to hydraulic fracture include relatively weak cohesive soils or loose granular soils with low shear strength. Medium dense to very dense sands and very stiff to hard silts and clays have a low to moderate hydraulic fracture potential. HDD installations with greater depth or drill paths in formations with higher shear strength, or intact rock formations may reduce the potential for hydraulic fracturing.

Drilling Fluids Surface Release

Drilling fluid surface release, commonly referred to as frac outs, occur when drilling fluid emerges at the ground surface. Drilling fluid surface release, whether by formational fluid loss or hydraulic fracture, have

the potential for releasing relatively large volumes of drilling fluid over a short period of time, particularly if the drill rig's high-pressure drilling fluid pumps are not immediately disengaged.

In practice, drilling fluid surface release most often occurs in close proximity to the entry and exit points where soil cover is thin. Drilling fluid surface release can also occur at locations along a drill path where there are low shear strength soils, or along preexisting fractures or voids in a rock formation. Other locations where drilling fluid surface releases can occur include exploratory boring locations, or along the sides of existing structures such as piles or utility poles. In some instances, drilling fluid can surface a significant distance from the HDD alignment as a result of drilling fluid flowing laterally through fractures and voids in rock formations.

Hydraulic Fracture and Drilling Fluid Surface Release Considerations

In order to provide an opinion of the potential for hydraulic fracture and drilling fluid surface release, we reviewed the reported subsurface soil and bedrock conditions for the proposed HDD profile. Our review considers soil and rock types encountered by the three exploratory borings completed along the proposed drill path, and the susceptibility of those soil and rock types to hydraulic fracture or formational fluid loss. We also considered the drilling fluid pressures that will be required to move solids laden drilling fluid from the cutting tools to the entry point. Based on these considerations, and our HDD construction experience, we developed a qualitative opinion of the relative risk of drilling fluid surface release along the of the proposed HDD alignment.

We estimate that the risk of hydraulic fracture and subsequent drilling fluid surface release is relatively low along much of the HDD alignment in rock. This includes the portions of the alignment that cross Middle Island Creek. This opinion is based on the relatively good quality sandstone and claystone rock units expected along the majority of the HDD profile. We estimate that the downhole drilling fluid pressures should be much less than the shear strength of the rock units expected along the HDD profile. We estimate that the risk of formational fluid loss within the thinly bedded shale units is moderate, however, these units are typically overlain by more intact claystone and sandstone units that should help prevent drilling fluid surface releases. It is our opinion that the risk of drilling fluid surface release is moderate where the HDD profile is located within the overburden soils. Our estimated risk of drilling fluid surface release is contingent on the HDD contractor taking all practical measures to maintain drilling fluid returns and monitoring downhole annular drilling fluid pressures during the pilot hole.

The evaluation of the hydraulic fracture potential in soil is defined by cavity expansion theory. However, cavity expansion theory cannot be applied to bedrock conditions. Currently, there are no widely accepted methods for calculating the safety factor against hydraulically fracturing bedrock during HDD operations. This is primarily because the annular drilling fluid pressures associated with HDD operations are well below that which is required to fracture even relatively weak/soft bedrock. In bedrock, the mechanism by which drilling fluid can be released to the ground surface during HDD activities is by following preexisting voids, joints or fractures in the bedrock.

As with any HDD installation, drilling fluid surface releases are a possibility. As such, we recommend that contractor contingency and mitigation plans be implemented to help prevent drilling fluid surface releases and to respond to them in a timely manner should they occur. Contractor Mitigation plans should include frequent monitoring of the HDD alignment for drilling fluid releases. During pilot hole operations, downhole annular drilling fluid pressures should be monitored to determine if downhole pressures exceed anticipated

pressures. If downhole pressures substantially exceed the anticipated pressures, HDD drilling proceedures should be implemented to reduce the downhole pressures to the extent pactical.

HDD CONSTRUCTION CONSIDERATIONS

General

The HDD contractor's means and methods during construction are critical to the successful completion of the HDD. Specifically, while completing the pilot hole, only small deviations from the design for horizontal and vertical curvature should be allowed so that manageable pull load forces can be maintained. The HDD contractor's ability to maintain proper drilling fluid properties with appropriate penetration and drilling fluid flow rates will also be important factors to consider during HDD operations, because hole conditions and annular drilling fluid pressures will be directly affected by these operations.

Pilot Hole Considerations

The design drawing includes the necessary geometric information required to complete the pilot hole and should be provided to the selected HDD contractor along with this report.

We recommend that a secondary survey system (TruTracker, ParaTrack or equivalent) be used along the entire length of the HDD. The design radii of the entry and exit vertical curves of the HDD profile are 3,600 feet. We recommend a horizontal tolerance of 5 feet left and 5 feet right of the designed alignment. We recommend a vertical tolerance of 2 feet above and 10 feet below the designed profile.

Drill Hole Stability

In general, we do not expect the subsurface conditions to present uncontrollable hole stability problems; however, proper management of drilling fluid properties throughout the HDD installation process should help maintain the stability of the drilled hole. Care should be taken to remove the cuttings from the drilled hole through the soil sections to prevent an accumulation that might constrict or block the drilled hole.

Cuttings Removal and Annular Solids

If cuttings are not effectively removed from the hole during HDD operations, pullback forces could be excessively high during pullback of the product pipe. The product pipes could become lodged in the hole, or the product pipe could become damaged. The failure to effectively remove cuttings from the hole could potentially result in failure of the HDD installation. Therefore, we recommend that the drilling contractor maintain drilling fluid returns at all times, and use appropriate means and methods (appropriate penetration rates, drilling fluid management, mechanical methods) to adequately remove the cuttings from the hole during the HDD process. In order to reduce the potential for down hole blockage during HDD operations, the annular solids in the drilling fluid should be maintained within acceptable limits, which is typically less than 30 percent.

Reaming Considerations

During the reaming operations, the rate of penetration and drilling fluid flow rates should be evaluated to reduce potential problems with inadequate removal of cuttings, hydraulic fracturing and drilling fluid surface releases. An annular solids percentage of 30 percent or less is generally considered acceptable, this requires pumping drilling fluid downhole at a flow rate such that the volume of drilling fluid is roughly three times the volume of soil cuttings being generated.

TECHNICAL REVIEW RESULTS, RISK DISCUSSION AND CONSIDERATIONS

Based on the information available at this time, and our technical review of the geotechnical engineering and HDD design provided by the project team, it is our opinion that the proposed Middle Island Creek HDD presents Rover with a conventionally acceptable level of risk if proper construction techniques are used. We anticipate the likelihood to be high for a prepared, qualified HDD contractor to successfully complete this crossing.

The contractor's means and methods during construction are critical to the successful completion of the HDD. The HDD contractor's ability to maintain proper drilling fluid properties with appropriate penetration and drilling fluid flow rates will be critical factors to consider during drilling, because hole conditions and annular drilling fluid pressures will be directly affected by these factors.

At the request of Rover, we anticipate that we (GeoEngineers) will provide on-site representation during the construction of the Middle Island Creek HDD to observe HDD construction operations; assess the compliance of the contractor with the design and contract documents; and provide recommendations for adjustments to construction operations, if/as necessary.

LIMITATIONS

We have prepared this review for use by Rover and the project team, their authorized agents and other approved members of the design team involved with this project. The review is not intended for use by others, and the information contained herein is not applicable to other sites.

The geotechnical engineering services and HDD design drawings were completed by others for this phase of the project. The validity of our review is contingent upon the accuracy of the provded data.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in this area at the time the report was prepared. No warranty or other conditions, express or implied, should be understood.

CLOSING

We appreciate the opportunity to be of continued service to Rover. Please call if you have any questions concerning this report or if we can be of further assistance.

Sincerely,
GeoEngineers, Inc.

Jonathan L. Robison
Principal

Daniel J. Campbell, PE
Senior Principal

DANIEL J. CAMPBELL REGISTERED 19532 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER

5/12/2017

Mark A. Miller
Principal

List of Attachments:
Captina Creek HDD Issued For Construction Drawing

One copy submitted electronically