COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
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Secretary of Natural Resources

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Director

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July 5, 2017

Ms. Amanda B. Tornabene
Director Environmental Services
Dominion Energy Services Inc.
5000 Dominion Boulevard,
Glen Allen, VA 23060

Subject: Dominion Energy Transmission, Inc: Annual Standards and Specifications for Erosion & Sediment Control and Stormwater Management

Dear Ms. Tornabene:

The Virginia Department of Environmental Quality (DEQ) hereby approves the Annual Standards and Specifications for Erosion & Sediment Control (ESC) and Stormwater Management (SWM) for Dominion Energy Transmission, Inc. (DETI) as revised June 2017.

Please note that your approved Annual Standards and Specifications include the following requirements:

1. Projects with land disturbing activities $\geq$10,000 ft^2 or $\geq$ 2,500 ft^2 in Chesapeake Bay Preservation Areas require a DETI review and approval of an ESC plan;
2. Projects with land disturbing activities $\geq$1 acre or $\geq$ 2,500 ft^2 in Chesapeake Bay Preservation Areas require a DETI review and approval of a SWM plan;
3. ESC variance requests must be submitted to DEQ and will be reviewed in accordance with ESC (9VAC25-840-50) requirements;
4. SWM exception requests must be submitted to DEQ and will be reviewed in accordance SWM (9VAC25-870-57) requirements;
5. Requests for use of Guidance Memorandum No:15-2003 - Postdevelopment Stormwater Management Implementation Guidance for Linear Utility Projects must be submitted to DEQ for approval;
6. The following information must be submitted to DEQ at least two weeks in advance of the commencement of land-disturbing activities for each project. Notifications shall be sent by email to: linearprojects@deq.virginia.gov.
    - i: Project name;
    - ii: Project location (including nearest intersection, latitude and longitude, access point, traversed localities);

iii: On-site project manager name and contact info;
iv: Responsible Land Disturber (RLD) name and contact info;
v: DEQ-Certified ESC and SWM Inspector name and contact info;
vi: Project description;
vii: Acreage of disturbance for project; and
viii: Project start and finish date.

Also please note that Appendix G of your approved Annual Standards and Specifications includes ACP Project requirements. Requirements that are specific to the Atlantic Coast Pipeline (ACP) project include the following:

1. Notification information identified in item 6 above is required for each separate land disturbance construction area spread;
2. In addition to DETI's internal review process, the site specific ESC (9VAC25-840-40) and SWM (9VAC25-870-55) plan is required to be submitted to DEQ for review and approval;
3. The initial draft and final site specific ESC and SWM plan, and supporting documents must be posted on ACP's website for public view;
4. Inspection reports conducted by ACP as well as complaint logs and complaint responses must be submitted to DEQ in accordance with the Annual Standards and Specifications requirements for the ACP project.

Attachment B of your submittal also includes deviations from the Virginia Erosion and Sediment Control Handbook (VESCH) for the ACP Project. These alternative ESC practices and procedures are not considered ESC variances as long as the alternate measures proposed meet the regulatory requirement of the minimum standards (9VAC25-840-40). DEQ uses the VESCH as guidance on the acceptable methods to meet the required minimum standards. DEQ believes that these alternative methods in Attachment B may be used for the ACP project to meet the regulatory requirements of the minimum standards contingent on DEQ review and approval of the site specific ESC plan. If in the field these alternatives are found to be deficient, other ESC measures will be necessary to ensure compliance with the regulatory requirements.

To ensure compliance with approved specifications, the Virginia Erosion and Sediment Control Law and the Virginia Stormwater Management Act, DEQ staff will conduct random site inspections, respond to complaints, and provide on-site technical assistance with specific erosion and sediment control and stormwater management measures and plan implementation.

Section 62.1-44.15:55.E of the Virginia Erosion and Sediment Control law and Section 62.1-44.15:31.D of the Virginia Stormwater Management Act authorizes the state to charge fees for costs incurred in implementing the standards and specifications program. Please see the enclosed invoice for Annual Standards and Specifications services.

Please contact Hannah Zegler (804-698-4206) or Larry Gavan (804-698-4040) should you have any questions concerning your Annual Standard and Specifications requirements.

Sincerely,

Frederick K. Cunningham
Director, Office of Water Permits

Cc: Karl Kratzer
Robert Hare
Melanie Davenport, DEQ-CO
Ben Leach, DEQ-CO
Larry Gavan, DEQ-CO
Hannah Zegler, DEQ-CO

Case Decision Information:
As provided by Rule 2A:2 of the Supreme Court of Virginia, you have thirty days from the date of service (the date you actually received this decision or the date it was mailed to you, whichever occurred first) within which to appeal this decision by filing a notice of appeal in accordance with the Rules of the Supreme Court of Virginia with the Director, Department of Environmental Quality. In the event that this decision is served on you by mail, three days are added to that period.

Dominion Energy Services, Inc.
5000 Dominion Boulevard, Glen Allen, VA 23060
DominionEnergy.com

June 29, 2017

BY OVERNIGHT OF EXPRESS MAIL

Mr. Fred Cunningham
Office of Stormwater Management
629 East Main Street
Richmond, VA 23219

RE: Dominion Transmission, Inc.
Annual Standards and Specifications- June 23 Revision
Alternative ESC Practices and Procedures – June 23 Revision

Dear Mr. Cunningham:

Enclosed for your review are the revised *Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management for Construction and Maintenance of Gas Transmission Facility Projects* for Dominion Energy Transmission, Inc. The specifications have been revised to incorporate all of the comments received on June 20, 2017 from the DEQ. All requested changes have been made in the document with the exception of Comment 5.

Regarding Comment 5: (Appendix I, p.34) – Please change 'VESCP Authority' to "AS&S holder".

Response: The language requested for edit refers to an internal policy document which is provided for reference only. The definition used in that document comports directly with the language in the regulations. The requirement for the AS&S holder (DETI) to have properly certified personnel is clearly articulated in Section 2 of the AS&S document.

The Annual Standards and Specifications (inclusive of all Appendices) are enclosed as **Attachment A**. A digital copy of the document with track changes has been included for your review.

Concurrently, we are submitting the revised Alternative ESC Practices and Procedures proposed for use on the Atlantic Coast Pipeline (ACP) project, along with supporting information. The adaptations/ alternative practices are summarized in a table, and typical scenarios for steep slope hazard mitigation are provided. The variances requests are enclosed as **Attachment B**, and are requested due to the unique constraints and challenges for the project.

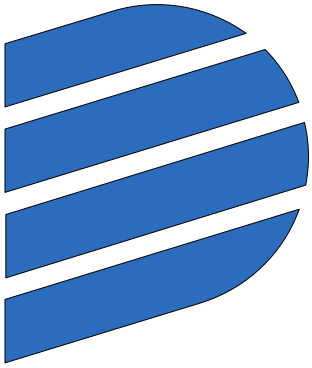
We respectfully request approval of these Annual Standards and Specifications and the concurrently submitted variance requests. If you have any questions concerning this submittal or need additional information, please contact Karl R. Kratzer at (804) 273-2914 or Karl.R.Kratzer@dom.com.

Sincerely,

Amanda B Tornabene
Director Environmental Services (Corporate Air, Gas Infrastructure, Power Delivery)

Enclosures
cc: Mr. Karl Kratzer
Mr. Robert Hare

bcc: Pam Faggert
Amanda Tornabene
Neil Robinson
Richard Gangle
Hannah Zegler, VADEQ



Dominion Energy®

2017

ANNUAL STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL AND STORMWATER MANAGEMENT FOR CONSTRUCTION AND MAINTENANCE OF GAS TRANSMISSION FACILITY PROJECTS IN VIRGINIA

Submitted By:

Dominion Energy Transmission, Inc.

707 East Main Street, 19th Floor, Richmond, Virginia 23219

JUNE 2017

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1. ANNUAL STANDARDS AND SPECIFICATIONS ADMINISTRATION

Dominion Energy Transmission Inc. (DETI) is responsible for administering, implementing and complying with the Annual Standards and Specifications for Erosion and Sediment Control (ESC) and Stormwater Management (SWM) for Gas Transmission Facility Development. In accordance with Va. Code §§ 62.1-44.15:54.E and 62.1-44.15:27.F, this document serves as the annual submittal to the Virginia Department of Environmental Quality (DEQ) of standards and specifications developed so that DETI can continue to operate under Annual Standards and Specifications for ESC and SWM. This document addresses stormwater management and ESC and establishes general specifications for the control of erosion and sedimentation and stormwater runoff management as a result of land-disturbing activities[1] performed during the construction, operation and maintenance of natural gas pipelines. These Annual Standards and Specifications for ESC and SWM shall be consistent with the requirements of the Virginia Erosion and Sediment Control Law and associated regulations and the Virginia Stormwater Management Act and associated regulations, where applicable. The specifications shall apply to applicable natural gas transmission facility projects pursuant to subdivision 1 of § 62.1-44.15:55 of the Code of Virginia, which allows annual standards and specifications for, "Construction, installation or maintenance of electric transmission, natural gas and telephone utility lines and pipelines, and water and sewer lines." DETI projects not provided for in subdivision 1, and not otherwise exempted from ESC or SWM requirements, will comply with the requirements of the local or state authority in the locality in which the project is located.

In accordance with federal law, construction stormwater permits issued under a delegated National Pollutant Discharge Elimination System (NPDES) permit like the one in place in Virginia cannot be required unless there is a triggering event (i.e., the release of a hazardous substance in excess of its reportable quantity or a discharge that contributes to a violation of a water quality standard). See 33 U.S.C. § 1342(l)(2); 40 C.F.R. § 122.26(c)(1)(iii); Natural Resources Defense Council v. United States Environmental Protection Agency, 526 F.3d 591 (9th Cir. 2008) (invalidating EPA's unconditional exemption in 40 C.F.R. § 122.26(a)(2) and reinstating the conditional exemption). This exemption is embodied in the Virginia Stormwater Management Program (VSMP) Regulation in 9VAC25-870-380A(2) which states: "*The board*

[1] For stormwater management compliance, "*Land disturbance" or "land-disturbing activity" means a manmade change to the land surface that potentially changes its runoff characteristics including clearing, grading, or excavation, except that the term shall not include those exemptions specified in § 62.1-44.15:34 of the Code of Virginia*. For Erosion and Sediment Control compliance, ""*Land-disturbing activity" means any man-made change to the land surface that may result in soil erosion from water or wind and the movement of sediments into state waters or onto lands in the Commonwealth, including, but not limited to, clearing, grading, excavating, transporting, and filling of land…*" with exemptions defined per § 62.1-44.15:51, and

may not require a state permit for discharges of stormwater runoff from mining operations or oil and gas exploration, production, processing or treatment operations, or transmission facilities, composed entirely of flows that are from conveyances or systems of conveyances (including but not limited to pipes, conduits, ditches, and channels) used for collecting and conveying precipitation runoff and that are not contaminated by contact with or that has not come into contact with, any overburden, raw material, intermediate products, finished product, by-product or waste products located on the site of such operations."

DETI intends to follow the provisions outlined in DEQ Guidance Memorandum No. 15-2003 (GM15-2003), when applicable. GM15-2003 provides guidance on stormwater implementation for linear utility projects under the Virginia Stormwater Management Program. The guidance document describes general terms and conditions under which linear utility projects are expected to operate if they are to maintain exemption from Stormwater Management Plan submission and CGP coverage requirements. The review for initial applicability of GM15-2003 to a specific project will be conducted and documented by Dominion using DEQ-certified Plan Reviewers early in the project planning process. DETI will then contact DEQ for a preliminary review to determine whether GM15-2003 will be applicable to the project, prior to the development of detailed ESC and SWM plans. The preliminary submission and review must include sufficient information (estimated extent of land disturbance, estimated land cover conditions, anticipated sequence of construction, anticipated drainage features and receiving outfalls, etc.) for DEQ to review applicability under the Guidance Memorandum and notify DETI if a SWM plan will be required. DEQ has indicated that the review and coordination to determine if a SWM plan waiver will be issued will typically take less than 30 days (typically 7 days for initial review and then subsequent time for revisions, meetings and coordination). DEQ advises that face-to-face project review meetings with the project proponent are often an easy way to secure feedback early in the planning process. If DEQ concurs that the project qualifies under GM15-2003, detailed erosion control plans will be developed (and annotated in accordance with the guidance memorandum), reviewed and approved by Dominion prior to engaging in land disturbance. DETI may be required by DEQ to produce additional documentation of water quantity or water quality calculations/analysis to demonstrate the applicability of Guidance Memo No. 15-2003. If GM15-2003 is determined to not be applicable, the stormwater-related technical criteria set forth in Appendix B must be implemented, unless an exception is secured. Note that permanent access roads are generally not envisioned to qualify under GM 15-2003 and will require stormwater management or an exception from the DEQ (see Appendix B for more information/discussion).

The gas transmission facilities covered under these Annual Standards and Specifications from ESC and SWM are envisioned to primarily include conventional buried pipeline systems consistent with subdivision 1 of § 62.1-44.15:55 of the Code of Virginia including associated

valves, pigging facility launchers and receivers, odorization facilities, measurement and regulation stations, points of delivery, compressor stations, and necessary access. These Annual Standards and Specifications for ESC and SWM must be submitted annually to DEQ for review and approval. DETI is responsible for ensuring that individual project plans are developed and implemented in compliance with these Annual Standards and Specifications and applicable laws and regulations. As a holder of Annual Standards and Specifications, DETI ensures compliance with these Annual Standards and Specifications for ESC and SWM for gas pipeline projects through self-administration of these Standards and Specifications, including plan review, inspections, and overall compliance rather than the individual localities in which the projects are located. DETI may be required to submit relevant project documentation and plans for covered activities to the DEQ. DEQ receives regular notifications of the work done by DETI, and provides random site inspections and inspections in response to complaints to assure compliance. Enforcement shall be administered by the DEQ and the State Water Control Board where applicable. DEQ and the State Water Control Board has the authority to enforce these specifications, to take enforcement actions, and to charge fees for the costs of review and approval of standards and specifications, project inspections and compliance pursuant to § 62.1-44.15:55(D).2.

These Annual Standards and Specifications for ESC and SWM also assist DETI in meeting the standards of the Federal Energy Regulatory Commission (FERC) Upland Erosion Revegetation and Maintenance Plan (Plan) and the FERC Wetland and Waterbody Construction and Mitigation Procedures (Procedures) (FERC, 2013). A copy of the Plan and Procedures can be found in Appendix C and D. DETI and its construction contractors must implement this plan as appropriate for all construction in Virginia unless a project-specific variance to the Virginia Erosion and Sediment Control Laws and regulation and/or exception under the Virginia Stormwater Management Act and associated regulations has been reviewed and granted by the DEQ. In instances where the requirements or practices differ between the Virginia Erosion and Sediment Control Handbook and the FERC Plan and Procedures guidance, the more stringent criteria shall be applied. The Annual Standards and Specifications will be compared to FERC's Plan and Procedures to determine the appropriate (i.e., whichever is more stringent) best management practices. Project variance and exception requests will be considered freestanding of this Annual Standards and Specifications submission and will be considered by DEQ on a site-specific basis.

Approved deviation requests (DEQ approved deviations from guidance documents (e.g. VESCH)) and the associated DEQ approval letters will also be appended to these Annual Standards in Appendix H, since these technical modifications to practices may be applied more broadly to many projects.

DETI anticipates that gas transmission projects will remain exempt from the *General VPDES Permit for Discharges of Stormwater from Construction Activities* (9VAC25-880) (also referred to more generally as the construction general permit) pursuant to federal and state exemptions. Each project will be reviewed for consistency with these exemptions or the appropriate requirements and GM15-2003, and applicable stormwater management provisions (see Appendix B) are incorporated in these Annual Standards and Specifications for ESC and SWM if the DEQ requires a construction general permit (CGP) for a specific project, or determines that GM15-2003 will not apply.

1.1 PROJECT TRACKING AND REPORTING

DETI is responsible for providing project tracking and e-notification to DEQ of all regulated land-disturbing activities subject to these Annual Standards and Specifications to comply with applicable ESC requirements pursuant to 9VAC25-840-65 and applicable SWM requirements pursuant to 9VAC25-870-170.

The DETI project team must electronically notify the DEQ of any project that DETI intends to construct in Virginia to start the project permitting process. The following information is required to be included in the e-notification two weeks prior to initiating the regulated land disturbing activity (LDA):

- Project name or project number
- Project location (including nearest intersection, latitude, and longitude)
- On-site project manager name and contact info
- Responsible Land Disturber (RLD) name and contact info
- Project description
- Acreage of disturbance for project
- Project start and finish date
- Any variances/waivers/exceptions associated with the project

Notification must be made electronically to Linearprojects@deq.virginia.gov. Other questions should be directed to Larry Gavan (804-698-4040) and Hannah Zegler (804-698-4206).

Under the Construction General Permit (CGP), if applicable, the operator shall post the notice of coverage letter at a publicly accessible location near an active part of the construction project (e.g. where pipeline crosses a public road). The operator shall maintain the posted information until the termination of the general permit. The operator will also make the SWPPP available as follows:

1. Operators with day-to-day operational control over SWPPP implementation shall have a copy of the SWPPP available at a central location on-site for use by those

identified as having responsibilities under the SWPPP whenever they are on the construction site.

2. The operator shall make the SWPPP and all amendments, modifications, and updates available upon request to the department, the VSMP authority, the EPA, the VESCP authority, local government officials, or the operator of a municipal separate storm sewer system receiving discharges from the construction activity. If an on-site location is unavailable to store the SWPPP when no personnel are present, notice of the SWPPP's location must be posted near the main entrance of the construction site.

The operator shall make the SWPPP available for public review in an electronic format or in hard copy. Information for public access to the SWPPP shall be posted and maintained in accordance with Part II C. If not provided electronically, public access to the SWPPP may be arranged upon request at a time and at a publicly accessible location convenient to the operator or his designee but shall be no less than once per month and shall be during normal business hours. Information not required to be contained within the SWPPP by this general permit is not required to be released.

1.2 EROSION AND SEDIMENT CONTROL - Quarterly Reports

DETI will report, on a quarterly basis, a listing of each regulated land-disturbing activity for which an ESC plan (and a SWM plan if applicable) has been approved under these Annual Standards and Specifications for ESC and SWM, and the construction status (construction ongoing, not started, completed during quarter), to DEQ quarterly. The report must include the following:

- Project name or project number
- Project location (including nearest intersection, latitude, and longitude)
- On-site project manager name and contact info (if applicable)
- Responsible Land Disturber (RLD) name and contact info
- Project description
- Acreage of disturbance for project
- Anticipated project start and finish date
- Any approved variances/exceptions associated with the project

1.3 STORMWATER MANAGEMENT – Annual Reports

Stormwater Management Plans will be required for DETI projects when projects are unable to satisfy the terms and conditions contained in DEQ Guidance Memo No. 15-2003, or are determined not to be exempt from associated requirements of the *General VPDES Permit for Discharges of Stormwater from Construction Activities* (9VAC25-880) (referred to more generally as the construction general permit or CGP). When applicable, DETI will assure that SWM plans and associated Stormwater Pollutant Prevention Plans (SWPPPs) and CGP registrations statements are prepared, reviewed, and approved prior to initiating regulated land disturbing activities. The technical criteria for SWM are addressed in Appendix B of these Annual Standards and Specifications for ESC and SWM.

On a fiscal year basis (July 1 to June 30), DETI will report to the department by October 1 of each year in a format provided by DEQ. The information to be provided shall include the following:

1. Information on each permanent stormwater management facility completed during the fiscal year to include type of stormwater management facility, geographic coordinates, acres treated, and the surface waters or karst features into which the stormwater management facility will discharge;

2. Number and type of enforcement actions during the fiscal year; and

3. Number of exceptions granted during the fiscal year.

1.4 RECORDKEEPING

DETI must keep records in accordance with the following:

- All individual project records, including approved plans, inspection records, documented field changes, and CGP registration statements (if applicable) must be maintained for a period of three years after completion of the project or state permit termination. This period of retention shall be extended automatically during the course of any unresolved litigation regarding the regulated activity or regarding control standards applicable to DETI, or as requested by the State Water Control Board.
- A construction record drawing for all permanent, structural stormwater management facilities (“as-built”) with seal and signature of a Virginia-licensed Professional Engineer must be maintained by DETI in perpetuity, or until the stormwater facility is removed.
- Stormwater management facility inspection records must be documented and retained for at least five years from the date of inspection.

1.5 PLAN DESIGN, REVIEW, AND APPROVAL

This section outlines requirements for Erosion and Sediment Control and Stormwater Management, along with applicable plan contents for review and approval by DEQ certified personnel (as described in Section 2 of this document) prior to initiating regulated land disturbing activities.

1.5.1 ESC REQUIREMENTS

DETI follows the policies and procedures described in the Virginia Erosion and Sediment Control Handbook (VESCH). The use of the VESCH, along with accompanying technical documents and guidance, is strongly preferred. DETI utilizes a comprehensive design, review and approval program that includes review for consistency with both the general specifications for Minimum Standards and Specifications (STDS & SPEC) and the FERC Plan and Procedures. The FERC Plan and Procedures (Appendices C and D) are hereby incorporated by reference and must be utilized on all FERC-regulated DETI projects. In the event of differences between the FERC Plan and Procedures and the VESCH criteria, the more stringent criteria shall apply. The Annual Standards and Specifications will be compared to FERC's Plan and Procedures to determine the appropriate (i.e., whichever is more stringent) best management practices. The general specifications for ESC apply to land-disturbing activities and are included in these Annual Standards and Specifications by reference, as follows:

- Virginia Erosion and Sediment Control Law (§62.1-44 et seq. as amended);
- Virginia Erosion and Sediment Control Regulations (9VAC25-840 et seq. as amended);
- Virginia Erosion and Sediment Control and Stormwater Management Certification Regulations (9VAC25-850 et seq. as amended);
- Virginia Erosion and Sediment Control Handbook, 1992, as amended, and related technical documents and guidance specifications;
- Technical Bulletins and Memos, as amended, on the DEQ website.

ESC plans and documents must be submitted to the designated Plan Reviewer (defined in Section 2.2) for review and approval. Plans must be reviewed and approved by DEQ certified personnel (*as described in Section 2, Personnel Roles and Responsibilities*) to ensure compliance with these Annual Standards and Specifications for ESC and SWM and reviewed by DETI for consistency with the FERC Plan and Procedures guidance. Any non-VESCH control measures incorporated into plans must include all applicable practical information including definition, purpose, conditions where practice applies, planning considerations, design criteria, construction specifications, design tables and plates and maintenance/inspection requirements. Should non-VESCH control measures fail to effectively control soil erosion, sediment deposition, and non-agricultural runoff, then VESCH control measures shall be utilized. All documents submitted for

review must include the appropriate information, as described below (and shown in the flow chart below) in addition to the ESC Plan Checklist (Appendix A).

1.5.2 ESC PLAN CONTENTS

As applicable, ESC drawings must include the following:

a) Minimum standards 1 through 19 as applicable;
b) General Erosion and Sediment Control Notes ES-1 through ES-9 (Appendix E);
c) Total area of disturbance. If the project is phased, the total area of disturbance for each phase must be noted;
d) Pre-development and post-development land cover conditions
e) Construction sequence of operations with staged implementation of ESC measures for each phase;
f) Existing features that will be demolished or removed that may require ESC measures;
g) Erosion and Sediment Control Critical Areas identification and discussion;
h) Location of various support activities including, but not limited to, areas where wash water may occur; storage area for chemicals, fuels and fertilizers; concrete wash out areas; vehicle fueling and maintenance areas; sanitary waste facilities and construction waste storage; and
i) Information suitable for drainage and ESC review (may include drainage areas, flow paths, points of analysis, outfalls, or other drainage patterns) should be submitted (either on the plans or in supporting documentation).
j) When applicable, the location of the on-site rain gauge must be included.

The Erosion and Sediment Control Plan Checklist is included in Appendix A.

1.5.3 SWM REQUIREMENTS

Portions of these Annual Standards and Specifications related to Stormwater Management shall apply to regulated land-disturbing activities which are not exempted under GM 15-2003 from SWM plan submission and/or projects which are required to obtain CGP coverage. The following requirements shall apply, when applicable, and are hereby incorporated by reference:

- Virginia Stormwater Management Act (§62.1-44 et seq. as amended);
- Virginia Stormwater Management Permit Regulations (9VAC25-870 et seq. as amended);
- Virginia Stormwater Management Handbook, 1999, as amended; and
- Technical Bulletins and Memos, as amended, on the DEQ website.
- DEQ Guidance Memorandum No. 15-2003 (GM 15-2003)
- Construction General Permit Regulation 9VAC25-880 et seq.
- Standards and Specifications for stormwater practices as published on the Virginia Stormwater BMP Clearinghouse (http://www.vwrrc.vt.edu/swc/index.html).

Off-site credit use should be coordinated with the DEQ Central Office Nutrient Credit Coordinator (Derick Winn, Office of Stormwater Permits: 804-698-4114).

1.5.4 SWM PLAN CONTENTS

ESC and SWM/SWPPP plans and documents must be submitted to the designated Plan Reviewer (certified in accordance with Section 2 of this document) for review and approval. Plans must be reviewed to ensure compliance with these Annual Standards and Specifications for ESC and SWM.

If applicable, the stormwater management plan shall be implemented as approved or modified by DETI and shall be developed in accordance with the following:

1. A stormwater management plan for a land-disturbing activity shall apply the stormwater management technical criteria set forth in this part to the entire land-disturbing activity. Individual lots in new residential, commercial, or industrial developments shall not be considered separate land-disturbing activities.

2. A stormwater management plan shall consider all sources of surface runoff and all sources of subsurface and groundwater flows converted to surface runoff.

A complete stormwater management plan shall include the following elements:

1. Information on the type of and location of stormwater discharges, information on the features to which stormwater is being discharged including surface waters or karst features if present, and predevelopment and postdevelopment drainage areas;

2. Contact information including the name, address, telephone number, and email address of the owner and the tax reference number and parcel number of the property or properties affected;

3. A narrative that includes a description of current site conditions and final site conditions or if allowed by the VSMP authority, the information provided and documented during the review process that addresses the current and final site conditions;

4. A general description of the proposed stormwater management facilities and the mechanism through which the facilities will be operated and maintained after construction is complete;

5. Information on the proposed stormwater management facilities, including (i) the type of facilities; (ii) location, including geographic coordinates; (iii) acres treated; and (iv) the surface waters or karst features into which the facility will discharge;

6. Hydrologic and hydraulic computations, including runoff characteristics;

7. Documentation and calculations verifying compliance with the water quality and quantity requirements of these regulations;

8. A map or maps of the site that depicts the topography of the site and includes:

a. All contributing drainage areas;

b. Existing streams, ponds, culverts, ditches, wetlands, other water bodies, and floodplains;

c. Soil types, geologic formations if karst features are present in the area, forest cover, and other vegetative areas;

d. Current land use including existing structures, roads, and locations of known utilities and easements;

e. Sufficient information on adjoining parcels to assess the impacts of stormwater from the site on these parcels;

f. The limits of clearing and grading, and the proposed drainage patterns on the site;

g. Proposed buildings, roads, parking areas, utilities, and stormwater management facilities; and

h. Proposed land use with tabulation of the percentage of surface area to be adapted to various uses, including but not limited to planned locations of utilities, roads, and easements;

9. If an operator intends to meet the requirements established in 9VAC25-870-63 or 9VAC25-870-66 through the use of off-site compliance options, where applicable, then a letter of availability from the off-site provider must be included; and

10. If payment of a fee is required with the stormwater management plan submission by the VSMP authority, the fee and the required fee form in accordance with Part XIII (9VAC25-870-700 et seq.) must have been submitted.

Elements of the stormwater management plans that include activities regulated under Chapter 4 (§ 54.1-400 et seq.) of Title 54.1 of the Code of Virginia shall be appropriately sealed and signed by a professional registered in the Commonwealth of Virginia pursuant to Article 1 (§ 54.1-400 et seq.) of Chapter 4 of Title 54.1 of the Code of Virginia.

A construction record drawing for permanent stormwater management facilities shall be submitted to the VSMP authority in accordance with 9VAC25-870-108 and 9VAC25-870-112.

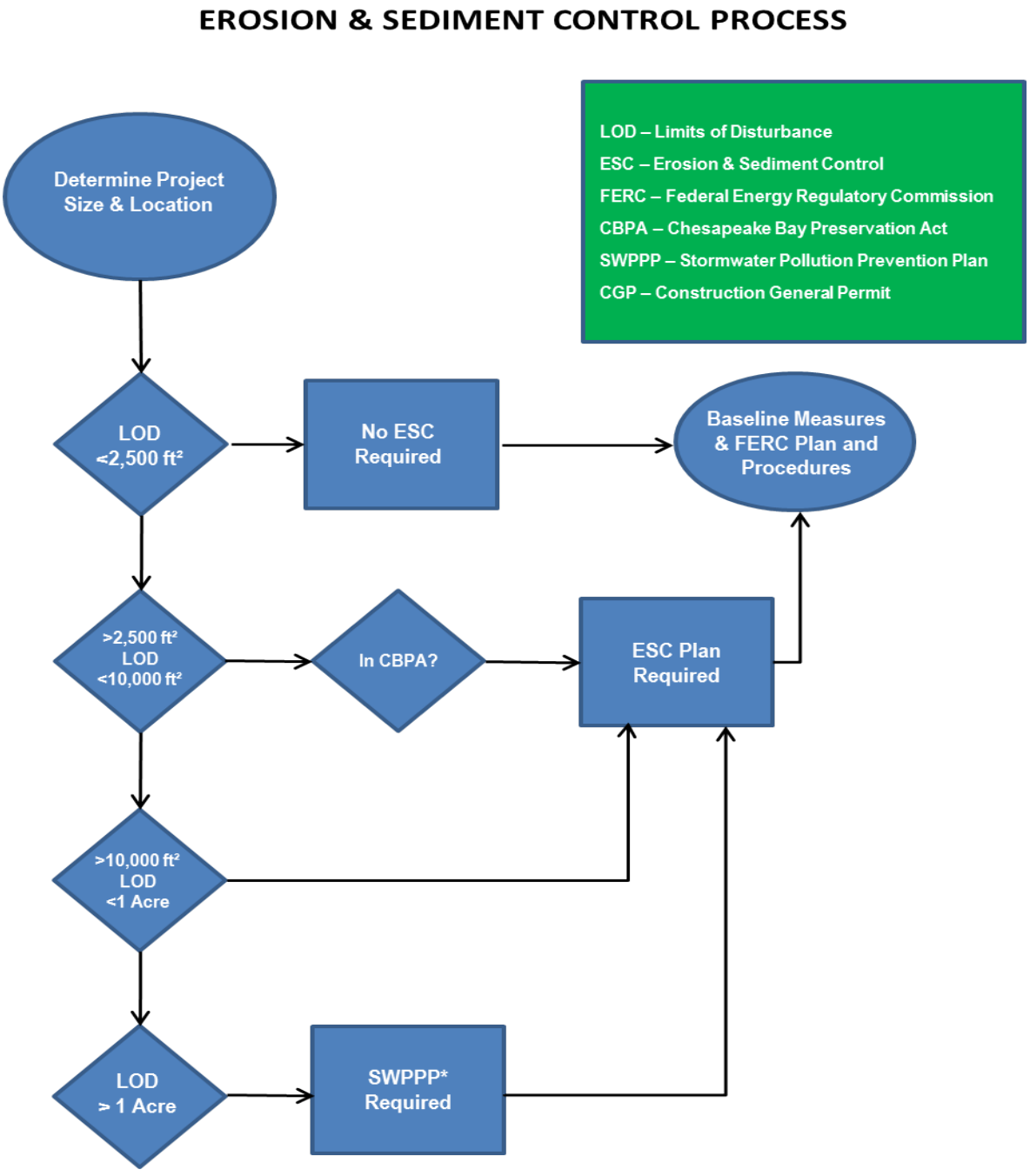
The construction record drawing shall be appropriately sealed and signed by a professional registered in the Commonwealth of Virginia, certifying that the stormwater management facilities have been constructed in accordance with the approved plan.

DETI Plan Review personnel (see Section 2.0) will verify whether a SWM plan is required for submission (as outlined above) and will document that the required elements above are included, when applicable. In addition to the above elements, the following documentation will be reviewed and approved prior to initiating the land disturbing activity:

- If applicable, the Stormwater Pollution Prevention Plan (SWPPP), inclusive of registration statement, Pollution Prevention Plan, Erosion and Sediment Control Plan, and Stormwater Management Plan and Calculations;
- If a SWPPP and/or CGP is required for a project, applicable TMDL information and general information shall be included, in addition to the required registration statement.
- Post-construction maintenance requirements of permanent BMPs, if applicable (See Appendix B);
- Manufacturer's recommended maintenance and inspection of manufactured permanent BMPs (per the BMP Clearinghouse);
- Post-construction inspection requirements for permanent BMPs;
- A map or digital file, including the appropriate base data, delineating the area treated by the BMP;
- A map or digital file, including the appropriate base data, depicting the applicable area used to determine percent impervious cover; and
- SWM Plan Checklist (Appendix B).

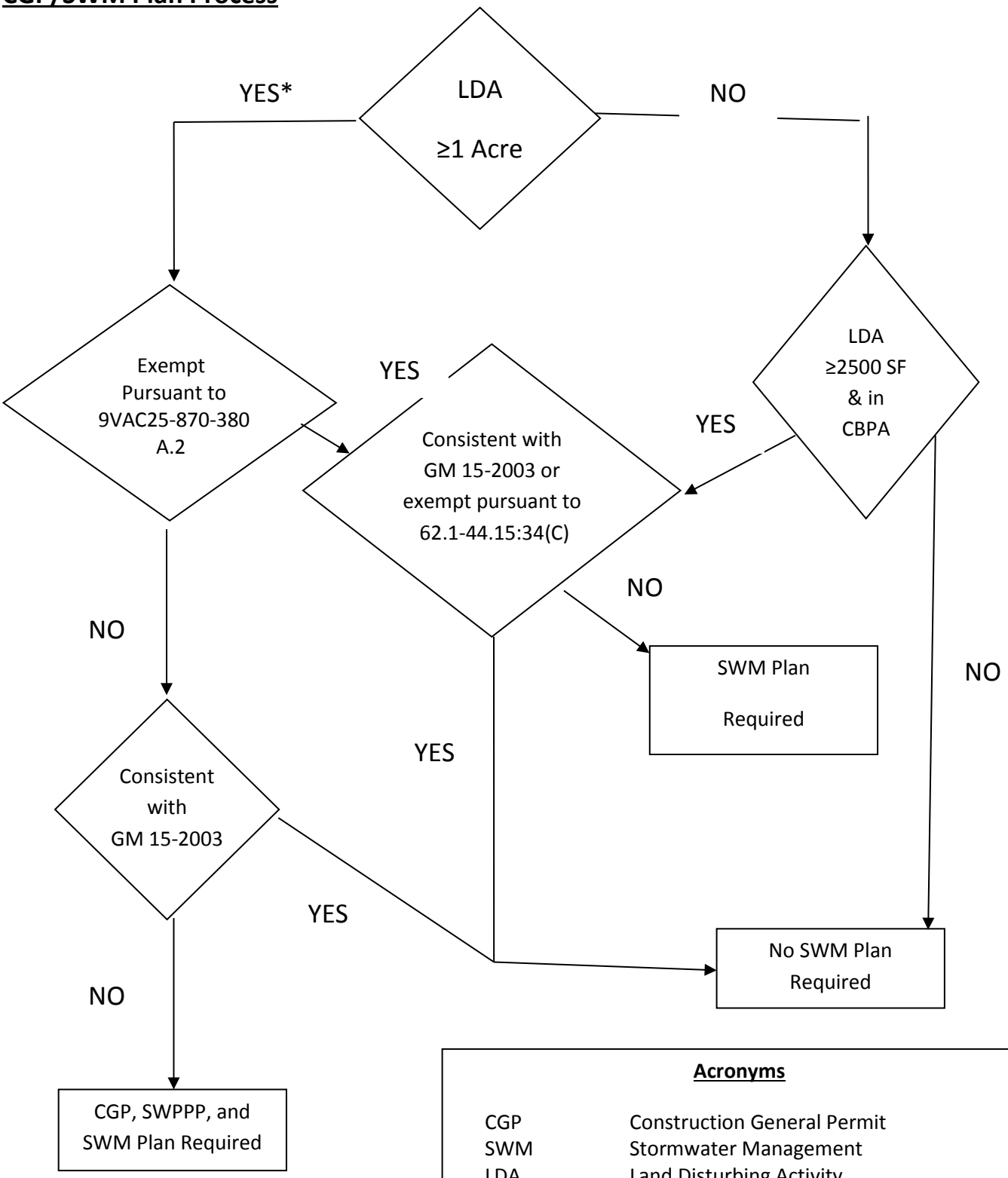
1.5.5 REVISIONS

All revisions to the approved Erosion and Sediment Control Plan or the approved Stormwater Management Plan for the project require review and approval by DEQ certified Plan Reviewer for ESC (and SWM, when applicable). Changes shall be documented and dated on the plans.



* See Figure 2 – next page

CGP/SWM Plan Process



Acronyms

CGP	Construction General Permit
SWM	Stormwater Management
LDA	Land Disturbing Activity
SF	Square Feet
CBPA	Chesapeake Bay Preservation Area
GM 15-2003	Guidance Memo No. 15-2003
SWPPP	Stormwater Pollution Prevention Plan

*SWPPP required for all projects disturbing ≥ 1 acre.

2. PERSONNEL ROLES AND RESPONSIBILITIES

DETI will be the plan approval authority and administrator for the DETI Annual Standards and Specifications for ESC and SWM. A description of the expected administrative roles and associated required certifications[2] is provided below. Note that roles may be combined for staff resource purposes as long as the person responsible for each task is fully qualified for all assigned roles. The ESC plans and SWM plans/SWPPP (where applicable) must be included in all pipeline construction specifications and DETI must assure that the contractor is aware of their responsibility prior to starting any construction activities by covering this specification during pre-construction training and meetings. DETI must provide quality assurance for the ESC and SWM plans as well as guidance, as needed, for implementation of ESC and SWM measures on all projects. DETI may enter into agreements or contracts with contractors to assist with carrying out the certification requirements set forth in the ESC and SWM Law and Regulations.

2.1 PROGRAM ADMINISTRATOR

The Program Administrator will be responsible for the management and coordination of these Annual Standards and Specifications for ESC and SWM. The Program Administrator must be certified as an ESC (and SWM when applicable) Combined Administrator by DEQ or provisionally certified. This role may be conducted by a third party as directed by DETI.

2.2 PLAN REVIEWER

The Plan Reviewer will be responsible for the review of ESC and SWM portions of project plans for compliance with these Annual Standards and Specifications and applicable laws and regulations. The Plan Reviewer must be certified as an ESC (and SWM when applicable) Plan Reviewer by DEQ or provisionally certified. This role may be conducted by a third party firm preparing the plans as directed by DETI.

2.3 CONSTRUCTION SITE SUPERVISOR

The Construction Site Supervisor will have direct oversight of all personnel that prepare, construct, maintain and rehabilitate a given project. The Supervisor also has control over site-specific construction plans, including the ability to make modifications to those plans. This person must ensure compliance with ESC, SWPPP, and Virginia Stormwater Management Program (VSMP) requirements as well as compliance with these Annual Standards and Specifications. The Construction Site Supervisor is authorized to direct workers at a site to carry out activities in accordance with these and other permit conditions. The Construction Site Supervisor must be certified as a Responsible Land Disturber (RLD) by DEQ.

[2] Detailed directions for obtaining certifications can be found via the DEQ website at: http://www.deq.virginia.gov/ConnectWithDEQ/TrainingCertification.aspx

2.4 ENVIRONMENTAL INSPECTOR

The Environmental Inspector (EI) will serve as the primary point of contact for on-site environmental compliance. The EI will provide expert technical support on a wide range of environmental issues and is responsible for:

- ESC Plan, FERC Plan and Procedures and environmental conditions of FERC's Orders compliance;
- Verifying that the limits of disturbance (LOD) and locations of access roads are visibly marked before clearing and maintained throughout construction;
- Proper maintenance of environmental records on site;
- Advising the Environmental Construction Coordinator (ECC) on site-specific environmental concerns;
- Educating company inspectors and personnel on site-specific environmental concerns and requirements; and
- Reporting any non-compliance and problem areas.

An EI is required on projects involving oversight by the FERC, and DETI may assign them on other projects as well. The EI must be certified as an ESC (and SWM, when applicable) Inspector by DEQ or provisionally certified. This role may be conducted by a certified, third party firm as directed by DETI. At least one EI is required for each construction spread during construction and restoration. DETI must ensure that the number and experience of EI's assigned to each construction spread will be appropriate for the length of the construction spread and the number/significance of resources affected.

2.5 ENVIRONMENTAL CONSTRUCTION COORDINATOR

The Environmental Construction Coordinator (ECC) will serve as part of the environmental team relative to environmental compliance within DETI. The ECC has the responsibility of ensuring full compliance with applicable laws, environmental rules, regulations, permits, and company policies that pertain to their projects. The ECC's roles and responsibilities may include:

- Ensure compliance with applicable federal, state, and local environmental regulations, permits, company standards, and procedures, and facility procedures at assigned projects;
- Promote environmental stewardship;
- Coordinate with EI's and contractors to ensure site environmental compliance;
- Serve as primary site coordinator with Dominion Environmental Services (DES), internal departments, and external agencies regarding environmental issues;
- Serve as contact with community or local public to resolve environmental emergencies, complaints, or problems;
- Maintain environmental permits, plans, and various compliance records; and

- Assist with environmental emergency response activities.

2.6 EROSION AND SEDIMENT CONTROL AND STORMWATER INSPECTOR

The Erosion and Sediment Control Inspector will be responsible for the inspection and compliance with ESC and SWM/SWPPP practices, as applicable, as well as those practices outlined in these Annual Standards and Specifications. These responsibilities will typically be shared between the EI and the ESC/SWM Inspector. The Inspector must be certified as an ESC (and SWM when applicable) Inspector by DEQ or provisionally certified. This role may be conducted by a third-party firm preparing the plans as directed by DETI. DETI must ensure that inspection staff is suitable for the size and scope of the project.

3. TECHNICAL CRITERIA

3.1 EROSION AND SEDIMENT CONTROL

DETI must employ erosion and sediment control measures for all land-disturbing activities associated with the construction and maintenance of gas transmission facility projects.

The minimum standards set forth in 9 VAC 25-840-40 and the control practices laid out in the Virginia Erosion and Sediment Control Handbook (VESCH) shall be applied to the planning, design, construction, and maintenance of ESC and SWM plans (when applicable).

1. Permanent or temporary soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven days to denuded areas that may not be at final grade but will remain dormant for longer than 14 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.

2. During construction of the project, soil stock piles and borrow areas shall be stabilized or protected with sediment trapping measures. The applicant is responsible for the temporary protection and permanent stabilization of all soil stockpiles on site as well as borrow areas and soil intentionally transported from the project site.

3. A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall not be considered established until a ground cover is achieved that is uniform, mature enough to survive and will inhibit erosion.

4. Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment shall be constructed as a first step in any land-disturbing activity and shall be made functional before upslope land disturbance takes place.

5. Stabilization measures shall be applied to earthen structures such as dams, dikes and diversions immediately after installation.

6. Sediment traps and sediment basins shall be designed and constructed based upon the total drainage area to be served by the trap or basin.

a. The minimum storage capacity of a sediment trap shall be 134 cubic yards per acre of drainage area and the trap shall only control drainage areas less than three acres.

b. Surface runoff from disturbed areas that is comprised of flow from drainage areas greater than or equal to three acres shall be controlled by a sediment basin. The minimum storage capacity of a sediment basin shall be 134 cubic yards per acre of drainage area. The outfall system shall, at a minimum, maintain the structural integrity of the basin during a 25-year storm of 24-hour duration. Runoff coefficients used in runoff calculations shall correspond to a bare earth condition or those conditions expected to exist while the sediment basin is utilized.

7. Cut and fill slopes shall be designed and constructed in a manner that will minimize erosion. Slopes that are found to be eroding excessively within one year of permanent stabilization shall be provided with additional slope stabilizing measures until the problem is corrected.

8. Concentrated runoff shall not flow down cut or fill slopes unless contained within an adequate temporary or permanent channel, flume or slope drain structure.

9. Whenever water seeps from a slope face, adequate drainage or other protection shall be provided.

10. All storm sewer inlets that are made operable during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.

11. Before newly constructed stormwater conveyance channels or pipes are made operational, adequate outlet protection and any required temporary or permanent channel lining shall be installed in both the conveyance channel and receiving channel.

12. When work in a live watercourse is performed, precautions shall be taken to minimize encroachment, control sediment transport and stabilize the work area to the greatest extent possible during construction. Nonerodible material shall be used for the construction of causeways and cofferdams. Earthen fill may be used for these structures if armored by nonerodible cover materials.

13. When a live watercourse must be crossed by construction vehicles more than twice in any six-month period, a temporary vehicular stream crossing constructed of nonerodible material shall be provided.

14. All applicable federal, state and local requirements pertaining to working in or crossing live watercourses shall be met.

15. The bed and banks of a watercourse shall be stabilized immediately after work in the watercourse is completed.

16. Underground utility lines shall be installed in accordance with the following standards in addition to other applicable criteria:

a. No more than 500 linear feet of trench may be opened at one time.

b. Excavated material shall be placed on the uphill side of trenches.

c. Effluent from dewatering operations shall be filtered or passed through an approved sediment trapping device, or both, and discharged in a manner that does not adversely affect flowing streams or off-site property.

d. Material used for backfilling trenches shall be properly compacted in order to minimize erosion and promote stabilization.

e. Restabilization shall be accomplished in accordance with this chapter.

f. Applicable safety requirements shall be complied with.

17. Where construction vehicle access routes intersect paved or public roads, provisions shall be made to minimize the transport of sediment by vehicular tracking onto the paved surface. Where sediment is transported onto a paved or public road surface, the road surface shall be cleaned thoroughly at the end of each day. Sediment shall be removed from the roads by shoveling or sweeping and transported to a sediment control disposal area. Street washing shall be allowed only after sediment is removed in this manner. This provision shall apply to individual development lots as well as to larger land-disturbing activities.

18. All temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization or after the temporary measures are no longer needed, unless otherwise authorized by the VESCP authority. Trapped sediment and the disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation.

19. Properties and waterways downstream from development sites shall be protected from sediment deposition, erosion and damage due to increases in volume, velocity and peak flow rate of stormwater runoff for the stated frequency storm of 24-hour duration in accordance with the following standards and criteria. Stream restoration and relocation projects that incorporate natural channel design concepts are not man-made channels and shall be exempt from any flow rate capacity and velocity requirements for natural or man-made channels:

a. Concentrated stormwater runoff leaving a development site shall be discharged directly into an adequate natural or man-made receiving channel, pipe or storm sewer system. For those sites where runoff is discharged into a pipe or pipe system, downstream stability analyses at the outfall of the pipe or pipe system shall be performed.

b. Adequacy of all channels and pipes shall be verified in the following manner:

(1) The applicant shall demonstrate that the total drainage area to the point of analysis within the channel is one hundred times greater than the contributing drainage area of the project in question; or

(2) (a) Natural channels shall be analyzed by the use of a two-year storm to verify that stormwater will not overtop channel banks nor cause erosion of channel bed or banks.

(b) All previously constructed man-made channels shall be analyzed by the use of a ten-year storm to verify that stormwater will not overtop its banks and by the use of a two-year storm to demonstrate that stormwater will not cause erosion of channel bed or banks; and

(c) Pipes and storm sewer systems shall be analyzed by the use of a ten-year storm to verify that stormwater will be contained within the pipe or system.

c. If existing natural receiving channels or previously constructed man-made channels or pipes are not adequate, the applicant shall:

(1) Improve the channels to a condition where a ten-year storm will not overtop the banks and a two-year storm will not cause erosion to the channel, the bed, or the banks; or

(2) Improve the pipe or pipe system to a condition where the ten-year storm is contained within the appurtenances;

(3) Develop a site design that will not cause the pre-development peak runoff rate from a two-year storm to increase when runoff outfalls into a natural channel or will not cause the pre-development peak runoff rate from a ten-year storm to increase when runoff outfalls into a man-made channel; or

(4) Provide a combination of channel improvement, stormwater detention or other measures which is satisfactory to the VESCP authority to prevent downstream erosion.

d. The applicant shall provide evidence of permission to make the improvements.

e. All hydrologic analyses shall be based on the existing watershed characteristics and the ultimate development condition of the subject project.

f. If the applicant chooses an option that includes stormwater detention, he shall obtain approval from the VESCP of a plan for maintenance of the detention facilities. The plan shall set forth the maintenance requirements of the facility and the person responsible for performing the maintenance.

g. Outfall from a detention facility shall be discharged to a receiving channel, and energy dissipators shall be placed at the outfall of all detention facilities as necessary to provide a stabilized transition from the facility to the receiving channel.

h. All on-site channels must be verified to be adequate.

i. Increased volumes of sheet flows that may cause erosion or sedimentation on adjacent property shall be diverted to a stable outlet, adequate channel, pipe or pipe system, or to a detention facility.

j. In applying these stormwater management criteria, individual lots or parcels in a residential, commercial or industrial development shall not be considered to be separate development projects. Instead, the development, as a whole, shall be considered to be a single development project. Hydrologic parameters that reflect the ultimate development condition shall be used in all engineering calculations.

k. All measures used to protect properties and waterways shall be employed in a manner which minimizes impacts on the physical, chemical and biological integrity of rivers, streams and other waters of the state.

l. Any plan approved prior to July 1, 2014, that provides for stormwater management that addresses any flow rate capacity and velocity requirements for natural or man-made

channels shall satisfy the flow rate capacity and velocity requirements for natural or man-made channels if the practices are designed to (i) detain the water quality volume and to release it over 48 hours; (ii) detain and release over a 24-hour period the expected rainfall resulting from the one year, 24-hour storm; and (iii) reduce the allowable peak flow rate resulting from the 1.5, 2, and 10-year, 24-hour storms to a level that is less than or equal to the peak flow rate from the site assuming it was in a good forested condition, achieved through multiplication of the forested peak flow rate by a reduction factor that is equal to the runoff volume from the site when it was in a good forested condition divided by the runoff volume from the site in its proposed condition, and shall be exempt from any flow rate capacity and velocity requirements for natural or man-made channels as defined in any regulations promulgated pursuant to § 62.1-44.15:54 or 62.1-44.15:65 of the Act.

m. For plans approved on and after July 1, 2014, the flow rate capacity and velocity requirements of § 62.1-44.15:52 A of the Act and this subsection shall be satisfied by compliance with water quantity requirements in the Stormwater Management Act (§ 62.1-44.15:24 et seq. of the Code of Virginia) and attendant regulations, unless such land-disturbing activities are in accordance with 9VAC25-870-48 of the Virginia Stormwater Management Program (VSMP) Regulations.

n. Compliance with the water quantity minimum standards set out in 9VAC25-870-66 of the Virginia Stormwater Management Program (VSMP) Regulations shall be deemed to satisfy the requirements of subdivision 19 of this subsection.

3.2 GENERAL DESCRIPTION OF CONSTRUCTION ACTIVITIES

The stages of construction typically include: survey and planning, mowing and clearing, grubbing and grading, trenching, pipe assembly (including stringing, bending, welding, testing, coating, and lowering-in), backfilling, final grading, and restoration. The erosion and sediment control measures to be installed for each of these stages are described below. If any denuded area will remain idle for more than 14 days, temporary stabilization (temporary seed, mulch, additional sediment barriers as directed by the ECC) must be applied within seven (7) days to that area.

3.2.1 CONSTRUCTION WORK AREAS

Construction work areas, also called the LOD, include all access roads, staging areas, temporary pipe yards and contractor yards, and the construction right-of-way. To the extent possible, previously disturbed areas will be used for construction to minimize new impacts. Landowner agreement and appropriate permits must be obtained prior to the use of any area for construction activities. Erosion and sediment control plans apply to all construction work areas.

The construction right-of-way will include the permanent pipeline right-of-way and temporary right-of-way for the length of the project. Additional workspace may be required in certain areas. The construction right-of-way may be widened (subject to compliance with all applicable survey, plan preparation and approval, and mitigation requirements) in areas such as steep slopes and topsoil conservation areas to ensure safe construction or for storage of excess spoil.

Following construction, all disturbed areas must be restored with an approved vegetative cover directed by the landowner, permits these Annual Standards and Specifications. All temporary work areas must be restored to pre-construction conditions and uses.

DETI must provide the contractor with a construction line list that describes any special requirements (i.e. timber salvage, topsoil segregation, restoration measures, fencing requirements, etc.) requested by landowners. The contractor must comply with these special requirements.

DETI must also obtain the necessary right-of-way permits (i.e. federal, state, stream crossing, wetland crossing, road crossing permits, etc.) for the installation of pipeline. Permit requirements may be more stringent than the requirements of this plan and, if so, the more restrictive requirements will be implemented. The contractor must obtain permits that may be required for activities such as burning, blasting, and transportation.

3.2.2 SURVEY AND PLANNING

In most cases the LOD will be selected in advance and included in all surveys, landowner negotiations and permitting. Any work areas selected by the contractor must receive appropriate review and permitting prior to their use. The limits of the approved work areas, boundaries of environmentally sensitive areas, and the location of the facilities must be marked in the field prior to the start of mechanized activities. Changes to the LOD must be denoted/marked up on the ESC plans and recorded in the SWPPP (if applicable). Any changes affecting overall permitted disturbed area or potential affecting compliance with stormwater or ESC criteria must be reviewed and approved in advance in accordance with Section 1.5.5 (Revisions).

Environmentally sensitive areas are those that are more susceptible to serious erosion problems and thus may require enhanced erosion and sediment control measures. Examples of such areas may include steep slopes and sinkholes down-gradient of project activities. Examples of specialized controls that may be used in these areas include specialized pipeline construction methods that combine several construction stages, thereby reducing earth disturbance. Additional details for working in steep slopes can be found below in Section 3.4 Special Procedures.

3.2.3 CLEARING AND MOWING

The initial tree clearing may be performed by either non-mechanized or mechanized means. Non-mechanized methods entail the use of crews accessing the construction work areas on foot and cutting timber with handheld chainsaws. Trees are removed when mechanized equipment is

mobilized to the project. Erosion and sedimentation control measures must be installed as a **first step** in any land-disturbing activity after clearing and must be made functional before upslope land disturbance takes place.

Vegetation will be cut at ground level and un-merchantable timber (i.e. brush, stumps, slash, and tree tops) may be disposed of by chipping and distribution along the upland right-of-way or by burning, if allowed. Burning must be avoided if practicable. Merchantable timber will be cut and stacked along the outboard edge of the construction right-of-way in upland areas as directed by the landowner or the Construction Supervisor. If chips are spread along the right-of-way, they must be spread at no more than 1-ton per acre and an additional application of 11 pounds of nitrogen per acre, at least 50% is slow release, must be made to affected areas. If necessary, the desirable trees will be protected by fencing and armoring. If chipping is to serve as "Mulching" for Erosion and Sediment Control purposes, then mulching should be consistent with the application rates from ESC Standard and Specification 3.35.

3.2.4 GRUBBING AND GRADING

This step involves grubbing stumps, removing and segregating topsoil where applicable, and leveling the construction right-of-way to create a safe operating area for equipment and vehicles. Topsoil and subsoil disturbed during grading operations will not be mixed with foreign material (i.e. stumps and slash). The disposal methods described above for clearing debris also apply to stumps. In addition, stumps may not be buried in the right-of-way in upland, non-agricultural, non-residential areas. Grading must be delayed at environmentally sensitive areas that will be treated as separate construction areas (i.e. steep slopes) until the contractor is prepared to complete all other construction activities at that site in the shortest practicable time.

Erosion and sedimentation control measures must be installed as a **first step** in any land-disturbing activity and must be made functional before upslope land disturbance takes place.

3.3 EROSION AND SEDIMENT CONTROL PRACTICES

The following are the more commonly used practices applied to pipeline construction (from Virginia Uniform Coding System for Erosion and Sedimentation Control Practices). The use of the VESCH, along with accompanying technical documents, guidance and practices is strongly preferred. The VESCH and related technical documents and guidance specifications are incorporated by reference into these Annual Standards and Specifications. Details for those practices marked with an * are included in Appendix A. For full details, refer to the 1992 VESCH. Non-VESCH measures are included herein but may be further reviewed and approved by DEQ on a project-specific basis.

Practice	**Title**	**Key**
3.01*	Safety Fence	SAF

3.02*	Temporary Stone Construction Entrance	CE
3.03	Construction Road Stabilization (Temp)	CRS
3.04*	Straw Bale Barrier	STB
3.05*	Silt Fence	SF
3.07*	Storm Drain Inlet Protection	IP
3.08*	Culvert Inlet Protection	CIP
3.09*	Temporary Diversion Dike	DD
3.10*	Temporary Fill Diversion	FD
3.11*	Temporary ROW Diversion/Water Bars	RWD
3.12*	Diversion	DV
3.13	Temporary Sediment Trap	ST
3.14	Temporary Sediment Basin	SB
3.15	Temporary Slope Drain	TSD
3.17	Stormwater Conveyance Channel	SCC
3.18*	Outlet Protection	OP
3.19*	Riprap	RR
3.20*	Rock Check Dams	CD
3.21	Level Spreader	LS
3.22	Vegetative Streambank Stabilization	VSS
3.23	Structural Streambank Stabilization	SSS
3.24*	Temporary Vehicular Stream Crossing	SC
3.25*	Utility Stream Crossing	USC
3.26*	Dewatering Structure	DS
3.29	Surface Roughening	SR
3.30	Topsoiling	TO

3.31	Temporary Seeding	TS
3.32	Permanent Seeding	PS
3.34	Bermudagrass & Zoysiagrass Est.	BE/ZE
3.35	Mulching	MU
3.36*	Soil Stabilization Blankets & Matting	B/M
3.37	Trees, Shrubs, Vines & Ground Cover	VEG
3.38	Tree Preservation & Protection	TP
3.39	Dust Control	DC

The following practices are identified as baseline measures for minimizing erosion and enhancing revegetation in accordance with the FERC Plan, found in Appendix C. They are listed by Plan section reference.

IV.B	Topsoil Segregation	TSS
IV.F.1	Temporary Slope Breakers	TSB
IV.F.2	Temporary Trench Plugs	TTP
V.C	Soil Compaction	SCO
VI.	Off-Road Vehicle Control	ORV

In instances where the requirements or practices differ between the VESCH and the FERC Plan and Procedures guidance, the more stringent criteria shall be applied. *(e.g. FERC TSB spacing criterion are not as stringent as VESCH RWD spacing criterion, so the VESCH criterion would be applied.)* The following practices and measures are identified as baseline measures for minimizing erosion and sediment control and are not found in the VESCH or the Plans and Procedures. These include:

Timber Mat Stabilization	TM

DETI utilizes construction timber mats to provide access through areas such as wetlands and waterbodies, some agricultural fields, steep slopes, and other areas as determined by the Construction Supervisor. This practice reduces soil compaction and provides a stable travel lane for contractors along the project right-of-way, thus minimizing land disturbance. This practice may be incorporated in addition to the VESCH-related practices and requirements.

The use of construction timber may generally not constitute soil disturbance or a change in hydrology. Therefore, the installation of timber mat access roads and work pads is not considered a regulated land-disturbing activity and these areas are generally not included in land disturbance area calculations.

Geotextile Bag/Dewatering Bag GB

DETI utilizes geotextile bags for dewatering and velocity reduction on a majority of pipeline construction projects in lieu of straw bale dewatering practices illustrated in DS (Std. 3.26 Dewatering Structure). The purpose, definition, conditions of application and planning considerations are identical. Design criteria and specifications vary by dewatering bag manufacturer. A variety of geotextile dewatering bag products are available on the market. When incorporated into a plan, all manufacturers' guidance on the use, design, sizing, maintenance and application of the geotextile dewatering bag shall be followed.

3.4 SPECIAL PROCEDURES

The following procedures and practices are commonly utilized on pipeline construction sites and may have standards established by more than one regulation.

3.4.1 WETLAND AND WATERBODY CROSSINGS (PROCEDURES V & VI)

Sections V and VI of the FERC Procedures outline methods for crossing wetlands and waterbodies. See Appendix D for additional details regarding equipment bridges and crossing methodologies including: dry-ditch, flume, and horizontal direction drill.

3.4.2 TIME WINDOWS FOR CONSTRUCTION (PROCEDURES V.B.1)

Unless expressly permitted or further restricted by the appropriate federal or state agency in writing on a site-specific basis, crossings must be constructed during the following time windows:

- Coldwater Fisheries - June 1 through September 30;
- Coolwater and Warmwater Fisheries - June 1 through November 30;
- Natural Trout Streams - restrictions set forth by the Virginia Department of Game and Inland Fisheries (VDGIF), October 1st through March 31st for Brown Trout (*Salmo trutta*) and Brook Trout (*Salvelinus fontinalis*), March 15th through May15th for Rainbow Trout (*Oncorhynchus mykiss*) and March 15th through June 30th for the Roanoke Logperch (*Percina rex*); and
- Stockable Trout Streams - there are no time of year restrictions for stockable trout streams; however, as required by the VDGIF, DETI must consult with the VDGIF regional offices before constructing in stockable trout streams.
- Time-of-Year Restrictions (TOYR) – TOYR may be applied to certain construction activities for protection of certain species (e.g. listed freshwater mussels, bat hibernaculum, etc.) as required by UFWS and/or wetland permitting agencies. Applicable TOYR will be described in permit documentation and enforced by the ECC.

3.4.3 POTENTIAL EROSION PROBLEM AREAS/CRITICAL AREAS

Critical Areas, or potential erosion problem areas, **as described in VESCH** will be protected by project specific BMPs. A list of potential critical areas is included in **Appendix J**. Special attention will be given to those slopes that are near surface waters. The discharge of soils from failed slopes into surface waters is a serious occurrence and may result in environmental non-compliance. Critical Areas must be identified in the Erosion and Sediment Control narrative and appropriate management measures must be provided. Critical areas are defined as areas on the site which have potentially serious erosion problems (steep slopes, channels, wet weather/underground springs, etc.).

Potential erosion problem areas or critical areas (see slope length and gradient erodibility criteria in VESCH), including but not limited to areas with 30º slopes (58%) or greater, will be protected by belted silt retention fence and permanent slope breakers. Slope breakers (aka right-of-way diversions) will be placed in the appropriate spacing listed in VESCH Std. and Spec. 3.11 (RWD) in areas with greater than 14º slopes (25% slopes). Spacing shall be 50 ft. when slopes are 25-40%, and 25 ft. when in excess of 40%. In addition to the criteria for RWD on slopes steeper than 25%, RWD should be installed at the designer's discretion and consistent with the VESCH 3.11 RWD specification.

Care will be taken to avoid areas of steep slopes as much as practical; however, areas which could not be avoided will be addressed with waterbars and Rolled Erosion Control Product (RECP). RECPs must be consistent with VESCH Std. and Spec. 3.36 for Soil Stabilization Blankets and Matting. In the event that subsurface flow is encountered, an Under Drain will be utilized, as necessary, to divert water outside of the LOD. If encountered, seeps can be mitigated by using seep collectors placed down-slope of areas showing seepage. Armored fill placed at the toe of the slope may be used in areas of steep slopes in addition to a perforated drain pipe to divert subsurface water away from the cut slope. If a slip occurs Dominion will install super silt fence, gabion baskets, jersey barriers or other portable containment devices to keep the slip from impacting areas outside the LOD or waters of the state. Steep slopes will be avoided to the maximum extent practicable and are limited. Those areas will be restored with erosion control blanket and Dominion will implement the slip prevention items mentioned above as needed. Please also see DETI's *Slope Stability Policy and Procedure for Pipeline Design, Construction and Right of Way Maintenance* (Appendix I) for additional details regarding Dominion's internal policy regarding slips.

3.4.4 ADDITIONAL CRITERION – ACP/OTHER LARGE PROJECTS

The Department of Environmental Quality, in some instances, exercises discretionary authority on certain large projects to apply more stringent additional criteria than those normally applied

under these Standards and Specifications. The Atlantic Coast Pipeline (ACP) project is an example of one of these large projects. The special conditions for the ACP project are contained in Appendix G and will be adhered to, in addition to the minimum criteria outlined in this document. Project managers at DETI should be advised that projects with significant disturbed acreage (e.g. > 50 acres) are likely to face additional scrutiny by DEQ and certain additional criterion may apply. Early coordination with DEQ for large projects is recommended.

3.4.5 SWPPP APPLICABILITY

Per the request of DEQ, DETI commits to develop and implement Stormwater Pollution Prevention Plans (SWPPPs) for all projects that equal or exceed 1 acre of disturbance, even if exemptions from a permit are granted (via oil and gas exemption and/or GM 15-2003). The ESC and SWM Plan requirements are addressed separately in this document. In addition to those requirements, DETI will include the relevant general information and the SWPPP. The components DETI to be included in the SWPPP include the following:

SWPPP Contents

1. General Information (as described in section A.1 of Part II of the CGP): Subsections (d) & (e) only
2. Erosion and Sediment Control Plan (addressed separately herein)
3. SWM Plan (addressed separately herein, if no SWM Plan waiver secured)
4. Pollution Prevention Plan (as described in Section A.4 of Part II of the CGP)
5. SWPPP Requirements for Impaired Waters, etc. (as described in Section A.5 of Part II of the CGP)
6. Qualified Personnel (as described in Section A.6 of Part II of the CGP)
7. Individuals or positions with delegated authority to sign inspection reports or modify the SWPPP.
8. Certification: "I certify under penalty of the law that I have read and understand this document and that this document and all attachments were prepared in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations."

SWPPP Provisions to be Implemented by DETI:

1. Provisions for SWPPP Amendments, Modifications, and Updates (as described in Section B of Part II of the CGP, excluding references to federal officials and Part III.K)

2. SWPPP Implementation (as described in Section E of Part II of the CGP, excluding references to general permit coverage)
3. SWPPP Inspections (as described in Section F of Part II of the CGP, excluding references to the general permit and certifications pursuant to Part III.K)
4. Corrective Actions (as described in Section G of Part II of the CGP)

3.5 MAINTENANCE

Right-of-ways are generally maintained by mowing not more frequently than once every three years by the pipeline patrol and when necessary for inspection purposes. In no case will 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.

Maintenance of permanent right-of-ways in wetlands will be performed on an "as-needed" basis and will consist of limited cutting of growth as required to permit operation and maintenance pursuant to Dominion requirements. Native herbaceous and woody shrub species must be allowed to reestablish in wetland right-of-way. However, to facilitate periodic corrosion and leak surveys, a corridor not exceeding 10 feet in width centered on the pipeline may be maintained at a frequency necessary to maintain an herbaceous state. Herbicides or pesticides will not be used in or within 100 feet of a wetland, except as allowed by the appropriate federal or state agency.

In all cases, right-of-ways will be left in a natural vegetated state and may not be mowed or bush hogged more than four times per year in accordance with the management guidelines for *Open Space* in Table 1 of the *Virginia Runoff Reduction Method Instructions and Documentation.* Section 7c FERC projects will follow the FERC Plan and Procedures guidance criteria for the restoration of disturbed lands to a hydrologically functional state.

3.6 EMERGENCY PROVISIONS

In the event of an emergency, DETI reserves the right to conduct land-disturbing activities in response to a public emergency, including grid reliability issues, to avoid imminent endangerment to human health or the environment in accordance with exemptions cited in Virginia Code §62.1-44.15:34. In such situations, the DEQ shall be advised of the disturbance within seven days of commencing the land-disturbing activity, and compliance with the administrative requirements of these Annual Standards and Specification is required within 30 days of commencing the land-disturbing activity.

3.7 INSPECTIONS

DETI or its designated representative will continue to be responsible for routine inspections for compliance with the erosion and sediment control and stormwater management (where

applicable) regulations and any FERC Certificate. Certified personnel as outlined in Section 2 must conduct all inspections.

For all projects, DETI or its designated representative will be responsible for periodic inspections in compliance with 9 VAC 25-840-60(B).1. Specifically, DETI or its designated representative will provide for an inspection during or immediately following initial installation of erosion and sediment controls, at least once in every two-week period, within 48 hours following any runoff producing storm event, and at the completion of the project, or in accordance with an alternate inspection approved by the State Water Control Board.

For FERC-regulated projects, DETI or its designated representative will be responsible for periodic inspections in compliance with FERC Plan II.B.13. Specifically, FERC Plan related inspections must be conducted;

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

Pipeline projects must avoid discharges of concentrated runoff to surface waters unless permitted discharges (such as dewatering) have been appropriately filtered, treated or settled prior to being discharged in a dispersed manner.

In instances where a project is subject to Stormwater Management requirements, inspections must be conducted in accordance with the inspection frequencies outlined in Appendix B (Section 5).

3.8 ENFORCEMENT

While DETI continues to hold its employees, consultants and contractors to strict environmental compliance standards, regulatory enforcement will be administered by DEQ. DETI may be required to submit relevant project documentation and plans for covered activities to the DEQ to ensure consistency with these Annual Standards and Specifications and applicable permit requirements. The State Water Control Board has the authority to enforce approved specifications and charge fees equal to the lower of (i) $1000 or (ii) an amount sufficient to cover the costs associated with standard and specification review and approval, project inspections and compliance. The Virginia DEQ will serve as the VESCP and VSMP authority and will perform random site inspections or inspections in response to a complaint to assure compliance with the associated laws/regulations and these Annual Standards and Specifications. Construction contracting firms retained by DETI must be required to comply with all contractual obligations, and DETI must enforce their compliance to the extent legally available, as necessary.

APPENDIX A

ESC Plan Checklist

Erosion and Sediment Control Practice Details

The following construction details are taken from the Virginia Erosion and Sediment Control Handbook (VESCH), Third Edition, 1992, as amended. Specific details and guidelines are covered more completely in Chapter 3 of the VESCH.

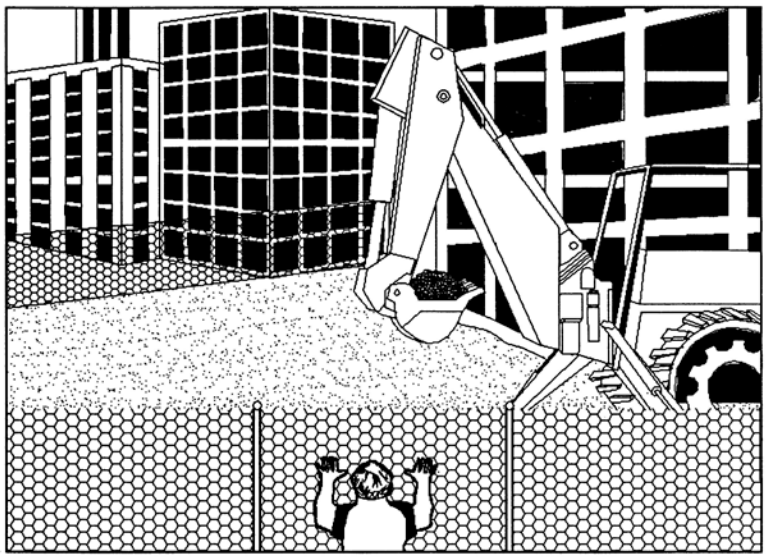
The Contractor must go to the VESCH to reference practices that are covered in the specification but not listed below.

Practice	Title	Key
3.01	Safety Fence	SAF
3.02	Temporary Stone Construction Entrance	CE
3.04	Straw Bale Barrier	STB
3.05	Silt Fence	SF
3.07	Storm Drain Inlet Protection	IP
3.08	Culvert Inlet Protection	CIP
3.09	Temporary Diversion Dike	DD
3.10	Temporary Fill Diversion	FD
3.11	Temporary Right-Of-Way Diversion	RWD
3.12	Diversion	DV
3.18	Outlet Protection	OP
3.19	RipRap	RR
3.20	Rock Check Dams	CD
3.24	Temporary Vehicular Stream Crossing	SC
3.25	Utility Stream Crossing	USC
3.26	Dewatering Structure	DS
3.36	Soil Stabilization Blankets & Matting	B/M

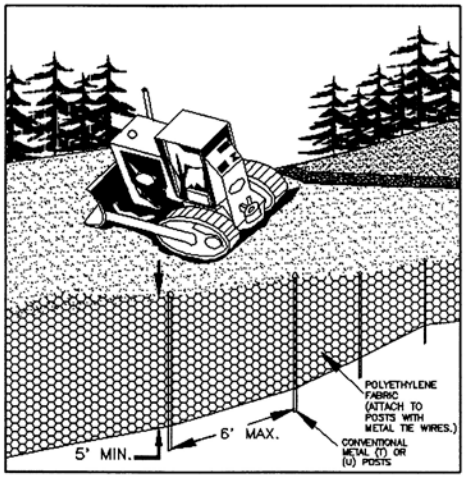
The following items are specific to the practices within this document and are not found in the VESCH manual. Details for these items are located at the end of this appendix following the items listed above.

Timber Mat Stabilization	TM
Geotextile Bag/Dewatering Bag	GB
Bleeder Drain and Outlet	BD
Trench Plug Drain	TP

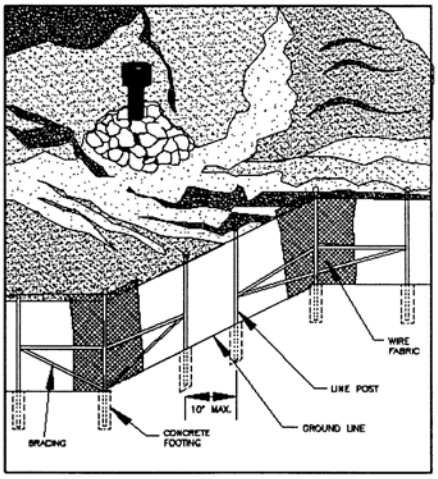
SAFETY FENCE



PERSPECTIVE VIEW



PERSPECTIVE VIEW
PLASTIC FENCE

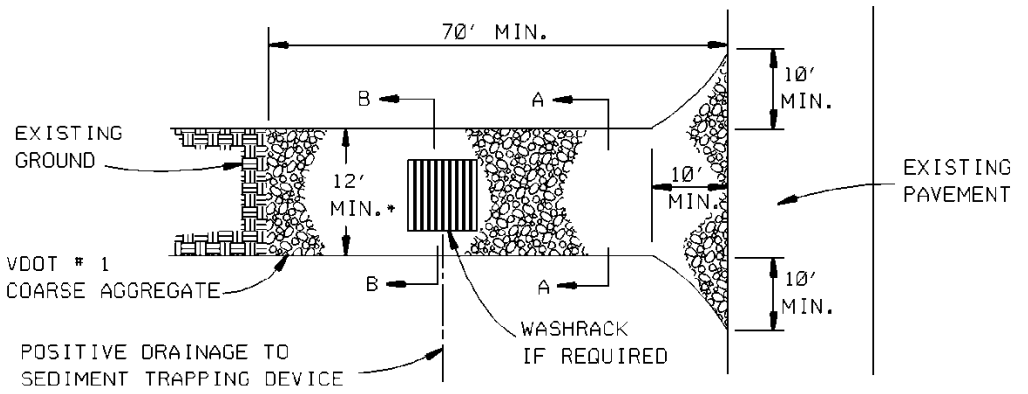


PERSPECTIVE VIEW
METAL FENCE

Source: Adapted from Conwed Plastics and VDOT Road and Bridge Standards

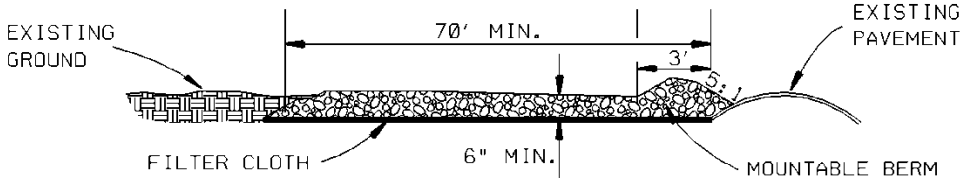
Plate 3.01-1

STONE CONSTRUCTION ENTRANCE - 3.02

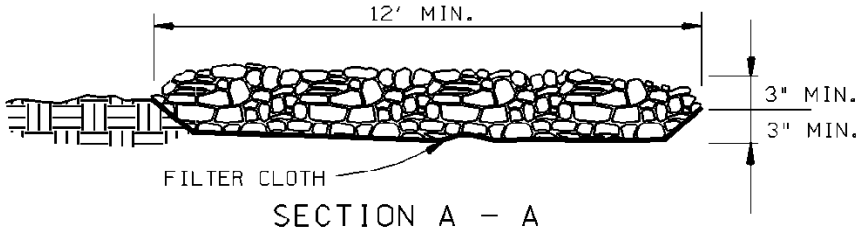


* MUST EXTEND FULL WIDTH OF INGRESS AND EGRESS OPERATION

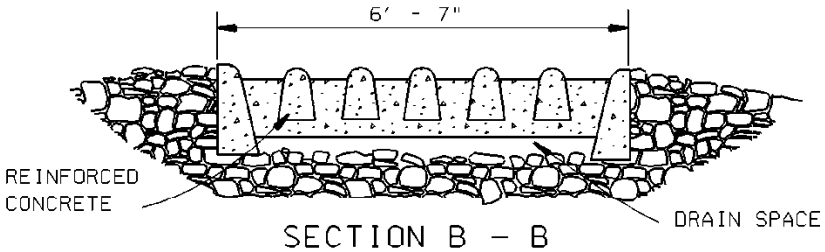
PLAN VIEW



ELEVATION



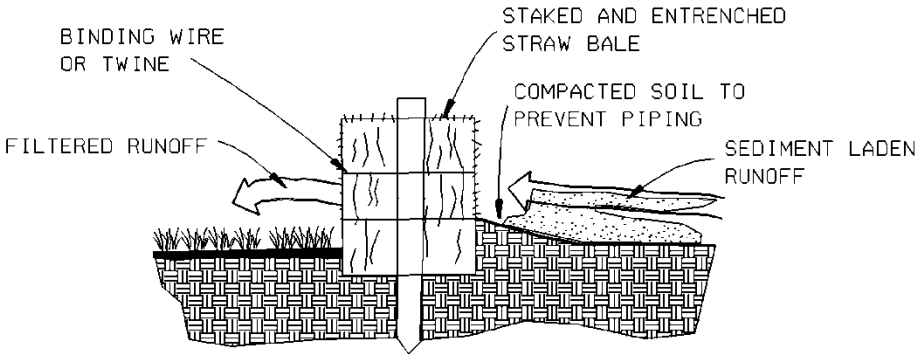
SECTION A - A



SECTION B - B

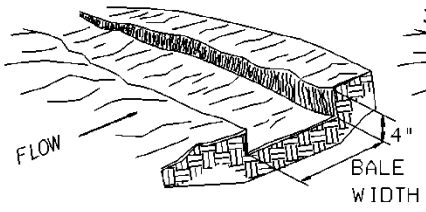
vss302.dgn

STRAW BALE BARRIER - 3.04

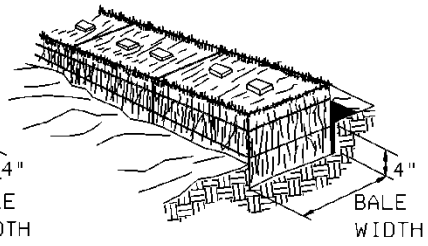


PROPERLY INSTALLED STRAW BALE
CROSS SECTION

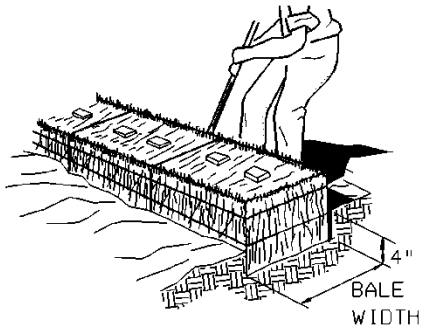
1. EXCAVATE THE TRENCH



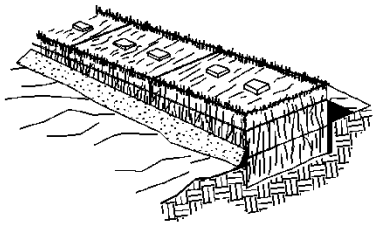
2. PLACE AND STAKE STRAW BALES



3. WEDGE LOOSE STRAW BETWEEN BALES



4. BACKFILL AND COMPACT THE
EXCAVATED SOIL

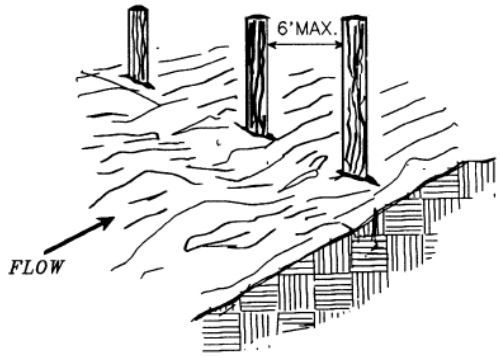


CONSTRUCTION OF STRAW BALE BARRIER

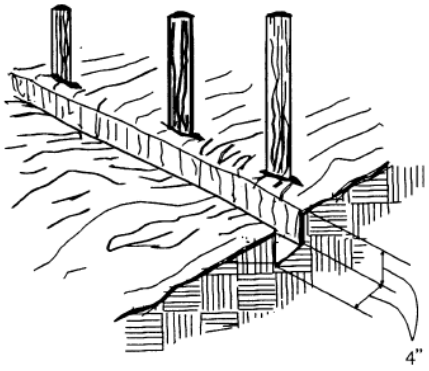
va6304.dgn

CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT)

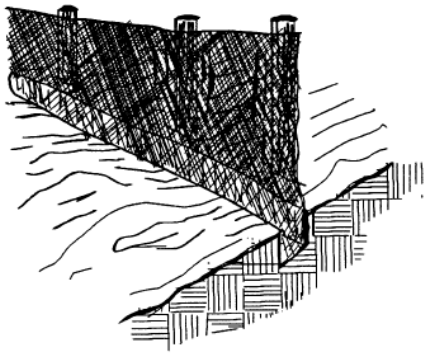
1. SET THE STAKES.



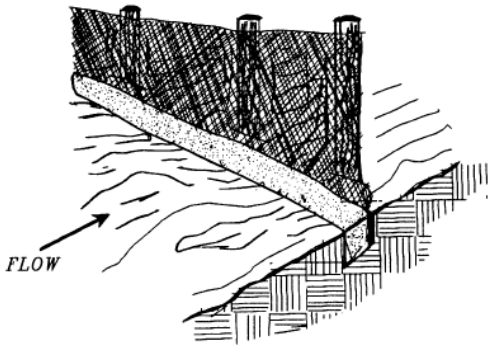
2. EXCAVATE A 4"X 4" TRENCH UPSLOPE ALONG THE LINE OF STAKES.



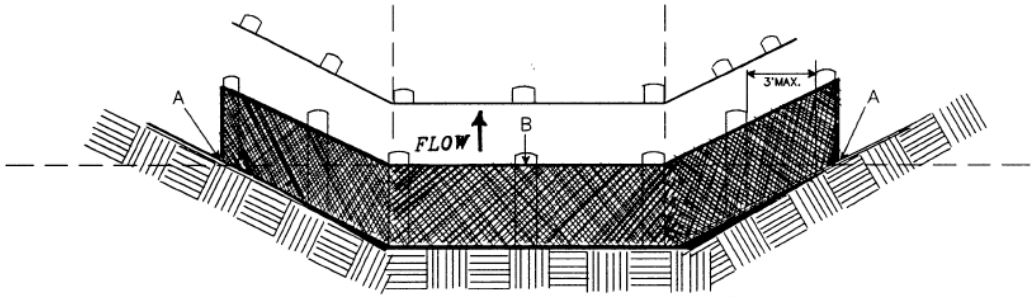
3. STAPLE FILTER MATERIAL TO STAKES AND EXTEND IT INTO THE TRENCH.



4. BACKFILL AND COMPACT THE EXCAVATED SOIL.



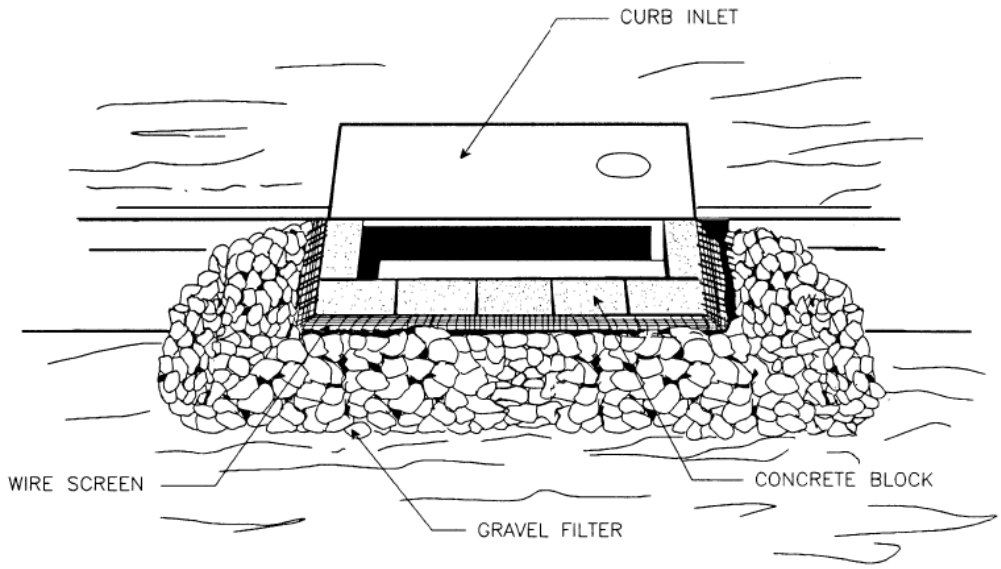
SHEET FLOW INSTALLATION
(PERSPECTIVE VIEW)

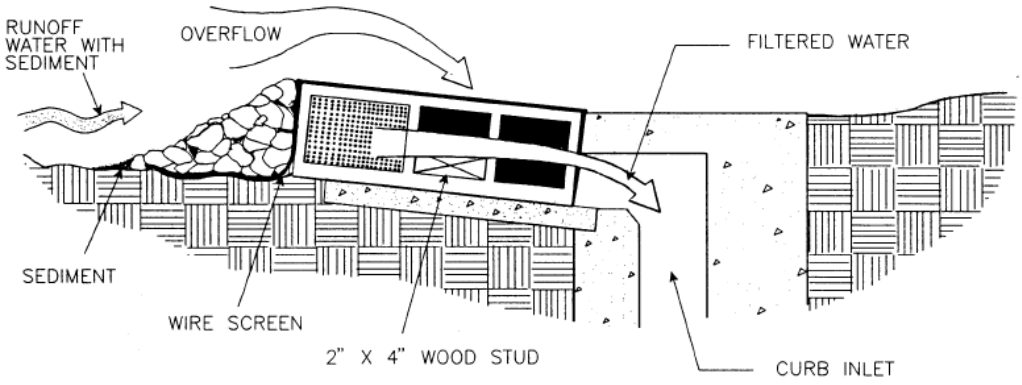


POINTS A SHOULD BE HIGHER THAN POINT B.

DRAINAGEWAY INSTALLATION
(FRONT ELEVATION)

BLOCK & GRAVEL CURB INLET SEDIMENT FILTER



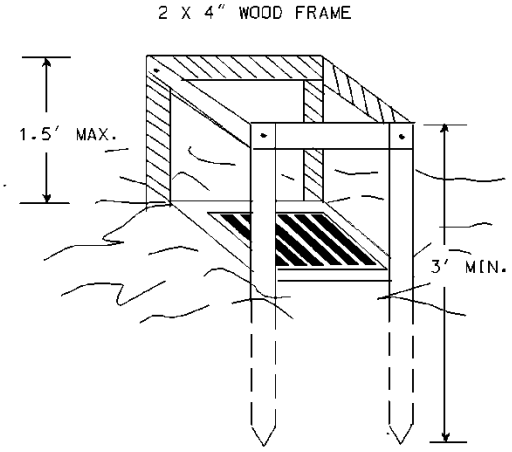


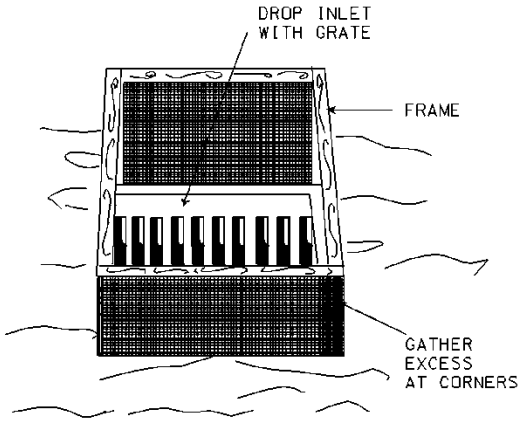
SPECIAL APPLICATION

THIS METHOD OF INLET PROTECTION IS APPLICABLE AT CURB INLETS WHERE AN OVERFLOW CAPABILITY IS NECESSARY TO PREVENT EXCESSIVE PONDING IN FRONT OF THE STRUCTURE.

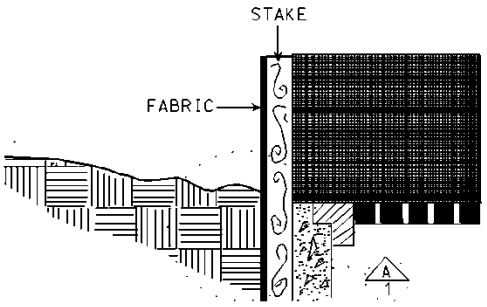
* GRAVEL SHALL BE VDOT #3, #357 OR #5 COARSE AGGREGATE

SILT FENCE DROP INLET PROTECTION - 3.07-1

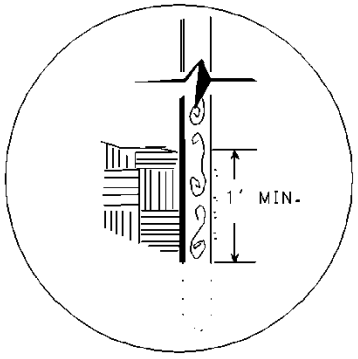




PERSPECTIVE VIEWS



ELEVATION OF STAKE AND FABRIC ORIENTATION

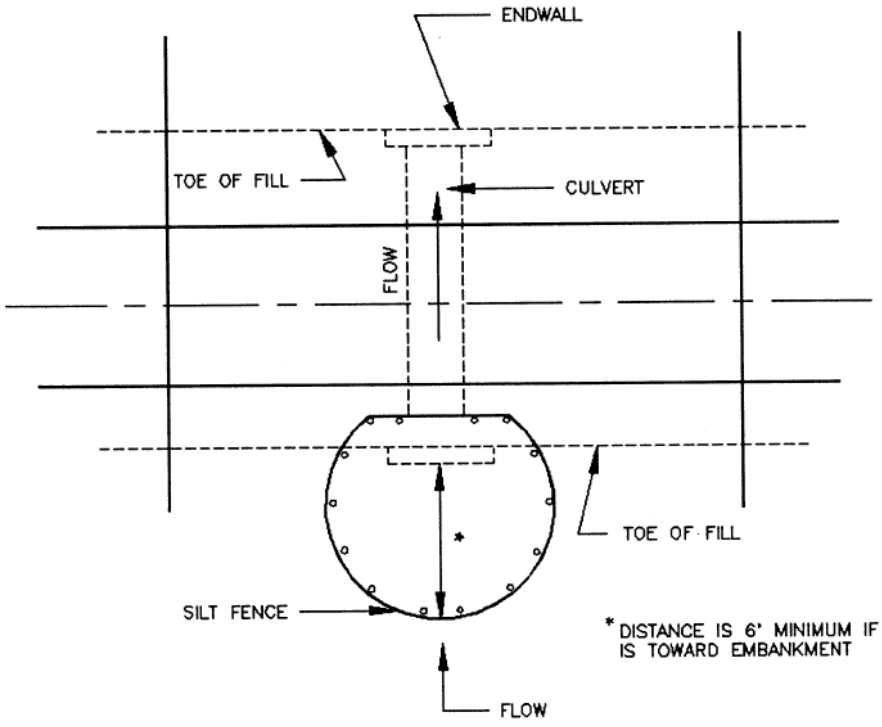


DETAIL A

SPECIFIC APPLICATION

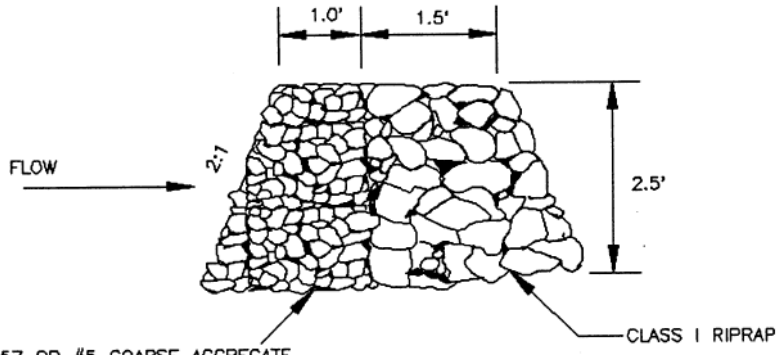
THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS A RELATIVELY FLAT AREA (SLOPE NO GREATER THAN 5%) WHERE THE INLET SHEET OR OVERLAND FLOWS (NOT EXCEEDING 1 C.F.S.) ARE TYPICAL. THE METHOD SHALL NOT APPLY TO INLETS RECEIVING CONCENTRATED FLOWS, SUCH AS IN STREET OR HIGHWAY MEDIANS.

SILT FENCE CULVERT INLET PROTECTION



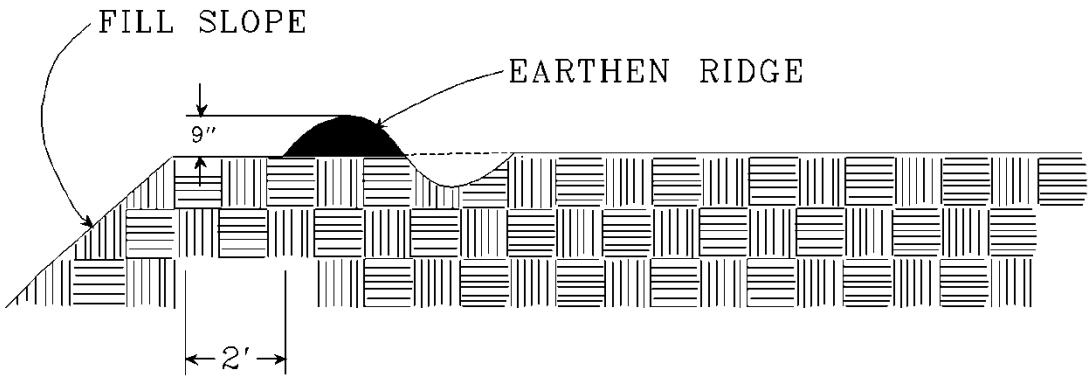
* DISTANCE IS 6' MINIMUM IF FLOW IS TOWARD EMBANKMENT

OPTIONAL STONE COMBINATION **

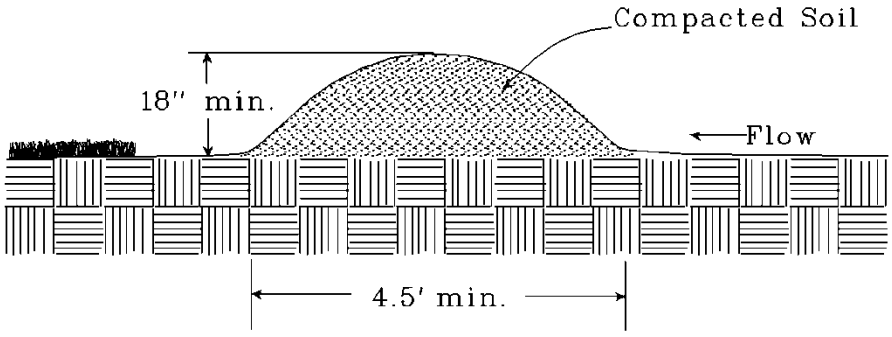


** VDOT #3, #357 OR #5 COARSE AGGREGATE TO REPLACE SILT FENCE IN " HORSESHOE " WHEN HIGH VELOCITY OF FLOW IS EXPECTED

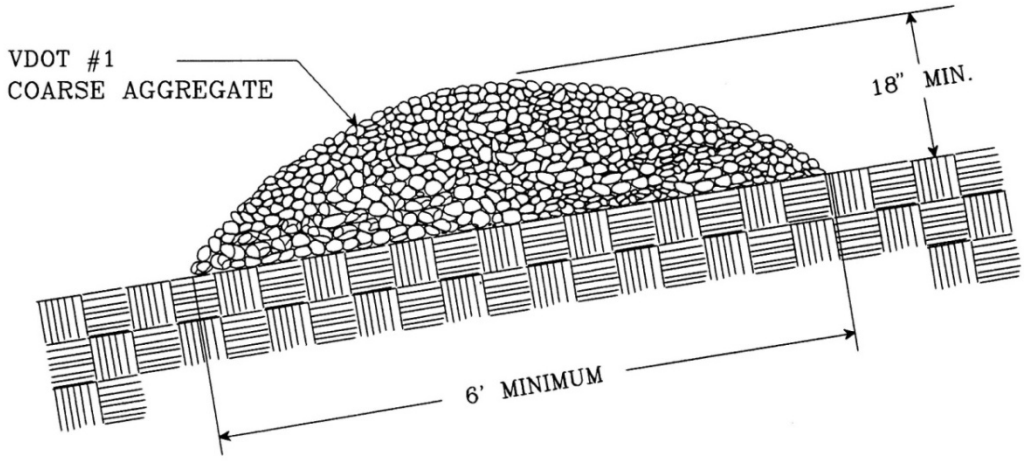
TEMPORARY FILL DIVERSION - 3.10



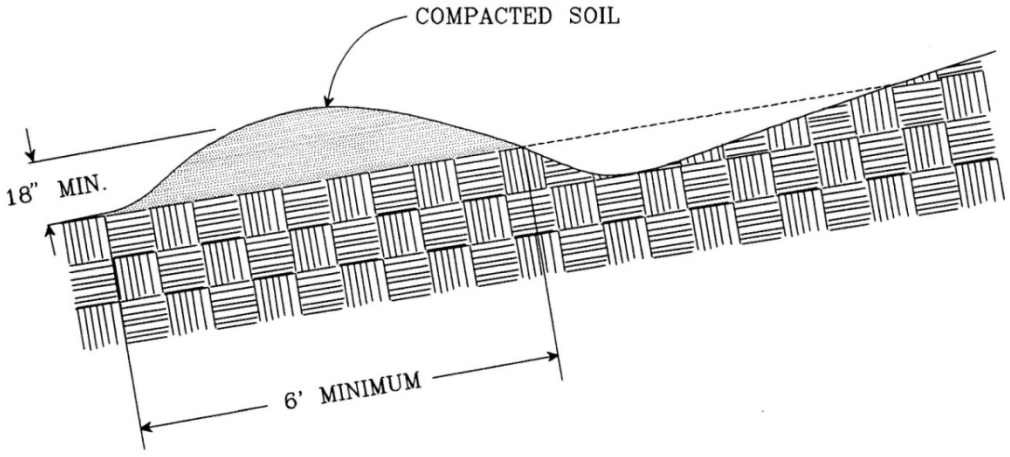
TEMPORARY DIVERSION DIKE - 3.09



TEMPORARY RIGHT-OF-WAY DIVERSIONS

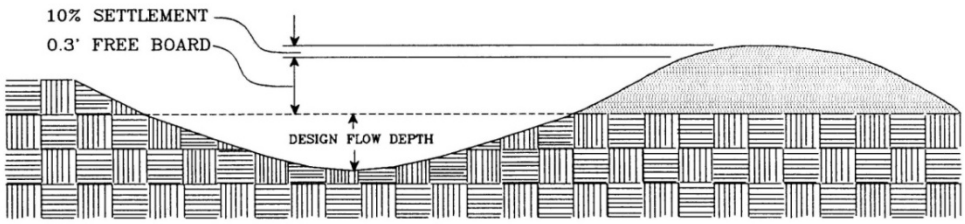


TYPICAL GRAVEL STRUCTURE

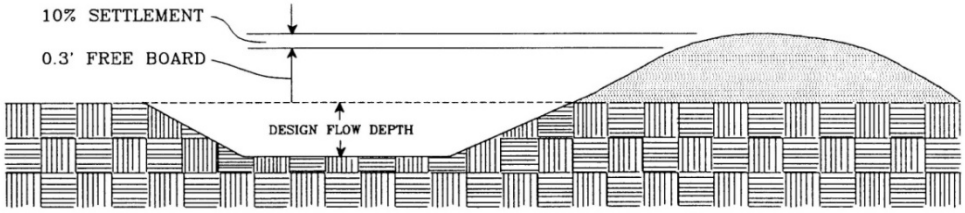


TYPICAL EARTHEN STRUCTURE

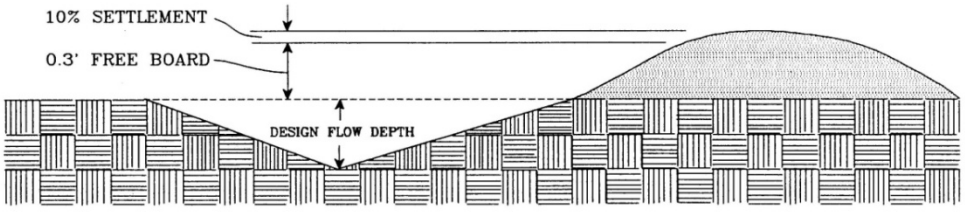
DIVERSIONS



TYPICAL PARABOLIC DIVERSION

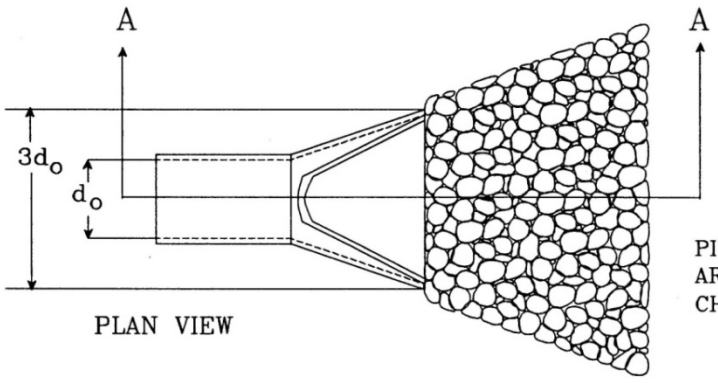


TYPICAL TRAPEZOIDAL DIVERSION



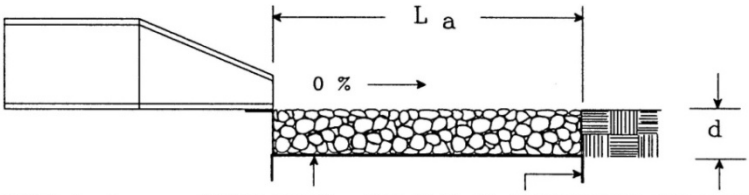
TYPICAL VEE-SHAPED DIVERSION

PIPE OUTLET CONDITIONS



PLAN VIEW

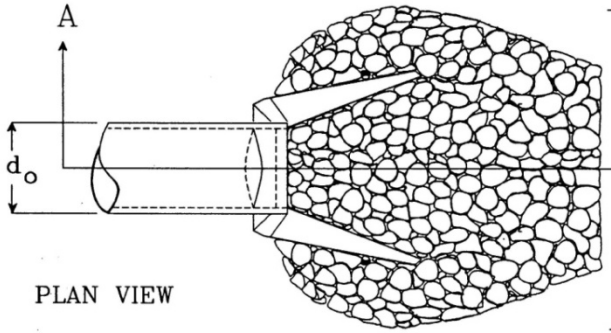
PIPE OUTLET TO FLAT AREA WITH NO DEFINED CHANNEL



SECTION A–A

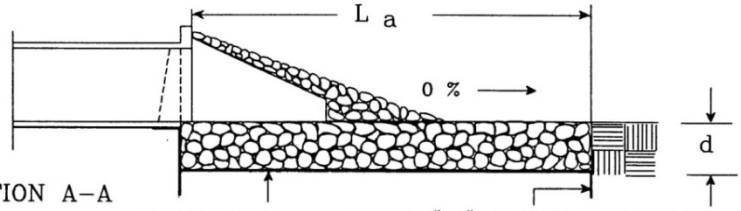
FILTER CLOTH

KEY IN 6"–9"; RECOMMENDED FOR ENTIRE PERIMETER



PLAN VIEW

PIPE OUTLET TO WELL DEFINED CHANNEL



SECTION A–A

FILTER CLOTH

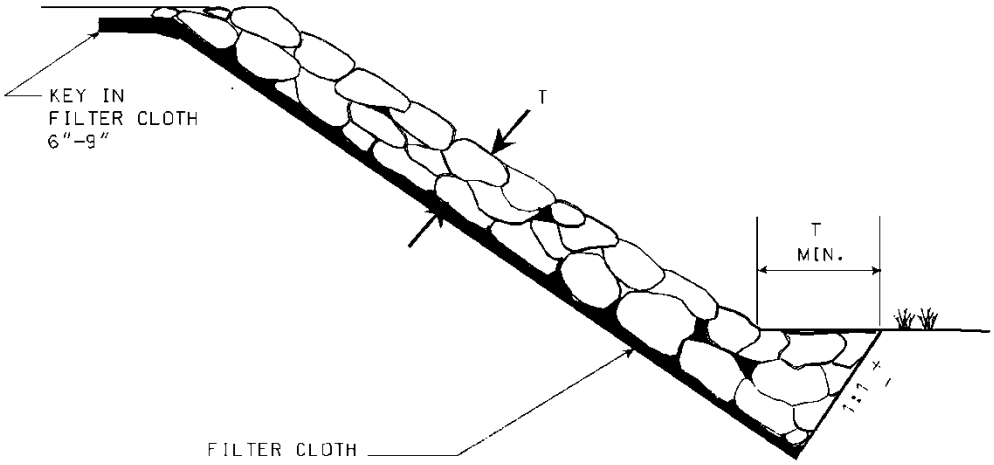
KEY IN 6"–9"; RECOMMENDED FOR ENTIRE PERIMETER

NOTES: 1. APRON LINING MAY BE RIPRAP, GROUTED RIPRAP, GABION BASKET, OR CONCRETE.
2. La IS THE LENGTH OF THE RIPRAP APRON AS CALCULATED USING PLATES 3.18–3 AND 3.18–4.
3. d = 1.5 TIMES THE MAXIMUM STONE DIAMETER, BUT NOT LESS THAN 6 INCHES.

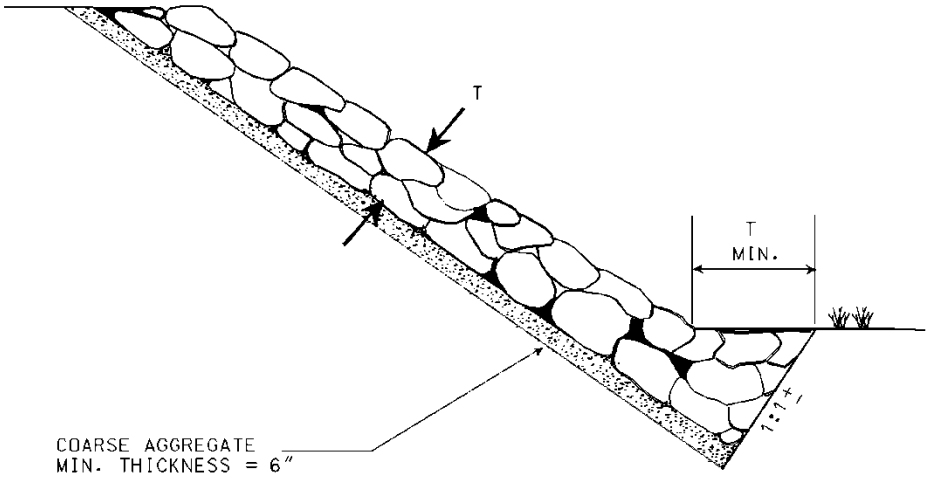
TOE REQUIREMENTS FOR BANK STABILIZATION - 3.19

FILTER CLOTH UNDERLINER

(PREFERRED)

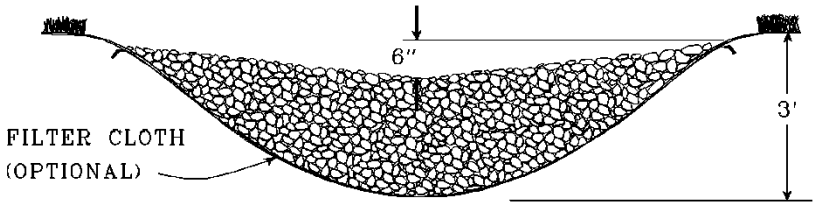


GRANULAR FILTER

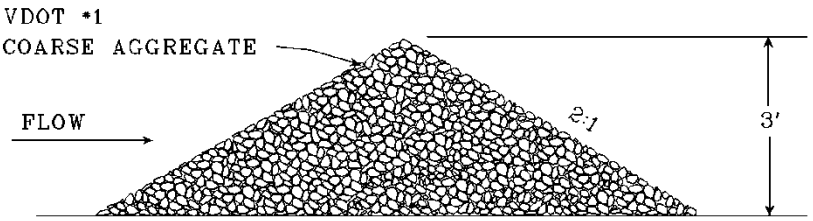


ROCK CHECK DAM - 3.20

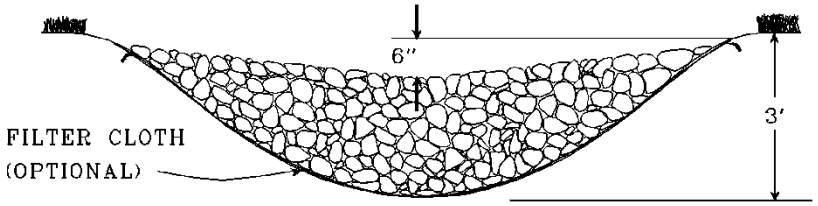
2 ACRES OR LESS OF DRAINAGE AREA:



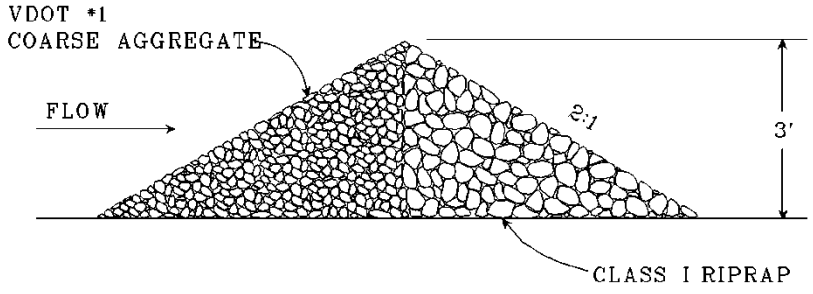
(DOWNSTREAM VIEW)



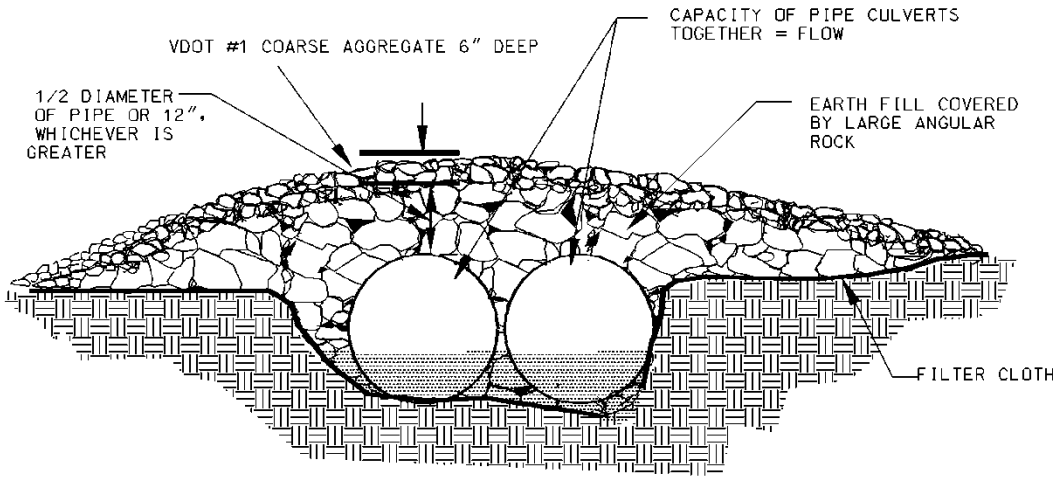
2-10 ACRES OF DRAINAGE AREA:



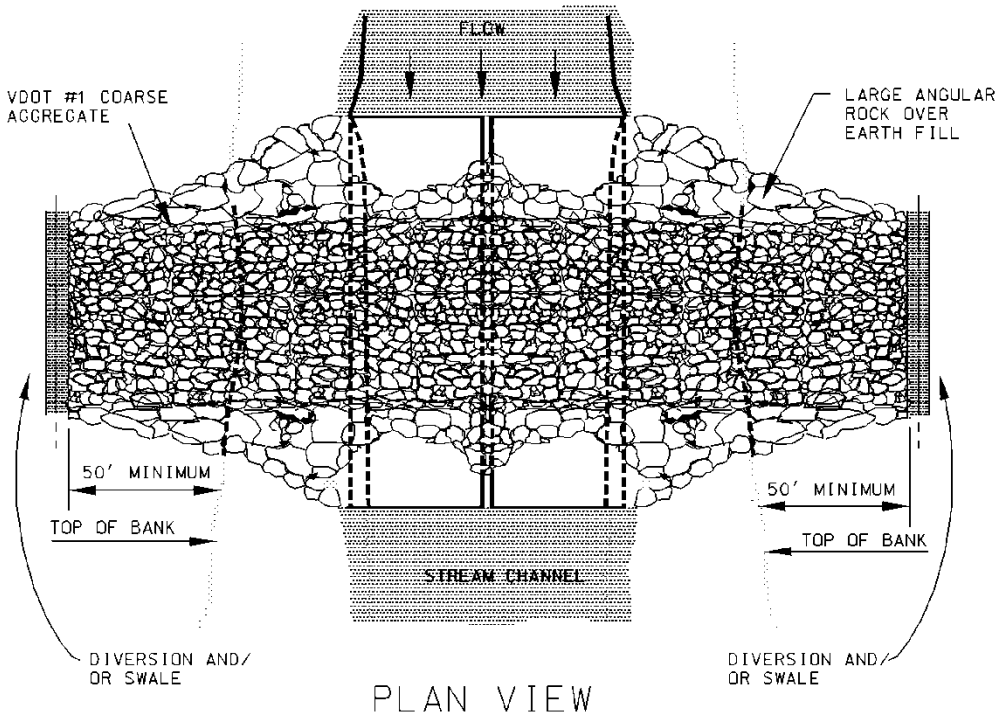
(DOWNSTREAM VIEW)



TEMPORARY CULVERT CROSSING - 3.24

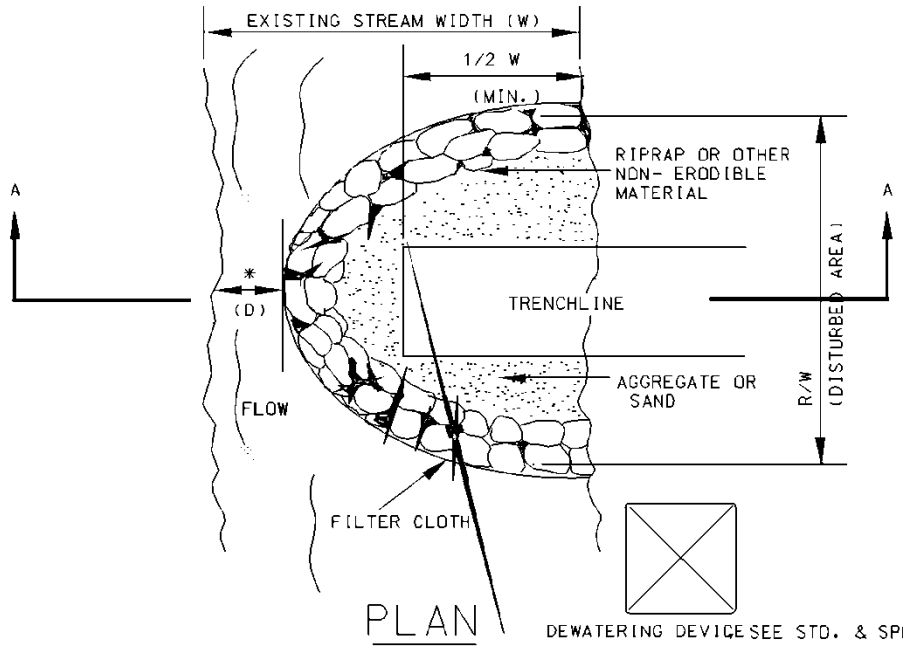


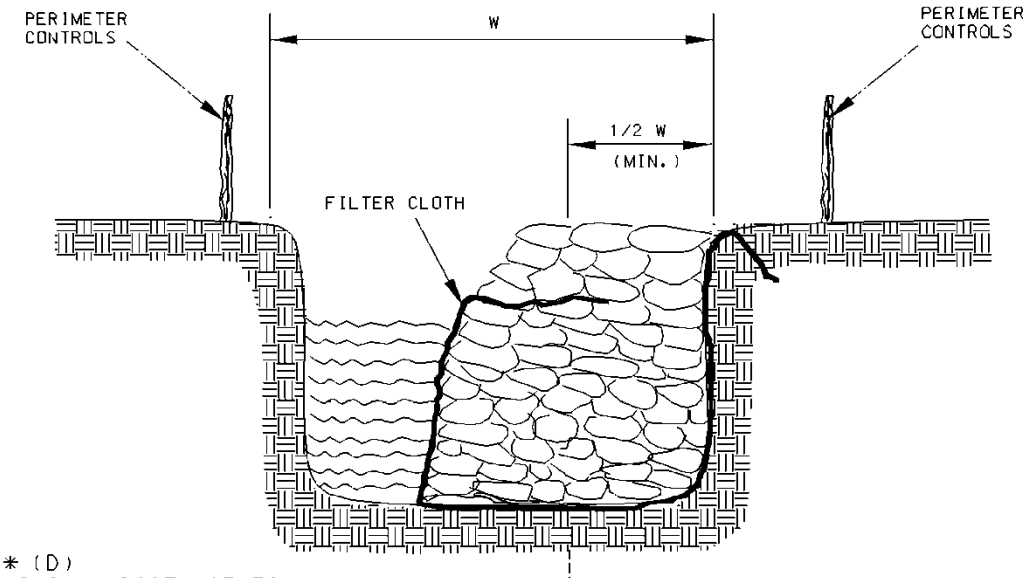
ELEVATION



PLAN VIEW

COFFERDAM CROSSING - 3.25

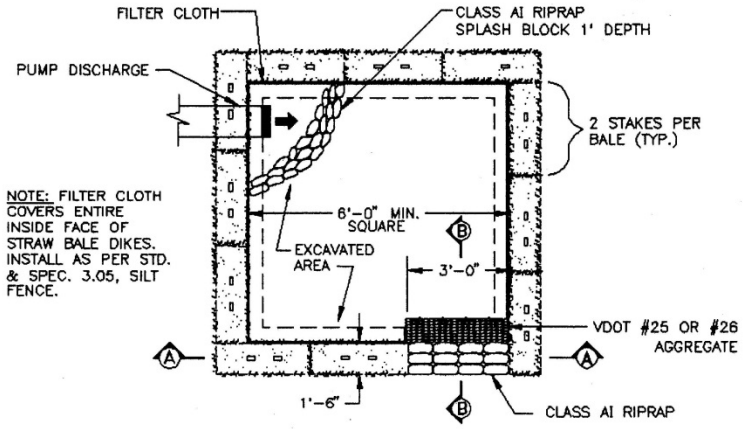




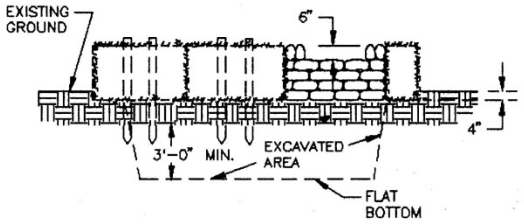
* (D)
MINIMUM DISTANCE TO BE 25% OF TOTAL WIDTH (W) OF THE STREAM.

SECTION A-A

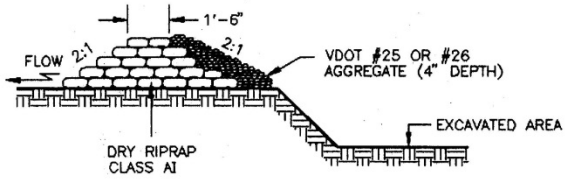
STRAW BALE/SILT FENCE PIT



PLAN VIEW



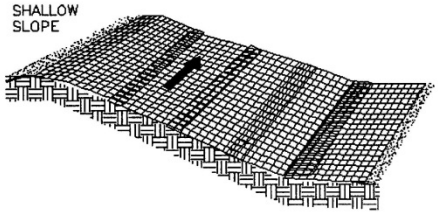
CROSS-SECTION A-A



CROSS-SECTION B-B

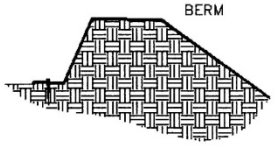
TYPICAL ORIENTATION OF TREATMENT – 1 (SOIL STABILIZATION BLANKET)

SHALLOW SLOPE

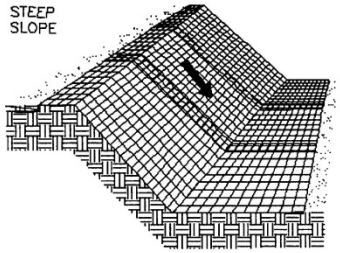


ON SHALLOW SLOPES, STRIPS OF NETTING PROTECTIVE COVERINGS MAY BE APPLIED ACROSS THE SLOPE.

WHERE THERE IS A BERM AT THE TOP OF THE SLOPE, BRING THE MATERIAL OVER THE BERM AND ANCHOR IT BEHIND THE BERM.

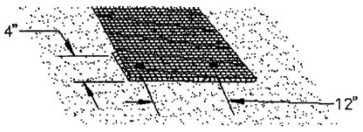


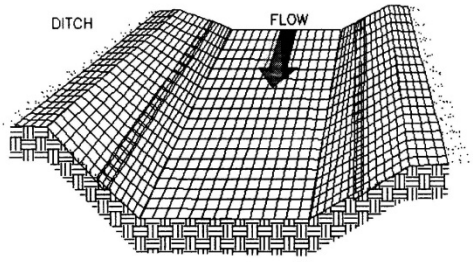
STEEP SLOPE



ON STEEP SLOPES, APPLY PROTECTIVE COVERING PARALLEL TO THE DIRECTION OF FLOW AND ANCHOR SECURELY.

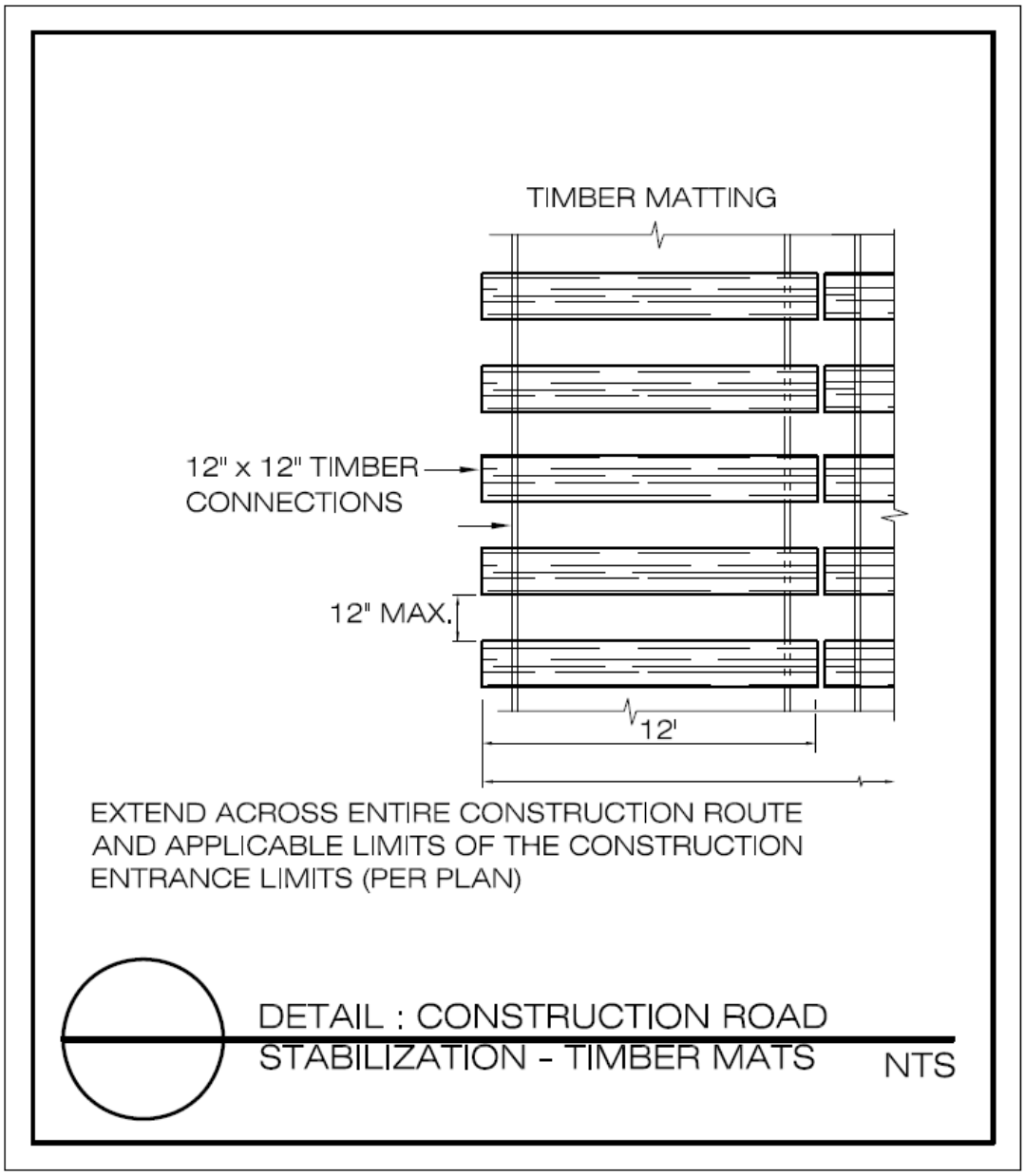
BRING MATERIAL DOWN TO A LEVEL AREA BEFORE TERMINATING THE INSTALLATION. TURN THE END UNDER 4" AND STAPLE AT 12" INTERVALS.





IN DITCHES, APPLY PROTECTIVE COVERING PARALLEL TO THE DIRECTION OF FLOW. USE CHECK SLOTS AS REQUIRED. AVOID JOINING MATERIAL IN THE CENTER OF THE DITCH IF AT ALL POSSIBLE.

TIMBER MAT STABILIZATION



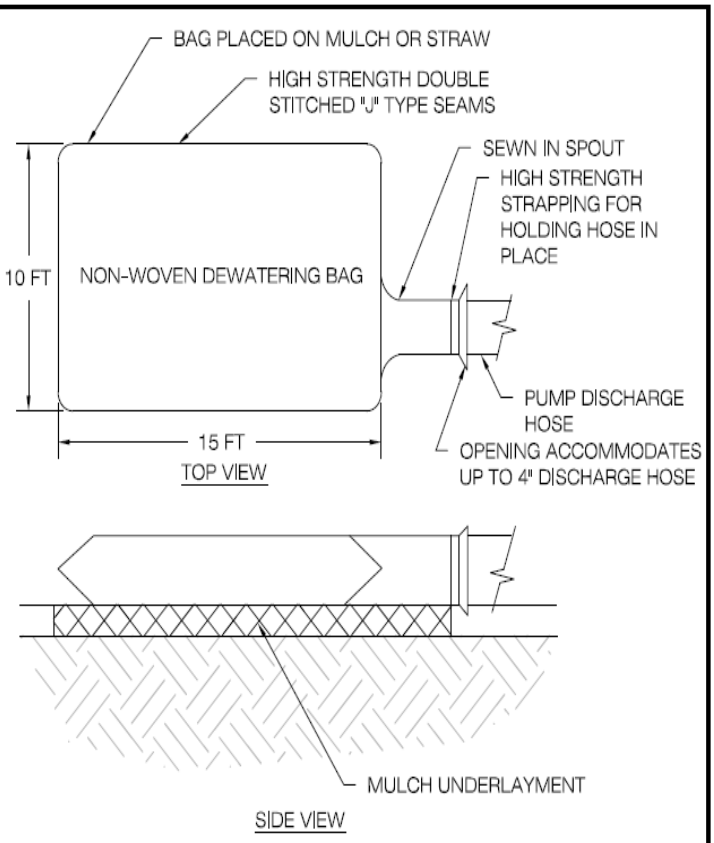
GEOTEXTILE/DEWATERING BAG

THE DEWATERING BAG SHALL BE MADE OF NON-WOVEN GEOTEXTILE WITH A MIN. SURFACE AREA OF 225 SQUARE FEET PER SIDE. ALL STRUCTURAL SEEMS SHALL BE SEWN WITH A DOUBLE STITCH USING A DOUBLE NEEDLE MACHINE WITH HIGH STRENGTH THREAD. THE SEAM STRENGTH SHALL WITHSTAND 100 LB/IN USING ASTM D-4884 TEST METHOD, THE DEWATERING BAG SHALL HAVE A NOZZLE LARGE ENOUGH TO ACCOMMODATE A FOUR INCH DISCHARGE HOSE, THE NOZZLE SHALL BE SEALED TIGHTLY AROUND THE DISCHARGE HOSE WITH A STRAP OR SIMILAR DEVICE TO PREVENT UNTREATED WATER FROM ESCAPING, THE GEOTEXTILE FABRIC SHALL BE A NON-WOVEN FABRIC WITH THE FOLLOWING PROPERTIES:

GEOTEXTILE FABRIC FOR DEWATERING BAG			
PROPERTIES	TEST METHOD	UNITS	DEWATERING BAG 12 OZ
WEIGHT	ASTM D-3776	OZ/YD	12
GRAB TENSILE	ASTM D-4632	LBS.	300
PUNCTURE	ASTM D-4833	LBS.	175
FLOWRATE	ASTM D-4491	GAL/MIN/FT2	70
PERMITIVITY	ASTM D-4491	1.3 SEC-1	1
MULLEN BURST	ASTM D-3786	LBS.IN2	580
UV RESISTANT	ASTM D-4355	%	70
AOS % RETAINED	ASTM D-4751	0.40-0.80 MM	100

NOTE:
ALL PROPERTIES ARE MINIMUM AVERAGE ROLL VALUE EXCEPT THE WEIGHT OF THE FABRIC WHICH IS GIVEN FOR INFORMATION ONLY.

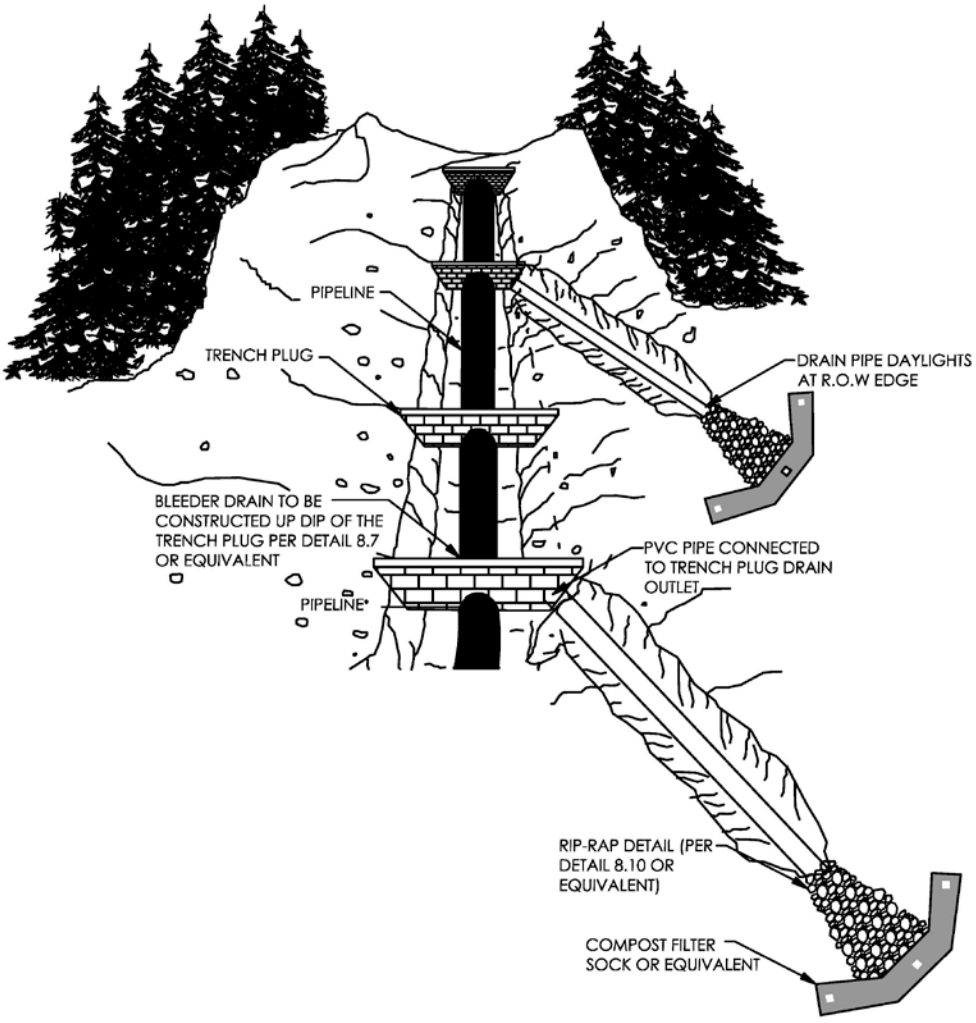
CONSTRUCTION:
THE DEWATERING BAG SHALL BE INSTALLED OVER A 3 INCH GRAVEL BASE TO PROMOTE INFILTRATION AND DEWATERING OF THE BAG.



DETAIL: GEOTEXTILE BAG (DEWATERING BAG)

NTS

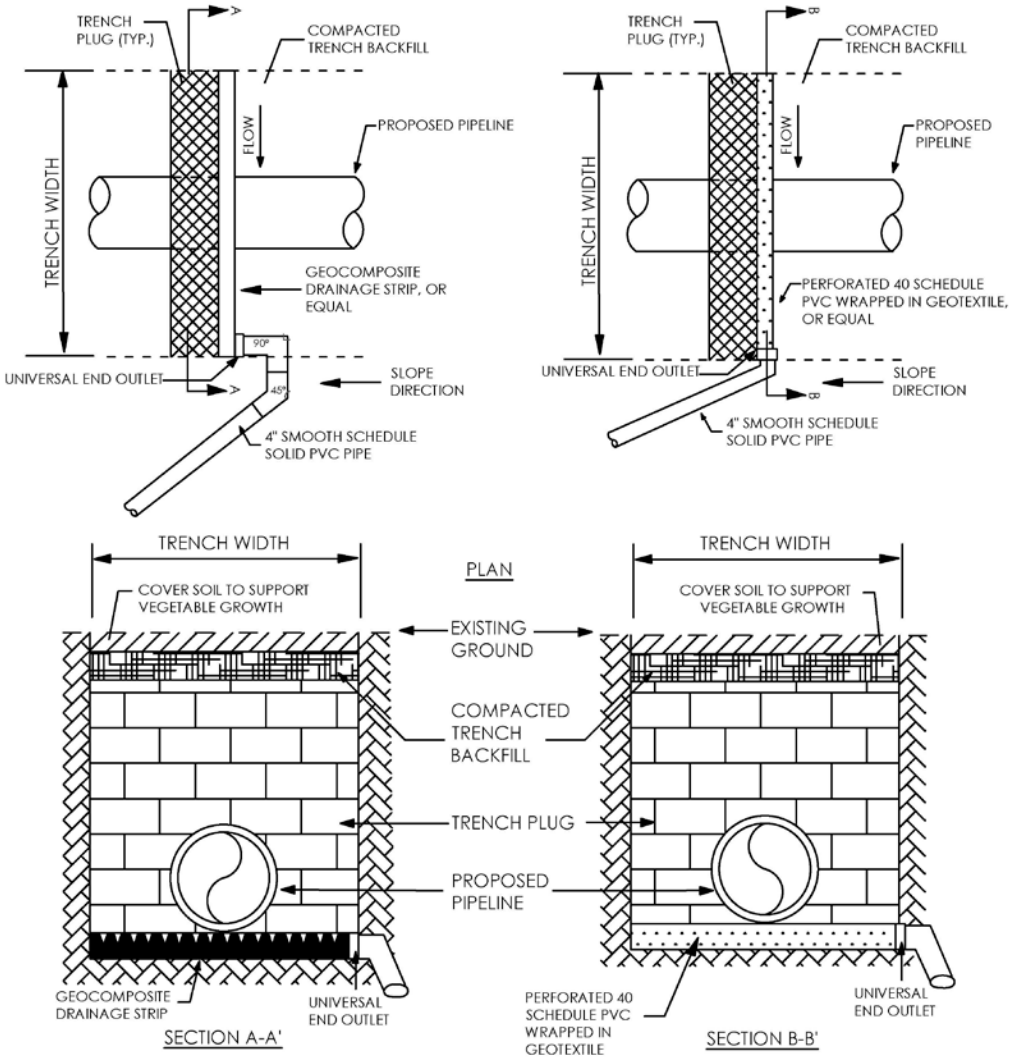
Where trenching activities are proposed in high slip potential soils and in areas where existing ground slopes are greater than 3:1, bleeder drains shall be installed to passively drain water from the trench area. The following illustration shows a drain placed at every second trench plug.



NOT TO SCALE

SLIP PREVENTION: BLEEDER DRAIN AND OUTLET DETAIL

Two (2) types of trench plug drains are illustrated below. Geocomposite Drainage Strips or Perforated Schedule 40 PVC placed behind the trench plug and below the pipeline are effective ways to passively drain water. Both methods show Schedule 40 PVC discharge pipe at a minimum of a 2% grade.



NOT TO SCALE

SLIP PREVENTION: TRENCH PLUG DRAIN DETAILS

APPENDIX B

Stormwater Management

SWM Plan Checklist

1. STORMWATER MANAGEMENT

The intent of the Virginia Stormwater Management Program (VSMP) regulations is to improve water quality through runoff reduction and other stormwater control practices and establish water quantity requirements. The baseline level for the stormwater technical criteria is a forested/open space condition.

Under 9 VAC 25-870, regulated land-disturbing activities are required to meet the stormwater technical criteria for water quality and water quantity metrics as outlined in Part IIB. The water quality and quantity criterion are largely directed at avoiding, minimizing and mitigating impacts due to changes in hydrology and stormwater pollutant loads associated with changes in land cover. Each project will be reviewed to evaluate consistency with DEQ Guidance Memorandum No. 15-2003. The guidance memorandum stipulates a number of conditions which must be satisfied for linear utility projects if a Stormwater Management Plan will not be required. Specifically, the following conditions must be satisfied:

- The project does not significantly alter the predevelopment runoff characteristics of the land surface after the completion of construction and final stabilization.
- The project is managed so that less than one (1) acre of land disturbance occurs on a daily basis.
- The disturbed land where work has been completed is adequately stabilized on a daily basis.
- The environment is protected from erosion and sedimentation damage associated with the land-disturbing activity.
- The owner and/or construction activity operator designs, installs, implements and maintains pollution prevention measures to:
    - *Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters;*
    - *Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on-site to precipitation and to stormwater;*
    - *Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures;*
    - *Prohibit the discharge of wastewater from the washout of concrete;*
    - *Prohibit the discharge of wastewater from the washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials; and*

- *Prohibit the discharge of fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance.*

- DETI must provide reasonable assurance to DEQ that all of the above conditions will be satisfied. **This may be accomplished by incorporating these conditions into an Erosion and Sediment Control Plan developed for the project.**

Right-of-ways must be maintained in a Forest/Open Space condition consistent with the Virginia Runoff Reduction Method Instructions & Documentation, which stipulate that rights-of-way considered as Forest/Open space must be restored to a hydrologically functional state and "be left in a natural vegetated state (can include areas that will be bush hogged no more than four times per year)," in accordance with Table 1 of the Virginia Runoff Reduction Method (VRRM) Instructions and Documentation. The forestry and vegetative management practices employed by DETI within the right-of-way comply with the VRRM recommendations for open space. Where the right-of-way consists of forest or open space conditions prior to the construction activity, and will remain in a forested or open space condition under post-developed conditions (e.g. undisturbed or restored to a hydrologically functional state and all surfaces will remain as permeable surfaces which are mowed no more than once every three years, in accordance with FERC Plan Guidelines or maintained in accordance with Table 1 referenced above), runoff curve numbers are identical under the Virginia Runoff Reduction Method. DETI may be required to provide documentation to DEQ of water quantity analysis, and may be required to document consistency with and applicability of DEQ Guidance Memorandum No. 15-2003.

DETI will submit project information to DEQ for preliminary review of whether a SWM plan is required (see Section 1.0 of Main Document). Department of Environmental Quality (DEQ) Guidance Memo No. 15-2003 (Appendix F) addresses this for linear development projects in stating, "…the construction of aboveground or underground utilities may not result in changes to the predevelopment runoff characteristics of the land surface after the completion of construction and final stabilization." The guidance memorandum goes on further to state that, "If the project will not result in significant changes to the predevelopment runoff characteristics after the completion of construction and final stabilization…," the requirement for a CGP permit may be waived (this would be separate from the more general exemptions for oil and gas transmission described in Section 1 of the main document). DEQ will review preliminary project information to advise DETI whether a SWM plan is required.

For projects requesting waiver of Stormwater Plan, DEQ requires information to be submitted that reasonably demonstrates that the project will not significantly change the predevelopment runoff characteristics of the land surface after the completion of construction and final stabilization. Information submitted to DEQ may include:

- Pre- and post-construction drainage areas and land cover conditions.

- Limits of disturbance
- Methodology for the restoration of land cover conditions to predevelopment conditions.
- ESC Plan excluding 9VAC25-840-40.19.m. & n. (The full Erosion and Sediment Control Plan would be available later in the process, after the preliminary review discussed above and in Section 1 of the main document).

If DEQ determines that the project meets the criteria for granting a waiver, then DEQ will waive the requirement for the preparation and implementation of a stormwater management plan. This waiver allows the recipient to exclude the following regulatory sections:

- SWM Quality – 9VAC25-870-63 and -65
- SWM Quantity – 9VAC25-870-66
- ESC MS-19 – 9VAC25-840-40.19.m. & n.

Information shall be submitted to DEQ Central Office for review with a transmittal letter specifically requesting a SWM Plan waiver. DEQ, as the VSMP Authority, will evaluate each project on an individual basis.

If DEQ waives the requirement for a SWM plan, DETI will utilize the DEQ linear projects guidance and will incorporate the conditions stipulated in GM 15-2003 into the Erosion and Sediment Control plan for the project (See *Additional Note*s in Appendix E).

Each project must be reviewed by a certified SWM Plan Reviewer (qualifications described in Section 2 of the main document) to verify exemption. In certain instances, a project may have an element which does result in significant change to predevelopment runoff characteristics after the land-disturbing activity is completed. In those instances, (generally where the addition of impervious surfaces or conversion of forest to managed turf in combination are expected to cause significant changes in predevelopment runoff characteristics), a SWM plan must be prepared, reviewed, approved, and implemented in accordance with 9VAC25-870 and 9VAC25-880 (if applicable).

DETI access roads will be grouped into four categories based on the extent of improvements required to prepare the road for use to support the project. Depending on the improvements, the impact on stormwater runoff characteristics will range from no expected impact to a material impact. Specifically, the four categories are defined below; all access roads, or access road segments, will be assigned a category that is depicted on the corresponding alignment sheet and access road plans.

1. Existing road with no improvements proposed – includes those existing roads that are in a condition such that no improvements are needed to prepare the road for use to support the project (e.g., asphalt surfaced roads).

2. Existing road with minor improvements proposed – includes those existing roads that contain either a compacted earth or gravel surface and the current road configuration (i.e., width, grade, etc.) is adequate to support the project. Roads in this category may receive supplemental gravel to improve the surface condition; however, the footprint of the road would not be expanded (i.e., no additional impervious surface).

3. Existing road with major improvements proposed – includes those existing roads that will receive an expanded footprint (i.e., the impervious surface post-construction may exceed that existing preconstruction) in order to prepare the road for use to support the project.

4. New road – includes roads not located within the limits of an existing road.

Access roads in categories 2, 3 and 4 will involve varying degrees of land disturbance, and thus appropriate erosion and sediment controls (e.g., sediment barriers) will be identified and depicted on the plans. No Post-construction stormwater management criteria will apply to categories 1 & 2 because the roads are existing and there is no additional impervious surface. Access roads in categories 3 and 4 may also require drainage improvements (e.g.,
road side ditches and ditch relief culverts). The general approach to locating sediment barriers along access roads will be to provide sediment barriers when a resource (e.g., wetland, waterbody) is downgradient of and within 200 feet of an access road.

Access roads in categories 3 and 4 involve improvements that are expected to result in a material change to the existing stormwater runoff characteristics as a result of the addition of impervious surface. These access roads must meet the Stormwater management requirements for quality and quantity.

Access roads in categories 3& 4 will be identified as to whether they are temporary (meant to serve the project initial construction and then removed and restored after construction is complete) or permanent.

Temporary access roads will be restored/rehabilitated to establish a firm stand of erosion-resistant vegetation and restored to a hydrologically functional state prior to completion of the project. All non-porous stone surfacing will be removed and porous stone ballast will be removed where it impedes infiltration. Any defined ditches or topographic alterations which significantly alter predevelopment runoff characteristics will be graded and topsoiled to match pre-development drainage patterns and avoid concentration of runoff. In accordance with the maintenance guidelines herein, these vegetated areas will be mowed no more than four times per year and will be considered open space. For FERC 7c projects, soils restoration will follow the FERC plan and procedures and will typically include provisions for Soil Restoration, Soil Compaction, Topsoil Segregation, Replacement and Soil Conditioning, and Re-Contouring.

In some instances, permanent access roads may be required for the construction or long-term maintenance and operation of the utility infrastructure. Each instance where a permanent access road is proposed will be reviewed for consistency with stormwater quality and quantity requirements. If DETI is of the opinion that the increases in runoff relative to pre-development conditions are not significant, DETI may request an exception from the stormwater management criteria from DEQ. A request for an exception must demonstrate that the request is in accordance with the provisions for exceptions in the VSMP regulations (9VAC25-870-57 & 9VAC25-870-122) and that the activity avoids and minimizes impacts to stormwater runoff. DEQ will scrutinize each exception request, so early coordination is advised.

2. TECHNICAL REQUIREMENTS

2.1 WATER QUALITY

Part IIB of the stormwater regulations states that the total phosphorous load will not exceed 0.41-pound per acre per year (lb./ac/yr.) for new development activities. The Land Cover Guidance for the VRRM defines provides for certain areas (including "Utility rights-of-way that will be left in a natural vegetated state") under certain operational conditions to be considered forested/open space and not as managed turf for the purposes of stormwater quality and quantity compliance. In accordance with the above, DETI will coordinate with DEQ on the applicability of GM15-2003 and whether a SWM plan is required. If a SWM plan is required (e.g. due to significant changes to predevelopment runoff characteristics, or other requirements which trigger the need for CGP coverage or post-construction SWM), DETI must develop and implement a SWM plan consistent with the applicable requirements of 9VAC25-870 and 9VAC25-880. The VRRM Spreadsheet is a tool which regulated entities may use to document general water quality planning and consistency with the technical requirements of 9VAC25-870 (et seq).

2.2 WATER QUANTITY

As identified in the VSMP regulations, the technical criteria for water quantity are designed to ensure the protection of State waters from the potential harm of unmanaged stormwater runoff. This is generally achieved through the incorporation of techniques to address localized flooding and the protection of downstream channels. The specific technical criteria to be applied for water quantity analysis and compliance are contained in 9VAC25-870-66.

2.2.3 PRIOR DEVELOPED LANDS

As noted previously, DETI will provide for an initial evaluation of each project to ascertain whether the project may be exempt from CGP permit coverage and whether there is a significant

change in predevelopment runoff characteristics that might trigger the need for a Stormwater Management Plan and associated controls (pursuant to GM15-2003). DETI will obtain concurrence from DEQ early in the process if a SWM plan is not required pursuant to GM15-2003. Permanent facilities with significant impervious cover (such as compressor stations) are expected to provide for a stormwater management plan and associated controls if needed, even though these facilities may remain exempt from permit coverage. For portions of pipeline easements which traverse prior developed lands (e.g. under turf-intensive uses such as ballfields, or under existing parking lots or road segments), DETI does not expect to provide improvements to existing runoff conditions if predevelopment conditions are restored. DEQ has clarified that it is not their expectation that permanent best management practices be installed on restored right-of-way. As discussed earlier, DEQ will review the overall project (at an early stage), including soil restoration conditions, to identify whether SWM plan preparation is waived for these activities.

Where predevelopment land cover conditions are changed significantly triggering requirements for post construction stormwater quality and quantity requirements, post-construction Best Management Practices (BMPs) may be required to comply with water quality and water quantity criteria and MS-19 of the Erosion and Sediment Control Regulations. In such instances, the outfall within the project must comply with Part IIB or Part IIC (where applicable) of the stormwater regulations to assess compliance. This may include the "Energy Balance" method described by item B.3.a of 9VAC25-870-66. In these instances, water quantity criteria for flood control and channel protection must be addressed and managed through the preparation of a SWM plan consistent with 9VAC25-870 and 9VAC25-880.

These Annual Standards and Specifications for ESC and SWM also assist in meeting the standards of the Federal Energy Regulatory Commission (FERC) Upland Erosion Revegetation and Maintenance Plan (Plan) and the FERC Wetland and Waterbody Construction and Mitigation Procedures (Procedures). DETI and its construction contractors must implement this plan as appropriate for all construction in Virginia unless a variance to the Virginia Erosion and Sediment Control Regulations has been submitted to and granted approval by the DEQ.

3. STORMWATER MANAGEMENT BMPS

Stormwater Management BMPs used for consistency with these specifications should be approved by DEQ and contained in the Virginia Stormwater BMP Clearinghouse. For projects requiring post-construction SWM BMPs, DETI must report the following annually each year to DEQ:

Number and types of SWM BMPs installed;

Geographic coordinates of each BMP;

Drainage area or watershed size served; and

Receiving stream or hydrologic unit.

4. STORMWATER MAINTENANCE

Each project plan must be reviewed by certified personnel described in Section 2 (main document) to ascertain whether the specific project is exempt from post-construction stormwater quality and quantity requirement, or whether SWM planning is required (with DEQ concurrence). If post-construction SWM is required, non-structural BMPs allowed by the permit will be the preferred option. A maintenance plan for both the non-structural and any additional structural BMPs must be developed to ensure compliance with requirements for routine inspection or reporting in the Virginia Stormwater BMP Clearinghouse specifications. Maintenance requirements for non-structural BMPs must be identified and incorporated into inspection documentation during routine patrolling of the right-of-way by certified personnel. Any structural BMPs would require a more formal inspection. Each stormwater management facility will be inspected by DETI, as the owner of the facility, at least once every five years; and all inspections will be documented. Corrective measures must be carried out as soon as practicably feasible when needed. Long-term maintenance of structural SWM facilities must be conducted in accordance with 9VAC25-870-112. To be consistent with the provisions of 9VAC25-870-112, maintenance plans for the stormwater facilities must be submitted to DETI for formal review and approval prior to initiating the land disturbing activity, made available to DEQ upon request, and must provide for inspections and maintenance and the submission of inspection and maintenance reports to the DEQ. DETI transmission easements over land under which permanent stormwater management facilities will be placed must further assure the following:

- Be stated to run with the land;
- Provide for all necessary access to the property for purposes of maintenance and regulatory inspections;
- And, be enforceable by all appropriate governmental parties.

5. INSPECTIONS FOR STORMWATER MANAGEMENT

DETI or its designated representative will continue to be responsible for periodic inspections for compliance with the CGP, if required, erosion and sediment control regulations and any FERC Certificate. Certified personnel, as outlined in Section 2 of the main document, must conduct all inspections.

Inspections for compliance with the SWPPP (and relevant SWM and ESC elements) must occur in accordance with the following:

Inspections must be conducted at the following frequency:

(1) At least once every five business days; or

(2) At least once every 10 business days and no later than 48 hours following a measurable storm event. In the event that a measurable storm event occurs when there are more than 48 hours between business days, the inspection must be conducted no later than the next business day.

A measurable storm event means a rainfall event producing 0.25 inches of rain or greater over 24 hours. Where areas have been temporarily stabilized or land-disturbing activities will be suspended due to continuous frozen ground conditions and stormwater discharges are unlikely, the inspection frequency may be reduced to once per month. If weather conditions (such as above freezing temperatures or rain or snow events) make discharges likely, the operator must immediately resume the regular inspection frequency.

DETI's SWPPP inspections will be conducted by Certified Personnel as identified in Section 2 and will serve also as the periodic inspections.

For projects discharging to exceptional waters identified in 9VAC25-260-30.A.3.c, or to surface waters identified as impaired in the 2012 § 305(b)/303(d) Water Quality Assessment Integrated Report or for which a Total Maximum Daily Load (TMDL) wasteload allocation has been established and approved prior to the term of this general permit for (i) sediment or a sediment-related parameter (i.e., total suspended solids or turbidity) or (ii) nutrients (i.e., nitrogen or phosphorus), the following additional requirements will apply:

a. The exceptional water(s), impaired water(s), approved TMDL(s), and pollutant(s) of concern, when applicable, must be identified in the SWPPP;

b. Permanent or temporary soil stabilization must be applied to denuded areas within seven days after final grade is reached on any portion of the site;

c. Nutrients must be applied in accordance with manufacturer's recommendations or an approved nutrient management plan and will not be applied during rainfall events; and

d. The applicable SWPPP inspection requirements specified in Part II F 2 must be amended as follows:

(1) Inspections must be conducted at a frequency of (i) at least once every four business days or (ii) at least once every five business days and no later than

48 hours following a measurable storm event. In the event that a measurable storm event occurs when there are more than 48 hours between business days, the inspection must be conducted on the next business day; and

APPENDIX C

Federal Energy Regulatory Commission Upland Erosion Revegetation and Maintenance Plan (Plan)

Federal Energy Regulatory Commission

Office of Energy Projects

May 2013

UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN

Washington, DC 20426

MAY 2013 VERSION

UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN

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UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN (PLAN)

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 conditions 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-of-way 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.

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.

APPENDIX D

Federal Energy Regulatory Commission Wetland and Waterbody Construction and Mitigation Procedures (Procedures)

Federal Energy Regulatory Commission

Office of Energy Projects

May 2013

WETLAND AND WATERBODY CONSTRUCTION AND MITIGATION PROCEDURES

Washington, DC 20426

MAY 2013 VERSION

WETLAND AND WATERBODY CONSTRUCTION AND MITIGATION PROCEDURES

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WETLAND AND WATERBODY
CONSTRUCTION AND MITIGATION PROCEDURES (PROCEDURES)

I. APPLICABILITY

A. The intent of these Procedures is to assist project sponsors by identifying baseline mitigation measures for minimizing the extent and duration of project-related disturbance on wetlands and waterbodies. Project sponsors shall specify in their applications for a new FERC authorization, and in prior notice and advance notice filings, any individual measures in these Procedures they consider unnecessary, technically infeasible, or unsuitable due to local conditions 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 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.

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.

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) identification 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.

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.

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.

   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.

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.

APPENDIX E

General Notes

APPENDIX E

General Notes

TABLE 6-1

GENERAL EROSION AND SEDIMENT CONTROL NOTES

ES-1: Unless otherwise indicated, all vegetative and structural erosion and sediment control practices will be constructed and maintained according to minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook and Virginia Regulations 4VAC50-30 Erosion and Sediment Control Regulations.

ES-2: The plan approving authority must be notified one week prior to the pre-construction conference, one week prior to the commencement of land disturbing activity, and one week prior to the final inspection.

ES-3: All erosion and sediment control measures are to be placed prior to or as the first step in clearing.

ES-4: A copy of the approved erosion and sediment control plan shall be maintained on the site at all times.

ES-5: Prior to commencing land disturbing activities in areas other than indicated on these plans (including, but not limited to, off-site borrow or waste areas), the contractor shall submit a supplementary erosion control plan to the owner for review and approval by the plan approving authority.

ES-6: The contractor is responsible for installation of any additional erosion control measures necessary to prevent erosion and sedimentation as determined by the plan approving authority.

ES-7: All disturbed areas are to drain to approved sediment control measures at all times during land disturbing activities and during site development until final stabilization is achieved.

ES-8: During dewatering operations, water will be pumped into an approved filtering device.

ES-9: The contractor shall inspect all erosion control measures periodically and after each runoff-producing rainfall event. Any necessary repairs or cleanup to maintain the effectiveness of the erosion control devices shall be made immediately.

NOTE: General Notes incorporated into plans must use the current regulatory reference to 9VAC25-840 (and not 4VAC50-30, as cited above).

The following additional notes may be required by DEQ if a SWM Plan Waiver or CGP waiver is granted.

Additional Notes:

- *The project may not significantly alter the predevelopment runoff characteristics of the land surface after completion of construction and final stabilization;*

- The project may not significantly alter the predevelopment runoff characteristics of the land surface after the completion of construction and final stabilization.
- The project will be managed so that less than one (1) acre of land disturbance occurs on a daily basis.
- The disturbed land where work has been completed is adequately stabilized on a daily basis.
- The environment must be protected from erosion and sedimentation damage associated with the land-disturbing activity.
- DETI and/or the construction activity operator must design, install, implement and maintain pollution prevention measures to:

    - *Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters;*

    - *Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on-site to precipitation and to stormwater;*

    - *Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures;*

    - *Prohibit the discharge of wastewater from the washout of concrete;*

    - *Prohibit the discharge of wastewater from the washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials; and*

    - *Prohibit the discharge of fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance.*

- DETI must provide reasonable assurance to DEQ that all of the above conditions will be satisfied. This may be accomplished by incorporating these conditions into an Erosion and Sediment Control Plan developed for the project.

TABLE 6-1

GENERAL EROSION AND SEDIMENT CONTROL NOTES

ES-1: Unless otherwise indicated, all vegetative and structural erosion and sediment control practices will be constructed and maintained according to minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook and Virginia Regulations 4VAC50-30 Erosion and Sediment Control Regulations.

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- The disturbed land where work has been completed is adequately stabilized on a daily basis.
- The environment must be protected from erosion and sedimentation damage associated with the land-disturbing activity.
- DETI and/or the construction activity operator must design, install, implement and maintain pollution prevention measures to:

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    - *Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on-site to precipitation and to stormwater;*

    - *Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures;*

    - *Prohibit the discharge of wastewater from the washout of concrete;*

    - *Prohibit the discharge of wastewater from the washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials; and*

    - *Prohibit the discharge of fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance.*

- DETI must provide reasonable assurance to DEQ that all of the above conditions will be satisfied. This may be accomplished by incorporating these conditions into an Erosion and Sediment Control Plan developed for the project.

APPENDIX F

Linear Utility Projects Guidance

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER DIVISION

Subject: **Guidance Memo No. 15-2003**
Postdevelopment Stormwater Management Implementation Guidance for Linear Utility Projects under the Virginia Stormwater Management Program Regulation, 9VAC25-870

To: Regional Directors and Local VSMP Administrators

From: Melanie D. Davenport, Director

Date: April 23, 2015

Copies: James Golden, Jeff Steers, Fred Cunningham, Joan Salvati, Allan Brockenbrough, Jerome Brooks, Regional Stormwater Compliance Managers

Summary:

Section 76 (Linear Development Projects) of the Virginia Stormwater Management Program (VSMP) Regulation, 9VAC25-870, sets forth the postdevelopment stormwater management requirements for linear development projects. The purpose of this guidance document is to clarify the implementation of Section 76 with regards to the construction of linear utilities (e.g., waterlines, sewer lines, electric lines, telephone lines, oil and gas distribution pipelines, etc.) and was developed for use by the Department and local VSMP Authorities.

Electronic Copy:

An electronic copy of this guidance document in PDF format is available for staff internally on DEQNET, and for the general public on DEQ's website at: http://www.deq.virginia.gov/Programs/Water/Laws,Regulations,Guidance/Guidance/WaterPermitGuidance.aspx.

Contact Information:

Please contact Drew Hammond, Office of Stormwater Management, at (804) 698-4037 or Andrew.Hammond@deq.virginia.gov with any questions regarding the application of this guidance.

Disclaimer:

This document is provided as guidance and, as such, sets forth standard operating procedures for the agency. However, it does not mandate or prohibit any particular action not otherwise required or prohibited by law or regulation. If alternative proposals are made, such proposals will be reviewed and accepted or denied based on their technical adequacy and compliance with appropriate laws and regulations.

Postdevelopment Stormwater Management Implementation Guidance for Linear Utility Projects under the Virginia Stormwater Management Program Regulation, 9VAC25-870

Definitions:

"Land disturbance" or "land-disturbing activity" means a manmade change to the land surface that potentially changes its runoff characteristics including clearing, grading, or excavation, except that the term shall not include those exemptions specified in § 62.1-44.15:34 of the Code of Virginia.

"Linear development project" means a land-disturbing activity that is linear in nature such as, but not limited to, (i) the construction of electric and telephone utility lines, and natural gas pipelines; (ii) construction of tracks, rights-of-way, bridges, communication facilities and other related structures of a railroad company; (iii) highway construction projects; (iv) construction of stormwater channels and stream restoration activities; and (v) water and sewer lines. Private subdivision roads or streets shall not be considered linear development projects.

"Postdevelopment" refers to conditions that reasonably may be expected or anticipated to exist after completion of the land development activity on a specific site.

"Predevelopment" refers to the conditions that exist at the time that plans for the land development of a tract of land are submitted to the VSMP authority. Where phased development or plan approval occurs (preliminary grading, demolition of existing structures, roads and utilities, etc.), the existing conditions at the time prior to the first item being submitted shall establish predevelopment conditions.

"Stabilized" means land that has been treated to withstand normal exposure to natural forces without incurring erosion damage.

"Stormwater management plan" means a document(s) containing material for describing methods for complying with the requirements of the VSMP Regulation, 9VAC25-870.

"Virginia Stormwater Management Program (VSMP) authority" means an authority approved by the Board after September 13, 2011 to operate a Virginia Stormwater Management Program or the Department.

Regulatory Text:

9VAC25-870-76. Linear development projects.

Linear development projects shall control postdevelopment stormwater runoff in accordance with a site-specific stormwater management plan or a comprehensive watershed stormwater management plan developed in accordance with these regulations.

Guidance:

Section 76 of the VSMP Regulation, 9VAC25-870, establishes the requirement that linear development projects control postdevelopment stormwater runoff in accordance with a site-specific stormwater management plan or a comprehensive watershed stormwater management plan. The purpose of this guidance document is to clarify the implementation of Section 76 with regard to the construction of linear utilities (e.g., waterlines, sewer lines, electric lines, telephone lines, oil and gas distribution pipelines, etc.) and was developed for use by the Department and local VSMP Authorities.

The VSMP Regulation does not distinguish between various types of linear development projects such as aboveground or underground utilities, highway construction, rights-of-way, bridges, tracks and related structures of a railroad company. The Department of Environmental Quality (DEQ) recognizes that the construction of aboveground or underground linear utilities may not result in changes to the predevelopment runoff characteristics of the land surface after the completion of construction and final stabilization. Also, the application of the postdevelopment water quantity and water quality controls to these types of projects and the preparation and implementation of a stormwater management plan may provide minimum water quality benefit. Examples of such projects include:

- The installation of underground utilities (e.g., waterlines, sewer lines, oil and gas distribution pipelines) beneath existing impervious cover (e.g., asphalt pavement, concrete pavement) that will be returned to its predevelopment condition after the completion of construction and final stabilization;

- The installation of underground utilities (e.g., waterlines, sewer lines, oil and gas distribution pipelines) beneath existing pervious cover (e.g., forest/open space, managed turf) that will be returned to its predevelopment condition after the completion of construction and final stabilization; or

- The installation of aboveground (i.e., overhead) utility lines.

DEQ staff or the local VSMP authority should utilize their best professional judgment when evaluating aboveground or underground linear utility projects. If the project will not result in significant changes to the predevelopment runoff characteristics of the land surface after the completion of construction and final stabilization, then DEQ or the local VSMP authority, at their discretion, may waive the requirement for the preparation and implementation of a stormwater management plan. DEQ recognizes that on a site specific basis a stormwater management plan may be required especially if the linear utility project will significantly alter the predevelopment runoff characteristics of the land surface.

In addition, the construction of aboveground or underground linear utilities may be conducted without requiring coverage under the General VPDES Permit for Discharges of Stormwater from Construction Activities (Construction General Permit) provided that:

- The project does not significantly alter the predevelopment runoff characteristics of the land surface after the completion of construction and final stabilization;

- The project is managed so that less than one (1) acre of land disturbance occurs on a daily basis;

- The disturbed land where work has been completed is adequately stabilized on a daily basis;

- The environment is protected from erosion and sedimentation damage associated with the land-disturbing activity;

- The owner and/or construction activity operator designs, installs, implements, and maintains pollution prevention measures to:

    - Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters;

    - Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on-site to precipitation and to stormwater;

    - Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures;

    - Prohibit the discharge of wastewater from the washout of concrete;

    - Prohibit the discharge of wastewater from the washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials; and

    - Prohibit the discharge of fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance.

- The owner and/or construction activity operator provides reasonable assurance to DEQ or the local VSMP Authority that all of the above conditions will be satisfied. This may be accomplished by incorporating these conditions into an erosion and sediment control plan developed for the project.

As previously noted, DEQ staff or the local VSMP authority should utilize their best professional judgment when evaluating aboveground or underground linear utility projects. If the owner and/or construction activity operator provides reasonable assurance to DEQ or the local VSMP Authority that all of the aforementioned conditions will be satisfied, then the linear utility project may be conducted without requiring coverage under the Construction General Permit. Please note that this does not relieve the owner and/or construction activity operator from complying with any and all other applicable federal, state, and local requirements. DEQ or the local VSMP Authority reserves the right to require a registration statement for Construction General Permit coverage if the aforementioned conditions are not satisfied.

If the linear utility project will significantly alter the predevelopment runoff characteristics of the land surface requiring postdevelopment stormwater management or if other site specific conditions warrant Construction General Permit coverage, DEQ or the local VSMP authority may require a registration statement for permit coverage.

APPENDIX G

ACP Specific Requirements

Per the request received from DEQ by letter dated May 16, 2016 for the Atlantic Coast Pipeline (ACP) Project, **DETI has agreed to incorporate the following more stringent conditions into the planning and implementation phases of Erosion and Sediment Control and Stormwater Management for ACP**:

1. In addition to DETI's internal review process, individual project-specific plans will be submitted to DEQ for review and approval.
2. Given the nature of critical infrastructure, the project-specific Erosion and Sediment Control and Stormwater Management plans and DEQ approval will be made available to DEQ and may be made available to others as agreed upon in a memorandum to be negotiated between DETI and DEQ.
3. Inspection reports conducted by DETI as well as complaint logs and complaint responses will be submitted to DEQ.
4. DETI will provide for payment to DEQ of reasonable costs incurred by DEQ to hire additional technical expertise to assist DEQ in plan review and compliance activities for the ACP project, as articulated in the MOA current being negotiated with DEQ for the Atlantic Coast Pipeline project.

ACP Alternative ESC Practices or Procedures	
Handbook Specification	**Rationale for Alternative Method (as applicable)**
VESCH **Std. & Spec. 3.01 (Safety Fence)** "The polyethylene web of the plastic safety fence shall be secured to a conventional metal 'T' or "U" post driven into the ground to a minimum depth of 18 inches."	Stakes will be installed to the maximum extent of 18" as practical in the field to ensure the functionality of the safety fence. In areas where adequate embedment depth cannot be achieved, due to terrain/substrate constraints; additional measures including but not limited to sandbags, mounded earth, etc. will be utilized to secure the fence.
VESCH **Std. & Spec. 3.02 (Stone Construction Entrance)** "The entrance shall be maintained in a condition which will prevent tracking or flow of mud onto public rights-of-way. This may require periodic top dressing with additional stone or the washing and reworking of existing stone as conditions demand and repair and /or cleanout of any structures used to trap sediment. All materials spilled, dropped, washed, or tracked from vehicles onto roadways or into storm drains must be removed immediately. The use of water trucks to remove materials dropped, washed, or tracked onto roadways will not be permitted under any circumstances."	Instead, follow Virginia Minimum Standard MS-17 "Where construction vehicle access routes intersect paved or public roads, provisions shall be made to minimize the transport of sediment by vehicular tracking onto the paved surface. Where sediment is transported onto a paved or public road surface, the road surface shall be cleaned thoroughly at the end of each day. Sediment shall be removed from the roads by shoveling or sweeping and transported to a sediment control disposal area. Street washing shall be allowed only after sediment is removed in this manner."
VESCH **Std. & Spec. 3.11 (Temporary ROW Diversion)** "Grade- Positive drainage (with less than 2% slope) should be provided to a stabilized outlet, sediment-trapping facility, or a vegetative buffer strip of adequate size."	Exemption requested to increase fall slope of temporary ROW diversion to greater than 2 percent to help prevent temporary ROW diversion and overall potential slope failures by allowing the water to move off of the limits of disturbance. Temporary ROW diversions will have energy dissipating devices (coir logs, belted silt retention fence, rock aprons, etc.) installed at the outfall to slow and filter the water prior to exiting the limits of disturbance.
VESCH **Std. & Spec. 3.24 (Temporary Vehicular Stream Crossing)** "If the structure will remain in place for up to 14 days, the culvert shall be large enough to convey the flow from a 2-year frequency storm without appreciably altering the stream flow characteristics."	Exception requested to allow use of the 1-year frequency storm to size culverts that will be in place for up to 14 days since use of the 2-year frequency storm often results in culverts that are larger than the waterbody cross-section. Exception requested that if application of Std. & Spec. 3.24 results in a culvert that is larger than the cross-section of the waterbody, the selected culvert size will be based on that which can be accommodated without modification of the stream geometry.

VESCH **Std.& Spec. 3.26 (Dewatering Structure)** <u>For a Straw Bale/Silt Fence Pit</u> "Measure shall consist of straw bales, silt fence, a stone outlet (a combination of VDOT Class AI Riprap and VDOT #25 or #26 Aggregate) and a wet storage pit" "The excavated area should be a minimum of 3 feet below the base of the perimeter measures (straw bales or silt fence)."	In some cases, ACP could use a modified dewatering structure in combination with a filter bag. The structure is similar to the straw bale/silt fence pit described in the VESCH, but the wet storage area is not excavated 3 ft below the perimeter measures since the structures are placed off the right-of-way in well vegetated areas. The filter bag discharges into the dewatering structure for additional filtration through the straw bales. Additional energy dissipating devices may be installed downgradient of the dewatering structure, as necessary. It is noted that filter bags are often installed off the right-of-way to avoid discharge to denuded areas on the right-of-way and to benefit from additional filtration provided by the vegetation that exists off the right-of-way. Prior to installing a dewatering structure off the right-of-way appropriate coordination with the landowner will occur. Installation and removal of the referenced dewatering practice does not involve ground disturbance.
VESCH **Std. & Spec. 3.31 (Temporary Seeding**) Liming: An evaluation should be conducted to determine if lime is necessary for temporary seeding. Fertilizer: Shall be applied as 600 lbs./acre of 10-20-10 (14 lbs./1,000 sq. ft.) or equivalent nutrients. Lime and fertilizer shall be incorporated into the top 2 to 4 inches of the soil, if possible.	It is noted that, in accordance with Virginia Minimum Standard MS-2 will be adhered to by protecting stockpiles with sediment trapping measures (i.e. perimeter controls). Additionally, if during routine inspections it is observed that temporary seed is not successfully establishing within 14 days, the appropriate amendments will be considered and if needed, will be incorporated in accordance with ESC Technical Bulletin #4. Temporary and permanent stabilization shall be applied strictly in accordance with MS-1.
VESCH **Std. & Spec. 3.36 (Soil Stabilization Blankets and Matting)** "Site Preparation- After site has been shaped and	Exception to removing all "clods and rocks" more than 1" in diameter. Erosion control blankets and matting will be installed according to manufacturers' specifications and in a way that

ACP Alternative ESC Practices or Procedures	
Handbook Specification	**Rationale for Alternative Method (as applicable)**
graded to approved design, prepare a friable seeded relatively free from clods and rocks more than 1 inch in diameter, and any foreign material that will prevent contact of the soil stabilization mat with the soil surface."	achieves intimate contact with soils/substrate to help reduce the potential for erosion underneath the installed fabric.

APPENDIX H

Approved Deviations

Deviations from technical guidance documents that have been approved by DEQ for alterations to existing practices or additional practices should be catalogued with these annual standards and be incorporated into future revisions to the Standards and Specifications, if applicable. Both the deviation request and the approval letter should be inserted in this appendix upon approval.

Deviation Request Log

Request Date	Std &Spec.	Approval Date	Summary	Approved (Y/N)

APPENDIX I

Slope Stability Policy and Procedure for Pipeline Design, Construction and Right of Way Maintenance

NOTE: *In instances where the VESCH criteria and the Slope Stability Policy differ, the more stringent of the two criteria shall apply.*

Slope Stability Policy and Procedure for Pipeline Design, Construction and Right of Way Maintenance

Dominion Transmission, Inc.

Engineering Services Reference Manual

Revised 12/1/2016

Slope Stability Policy and Procedure for Pipeline Design, Construction and Right of Way Maintenance

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APPENDIX B Select Typicals
APPENDIX C Forms
APPENDIX D Slope Failure Priority Guidance

ACRONYM LIST

BMP – Best management practice
CLSM – Controlled low strength material
DCNR – (Pennsylvania) Department of Conservation and Natural Resources
DTI – Dominion Transmission, Inc.
DTM – Digital terrain model
E&S – Erosion and Sediment
E&SC – Erosion and sediment control
ECC – Environmental Compliance Coordinator
EI – Environmental Inspector
EIES – Energy Infrastructure Environmental Services
FERC – Federal Energy Regulatory Commission
GIS – Geographic information system
GPS – Global positioning system
HDD – Horizontal Directional Drill
LiDAR – Light Detection and Ranging
LMS – Learning management system
LOD – Limit of disturbance
MD - Maryland
MSE – Mechanically stabilized earth
NOT – Notice of Termination
NRCS – National Cooperative Soil Survey
NRI – Natural Resource Inventory
OEPA – Ohio Environmental Protection Agency
OGRIP – Ohio Geographically Referenced Information Program
PAMAP – Pennsylvania Map
ROW – Right of way
RSS – Reinforced Soil Slope
SWPPP – Stormwater Pollution Prevention Plan
TWS – Temporary work space
USDA – United States Department of Agriculture
USGS – United States Geological Survey

VESCP – Virginia Erosion and Sediment Control Program
WSS – Web Soil Survey
WV – West Virginia
WVDEP – West Virginia Department of Environmental Protection
WVDOH – West Virginia Department of Highways
WVGES – West Virginia Geological and Economic Survey

Slope Stability Policy and Procedure for Pipeline Design, Construction and Right of Way Maintenance

POLICY:

The following slope stability procedure must be utilized as part of the development and execution of any Dominion Transmission, Inc. (DTI) pipeline project. The possibility of slope failures including landslides, will be considered during the routing, design, construction, restoration and post-construction phases of a pipeline project to avoid, reduce, or mitigate the incidence of slope failures on DTI pipeline projects. Specifically, DTI personnel and contractors engaged in pipeline projects must be trained to understand this policy and conform to the following procedure.

PROCEDURE:

1.0 Applicability

This policy and procedure will become effective on September 30, 2016. The applicability table shown below provides the details of which sections of the procedure are applicable for new pipeline projects, active pipeline projects and pipeline replacement projects.

Table 1: Applicability Sections for New Pipeline Projects, Pipeline Replacement Projects, and Existing ROW.

Applicable Sections	New pipeline projects that begin permitting after 9/30/2016	Pipeline Replacement Projects in Existing ROW	Slope Failures on Existing ROW
2.0 Introduction	X	X	
2.1 Slope Failure Susceptibility	X	X	
2.2 Types of Slope Failures	X	X	
2.3 Slope Failure Causes	X	X	
3.0 Pipeline Route Selection	X		
3.1 Preliminary Route Selection	X		
3.2 Desktop Study	X		
3.2.1 Existing Landslide Maps and Data	X		
3.2.2 Define Slopes of Greater than 30 Degrees	X	X	
3.2.3 USDA Natural Resources Conservation Service Soil Surveys	X	X	
3.2.4 Light Detection and Ranging (LiDAR)	X		

Table 1: Applicability Sections for New Pipeline Projects, Pipeline Replacement Projects, and Existing ROW, Continued.

Applicable Sections	New pipeline projects that begin permitting after 9/30/2016	Pipeline Replacement Projects in Existing ROW	Slope Failures on Existing ROW
3.2.5 Mine Study	X		
3.2.6 Desktop Study Mapping	X		
3.3 Field Reconnaissance	X	X	
3.4 Desktop Slope Failure Risk Assessment	X		
3.5 Selection of Preventative Measures for Identified High Risk Slope Failure Locations	X		
3.5.1 Selection of Preventative Measures for Pipeline Replacement Projects		X	
4.0 Pipeline Design and Engineering	X	X	
4.1 Excavation Minimization	X	X	X
4.2 Document Slope Failure Areas on Project Plans	X	X	
4.3 Temporary Work Space (TWS)	X	X	X
4.4 Include Additional Drainage	X	X	X
4.5 Engineered Details	X	X	X
4.6 Construction Stormwater Permit	X	X	
4.7 Stormwater Pollution Prevention Plan	X	X	
4.8 Documentation of Design Information	X		
5.0 Pipeline Preconstruction Planning	X	X	

Table 1: Applicability Sections for New Pipeline Projects, Pipeline Replacement Projects, and Existing ROW, Continued.

Applicable Sections	New pipeline projects that begin permitting after 9/30/2016	Pipeline Replacement Projects in Existing ROW	Slope Failures on Existing ROW
5.1 Slope Failure Training	X	X	X
5.1.1 Training	X	X	X
5.1.2 Environmental Permit Transition	X	X	X
5.2 Slope Failure Mitigation and Response Materials	X	X	
6.0 Addressing Slope failures during Construction	X	X	
6.1 Inspections	X	X	
6.2 Responding to Slope Failures	X	X	X
6.2.1 Evaluate Priority	X	X	X
6.2.2 Install Temporary BMPs	X	X	X
6.2.3 Gather Data	X	X	X
6.2.4 Select Slope Failure Repair Approach	X	X	X
6.2.5 Install Short Term Stabilizing Measures	X	X	X
6.2.6 Implement and Document Slope Failure Repair	X	X	X
6.2.7 Documentation of Repairs	X	X	X
7.0 Addressing Slope Failures after Construction	X	X	X
8.0 Slope Failures Caused by a Third Party	X	X	X

2.0 Introduction

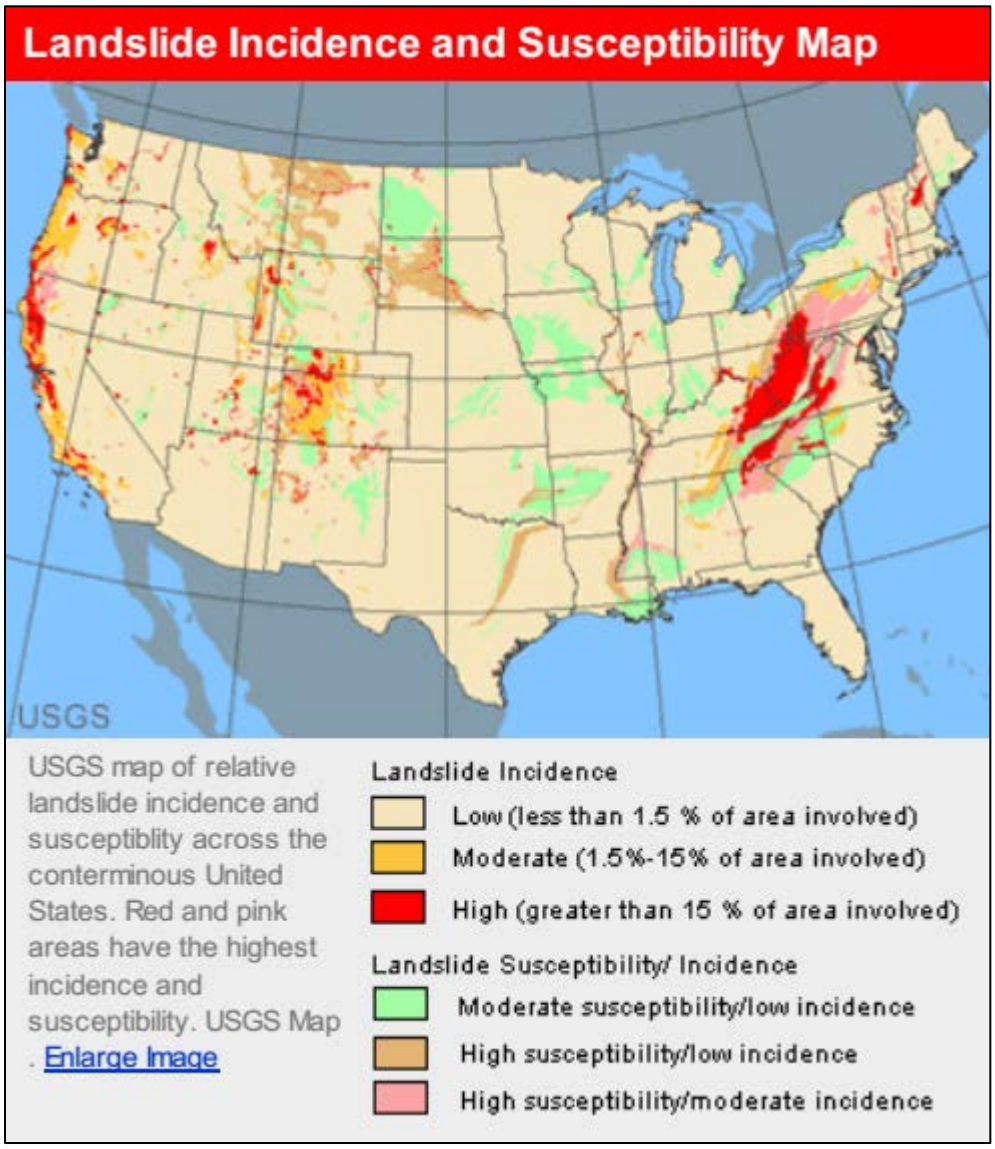
Slope failures, also referred to as landslides or slips on pipeline right-of-ways (ROW) can create adverse erosion control conditions, result in sediment deposits in adjacent waterways, cause landowner complaints, and/or damage the pipeline or other infrastructure. Additionally, slope failures can be costly to repair. Recognizing that the location of slope failures can be challenging to predict, the purpose of this procedure is to avoid and/or reduce the number and severity of slope failures that occur on new Dominion pipeline ROW, and planned expansion of existing Dominion ROW. Every pipeline project and slope failure is unique. Therefore, the specific requirements during project planning and implementation are dependent upon the site-specific conditions. The procedure provides the following:

- A method of identifying potential slope failures;
- Preventative measures;
- A method of protecting waterbodies from slope failure material runoff;
- Containment procedures for slope failure material;
- Remediation procedures; and,
- Training requirements.

2.1 Slope Failure Susceptibility

Slope failures are plentiful and occur naturally in a large portion of the DTI operating area, and in particular the Appalachian Plateau and Valley and Ridge Provinces. Susceptibility is generally associated with cohesive soils (Silts and Clays) formed on steeper slopes that are triggered by precipitation, gravity and human activities. This region has some of the highest landslide or slope failure susceptibility in the United States, as indicated in Figure 1, which shows a USGS landslide map of the conterminous United States, and Figure 2, which shows a smaller scale map of DTI's operating area, with the locations having the highest risk of landslides shown in red.

Figure 1 – Landslide Susceptibility Map of the United States[1]



[1] USGS - Landslide Overview Map of the Conterminous United States

Dominion

PIPELINE TRANSMISSION SYSTEM
LEGEND

- TRANSMISSION COMPRESSOR STATION
- PRODUCTION COMPRESSOR STATION
- STORAGE COMPRESSOR STATION
- MEASURING AND REGULATING FACILITY
- DOMINION TRANSMISSION
- JOINT OWNERSHIP/PARTNERSHIP INTEREST
- DOMINION EAST OHIO
- LNG TERMINAL
- POINT OF GAS RECEIPT
- POINT OF GAS DELIVERY TO AFFILIATES
- POINT OF GAS DELIVERY TO NON-AFFLIATES
- GAS STORAGE POOL
- OTHER PIPELINES
- DOMINION HOPE

SCALE
50 30 10 0 50 100 150 MILES

Revised 06/09/16 MPR

LANDSLIDE INCIDENCE	
	LOW (LESS THAN 1.5% OF AREA INVOLVED)
	MODERATE (1.5%–15% OF AREA INVOLVED)
	HIGH (GREATER THAN 15% OF AREA INVOLVED)
LANDSLIDE SUSCEPTIBILITY/INCIDENCE	
	MODERATE SUSCEPTIBILITY/LOW INCIDENCE
	HIGH SUSCEPTIBILITY/LOW INCIDENCE
	HIGH SUSCEPTIBILITY/MODERATE INCIDENCE

PREPARED BY:

Landslides are common in the mountainous terrain of Virginia due to the presence of steep slopes and highly fractured bedrock overlain by shallow soils. The greatest landslide hazards are present in western and southwestern Virginia. Areas of low-relief such as the Piedmont and Coastal Plain also have landslides but these are generally smaller and generated by human disturbance.

Landslides have occurred throughout the majority of Pennsylvania. However, most landslides occur in southwestern Pennsylvania in areas where shallow soils are developed on steep slopes that have clay-rich bedrock. Areas such as this include the Waynesburg Hills and Pittsburgh Low Plateau sections of the Appalachian Plateaus province.

Landslides are rare or nonexistent throughout much of Ohio due to a lack of steep slopes and/or lack of geologic units prone to failure. However, there are a few areas of Ohio that experience frequent landslides. Portions of eastern and southern Ohio are characterized by steep slopes and several hundred feet of local relief. Bedrock of Mississippian, Pennsylvanian, and Permian ages, thick colluvium, and thick lake silts and outwash formed in association with Pleistocene glaciers make these areas particularly prone to slope failures. Red mudstones lose strength when they become wet and are the most slide-prone rocks in eastern Ohio. The state has experienced slope failures in areas where thick colluvium has developed, such as in Hamilton and Clermont County and the Scioto River Valley. The north-eastern half of Ohio along the Lake Erie shoreline experiences continual erosion, preventing the natural achievement of slope stability.

New York is not categorized as a state with a serious landslide threat as most of the state's soil consists of dense glacial till comprised mostly of granular material that is not prone to landsliding. However, landslides have occurred across all of New York State, from the Adirondacks to Long Island where soft cohesive soils exist. The most common type of landslides that occur in New York are due to the combination of New York's physiography and glacial history with most landslides occurring along major rivers and lake valleys were there were previously glacial lakes. These lakes result in glacial lake deposits (silts and clays) and are generally associated with steeper slopes.

2.1.1 Appalachian Highlands Region

The geology of the Appalachian Highlands is a primary contributor to the high incidence of slope failures. The Appalachian Plateau Province in West Virginia and Pennsylvania occurs west of the Appalachian Front, and coincides with the highest incidence of slope failures. This region contains narrow valleys and

steep sided slopes with some deeper valleys. Overburden soils generally consist of colluvium overlying shallow bedrock. Colluvium is soil and debris (rock, tree material, etc.) that accumulate at the base of a slope or along the side slope by mass wasting or sheet erosion. It generally includes angular rock fragments, not sorted according to size, and could contain larger portions of bedrock. The sedimentary bedrock is mostly of the Permian-Pennsylvanian age that is relatively flat-lying and consists of cyclic sequence of sandstone, red beds, shale, limestone, and coal from the Dunkard and Monongahela Groups. Bedrock from the underlying Conemaugh Group is present in the deeper valleys. Because of the region's steep topography, abundant rainfall, low shear strength rocks, and soils with low residual strength, landslides have resulted in major infrastructure and property damage. In addition, large portions of West Virginia are extensively underlain by deep mining operations and strip mines that can also be associated with ground movements.

Southeast of the Appalachian Plateau, the flanks of the Appalachian Ridges and the Blue Ridge are covered by colluvium that is highly susceptible to sliding. Because the colluvium covers many types of bedrock, the map designations of landslide incidence and susceptibility cross formational boundaries. The designations do not correspond so closely in these areas to the units on the geologic map of the United States as they do in most areas west of the Mississippi. Most slope movements in the colluvium consist of slowly moving debris slides although many debris avalanches and debris flows can occur. Rainfall and the subsequent increase in groundwater conditions is a common trigger for landslides in this region, with the factors being the soil types and shape of the land surface, all of which relate to the underlying bedrock geology, and in many cases to slope modifications by human activity. Widespread occurrences of landslides coincide with major rainfall events, especially when the remnants of large storms track over the mountains.

In the Great Valley of Pennsylvania, Maryland, West Virginia and Virginia, east of the Appalachian Ridges, broad areas of Cambrian and Ordovician limestone contain pockets of thick residual clay that is moderately susceptible to sliding. This clay forms many small earth flows and slumps, especially along highway cuts.

2.1.2 Piedmont Region

East of the Appalachian Mountains, is the Piedmont Province of Maryland, Pennsylvania and Virginia. The province is a dissected rolling plain formed on residual soil from deeply weathered metamorphic rocks, and is bordered on the east by a dissected terraced plain on thick deposits of sand, gravel, and

clay. Most of the region is free of landslides, except in the Lower Cretaceous clays of Maryland and Virginia, where the incidence of slumps and earth flows is high.

2.1.3 Atlantic Coastal Plain Region

The low dissected Atlantic Coastal plain of Maryland and Virginia is generally free of slope instability due to the moderate terrain in the majority of the area. However, there are localized areas in eastern Maryland with relatively steep slopes that have a high incidence of slope failures. In addition, a majority of Southern Maryland is highly susceptible to slope failure where the Marlboro Clay is exposed. A poorly exposed outcropping of Marlboro Clay begins in Prince Georges County and continues southwest for approximately 20 miles reaching into Charles County. Slope failures are particularly numerous in the east-central and south-western portions of Prince Georges County. Also, in the valleys of Piscataway and Mattawoman Creeks, the clay is mostly buried beneath Holocene alluvium.

2.2 Types of Slope Failures

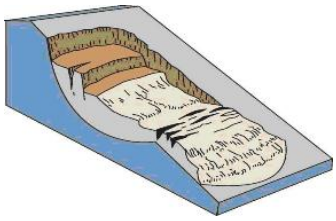
The term landslide or slip as it pertains to geologic reference can be defined as[2]: 1. the downward falling or sliding of a mass of soil, detritus, or rock, on or from a steep slope; 2. the mass itself. Other terms used to describe slips include landslides, land slips, land movements, slumps, slides, etc. The term “head scarp” refers to the tear in the ground surface located at the top of a slip. The term “toe bulge” refers to the mound of failed soil at the base of the slip.

The most common types of slips are described below[3], and a representation of some typical slips observed on pipeline ROW are presented in Figure 3.

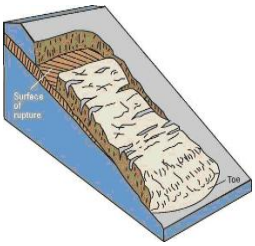
[2] http://dictionary.reference.com/browse/landslide

[3] FEMA Landslide Loss Reduction: A Guide for State and Local Government Planning

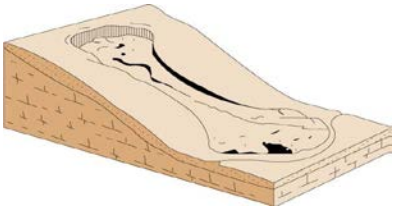
Figure 3 – Types of Slope Failures



Rotational Slide

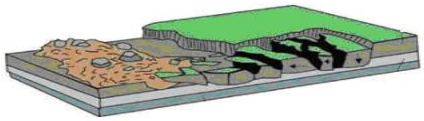


Translational Slide

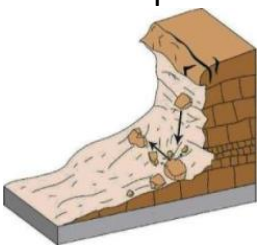


Earthflow

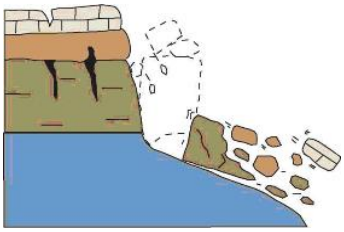
Creep



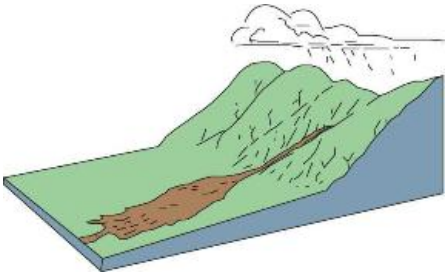
Lateral Spread



Falls



Topple



Debris Flow

Source: USGS

- *Rotational Slides* – Movement of soil and debris downslope in a distinctive rotational motion. A "slump" is an example of a small rotational slide.
- *Translational Slide* – Down slope movement of soil and/or rock on a relatively planar surface and has little rotational movement or backward tilting. The mass commonly slides out on top of the original ground surface.
- *Earthflow* – Unchannelized flow of water, soil, rock, and vegetation that moves downslope.
- *Creep* – Imperceptibly slow, steady downward movement of a slope. Evidence of creep can be indicated by curved tree trunks, bent or tilted fences or retaining walls, and hummocky ground surface.
- *Lateral Spread* – Nearly horizontal movement of geologic materials; usually occurs on very gentle slopes.
- *Falls* – Abrupt movement of masses of soil or rock that becomes detached from steep slopes or cliffs. Movement generally occurs by free-fall, bouncing, and rolling. These movements are promoted by undercutting, differential weathering, excavation, or erosion.
- *Topple* – A block of rock that tilts or rotates forward on a pivot point and then separates from the main mass, falling to the slope below.
- *Debris Flow* – A moving mass of loose mud, sand, soil, rock, water and air that travels down a slope under the influence of gravity. To be considered a debris flow, the moving material must be loose and capable of "flow" and at least 50% of the material must be sand-size particles or larger.

2.3 Causes of Slope Failures

Slope Failures can be caused by nature, by man, or a combination of both. A listing of common contributing factors to slips is below.

Human Activities

- Removal of shallow bedrock on steep slopes and replacement with a weaker backfill material, such as soil fill;
- Removal of vegetation and trees;
- Changes in slope configuration, such as additional load placed on the top of the soil mass, or removal of material near the bottom of the soil mass (such as trenching for pipeline construction); and,
- Changes to the surface water or groundwater regime, such as the addition of water to a slope.

Natural Factors

- Weather;
- Erosion of toe support;
- Weathering of bedrock can produce weak, slope failure-prone materials;
- Earthquakes; and,
- Rapid lowering or rising of water level.

3.0 Pipeline Route Selection

Pipeline route selection is an important component of avoiding or minimizing the impacts of slope failures for new natural gas pipelines. The route selection process described in this document must be used for all DTI projects that include the construction of new natural gas pipelines or re-alignment of existing pipelines. DTI will avoid or mitigate the adverse effects of slope failures by following a route selection process that incorporates identification, avoidance, and/or mitigation. This process is an iterative process, and it includes preliminary route selection, desktop studies, field reconnaissance, landowner discussions and landowner considerations, temporary and permanent access road identification, and environmental factors as inputs to developing a final route. Multiple iterations of each step in the process may be necessary to develop a route that avoids or reduces the risk of slope failures.

3.1 Preliminary Route Selection

Preliminary routing includes establishing a preliminary route that serves as a starting point for the project team, and the final route will likely vary from this preliminary route. A preliminary route can be established using tools such as topographic maps, Google Earth™, available light detection and ranging (LiDAR) data, and other computer mapping software. Considerations during preliminary routing include slope failure-prone areas and construction techniques. Preliminary routing will avoid or minimize routing parallel to slopes, also known as “side hilling”, as this construction technique requires excessive excavation of material, increases the construction limits of disturbance, and results in a right-of-way that is difficult to restore and to stabilize. During preliminary route layout, care must be taken to traverse slopes perpendicular to topographic contours, and to avoid traversing slopes greater than 30 degrees (58 percent) to the maximum extent practicable. If traversing slopes of greater than 30 degrees (58 percent) cannot be avoided, it must be minimized, and these areas will be a focus of the desktop study and further evaluation during the field reconnaissance process discussed below in Section 3.3.

3.2 Desktop Study

The purpose of the desktop study is to further evaluate the preliminary route and make route adjustments prior to conducting the field reconnaissance. The DTI Project Team/field engineer, in consultation with DTI Engineering Management must decide at the beginning of a project the appropriate data to be considered during the desktop study. For small projects, the desktop study may only consist of a review of the route, and identification of steep slope areas that can be avoided. For longer projects, the desktop study should be more extensive and can include all of the items discussed below. The desktop study includes a review of existing data on slope failures and slope failure-prone areas, to allow the DTI Project Team/field engineer to make corresponding alterations in the route to avoid or minimize routing across existing slope failures and slope failure-prone areas, and to identify areas that must be crossed that will require additional review during field reconnaissance and project design.

The DTI Project Team/field engineer must define the study corridor at the beginning of the study to provide ample coverage for route alterations either during the desktop study or the field reconnaissance study. Because the potential for route adjustments is greater for longer pipelines, the desktop study corridor must be wider than for shorter pipelines. The minimum width of a study corridor during the desktop review phase is 1000 feet, but may be expanded if necessary based on the project specifics. Geographic information system (GIS) is the most efficient method to conduct the desktop study. A project-specific GIS database can be developed using various information sources including, but not limited to those listed below. Additional information in the GIS includes topography, residential and commercial structures, land use, geology, streams, wetlands, cultural resource sites, cultural features such as roads, railroads, public lands and cemeteries to be used during the desktop study to refine the pipeline route prior to beginning the field reconnaissance. Potential access roads must be identified during the desktop study for further evaluation during the field reconnaissance.

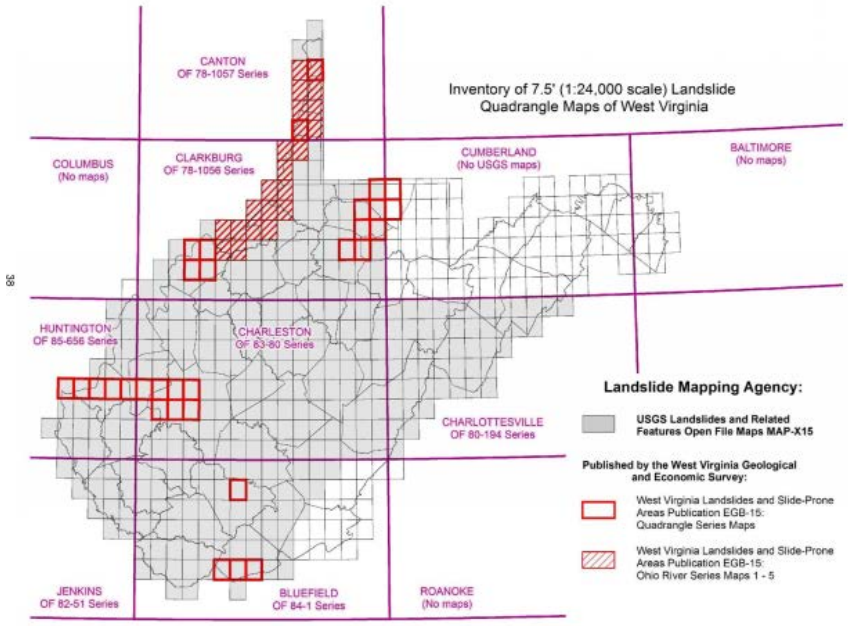
3.2.1 Existing Landslide Maps and Data

The United States Geological Survey (USGS) maintains publically available GIS data for a digital compilation of landslide overview mapping of the conterminous United States at http://pubs.usgs.gov/of/1997/ofr-97-0289/ . This dataset consists of polygons enclosing areas of landslide incidence and susceptibility for the conterminous United States. The purpose of this dataset is

to give the user a general indication of areas that may be susceptible to landslides, and is not suitable for local planning or site selection without further investigation on the ground.

For a portion of West Virginia, maps of old landslides and slide-prone areas were compiled in 1976 by the West Virginia Geological and Economic Survey (WVGES) in WVGES Publication EGB-15a, West Virginia Landslides and Slide-Prone Areas, P. Lessing, et. al, 1976. Landslides and slide-prone areas were mapped on USGS 7.5 minute quadrangles. Thirty-six 7.5 minute quadrangles are available as georeferenced images from the WV GIS Technical Center. The GIS data can be accessed here WVGISTC: GIS Data Clearinghouse, and areas covered by the data are shown in Figure 4 below. Non-georeferenced maps are available for the remaining USGS quadrangles shown in gray in Figure 4. These maps are available for download and can be georeferenced for projects that occur in areas where the georeferenced data are not directly available from the WV GIS Tech Center. State-specific information other than from USGS as discussed above are not available for Maryland, Ohio, New York, Pennsylvania or Virginia.

Figure 4 – Landslide Mapping in West Virginia



The maps must be used in the desktop study to identify areas of past slope failures, the slopes at the highest risk for slope failures, and the route adjusted to the extent practicable to avoid the highest hazard areas.

3.2.2 Define Slopes of Greater than 30 Degrees.

The desktop study must identify the degree of slope for the entire route. There are several methods to identify and define the degree of slope, either by direct measurement from topographic maps or using various computer programs. The DTI Project Team/field engineer will select an appropriate method based on the size of the project. The DTI Project Team/field engineer may select a slope angle that is shallower than 30 degrees on a project-specific bases.

3.2.3 USDA Natural Resources Conservation Service Soil Surveys

The United States Department of Agriculture (USDA) National Cooperative Soil Survey (NRCS) web-based Web Soil Survey (WSS) (http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm) provides georeferenced soil maps. The DTI Project Team/field engineer will review the soil survey information related to soil landscapes, soil formation, soil limitations for various land uses, and properties of the soils in the survey areas. In particular, information related to soil origin, slope steepness, drainage characteristics, typical soil profile with layer thickness, approximate depth to bedrock, and slope failure-prone soils can be obtained from the soil survey. Additionally, archived soil surveys are available for selected portions of West Virginia (http://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=WV), and may provide additional interpretation of soil conditions, land use applications, and soil hazards.

The objective of soil surveys is to separate major landforms that have similar land use, and not to delineate exact boundaries of soil type. Therefore, soil surveys provide a broad overview of soil conditions but are not designed for site-specific evaluations.

3.2.4 Light Detection and Ranging (LiDAR)

LiDAR is a remote sensing technology that measures distance by illuminating a target with a laser and analyzing the reflected light. LiDAR is capable of producing high resolution mapping of the earth's surface including very subtle topographic features such as headscarps, lobate features, and hummocky topography indicative of past or active slope failures.

For projects that include construction of new pipelines, the DTI Project Team/field engineer may use publicly available LiDAR data in the desk top study. If publicly available LiDAR data is not available, the project specific LiDAR data may be obtained if the DTI Project Team/field engineer and Engineering Management decides it is necessary. LiDAR data is available for purchase from select vendors for portions of the DTI system. Where LiDAR data is unavailable for purchase, it may be deemed necessary to obtain project-specific LiDAR data by flying the route. The DTI Project Team/field engineer and Engineering Management must determine if the route should be flown to obtain LiDAR data. If the DTI Project Team/field engineer determines that project specific LiDAR is not necessary, that decision must be documented in the Desktop study documentation. Typical LiDAR coverage ranges from 1000 feet to 4000 feet in width.

LiDAR data is analyzed by developing a digital terrain model (DTM) that can be imported to various computer aided drafting software suites. The DTM can be imported into the project GIS during the desktop study and used to identify past slope failures, steep slopes and other terrain features useful in routing the pipeline.

Publically available LiDAR data are available to varying degrees for each state as shown below;

Maryland: LiDAR data and other mapping data are available from the Maryland iMAP program located at http://imap.maryland.gov/Pages/lidar-topography-server.aspx

New York: LiDAR is available for portions of New York from the New York State Elevation Data site (http://gis.ny.gov/elevation/).

Ohio: LiDAR data for Ohio are available through the Ohio Geographically Referenced Information Program at http://ogrip.oit.ohio.gov/)

Pennsylvania: LiDAR data for Pennsylvania are available at the PAMAP website athttp://www.pamap.dcnr.state.pa.us/

Virginia: LiDAR is available for portions of Virginia from the Virginia LiDAR Database at http://www.virginialidar.com/index-3.html#.V3Qtw032apo

West Virginia: As of July 2015, LiDAR data is available from the WV GIS Tech Center for all or portions of Berkley, Gilmer, Jackson, Jefferson, Morgan, Webster, and Wyoming counties of West Virginia.

3.2.5 Mine Study

A mining study should occur in areas of suspected resource mining. Underground and surface coal mining is extensive throughout West Virginia, southwestern Pennsylvania, western Virginia, and southeastern Ohio. A study of state agency data bases should be checked for potential impacts to the pipeline route. Depending on the type of mining, the impacts could range from ground subsidence or ground movement from uncontrolled backfilling of strip mines or auger mining to longwall mine panel subsidence. Publically available mine mapping from state agencies are shown below:

New York
Department of Environmental Conservation - Mining & Reclamation
http://www.dec.ny.gov/cfmx/extapps/MinedLand/search/mines/
Information on the mines can be found by location, permit information or mine identification

Ohio
Division of Geological Survey - Division of Mineral Resources
https://gis.ohiodnr.gov/MapViewer/?config=OhioMines
Information for the coal seam and mine names are given

Pennsylvania
Pennsylvania Mine Map Atlas - Pennsylvania State University
http://www.minemaps.psu.edu/
Information on the Mine Map and the coal seam and mine names are given

Virginia
Virginia Department of Mines, Minerals and Energy
https://www.dmme.virginia.gov/DM/DMMappingCenter.shtml
Maps and Resource Center for mapping with mining status and coal mine outlines

West Virginia
West Virginia Geological & Economic Survey
http://ims.wvgs.wvnet.edu/index.html
All Mining Map - Information on the seam and mine names are given

3.2.6 Desktop Study Mapping

At the conclusion of the desktop study, a map will be generated that shows a composite of the desktop study results identifying the areas of high risk for slope failures including; slopes greater than 30 degrees (58 percent), past slope failures, slope failure-prone areas based on USGS mapping and/or LiDAR data, surface or near-surface mine areas that could impact stability and areas where shallow bedrock exists.

The purpose of the mapping is to document and locate areas where further evaluation during the field reconnaissance is necessary. The information from the desktop study must be used in conjunction with other desktop data (streams, wetlands, residences, roads, cultural features, etc.) to revise the preliminary route to avoid as many high hazard areas as practicable. Slope failure-prone areas that cannot be avoided, must be identified for further evaluation during the field reconnaissance.

3.3 Field Reconnaissance

Field reconnaissance must be performed by individuals experienced in the identification and assessment of slope failures, other geohazards, and pipeline constructability to enhance the data obtained during the desktop study. This geohazard field reconnaissance can be performed in conjunction with identification of environmental features (i.e., streams, wetlands), but must include an emphasis on risk indicators for future slope failures. In particular, the following information are to be recorded with a hand-held GPS unit or other suitable mapping device, field notes, and photographs: existing slope failures, hummocky topography, head scarps, toe bulges, seeps and springs, tilted utility poles and fence posts, misaligned fences or guardrails, tilted trees, curved tree trunks, bedrock outcrops, sink holes, and mine spoil.

Based on the project conditions, the field reconnaissance can be limited to those areas identified during the desktop study as having increased risk of slope failures and potentially other impacts. The DTI Project Team/field engineer in consultation with DTI Engineering Management must determine if the field reconnaissance is to be performed on the entire pipeline alignment. The study corridor for field reconnaissance must be no less than the planned LOD, but may be up to 600 feet or greater in width.

3.4 Desktop Slope Failure Risk Assessment

Following data collection through the desktop study and field reconnaissance, a desktop slope failure risk assessment will be performed using the Desktop Slope Failure Risk Assessment Matrix included in Appendix A for new pipeline projects. For pipeline replacement projects, the DTI Project Team/field engineer will use the results of the field reconnaissance discussed in Section 3.3 to identify existing and previous slope failures and designate those areas as High Risk.

Using the guidance information included in Appendix A, each potential slope failure area identified in the desktop study and field reconnaissance will be assigned a numerical value for the following:

- Low, Moderate, or High probability of additional slope movement; and,
- Low, Moderate, or High probability of significant impact to pipeline, waterbodies, roadways, adjacent property, or other features.

Multiplying these two numerical values provides a risk score, as shown in the Slope Failure Risk Matrix in Figure 5 (included in Appendix A). The resulting risk score will be tabulated to prioritize the slope failures based on risk of future movement and degree of impact. This prioritization will allow for selection of 1) risks which can be avoided through a reroute or special construction design; 2) risks which are feasible to address as part of construction; 3) risks which cannot be avoided and will be handled as a future maintenance repair, if necessary.

Figure 5 – Desktop Slope Failure Risk Assessment Matrix

Probability of significant impact to pipeline, waterbodies, roadways, adjacent property, or other features	**Probability of additional slope movement**		
	High Probability (3)	**Moderate Probability (2)**	**Low Probability (1)**
High Probability (3)	High Risk (9)	High Risk (6)	Moderate Risk (3)
Moderate Probability (2)	High Risk (6)	Moderate Risk (4)	Low Risk (2)
Low Probability (1)	Moderate Risk (3)	Low Risk (2)	Low Risk (1)

3.5 Selection of Preventative Measures for Identified High Risk Slope Failure Locations

Following risk prioritization as outlined in Section 3.4 above, those areas along the preliminary route that have a risk score of "High" will be assigned a preventative measure. The DTI Project Team/field engineer and DTI Engineering Management must select preventative measures appropriate for each high risk location identified during the slope failure risk assessment. The DTI Project Team/field engineer also will determine if preventative measures are necessary for any of the moderate risk

locations. This determination can be based on landowner concerns, highly sensitive resources in the area (trout streams, freshwater mussel streams, residential areas, transportation corridors, other utilities or other considerations. Potential preventative measures are listed below:

- Reroute around the slope failure hazard.
- Adjust the pipeline route through the slope failure hazard to minimize the consequence if slope failure were to occur. For instance, if a cross slope cannot be avoided, route the pipeline on the upslope side of the ROW and/or bury the pipe within bedrock to minimize risk to the pipeline integrity if a slope failure were to occur.
- Define locations that require engineered details, such as specialized backfill. This will include areas with slopes steeper than 30 degrees (58 percent).
- Define locations to perform a preemptive repair of an existing slope failure through which the pipeline passes.
- Adjust Temporary Work Space (TWS) limits such that soil stockpiling is not permitted along ridgelines where known slope failures are present immediately downslope of the LOD.
- In rare cases, Horizontal Directional Drill (HDD) under the hazard. However, it is not expected that HDD will be a viable options in most cases due to site constraints, such as steep terrain, that make HDD infeasible. Additionally, the increased impacts resulting from larger ground disturbance associated with HDD may increase the risk of slope failures.
- Identify and provide sufficient permanent access roads to facilitate inspection and repair in high risk slope failure locations after restoration.

3.5.1 Selection of Preventive Measures for Pipeline Replacement Projects

A Desktop Slope Failure Risk Assessment is not required for pipeline replacement projects. Therefore, the selection of preventive measures for pipeline replacement projects must be done using information gathered during the field reconnaissance. Any existing slope failure will be considered a high risk, and the project team should select an appropriate preventative measure to address that slope failure. Potential preventative measures are listed below:

- Reroute around the slope failure hazard.
- Adjust the pipeline route through the slope failure hazard to minimize the consequence if slope failure were to occur. For instance, if a cross slope cannot be avoided, route the pipeline on the upslope side of the ROW and/or bury the pipe within bedrock to minimize risk to the pipeline integrity if a slope failure were to occur.

- Define locations that require engineered details, such as specialized backfill. This will include areas with slopes steeper than 30 degrees (58 percent).
- Define locations to perform a preemptive repair of an existing slope failure through which the pipeline passes.
- Adjust Temporary Work Space (TWS) limits such that soil stockpiling is not permitted along ridgelines where known slope failures are present immediately downslope of the LOD.
- In rare cases, Horizontal Directional Drill (HDD) under the hazard. However, it is not expected that HDD will be a viable options in most cases due to site constraints, such as steep terrain, that make HDD infeasible. Additionally, the increased impacts resulting from larger ground disturbance associated with HDD may increase the risk of slope failures.
- Identify and provide sufficient permanent access roads to facilitate inspection and repair in high risk slope failure locations after restoration.

4.0 Pipeline Design and Engineering

Slope failure-prone areas that were identified through the desktop study and field reconnaissance during the pipeline route selection phase must be properly engineered if avoidance is not an option. Additionally, preventative measures for high-risk slope failure areas were assigned to prioritize the work. Some of the selected preventative measures will be implemented during the engineering and design phase, as described in this section.

4.1 Excavation Minimization

Pipeline construction activities can result in conditions that can cause slope failures including removal of shallow bedrock on steep slopes and replacement with a weaker backfill material, removal of vegetation and trees, changes in slope configuration, and changes to the surface water or groundwater regime. Therefore, care must be taken to minimize excavation to that necessary to safely install the pipeline in areas prone to slope failures. The pipeline trench should be excavated to minimize the volume of material excavated and requiring subsequent restoration. The prepared pipe should be welded and or bent to match the trench profile rather than expanding the trench profile to accommodate the pipeline. Road crossings and bore pits are to be designed to minimize excavation through the use of shoring. Adequate extra work space is to be determined during project design, to prevent storing excavated material on steep slopes.

4.2 Document Slope Failure Areas on Project Plans

Slope failures and slope failure-prone areas must be included in the project plans. The following items must be included on the Stormwater Pollution Prevention Plans (SWPPP) and the Erosion and Sediment (E&S) control plans:

- Slope failure areas having high risk, as determined in Section 3.4 (not applicable for pipeline replacement projects);
- Existing slope failures; and,
- Slopes steeper than 30 degrees (58 percent).

The above items will be clearly identified on the plans using legend items, shading, or call outs such that the information is conveyed to the construction personnel and that awareness of the hazard is communicated.

4.3 Temporary Work Space (TWS)

As discussed in Section 3.5, TWS limits must be identified during the route selection phase so that soil stockpiling is not permitted along ridgelines in high risk areas, or where known slope failures are present immediately downslope of the LOD. Similarly, the limits of TWS must be adjusted to avoid placement over existing slope failures.

4.4 Include Additional Drainage

The project plans and specifications must include provisions for additional subsurface drainage on slopes greater than 30 degrees (58 percent). Include callouts and details in the E&S plans for location and type of drainage.

4.5 Engineered Details

Project-specific engineered details and specifications must be developed for those slope failure-prone areas requiring engineered preventative measures, as identified in Section 3.5. These locations will likely include areas with slopes steeper than 30 degrees (58 percent), or locations requiring pre-emptive repair of an existing slope failure in the proposed pipeline corridor.

It is important to understand that there is no one particular type of repair approach that works for all slope failures. Selection of the most cost effective preventative measure generally requires the following steps:

1. Detailed subsurface exploration to determine the condition of existing materials, depth of failure surface, depth to bedrock or stable soils, and groundwater conditions.
2. Slope stability modeling of the existing slope and the proposed preventative measure(s). This is done to verify that the repair will provide sufficient improvement in the stability of the final slope. Surface topography, laboratory strength testing, and groundwater information are necessary to perform this type of analysis.
3. Perform an Alternatives Feasibility Study to assess suitability of possible preventative and/or repair measures. Associated construction costs of each alternative can be evaluated as well.

Given difficult site access and time constraints for most pipeline projects in this region, some of these steps may not be feasible. Absent this information, conservative assumptions can be made as to the soil strength parameters, and the depth and type of failure surface for design based on good engineering principles and best professional judgment.

In general, the following engineered design methods apply to slope failure prevention and correction, and are presented in general order of increasing cost. Selection of the most appropriate engineered prevention measure or combination thereof, is dependent on individual site conditions and constraints. The DTI Project Team/field engineer and Engineering Management must also consider input from landowners, permitting agencies, and the Federal Energy Regulatory Commission (FERC) as applicable to evaluate all the factors that influence the design and construction of engineered design methods. Example typicals are shown in Appendix B. These typicals are provided as potential examples, and must be tailored to meet the site-specific requirements for each slope failure location.

- Drainage Improvement:
  - Provide subsurface drainage at seep locations through granular fill and outlet pipes.
  - Incorporate drainage into trench breakers using granular fill.
  - Intercepting groundwater seeps and diverting off ROW.
- Buttressing slopes with Sakrete trench breakers.
- Change Slope Geometry:
  - Reduce the slope by cutting at the top, or incorporating a toe buttress.
  - On many overly steepened slopes the depth to bedrock is relatively shallow and slope failures often occur at the interface between the overburden soil and the bedrock. By removing the overburden soil and leaving the bedrock exposed, this could eliminate these types of slope failures. Continued erosion of the soft exposed bedrock should be anticipated.

  - Modifications to E&S BMPs may be required to manage stormwater runoff between the final ROW slope configuration and existing grades beyond the ROW. One alternative approach to manage stormwater is to direct runoff to a defined channel within the ROW to carry surface water downslope. The channel must be stabilized with rip rap or by other means and be directed to an appropriately-sized stabilized outlet.

- Bench and Regrade with Controlled Backfill:
  - A common slope failure repair approach for slopes up to 30 degrees (58 percent) includes removal of the failed soil mass and reconstruction of the slope by cutting level benches into competent soil or rock beneath the failure plane, installing subsurface drainage, and placing compacted soil or other material as backfill.
- Use Alternate Backfill:
  - Removal of the existing fill soil and replacement with rock fill, such as shot rock (WVDOH Item 704.8 or equivalent) can be beneficial in slope failure repair because it improves drainage, provides a higher friction strength, and generally weighs less than a compacted soil backfill. This method is effective on slopes as steep as 38 degrees (78 percent), but should not be expected to vegetate.
  - The potential use of controlled low strength material (CLSM), such as cementitious flowable fill, as backfill within the pipeline trench could be considered as a method to reduce the pipeline trench from collecting and transporting water. The challenge is placing this material incrementally up the slope and containing it long enough for the flowable fill to harden and gain strength. **Note: Dominion policy does not allow the use of CLSM containing fly ash as filler. Therefore a flowable fill using fine aggregates or sand must be used.**
- Chemical Stabilization of Backfill:
  - Chemical modifiers, such as cement and lime, have successfully been used to dry cohesive soils that are saturated beyond the optimum moisture content, and are often used to extend the construction season. When used at higher concentrations, these modified soils can exhibit increased strength properties that can benefit slope failure stabilization projects on slopes up to 30 degrees (58 percent) or greater.
- Geogrid Reinforced Slope:
  - For slopes steeper than 30 degrees (58 percent), construction of a reinforced soil slope (RSS) may be necessary to match existing grades. A RSS consists of benching into the existing slope, installing subsurface drains, and incorporating geogrid reinforcement into compacted backfill.

- Retaining Structures:
  - Numerous types of retaining structures can be effective for slope failure prevention and repair, and are often used in combination with the repair approaches discussed previously. However, structural approaches are generally expensive since they require specialized equipment for installation on remote sites with challenging access. From the standpoint of protecting the pipeline, the most economical solution in certain cases may be to install a retaining wall and then regrade the slope below. In some cases, the slope below the retaining structure may continue to move.
  - One structural approach includes installation of soil nails with surface mesh to anchor the surficial soils to the underlying competent soil or rock. The soil nail spacing and length are designed based on the soil/rock conditions and the depth of sliding. If desired, the surface mesh can be sized to permit vegetation growth through the mesh.
  - Another alternative is the proprietary Geopier SRT system, which utilizes patented plate pile steel reinforcing elements to stabilize slopes. This system is advertised for use on slope failures less than 15 feet in depth where the soil conditions consist of an upper zone of unstable soil over stable soil or soft rock, since the pile elements must penetrate below the sliding surface into stable material. If shallow bedrock is present, predrilling of each plate pile could be required.
  - Other structural retaining wall options include gabion baskets, modular blocks, geocells, H-pile and lagging, drilled shafts, tieback walls, sheet piles, and mechanically stabilized earth (MSE).

4.6 Construction Stormwater Permit

State agency construction stormwater permits and the Federal Energy Regulatory Commission (FERC) require that restoration of the ROW be performed to match preconstruction grade. These requirements sometimes can be problematic on slopes steeper than 30 degrees (58 percent) where pipeline construction activities remove the shallow bedrock and replace it with weaker soil fill. The soil fill has lower internal shear strength than the natural rock and is unstable on these steep slopes, thus increasing the risk of slope failures. To prevent this known slope failure root cause, slopes could be reconstructed to a shallower grade than the existing slope. If the final restored slope is 30 degrees (58 percent) or less, this approach would allow restoration of the ROW using fill materials comprised of natural soil and rock fragments without engineering design. If adjustments to the final grade are implemented, then the pipeline embedment must be increased sufficiently to maintain adequate cover depth. Additionally, modifications to stormwater Best Management Practices (BMPs) will be required since the ROW will likely be at lower elevation than the surrounding hillside, which could preclude

installation of waterbars to divert water off ROW. An option to manage this stormwater effort is to direct the runoff to a defined channel within the ROW to convey surface water downslope. Any change in topography may require an individual construction stormwater permit rather than the general permit, which could add significant time to the permitting timeline and require additional review by permitting agencies along with the potential for a public comment period. This approach would require landowner approval and FERC approval if on a FERC project.

4.7 Stormwater Pollution Prevention Plan (SWPPP)

The SWPPP must include a discussion of the methods implemented to avoid slope failures and a plan of action should slope failures occur. The below paragraph provides a template that can be modified with specific measures to be used on a project.

> *Potential erosion problem areas, including but not limited to areas with 30^0 slopes or greater, will be protected by silt fence and permanent slope breakers. Slope breakers will be placed a minimum of 75 feet apart in areas with greater than 25^0 slopes. Care has been taken to avoid areas of steep slopes as much as practical; however, areas which could not be avoided will be addressed with (INSERT ENGINEERING MEASURES, e.g. waterbars, Rolled Erosion Control Product). In the event that subsurface flow is encountered, an under drain will be utilized, as necessary, to divert water outside of the LOD. If encountered, seeps can be mitigated by using seep collectors placed downslope of areas showing seepage. Armored fill placed at the toe of the slope may be used in areas of steep slopes in addition to a perforated drain pipe to divert subsurface water away from the cut slope. If a slope failure occurs Dominion will (INSERT CONTAINMENT MEASURES, e.g. install super silt fence, gabion baskets, jersey barriers or other portable containment devices) to keep the slope failure from impacting areas outside the LOD or waters of the state. Steep slopes have been avoided to the maximum extent practicable. Steep slopes will be restored with erosion control blanket and Dominion will implement the slope failure prevention items mentioned above as needed.*

Maryland: Slopes equal to, or greater than, 15 percent are classified as “steep slopes” and must be shown on the NRI plan. The standard symbol for steep slopes must be used on the plan and included in the legend.

New York: The New York State Standards for Erosion and Sediment Control Manual requests site plans which delineate and avoid disturbing wetlands, stream corridors and, to the extent practicable, wood lots, steep slopes and other environmentally sensitive areas. The plans should also minimize impacts by

maintaining vegetative buffer strips between disturbed area and water resources. Additionally, an E&SC plan should be prepared for all land development and construction activity when uncontrolled erosion and sedimentation is anticipated and should, at a minimum, include sites on slopes that exceed 15%, sites in areas of severe erosion potential, sites within 100 feet and draining to wetland, sites within 100 feet draining to a watercourse, and/or sites with a high percentage of colloidal solids.

Ohio: Oil and gas pipeline construction activities are conditionally exempt from stormwater discharge permitting in Ohio. However, the Ohio Rainwater and Land Development Manual provides limited best practices for steep slopes. Additionally, the Ohio Environmental Protection Agency (OEPA) defines steep slopes as those that are 15 percent or greater.

Pennsylvania: According to the Erosion and Sediment Pollution Control Program Manual, critical areas should be covered with erosion control fabric. Critical areas are defined as part of a disturbed area which poses the greatest threat of sediment pollution to a receiving water. Any slope 3H:1V or steeper directly above a surface water is considered a steep slope and a critical area.

Virginia: According to the General VPDES Permit for Discharge of Stormwater from Construction Activities, a legible site plan must be submitted that identifies the limits of land disturbance including steep slopes and natural buffers around surface waters that will not be disturbed, as well as minimize(s) the disturbance of steep slopes is required as part of the permitting process.

West Virginia: WVDEP requires that the SWPPP include information on slide prone areas and the methods to be implemented to both avoid slope failures and a plan of action should slope failures occur.

4.8 Documentation of Design Information

The following documentation must be developed and filed in the DTI Engineering Documentum filing system.

- Desktop Study mapping and documentation of route adjustments to avoid slope failures and slope failure-prone areas;
- Slope failure Risk Assessment and identification of high risk areas; and
- Selected avoidance or mitigation method for each high risk slope failure location identified in the slope failure risk assessment

5.0 Pipeline Preconstruction Planning

5.1 Slope Failure Training

Training in this procedure consists of annual training on the ~~e~~ procedure, and project-specific review at the Environmental Permit Transition meeting.

5.1.1 Training

DTI personnel with responsibility for pipeline routing, construction, or operation must be trained in this procedure on an annual basis. The training may be completed by an online learning management system (LMS) module or may be conducted by Energy Infrastructure Environmental Services (EIES) personnel, or DTI Engineering Management. At a minimum, the following personnel will be trained;

- Engineering Directors and Managers;
- Design and construction engineers;
- Operations Directors, Managers and Supervisors;
- Construction supervisors; and
- Construction and operations Environmental Compliance Coordinators (ECC).

The training must include the following;

- types and causes of slope failures;
- routing avoidance and desktop methods;
- field reconnaissance;
- risk prioritization;
- pipeline design and engineering to prevent slope failures;
- addressing slope failures during construction;
- addressing slope failures post construction; and,
- reporting requirements.

5.1.2 Environmental Permit Transition

Prior to beginning construction, DTI and contractor personnel with responsibility for the pipeline construction must attend the Permit Transition with EIES. The EIES Permitting Lead will schedule the Permit Transition meeting to rollout the permits and clearances. The meeting will include a review of all environmental permits. At a minimum, the following personnel must attend the Environmental Permit Transition meeting;

- Permit Lead
- Project supervisor;
- Operations Supervisor/Manager (if available);
- ECC; and
- Environmental Inspector (EI) (if identified).

Recommended attendees at the Permit Transition meeting include the following;

- Construction engineer;
- Contractor supervisors, superintendents, and foreman - Policy can be reviewed with contractor at separate pre-construction meeting if cannot attend permit transition meeting;
- DTI inspectors; and

If the contractor cannot attend the environmental permit transition meeting, this policy will be reviewed with the contractor at a separate preconstruction meeting. The Environmental Permit Transition meeting will review the environmental permit conditions, training requirements, inspection requirements, and reference to this policy and procedure.

5.2 Slope Failure Mitigation and Response Materials

The DTI Construction Supervisor must identify during the preconstruction phase, the materials to be maintained onsite during construction to address a slope failure and to prevent slope failures from impacting waters of the state. These materials may include belted silt retention fence, super silt fence, jersey barriers, sakrete bags, gabion baskets, soil additives, drain pipe, stone, geotextile, or portable containment structures.

6.0 Addressing Slope Failures During Construction

6.1 Inspections

For projects with a construction stormwater permit or other E&S plan approved by a regulatory agency, inspection and maintenance of all E&S control structures shall be completed and documented. The ROW and E&S control devices will be inspected by the EI or person designated by the DTI Construction Supervisor. A record of weekly and storm event inspections will be maintained onsite for the duration of the project by the Project EI or Project Supervisor. Inspection forms will include the date(s) and names(s) of personnel making the inspection and results (including any major observations and corrective actions taken or needed). Any major observation and corrective action needed will be carried over to subsequent inspection reports until completely resolved. The inspection records must be maintained onsite during construction and retained by DTI Engineering for a minimum period of three (3) years after final stabilization. Completed inspection reports must be provided to the Construction ECC on a routine basis during construction, and the Construction ECC will conduct periodic site visits to review inspection records and to complete environmental self-assessments on select projects. Construction stormwater inspection requirements vary by state. The below table summarizes these requirements which are further detailed in the subsequent sections.

Table 2. Construction Stormwater Inspection Requirements by State.

State	Inspection Frequency	Rainfall Inspection	Inspection Records	Sign Posting
Maryland	Weekly	The following day after rainfall event resulting in runoff.	Inspection records maintained for three (3) years from the date that permit terminated.	NA
New York	< 5 acres – every 7 days > 5 acres disturbed at one time – at least 2 times every 7 calendar days separated by 2 full calendar days	NA	Inspection reports retained for 5 years following submittal of the NOT.	NA
Ohio	Every 7 calendar days	Within 24 hours of a 0.5” storm event that occurs within a 24 hour period.	Inspection reports retained for 3 years following the submittal of the NOT.	NA

Pennsylvania	Weekly	Within 24 hours after a measurable rainfall event	Inspection reports retained for 3 years from the date of the termination of coverage.	NA
Virginia	Every 5 business days or at least every 10 business days and →	Within 48 hours following any runoff producing measurable storm event.	Inspection report retained for 3 years from the expiration or termination of the permit.	Post copy of notice of coverage letter.
West Virginia	Every 7 calendar days for actively disturbed areas and Every 14 calendar days for restored areas	Within 24 hours after a storm event > 0.5" of rain in a 24 hour period.	Inspection reports retained for 2 years.	Sign posted within 24 hrs. of submitting NOI.

6.1.1 FERC Requirements

For FERC projects, inspections are required in accordance with the FERC Plan. FERC inspections are required on a daily basis in areas of active construction or equipment operation, on a weekly basis in areas with no construction or equipment operation, and within 24 hours of each 0.5 inch of rainfall. All grade surfaces, walls, dams and structures, vegetation, E&SC measures and other protective devices must be maintained in good and effective condition and promptly repaired or restored, even if damaged by a third party.

6.1.2 Maryland

The December 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control can be found at the following site:

http://www.mde.state.md.us/programs/water/stormwatermanagementprogram/soilerosionandsedimentcontrol/pages/programs/waterprograms/sedimentandstormwater/erosionsedimentcontrol/esc_standards.aspx

According to the Maryland Soil Erosion and Sediment Control Manual SECTION A-3 SEDIMENT CONTROL PRINCIPLES, the owner is responsible for conducting routine inspections and required maintenance. At a minimum, the site and all controls should be inspected weekly and the next day after each rain event. However, the approval authority may require more frequent inspections, especially adjacent to sensitive areas or in impaired watersheds. A written inspection report is part of every inspection. In addition,

Maryland requires a "Responsible Person" to act as an inspector. The responsible personnel involved in the construction project shall have a Certificate of Training at a Maryland Department of the Environment (MDE) approved training program for the control of erosion and sediment prior to beginning the project. Additionally, the owner or developer shall certify right of entry for periodic on-site evaluation by the appropriate enforcement authority and/or MDE.

6.1.3 New York

The following excerpts are from *Part IV. Inspection and Maintenance Requirements of the New York, Department of Environmental Conservation, SPDES General Permit for Stormwater Discharges from Construction Activity*. A copy of the entire document and appendices can be found at the following location**:**

http://www.dec.ny.gov/docs/water_pdf/gp015002.pdf

A qualified inspector must conduct site inspections. The qualified inspector qualifications are a: - licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity.

The qualified inspector shall conduct site inspections where soil disturbance activities are on-going at least once every seven (7) calendar days. In areas where disturbance is greater than five (5) acres of soil at any one time or in sensitive areas, the inspector shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days. During temporarily suspended work (e.g. winter shutdown) and when *temporary stabilization* measures have been applied to all disturbed areas, a site inspection should be completed at least once every thirty (30) calendar days.

6.1.4 Ohio

The following excerpt is from the *Ohio Environmental Protection Agency, General Permit Authorization for Stormwater Discharges Associated with Construction Activity under the National Pollutant Discharge Elimination System.* A copy of the entire document can be found at the following location**:**

http://www.epa.ohio.gov/Portals/35/permits/OHC000004_GP_Final.pdf

At a minimum, procedures in an SWPPP shall provide that all controls on the site are inspected at least once every seven calendar days and within 24 hours after any storm event greater than one-half inch of

rain per 24 hour period. The inspection frequency may be reduced to at least once every month if the entire site is temporarily stabilized or runoff is unlikely due to weather conditions. The permittee shall assign "qualified inspection personnel" to conduct these inspections to ensure that the control practices are functional and to evaluate whether the SWPPP is adequate and properly implemented.

6.1.5 Pennsylvania

The following excerpt is from the *March 2012 Pennsylvania Department of Environmental Protection (PADEP) Erosion and Sediment Pollution Control Program Manual.* A copy of the entire document can be found at the following location**:**

http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-88925/363-2134-008.pdf

PADEP requires a maintenance program that provides for the operation and maintenance of BMPs and the inspection of BMPs on a weekly basis and after each stormwater event, including the repair or replacement of BMPs to ensure effective and efficient operation. The program must provide the completion of a written report documenting each inspection and all BMP repair or replacement and maintenance activities.

Pennsylvania has no certification requirement for E&SC inspectors.

6.1.6 Virginia

The following excerpt is from the *Virginia Department of Environmental Quality, General VPDES Permit for Discharges of Stormwater from Construction Activity.* A copy of the entire document can be found at the following location**:**

http://www.deq.virginia.gov/Portals/0/DEQ/Water/Regulations/9VAC25-880-VPDESConstructionSWGPRegulation.pdf

Virginia requires Inspections to be conducted at a frequency of at least once every five business days and no later than 48 hours following a measurable storm event. In the event that a measurable storm event occurs when there are more than 48 hours between business days, the inspection shall be conducted on the next business day; and representative inspections used by utility line installation, pipeline construction, or other similar linear construction activities shall inspect all outfalls discharging to surface waters identified as impaired or for which a TMDL wasteload allocation has been established and approved prior to the term of this general permit.

Virginia requires a "Certified Inspector" to complete all E&SC inspections. Certified Inspector means an employee or agent of a VESCP authority who holds a certificate of competence from the Board in

the area of project inspection or is enrolled in the Board's training program for project inspection and successfully completes such program within one year after enrollment. The Virginia Regulation can be found at the following site:

http://register.dls.virginia.gov/details.aspx?id=3945

6.1.7 West Virginia

The following is summarized from *Section G. Other Requirements of the West Virginia Department of Environmental Protection, Division of Water and Waste Management, General Water Pollution Control Permit* for Stormwater Associated with Oil and Gas Related Construction Activities. A copy of the entire document can be found at the following location:

http://www.dep.wv.gov/WWE/Programs/stormwater/csw/Documents/OG%20stormwater%20GP%203_10_15.pdf

Inspections must be completed by individuals experienced and trained in E&S control inspections. Inspections must be completed and documented at least once every *seven (7) calendar days* for actively disturbed areas, *14 calendar days* for restored areas (restored areas includes pavement, buildings, stable waterways, a healthy, vigorous stand of perennial grass that uniformly covers at least 70 percent of the ground) and *within 24 hours* after any storm event greater than one-half (0.5) inch of rain per 24-hour period. The Project area will continue to follow the preceding schedule until a Notice of Termination (NOT) has been submitted and is approved by WVDEP. Slope failure repairs, soil conditioning, fertilization, reseeding, and mulching will be performed as required.

6.2 Responding to Slope Failures

In the event a slope failure is documented during an inspection, the following steps must be followed. Each step is discussed in detail in the following subsections and summarized in Table 2.

1. Contact the ECC immediately and they will notify EIES who will help evaluate the priority of the slope failure based on the document “Slope Failure Priority Guidance” in Appendix D. The ECC will complete any required reporting to regulatory agencies.
2. Install temporary BMPs to contain slope failure material and to prevent the slope failure from impacting waters of the state.
3. Gather data on slope failure and submit to Dominion Engineering and EIES.
4. Determine repair method and whether the repair is field-directed or engineering-directed.
5. Install short term field stabilizing measures, if applicable.
6. Implement and document slope failure repair.

Table 3. Slope failure Reporting and Repair Responsibility Matrix.

Responsible Party	Action	Time Frame
Construction Supervisor	Report Slope failures to the ECC upon discovery, who will work with EIES to evaluate slope failure using Slope Failure Priority Guidance (Appendix D)	Immediately upon discovery
Construction Supervisor	Install temporary BMPs to contain slope failure material/prevent slope failure from impacting waters of the state	As soon as practicable
ECC	Notify state environmental agency if required	Immediately
Construction Supervisor	Complete Slope Failure Information and Reporting Form (Appendix C)	Within 5 business days of discovery of slope failure
Engineering Team	Complete Slope Failure Repair Assessment Form (Appendix C) and determine if slope failure repair will be field-directed or engineering-directed.	Within 10 business days of receipt of Slope failure Evaluation Reporting Form
Engineering Team	Design repair of Engineering-directed repairs	As soon as practicable
Construction Supervisor	Install short term stabilizing measures for Priority 1 and 2 slope failures that will not be repaired within 60 days of discovery	As soon as practicable
Construction Supervisor	Implement slope failure repair	As soon as practicable
Construction Supervisor	Document slope failure repair	Upon completion of repair

6.2.1 Evaluate Priority

Upon observation of a slope failure, the ECC must be contacted to assist in the Slope Failure Priority determination using the Slope Failure Priority Guidance in Appendix D. The ECC will contact the appropriate entity for all Priority 1 and 2 Slope failures, as specified in Appendix D.

6.2.2 Install Temporary BMPs

DTI's Construction Supervisor or the EI must direct the contractor to install temporary BMPs for containment of slope failure material to protect waterbodies from slope failure material and runoff. Typical details for temporary containment measures, including silt fence, silt sock, super silt fence, and jersey barriers, are included in the SWPPP. Selection of the appropriate BMPs must be determined by the EI in consultation with the DTI Construction Supervisor so that runoff from the slope failure material is contained and waterbodies, if present, are protected. It is noted that temporary BMPs will not arrest future slope movements, and follow up actions to remediate the slope failure must be implemented as soon as practicable.

6.2.3 Gather Data

The Construction Supervisor will obtain site data of the slope failure by completing the Slope failure Information and Reporting Form provided in Appendix C, and will submit this information to DTI Engineering and EIES within five (5) business days of discovering the slope failure. The slope failure information and reporting form included in Appendix C may be used to document slope failure information. In particular, the following minimum information will be obtained and communicated:

- Name of observer;
- Date;
- Slope failure location, including latitude and longitude;
- Slope failure dimensions;
- Site photographs;
- Site sketch;
- Evidence of preexisting slope failures;
- Presence of surface water or groundwater;
- Estimate of slope steepness;
- Estimate of slope failure type (i.e., rotational, translational, earthflow, etc.); and
- Slope failure priority based on Slope Failure Priority Guidance (Appendix D).

6.2.4 Select Slope Failure Repair Approach

Within ten (10) business days of receiving the slope failure data form, DTI Engineering will evaluate whether the slope failure repair is to be field-directed or engineering-directed, and whether to engage a specialist in slope failure evaluation and repair (i.e., geotechnical engineer). The attached score sheet has been developed to assist in determining the appropriate direction of the repair and whether to engage a specialist. In general, field-directed repairs are to be limited to slope failures that are on slopes flatter than 30 degrees (58 percent), can be repaired by installation of drainage measures and earthwork, and have low consequence of future failure. Slope failures that occur on steep slopes, extend outside the ROW, pose increased consequence of future failure, or require construction techniques outside the pipeline contractor's typical construction methods are to be directed by DTI Engineering.

Selection of the most appropriate slope failure repair method is dependent on individual site conditions and constraints. Section 3.5 above provides a discussion on typical repair approaches.

- If the slope failure repair will be field-directed, then the EI and Construction Supervisor will determine the most appropriate repair approach. In general, this will involve installation of drainage, minor slope regrading, and replacement of the failed soil on benches.
- If the slope failure repair will be engineering-directed, then the Project Engineer will lead development of the slope failure repair plan.
- If a geotechnical engineer is engaged, then the Project Engineer will coordinate with the specialist to select and design the repair. This may require field exploration, stability modeling, alternatives feasibility study, and preparation of construction plans.

6.2.5 Install Short Term Stabilizing Measures

In addition to installation of temporary BMPs per Section 5.2, Priority 1 and 2 slope failures that will not be repaired within 60 days of discovery, and other slope failures that will not be repaired within 120 days of discovery will have short term stabilizing measures applied. The following is a list of possible short term stabilizing measures that can be considered:

- Remove soil at the top of the slope failure to unload the slope;
- Install a toe buttress using soil or rock fill, gabion baskets or similar devices;
- If possible, perform minor regrading of the slope with some level of compaction to smooth out the existing scarps and reduce the number of pockets in which water can collect;

- Direct drainage away from the slope failure through waterbars, diversion ditches, or temporary drains;
- Place plastic on the failed slope to protect the soils from rainfall and surface runoff; and
- Monitor the slope failure for signs of slope movement, especially after periods of heavy rain fall. If additional movement is detected or visible (i.e. cracks or scarps), notify Dominion Engineering for assistance.

Even with temporary measures, there is still a risk of additional slope movement. Therefore, long term slope failure repair measures must be implemented.

6.2.6 Implement Slope Failure Repair The slope failure repair must be completed in an efficient and timely manner, and implemented in accordance with the slope failure repair approach selected following this procedure.

6.2.7 Document Repair

The slope failure repair must be documented by the Construction Supervisor, and documentation stored in the DTI Engineering Documentum filing system. Documentation must include the following;

- Name of person completing documentation;
- Date repair was completed;
- Repair location, including latitude and longitude;
- As-built of repair showing locations of installed devices including, subsurface drainage devices, ditching, water bars, buttressing, etc.;
- Method of repair; and
- Photos of repair.

7.0 Addressing Slope Failures After Construction

In the event of a slope failure occurring after construction and prior to regulatory agency approval of a Notice of Termination (NOT) the stormwater permit, the DTI Project Team/field engineer must follow the procedures described in Section 6.0. DTI financial policies provide an out-of-cycle budget request mechanism to reopen a project budget with the proper justification to address slope failures that are a result of construction after the project budget has been closed. The out of cycle budget request can be used to address slope failures that occur in the time period between NOT submittal and regulatory agency approval of the NOT, and to ensure inspections continue until the NOT is approved.

In the event that a slope failure is discovered after approval of the NOT through routine pipeline patrols or other methods of inspection, DTI Operations must report the slope failure to the ECC who will assist EIES in the determination of the slope failure priority classification as a Priority 1 (immediate danger to environment or human health), Priority 2 (sediment laden run-off has entered a water body, Priority 3 (sediment has not reached water body, but appears imminent), or Priority 4 (poses little or no threat to the environment). In addition, DTI Operations must contact DTI Field Engineering for assistance to review the condition and develop a repair plan in accordance with this Policy and Procedure for Slope failure Avoidance, Identification, Prevention, and Remediation.

8.0 Slope Failures Caused by a Third Party

If it is determined that a slope failure is caused by the actions of a third party and not related to pipeline construction or activities by DTI, the DTI Engineering Team or Operations will contact the DTI Land, Lease, and ROW group to make notification to the third party of the slope failure.

APPENDIX A

Desktop Slope Failure Risk Assessment

Desktop Slope Failure Risk Assessment Matrix

Probability of significant impact to pipeline, waterbodies, roadways, adjacent property, or other features	**Probability of additional slope movement**		
	High Probability (3)	**Moderate Probability (2)**	**Low Probability (1)**
High Probability (3)	High Risk (9)	High Risk (6)	Moderate Risk (3)
Moderate Probability (2)	High Risk (6)	Moderate Risk (4)	Low Risk (2)
Low Probability (1)	Moderate Risk (3)	Low Risk (2)	Low Risk (1)

<u>Probability of additional slope movement</u>

- Low
  - Slope 22° (40%) or flatter
  - No bedrock outcrops visible
  - No evidence of previous slope movement (bent trees, fence posts, utility poles)
  - No mapped landslide is present
- Moderate
  - Slope 22° to 30° (40% to 58%)
  - Bedrock outcrops possible or limited to small portion of the slope
  - Possible evidence of previous slope movement (bent trees, fence posts, utility poles)
  - Mapped landslides present in the area, but not within the LOD
- High
  - Slope steeper than 30° (58%)
  - Bedrock outcrops prevalent or cover a sizeable portion of the slope
  - Evidence of previous slope movement (bent trees, fence posts, utility poles)
  - Mapped landslide is present within the LOD
  - Existing landslide is present based on field observations

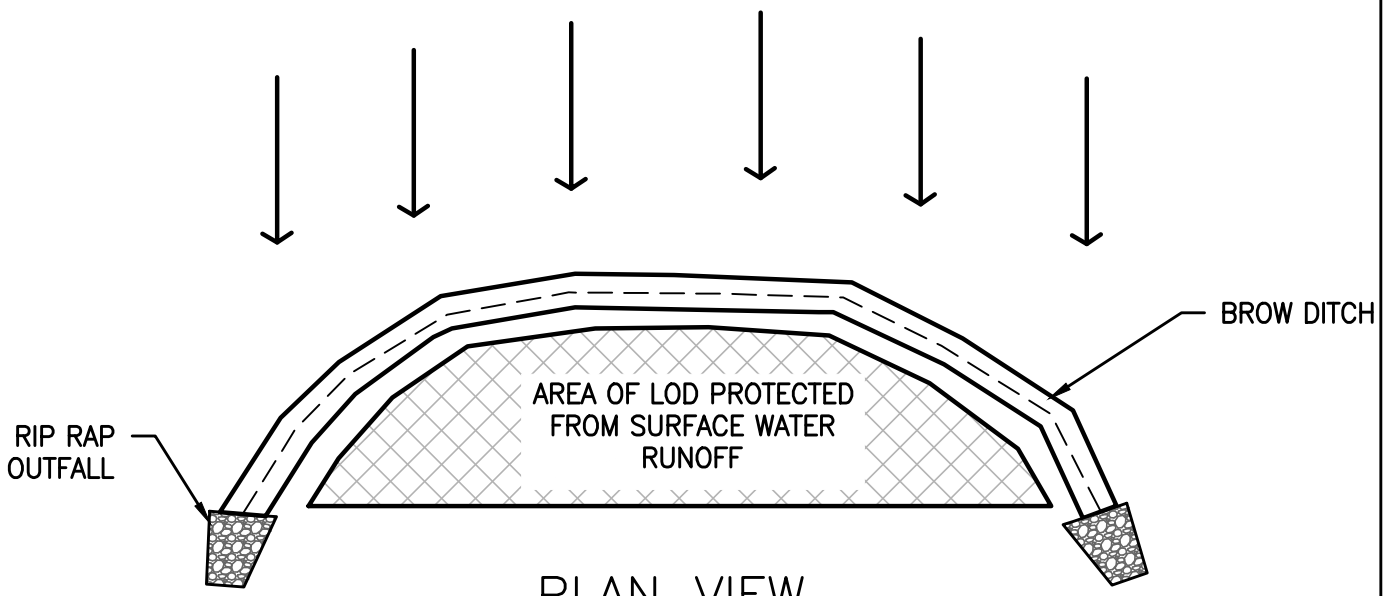
<u>Probability of significant impact to pipeline, waterbodies, roadways, adjacent property, or other features</u>

- Low
  - Pipeline traveling directly up and down the slope
  - Waterbodies or roadways are located 50 feet or more from toe of slope
- Moderate

    - Pipeline traveling directly up and down the slope and slope is 30° (58%) or steeper
    - Pipeline crossing the slope (sidehilling), but will likely be installed below top of bedrock surface
    - Waterbodies or roadways are located 20 to 50 feet or more from toe of slope
- High
    - Pipeline crossing the slope (sidehilling), but will not be installed below top of bedrock surface, or top of bedrock surface is unknown
    - Waterbodies or roadways are located less than 20 feet from toe of slope

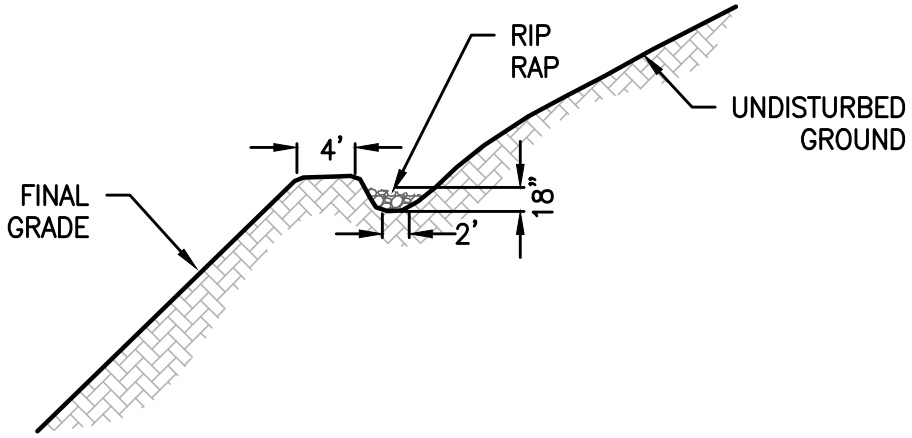
APPENDIX B

Select Typicals



PLAN VIEW

N.T.S.



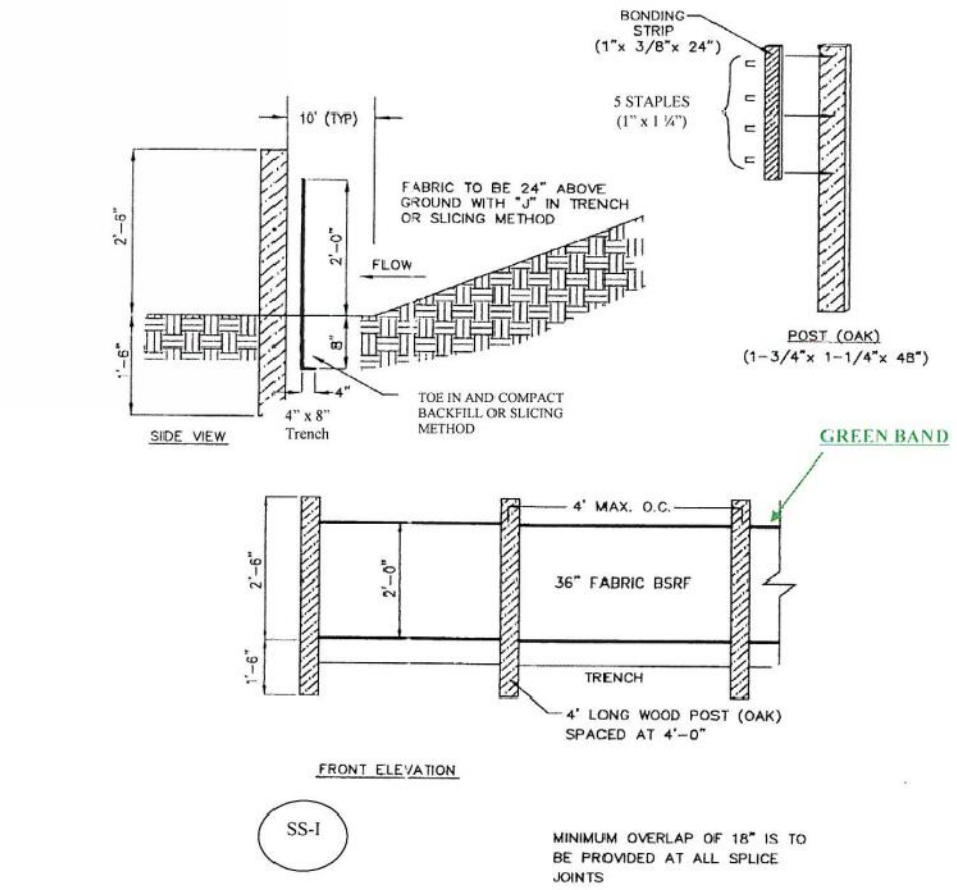
SECTION

N.T.S.

BROW DITCH DETAIL

BELTED SILT RETENTION FENCE
INSTALLATION DETAIL
PRIORITY 1 – GREEN BAND

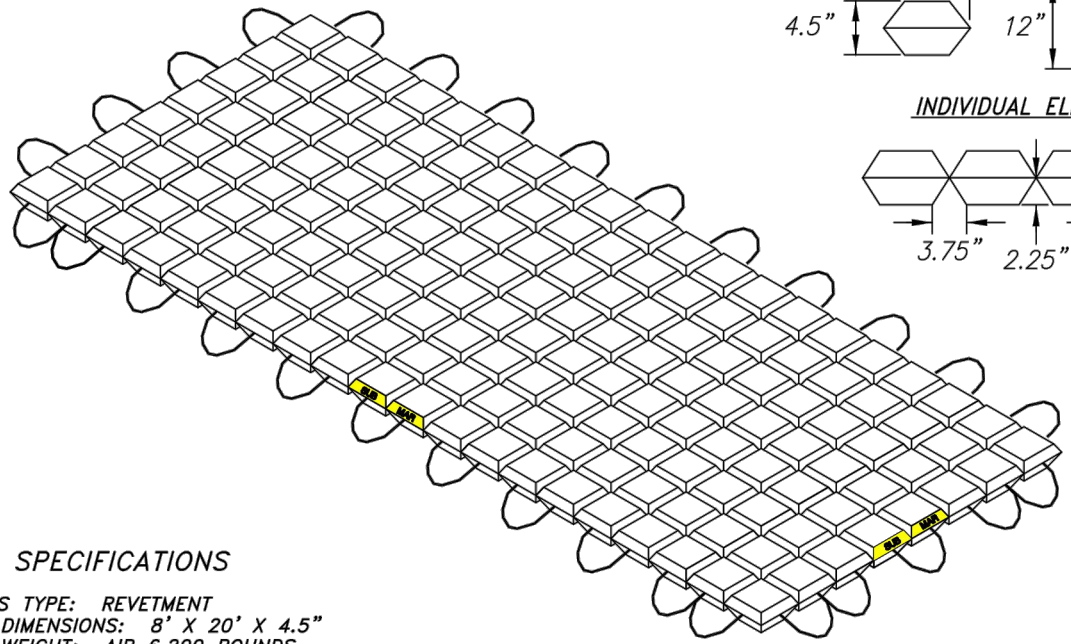
SILT-SAVER, INC.

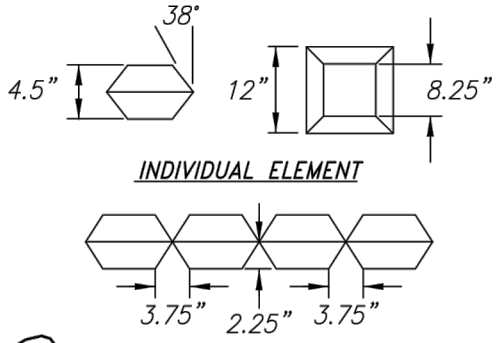


BELTED SILT RETENTION FENCE (BSRF)

SILT-SAVER, INC.
• 1094 Culpepper Drive • Conyers, GA 30094 •
Office 770-388-7818 • Fax 770-388-7640 • Toll Free 1-888-382-SILT (7458) • Website www.siltsaver.com •

BELTED SILT RETENTION FENCE





SPECIFICATIONS

MATTRESS TYPE: REVETMENT
MATTRESS DIMENSIONS: 8' X 20' X 4.5"
MATTRESS WEIGHT: AIR 6,200 POUNDS
MATTRESS WEIGHT SUBMERGED: 3,600 POUNDS (APPROX.)
CONCRETE DENSITY: 145 LBS. PER CU. FT., 4,000 PSI
160 ELEMENTS: 5/8" ULTRA VIOLET STABILIZED COPOLYMER
EXTRUDED FIBER ROPE, MINIMUM TENSILE STRENGTH 9,500 POUNDS

805 Dunn Street
Houma, LA 70360
Ph. 985-868-0001
Fax 985-851-0108
Email: submar@submar.com
Website: www.submar.com

SUBMAR
Synergy with Nature

SUBMAR
STANDARD 8.00'x20.00'
MAT DETAIL

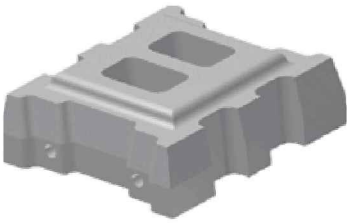
4.5" CONCRETE MATTRESS

DATE:	CHECKED BY:	DRAWN BY:	SCALE:	CONTACT:	PHONE. #:
01/03/13	DWD	KPF	N.T.S.		

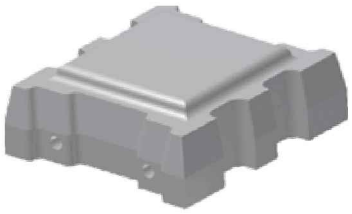
SUBMAR MATTRESS DETAIL

CONTECH®
ENGINEERED SOLUTIONS

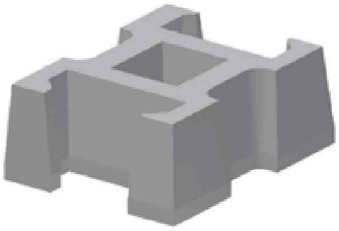
ARMORTEC® Product Details



ArmorFlex® - Open Cell

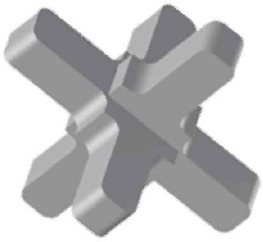


ArmorFlex® - Close Cell

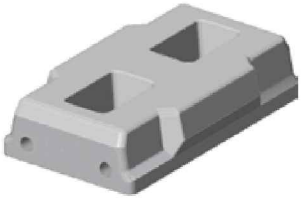


ArmorLoc®

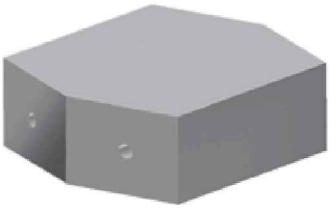
ArmorWedge®



A-Jacks®



ArmorStone®

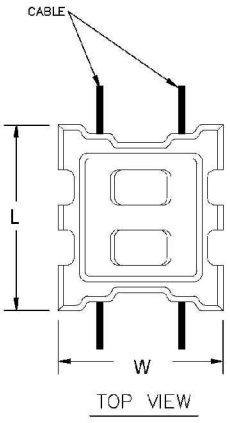


ArmorRoad®

MANUFACTURING SPECIFICATION
ASTM D6684-04

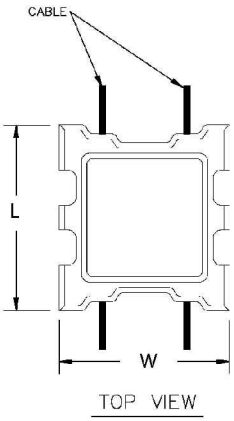
ARMORTEC®
Erosion Control Solutions

ArmorFlex® (not to scale)



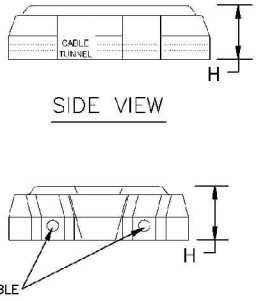
TOP VIEW

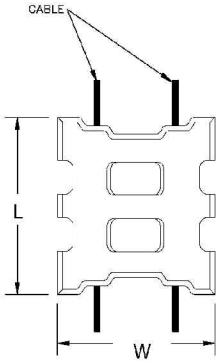
Open Cell Block



TOP VIEW

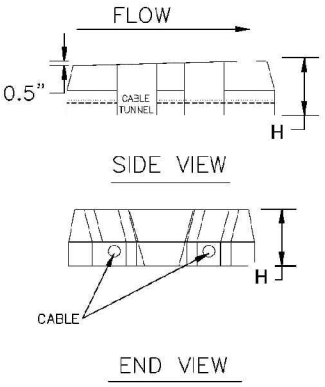
Close Cell Block

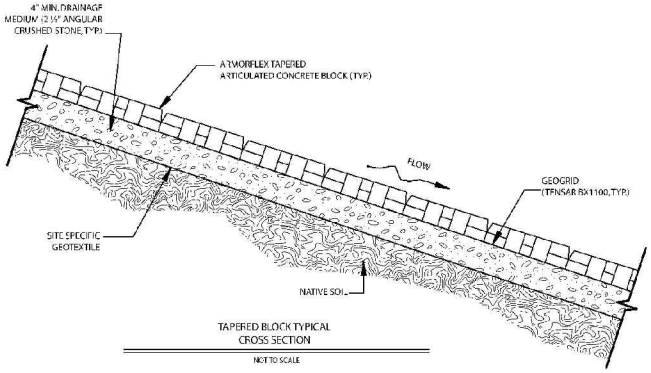




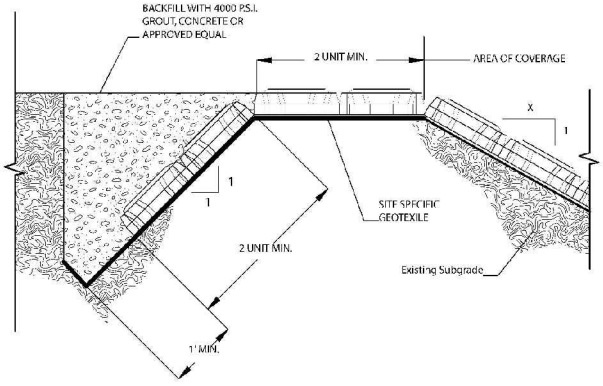
TOP VIEW

Tapered Series





Tapered Series - Cross Section

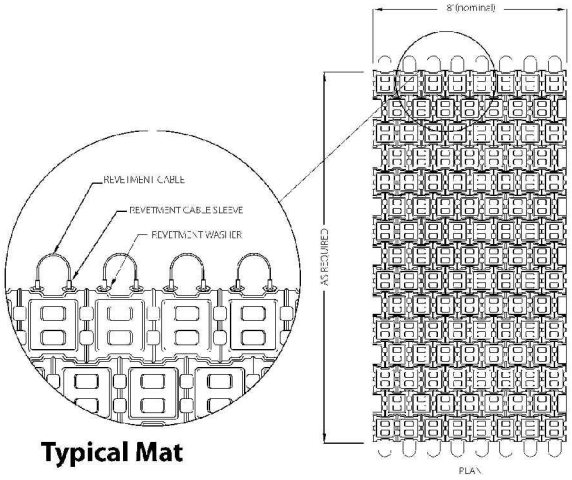


Top of Slope - Standard Detail

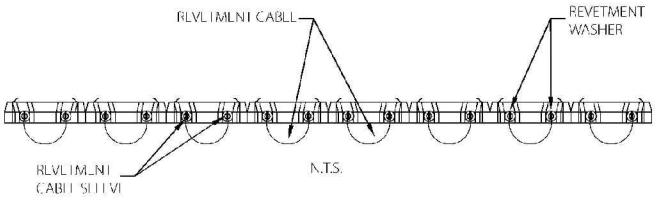
ArmorFlex Unit Specification

Concrete Block Class	Open/Closed Cell	Nominal Dimensions			Gross Area/ (sq. ft.)	Block Weight		Open Area %
		L	W	H		lbs	lbs/sq. ft.	
30s	Open	13.0	11.6	4.75	0.98	33-35	34-36	20
50s	Open	13.0	11.6	6.00	0.98	42-45	43-46	20
40	Open	17.4	15.5	4.75	1.77	59-64	33-36	20
50	Open	17.4	15.5	6.00	1.77	76-82	43-46	20
70	Open	17.4	15.5	8.50	1.77	108-117	61-66	20
40L	Open	17.4	23.6	4.75	2.58	97-105	38-41	20
70L	Open	17.4	23.6	8.50	2.58	174-188	68-73	20
45s	Closed	13.0	11.6	4.75	0.98	39-42	38-43	10
55s	Closed	13.0	11.6	6.00	0.98	50-54	49-55	10
45	Closed	17.4	15.5	4.75	1.77	71-77	40-43	10
55	Closed	17.4	15.5	6.00	1.77	91-98	52-56	10
85	Closed	17.4	15.5	8.50	1.77	136-146	77-83	10
45L	Closed	17.4	23.6	4.75	2.58	109-118	42-46	10
85L	Closed	17.4	23.6	8.50	2.58	207-223	80-87	10
High Velocity Application Block Classes								
40-T	Open	17.4	15.5	4.75	1.77	58-63	33-35	20
50-T	Open	17.4	15.5	6.00	1.77	75-81	43-46	20
70-T	Open	17.4	15.5	8.50	1.77	116-124	65-70	20

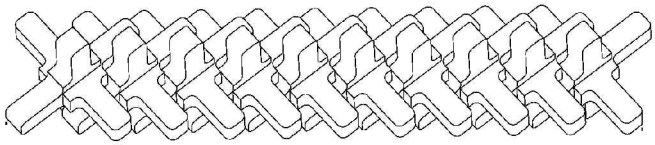
ArmorFlex® cont. (not to scale)



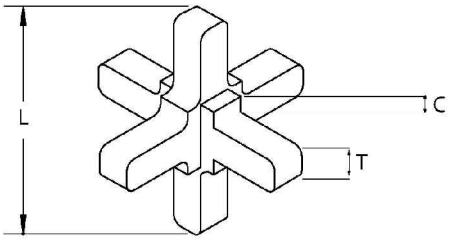
Typical Mat



A-Jacks® (not to scale)



A-Jacks Placement Profile

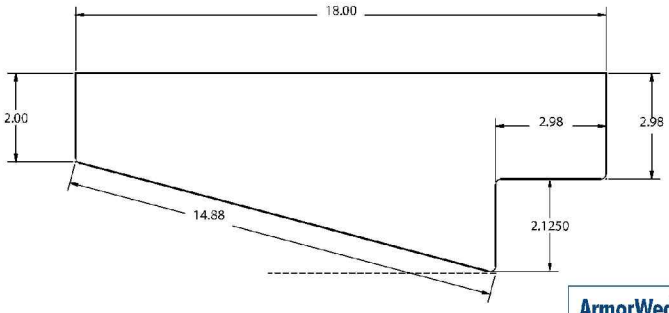


A-Jacks Unit

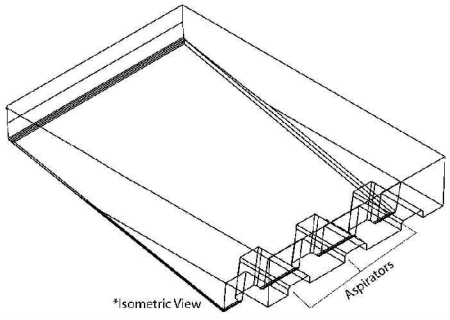
A-Jacks Unit Specification

A-JACKS	L(IN)	T(IN)/H(IN)	C(IN)	VOL(FT^3)	WT (LBS)
AJ-24	24	4	1.84	0.56	78
AJ-48	48	7.36	3.68	4.49	629
AJ-72	72	11.04	5.52	15.14	2.120
AJ-96	96	14.72	7.396	35.87	5.022
AJ-120	120	18.40	9.20	70.69	9.699

ArmorWedge® (not to scale)



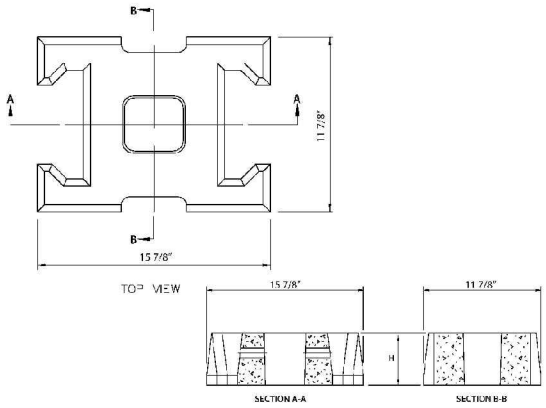
Side View - Typical Block



ArmorWedge Unit Specification

UNIT DIMENSION	UNIT WEIGHT (LBS/FT^3)	SYSTEM WEIGHT (LBS/FT^3)	UNIT COVERAGE (SF)	COMPRESSIVE STRENGTH (PSI)	MAXIMUM ABSORPTION (LBS/FT^3)
12x18	130-140	54-59	1.1875	4000	12

ArmorLoc® (not to scale)

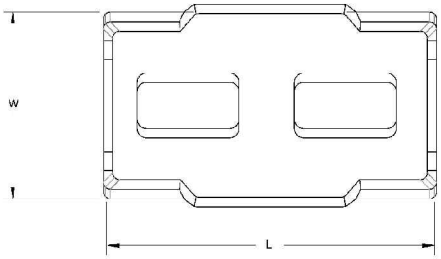


ArmorLoc Unit Specification

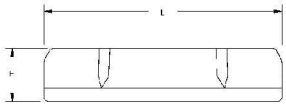
BLOCK	TECHNICAL DATA			DIMENSIONS AND WEIGHTS				
	Specific Weight lbs/ft³	Compressive Strength psi	Max Absorption, Avg. of 3 units 10 lbs/ft³	Thickness Inches (H)	Gross Area/ Grid ft²	Weights/ Grid lbs	Weights/ Area lbs/ft²	Open Area %
3510	130-140	4000 min	10	4	1.0	30-35	30-35	25
4511	130-140	4000 min	10	5.25	1.1	44-50	40-45	20
5011	130-140	4000 min	10	6	1.1	50-54	40-45	20

*Open-cell block shown. Closed-cell block also available.

ArmorStone® (not to scale)



PLAN

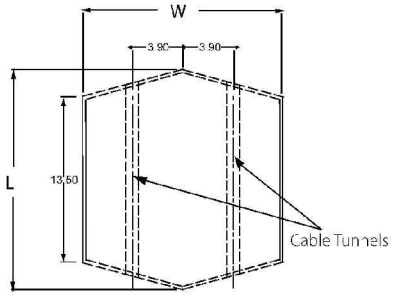


FRONT

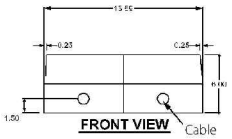
ArmorStone Unit Specification

CONCRETE BLOCK CLASS		NOMINAL DIMENSIONS (IN.)			UNIT COVERAGE (SF)	BLOCK		OPEN AREA %
		L	W	H		UNIT WEIGHT LBS.	SYSTEMS WEIGHTS LBS./SF	
AS 40	Open	18.00	10.00	4.50	1.25	50-54	40-44	25
AS 55	Closed	18.00	10.00	4.50	1.25	61-66	49-53	5

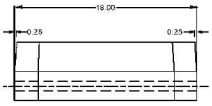
ArmorRoad® (not to scale)



TOP VIEW



FRONT VIEW



SIDE VIEW

ArmorRoad Unit Specification

BLOCK	TYPE	L	W	H	SF COVERAGE PER UNIT	WEIGHT LBS PER UNIT	SF PER TRUCK LOAD
Mat	Closed	18.00	15.60	6.00	1.74	105-109	750
Individual	Closed	18.00	15.60	6.00	1.74	100-104	750

ARMORTEC Minimum Physical Requirements per ASTM 06684-04

MIN. DENSITY (IN AIR) LBS/FT³		MIN. COMPRESSIVE STRENGTH PSI		MAX WATER ABSORPTION LBS/FT³	
Ave. of 3 Units	Individual Unit	Ave. of 3 Units	Individual Unit	Ave. of 3 Units	Individual Unit
130	125	4,000	3,500	9.1	11.7

NDS
WE PUT WATER IN ITS PLACE

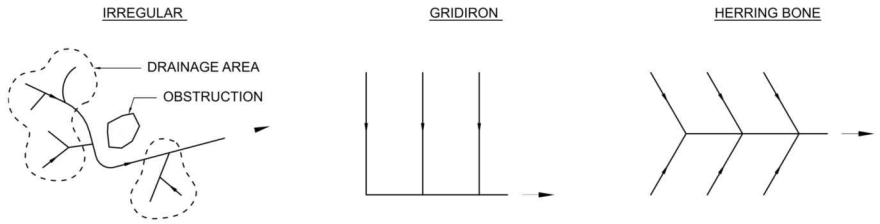
French Drains

Subsurface drainage systems have been in common use for centuries. They take many forms, but are all similar in design and function to the traditional French drain. French drains are excavated trenches filled with aggregate surrounding a slotted or perforated pipe that conveys excess surface and groundwater to a discharge point away from the drainage area. **EZ***flow* drainage products can be used as a substitution for conventional aggregate in French drain systems.

PLACEMENT

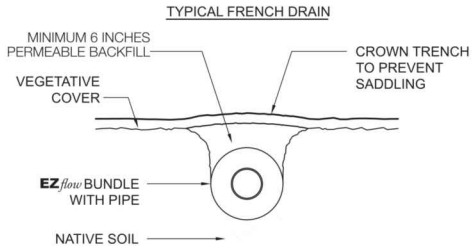
EZ*flow* drainage French drains should be laid out strategically to dewater irregular, poorly drained areas. A defined pattern such as a herring bone and gridiron should be used to drain complete areas including lawns, athletic fields, golf course greens and sand traps. These patterns include laterals that drain to collectors that discharge to an outfall. In general, laterals should not be longer than 50 feet and collectors no longer than 100 feet without increasing the pipe diameter downstream. In addition, the slope of each downgradient run should increase throughout the length of the system.

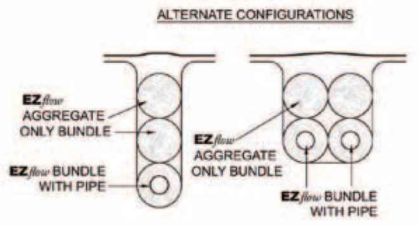
Trench depth and spacing will vary depending on soil texture of the area being drained. Trench depth can also be limited by outlet conditions in flatter areas. Lines may be spaced widely and deeply in sandy soils, and are generally placed shallower and closer together in clay soils.

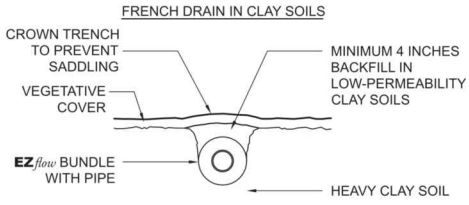


PRODUCT

The 7-inch **EZ***flow* drainage bundles with integrated 3-inch pipe are appropriate for small area residential subsurface drainage systems. 10-inch bundles with 4-inch pipe can be used to drain areas of up to two acres in poorly drained organic soils. In larger areas or if there is over 200 feet of pipe upstream, the 15-inch bundles with 6-inch pipe are recommended.





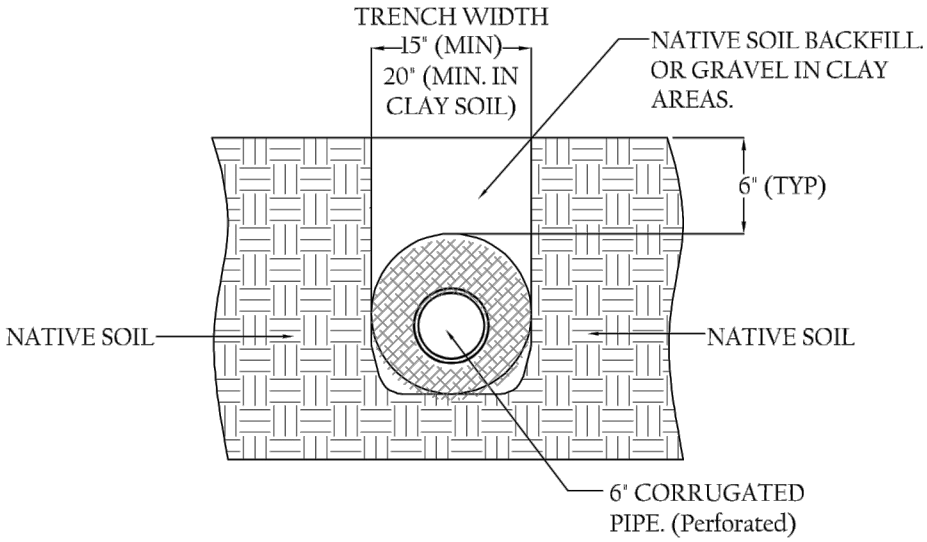


Minimum Recommended Depth of Cover*	
Condition	**Depth (in.)**
Residential area, commercial lawn mowers	6**
Athletic fields with consistent activity	8
Areas with occasional light vehicular traffic	12

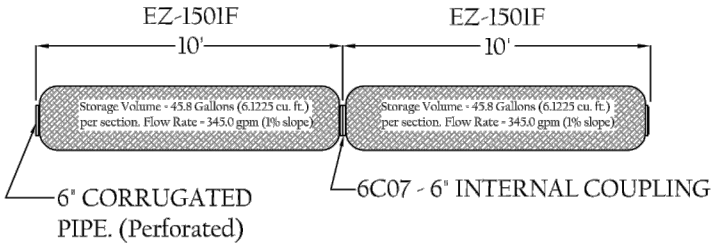
* It is recommended that **EZ***flow* drainage systems be installed a minimum of 6 inches below existing or planned subsurface irrigation lines.
** In low-permeability clay soils, trenches can be placed with a minimum 4 inches of permeable backfill.

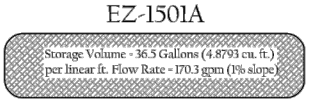
EZflow

TRENCH DRAIN DETAIL



SECTION





PLAN VIEW

ADDITIONAL COVER MAY BE REQUIRED BASED ON SITE CONDITIONS. 12" COVER REQUIRED TO OBTAIN AN H-10 LOAD RATING. CONSULT WITH A LOCAL ENGINEER FOR SITE SPECIFIC REQUIREMENTS.

EZflow™
AGGREGATE DRAINAGE SYSTEM

TECHNICAL SERVICES
1-888-825-4716
techservice@ndspro.com

N. T. S.

TRENCH DRAIN DETAIL

French Drain Installation Instructions

The steps below offer typical installation practices for French drains and will vary based on site conditions. These practices are also applicable to landscape plant bed drains and for wet areas on golf courses.

1. Identify the area to be drained and mark off lateral and collector lines before digging beginning trench excavation.

2. Start excavating the trench at the discharge point or where connections to downstream piping will be made. Trench width should be equal to the diameter of the bundle being used. Trench depth will reflect existing terrain, desired drainage line slope and length, height of bundles(s) and required cover thickness. Ensure proper slopes by using a transit or builder's level and grade the trench bottom evenly for proper flow.

3. Place the **EZ***flow* drainage bundle with pipe end to end along the edge of the trench. Use an end cap at the system high point and fully insert the proper couplings at all bundle-to-bundle connections. Lay the connected bundles with pipe in trench, stacking aggregate-only bundles above these bundles as needed.

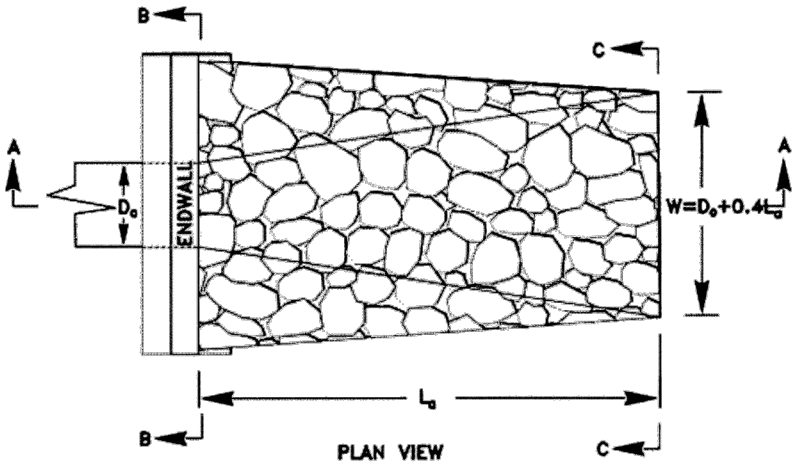
4. Place a minimum of 4-inches permeable backfill (see recommended depths of cover on page 6) over the bundles without compaction. Additional sand/backfill can be placed and compacted normally above the loose fill to prevent trench saddling. Cover trench with sod or topsoil and seed to finish installation.

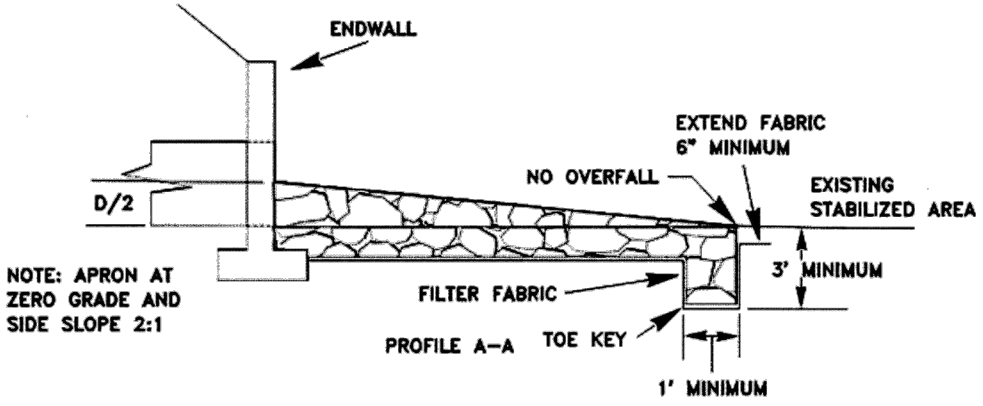
TRENCH DRAIN DETAIL

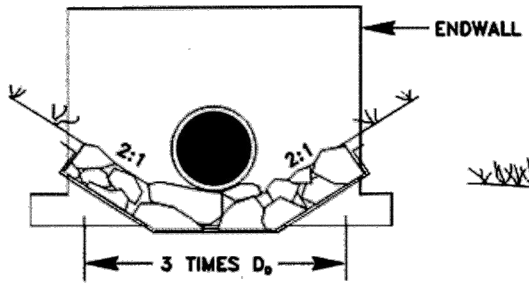
FIGURE 3.17.3

OUTLET PROTECTION

DISCHARGE TO UNCONFINED SECTION
(MINIMUM TAILWATER)

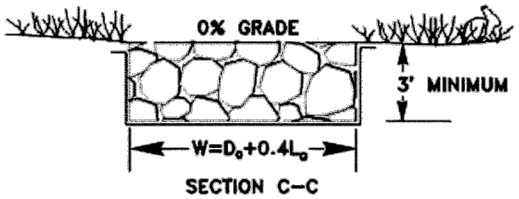






SECTION B–B

d



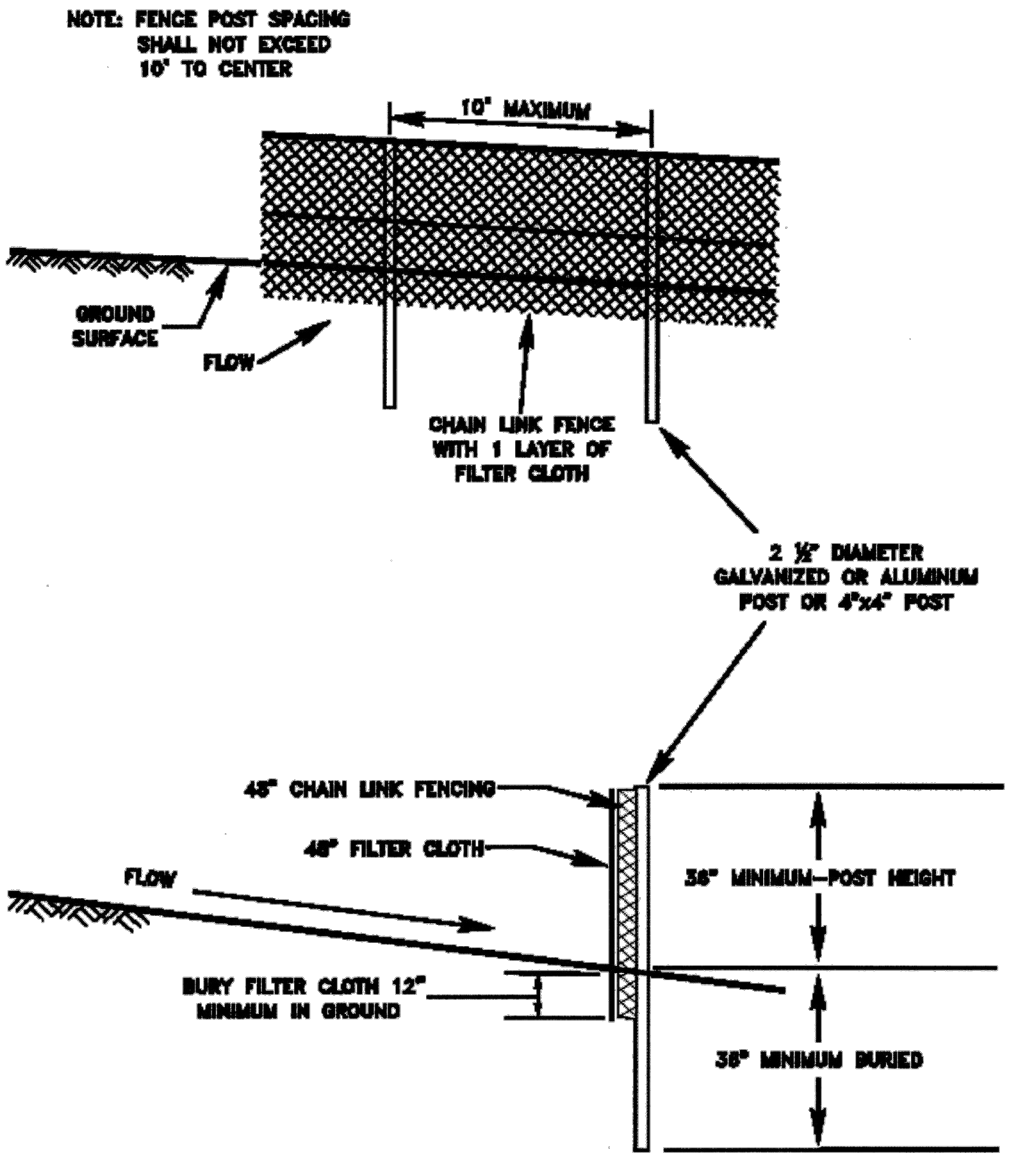
SECTION C–C

FROM NEW YORK STANDARDS AND SPECIFICATIONS
FOR EROSION AND SEDIMENT CONTROL

OUTLET PROTECTION DETAIL

FIGURE 3.28.1

SUPER SILT FENCE



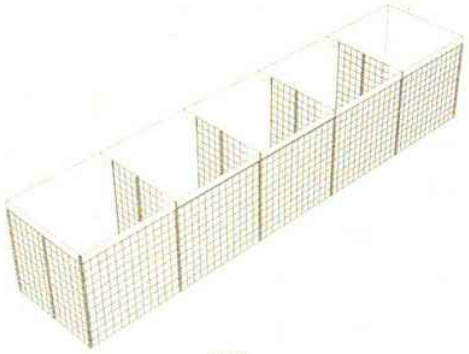
SUPER SILT FENCE DETAIL

BARRICAGE™ FLOOD

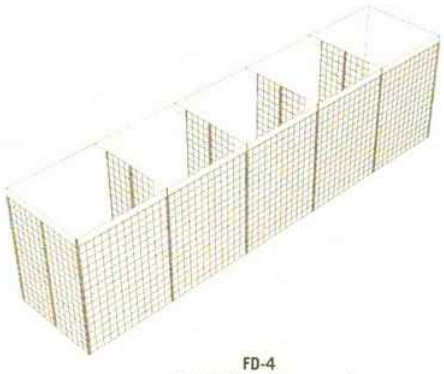
SHIELD | FLOOD | EARTH | ROCK

BarriCage™ geotextile-lined civil system for flood-defense applications. Interior grids free of geotextile fabric allow the fill to compact between cells. Easily fillable with dirt, sand, or gravel. Spiral corners join to other units with included connecting pins. Plastic ties are provided to secure geotextile lining and prevent fill from falling between system joints.

Connecting Pin | Plastic Tie



FD-3
H-3' W-3' L-15' (5 cages)



FD-4
H-4' W-3' L-15' (5 cages)

GENERAL SPECIFICATIONS:

Galvanized welded wire system to ASTM A 974-97 standards with geotextile lining. Lining is high-quality, nonwoven geotextile made of polypropylene fibers designed to form a high-strength fabric. Geotextile liner is available in tan color.

WELDED WIRE GRID CONTAINER	
Wire	
Wire Guage	8.5 American SWG, steel
Wire Diameter	0.155"/3.937mm
Wire Tensile Strength	80-110 ksi 550-760 kPa
Corrosion Protection	Zn-5Al-MM to ASTM A 856A/A 856M-03 minimum coating weight 0.8oz/Ft²/240g/m²
Grid	
Wire Spacing	3" x 3"
Tolerance on Line Wire Spacing	+/- 1/8"
Cross Wire Straightness Across Test Panel	Limit of deviation 1/4" in 72"
Mesh Strength	70% of wire tensile strength
Panels	
Squareness	In 4' diagonals shall not vary by more than 5/8"
Flatness	In 6' not more than 2" from plane

GEOTEXTILE	STANDARD	VALUE
Mechanical Properties		
Grab Tensile Strength (Machine Direction)	ASTM D 4632	170lbs.
Grab Tensile Strength (Cross Direction)	ASTM D 4632	170lbs.
Grab Elongation (Machine Direction)	ASTM D 4632	50%
CBR Puncture	ASTM D 6241	450lbs.
Endurance Resistance		
Trapezoidal Tear (Machine Direction)	ASTM D 4533	70lbs.
Trapezoidal Tear (Cross Direction)	ASTM D 4533	70lbs.
UV Resistance (% retained after 500 hrs)	ASTM D 4355	90%
Hydraulic Properties		
Apparent Opening Size*	ASTM D 4751	70 US Std. Sieve
Permittivity*	ASTM D 4491	1.50sec⁻¹
Permeability*	ASTM D 4491	.38 cm/sec
Water Flow*	ASTM D 4491	110 gpm/ft²

*At time of manufacturing. Handling may change these properties.

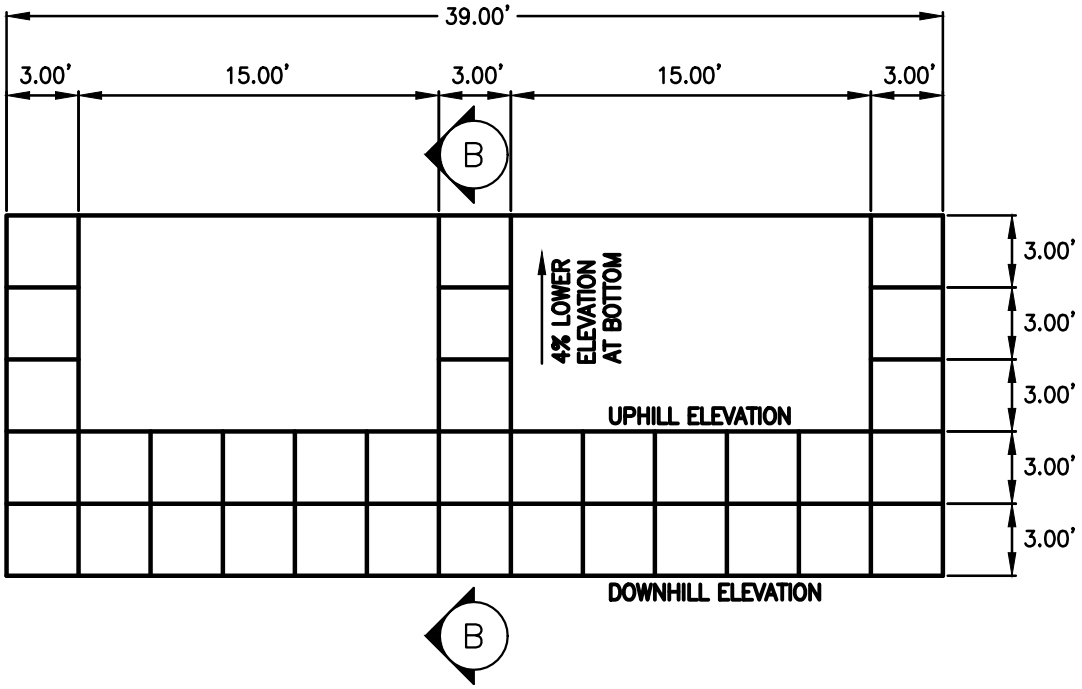
a product of landmark. EARTH SOLUTIONS, INC.

The given values were obtained through a series of testing performed by our suppliers and other outside testing facilities. The information included herein is subject to change at any time without notice from Landmark Earth Solutions™, Inc.

LandmarkEarthSolutions.com | (888) 574-6473 (#3)

barricage™

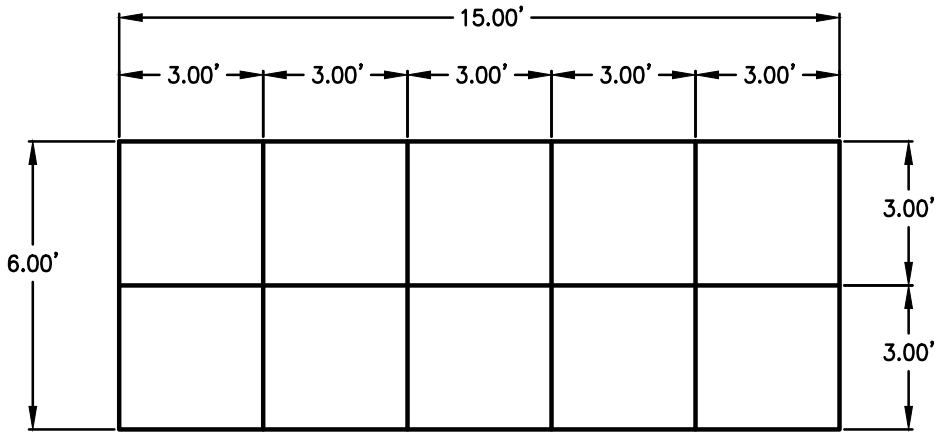
BARRICAGE CONTAINMENT DETAIL



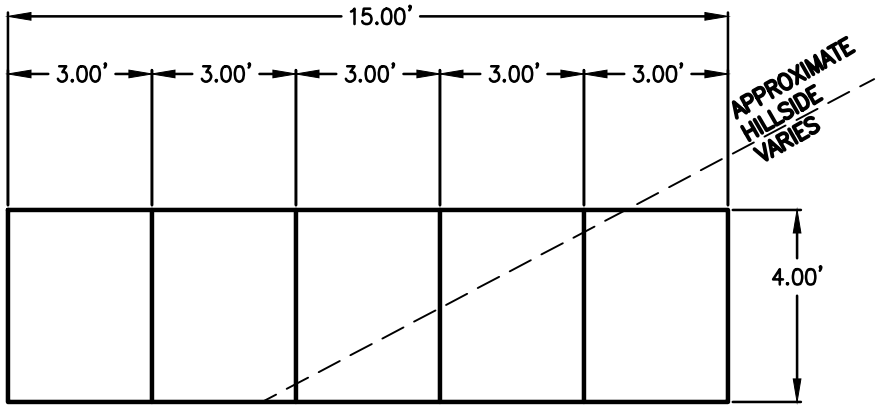
PLAN VIEW
N.T.S.

NOTE:
THIS PRODUCT FOR USE AS A TEMPORARY BUTTRESS
OR CONTAINMENT. NOT FOR PERMANENT USE.

BARRICAGE CONTAINMENT DETAIL



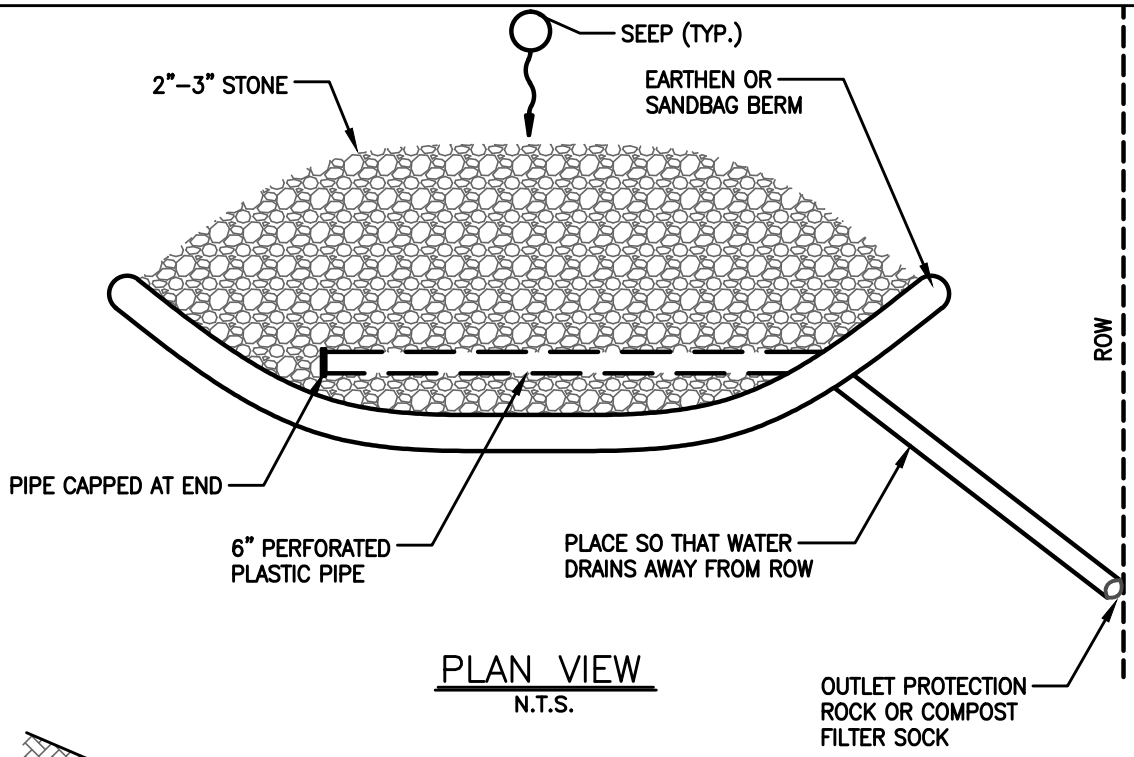
AERIAL VIEW
N.T.S.



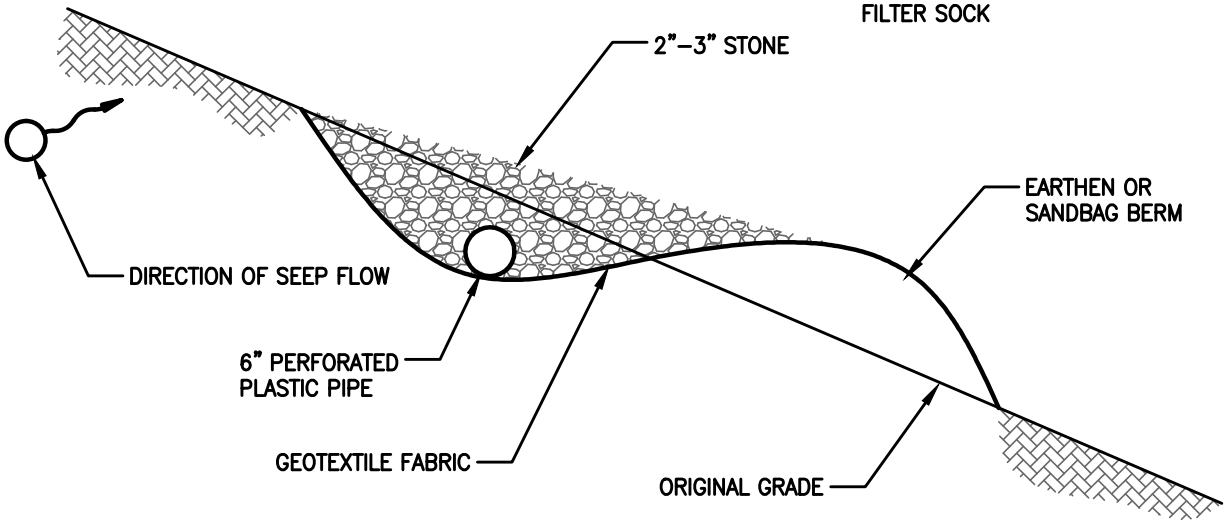
SECTION B
N.T.S.

NOTE:
THIS PRODUCT FOR USE AS A TEMPORARY BUTTRESS
OR CONTAINMENT. NOT FOR PERMANENT USE.

BARRICAGE CONTAINMENT DETAIL



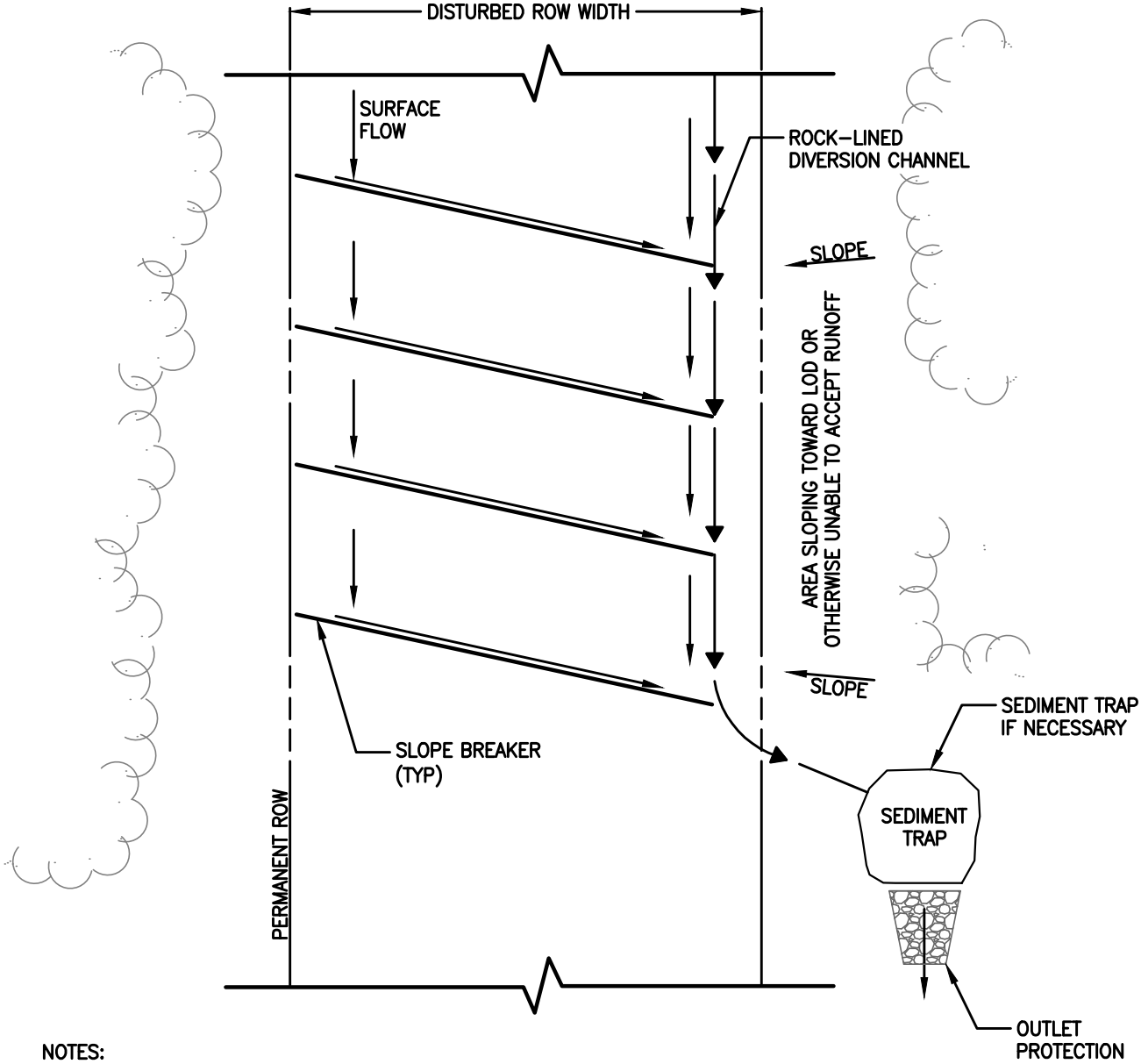
PLAN VIEW
N.T.S.



SECTION
N.T.S.

NOTE:
BERMS MAY BE CONSTRUCTED USING SANDBAGS TEMPORARILY DURING CONSTRUCTION. PERMANENT BERMS TO BE CONSTRUCTED USING COMPACTED EARTH.

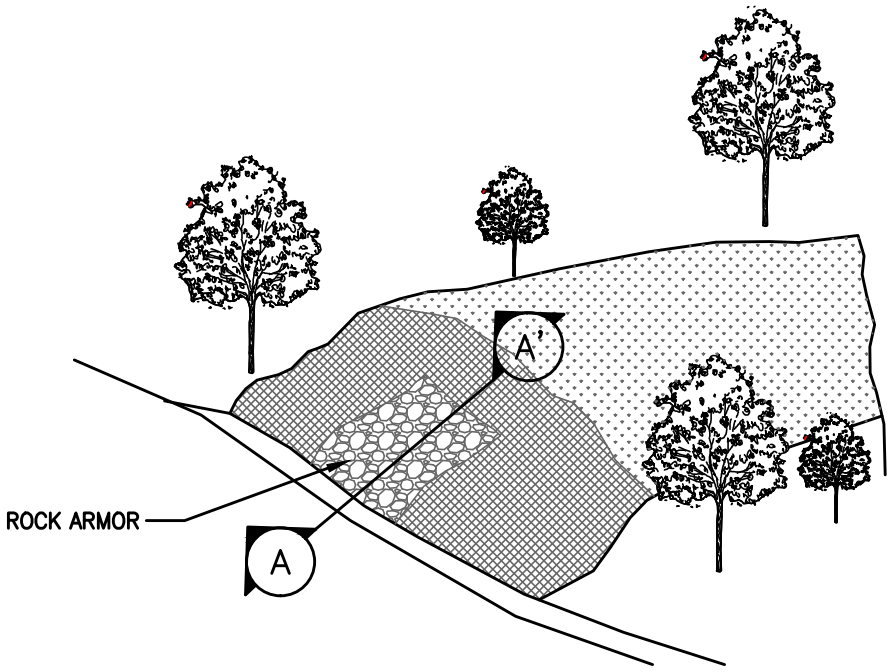
SEEP COLLECTOR DETAIL



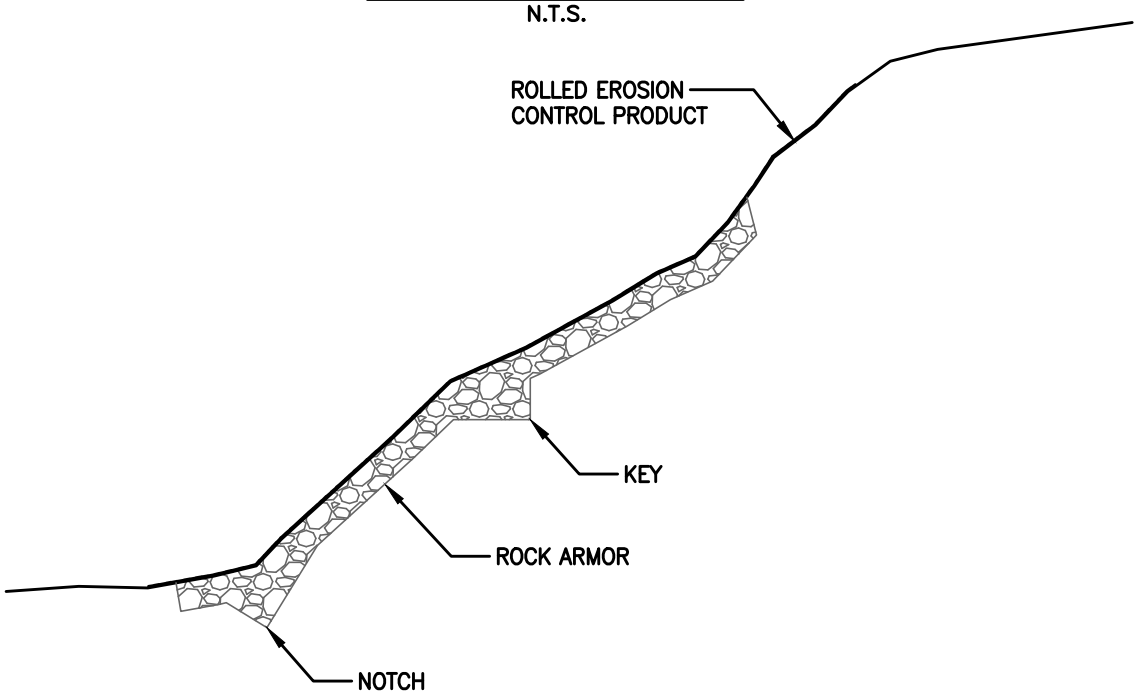
NOTES:

1. CHANNEL AND SLOPE BREAKER LAYOUT WILL NEED TO BE FIELD ADJUSTED TO CONFORM TO SITE CONDITIONS
2. CHANNEL MAY REQUIRE STONE CHECK DAMS, ROLLED EROSION CONTROL PRODUCTS AND OTHER SITE SPECIFIC EROSION AND SEDIMENT CONTROL MEASURES AS NECESSARY
3. SEDIMENT TRAP MAY BE REQUIRED WHERE SUFFICIENT VEGETATIVE COVER EXISTS DOWNSLOPE OF DIVERSION CHANNEL
4. SEDIMENT TRAP WILL REQUIRE SIZING BY AN ENGINEER

CROSS DRAIN DETAIL

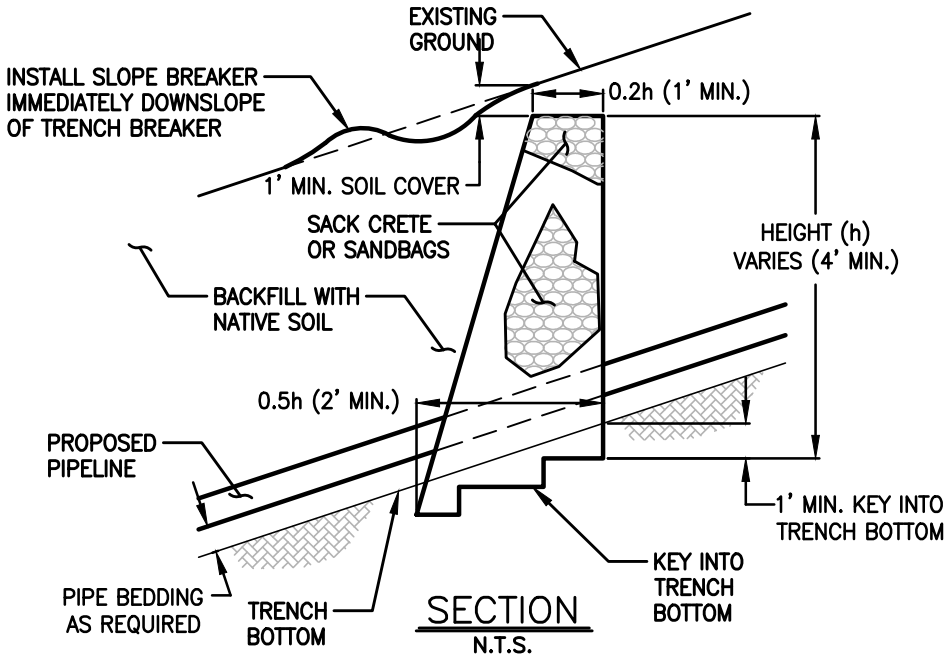


PERSPECTIVE VIEW
N.T.S.

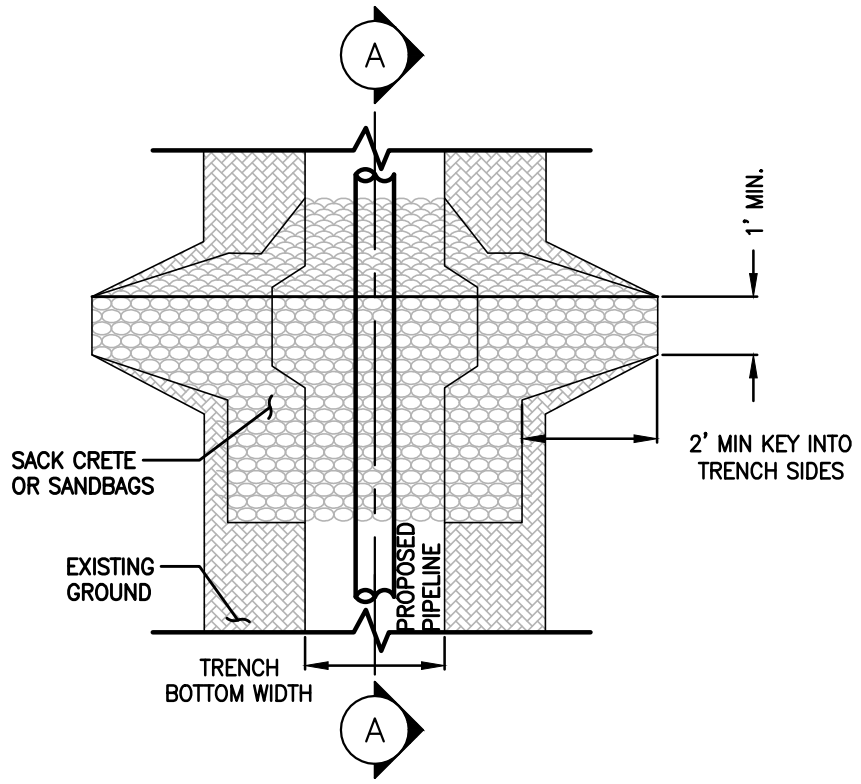


A–A' ROCK ARMOR ON STEEP SLOPE
N.T.S.

ROCK FILTER BLANKET DETAIL

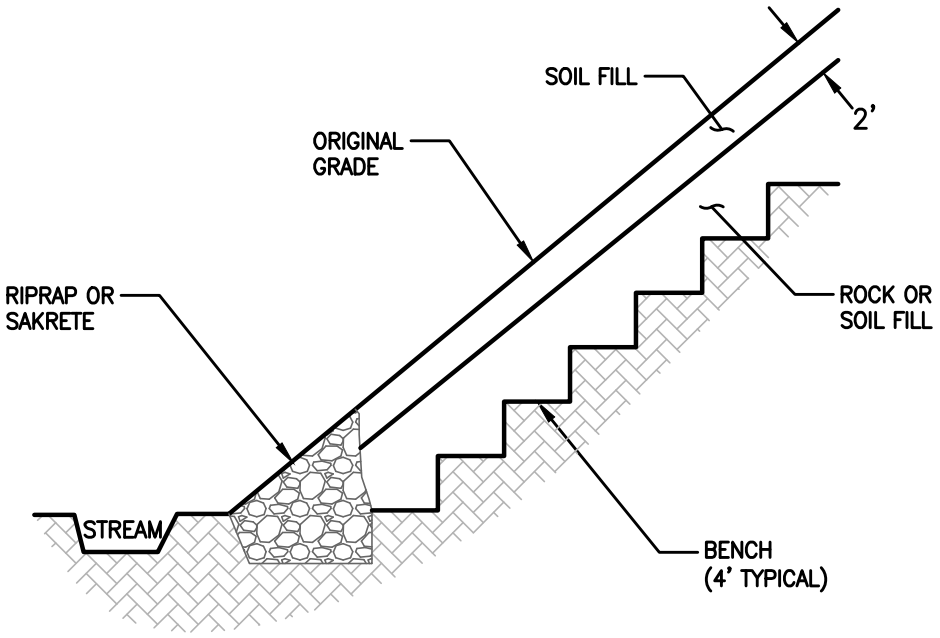


SECTION
N.T.S.

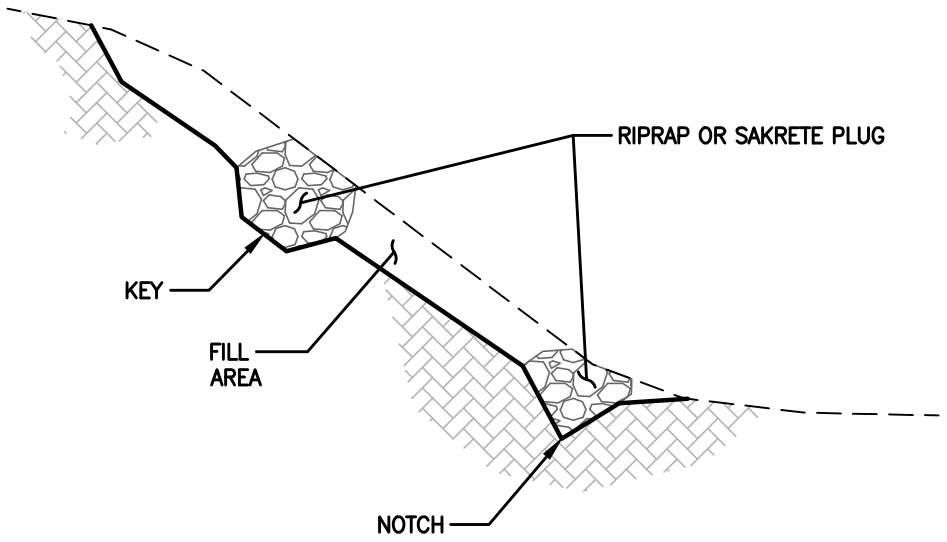


PLAN VIEW
N.T.S.

TRENCH PLUG AND WATERBAR DETAIL

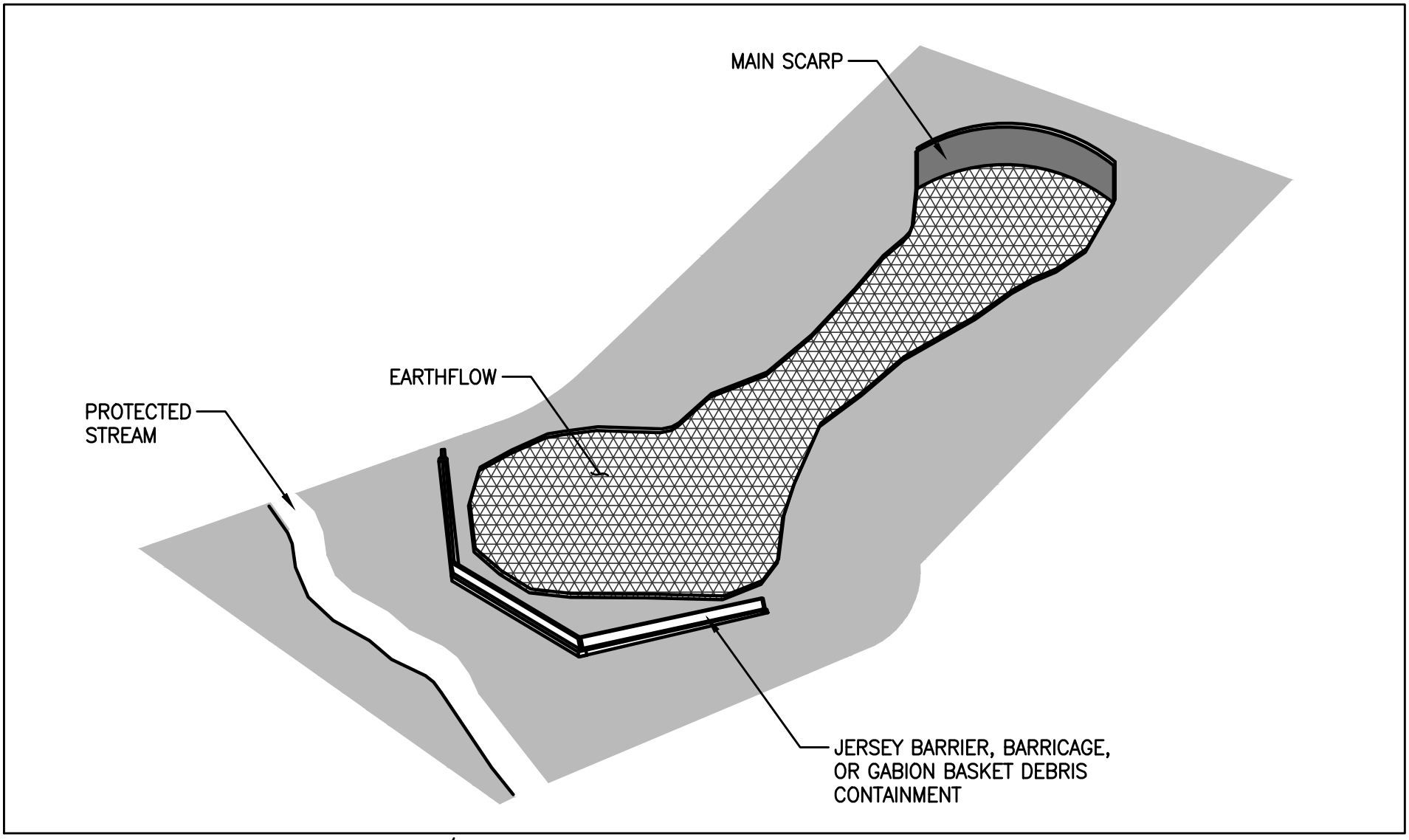


BENCH AND REGRADE TYPICAL
N.T.S.

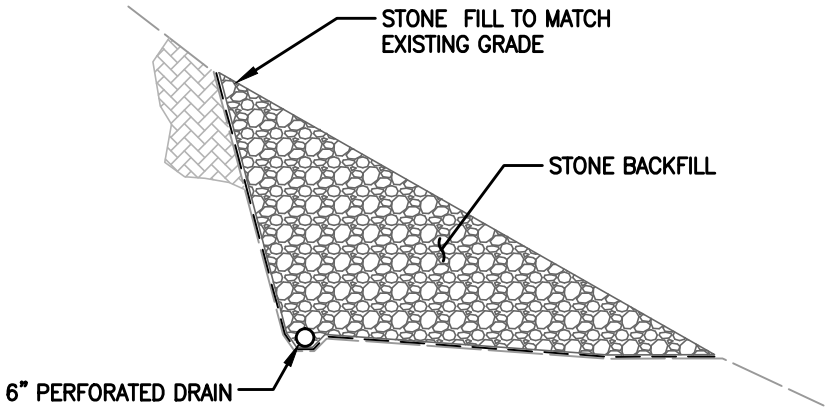


KEYING TYPICAL
N.T.S.

BENCH AND REGRADE WITH CONTROLLED BACKFILL DETAIL

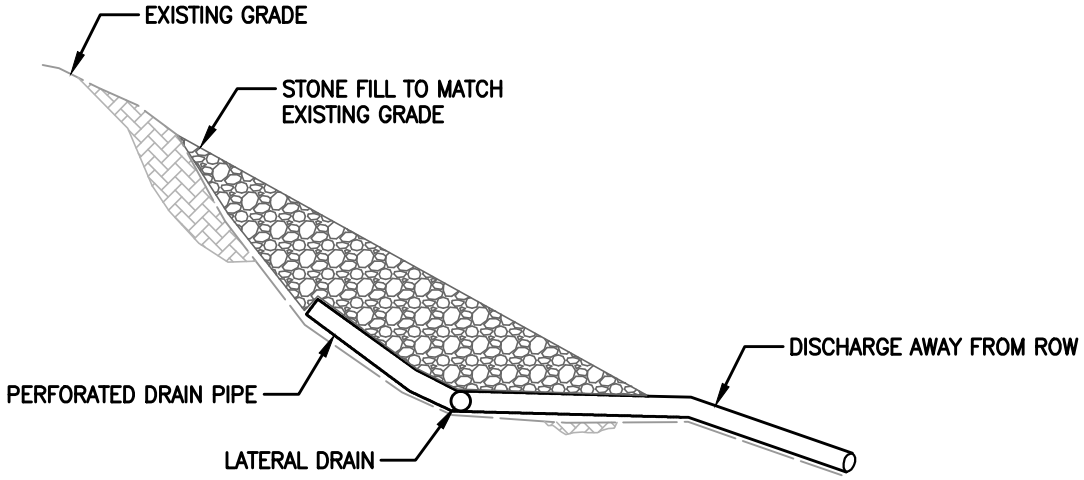


GABION BASKET/JERSEY BARRIER CONTAINMENT DETAIL



STONE WITH DRAIN TO RESTORE FAILING SLOPE

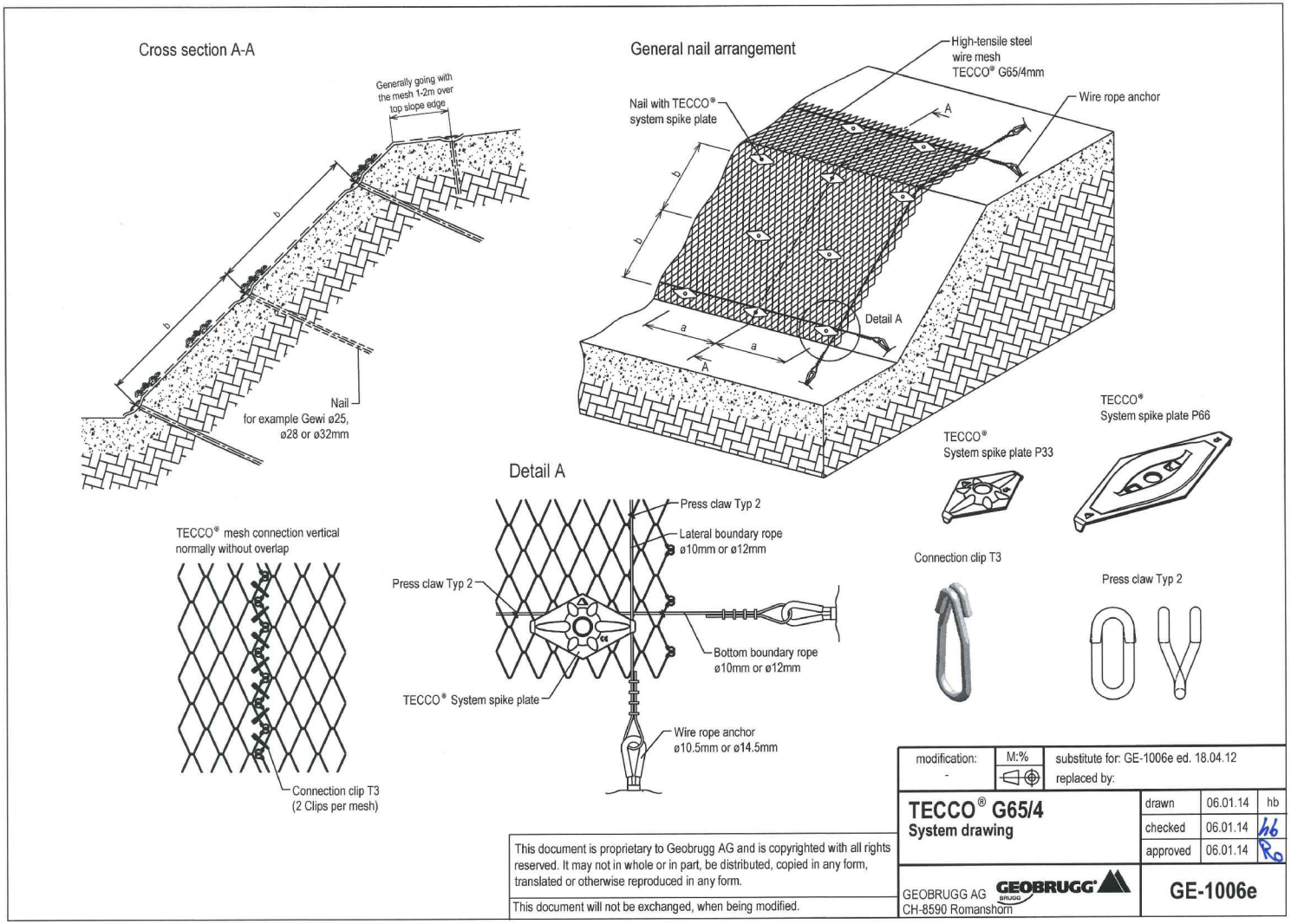
N.T.S.



SMALL SLIP REPAIR WITH LATERAL

N.T.S.

ROCK FILL ON SLOPES BETWEEN 30–38 DEGREES DETAIL



modification: -	M:%	substitute for: GE-1006e ed. 18.04.12 replaced by:

TECCO® G65/4
System drawing

drawn	06.01.14	hb
checked	06.01.14	hb
approved	06.01.14	RO

GEOBRUGG AG
CH-8590 Romanshorn

GE-1006e

GEOBRUGG–TECCO SYSTEM – WIRE MESH STABILIZATION

APPENDIX C

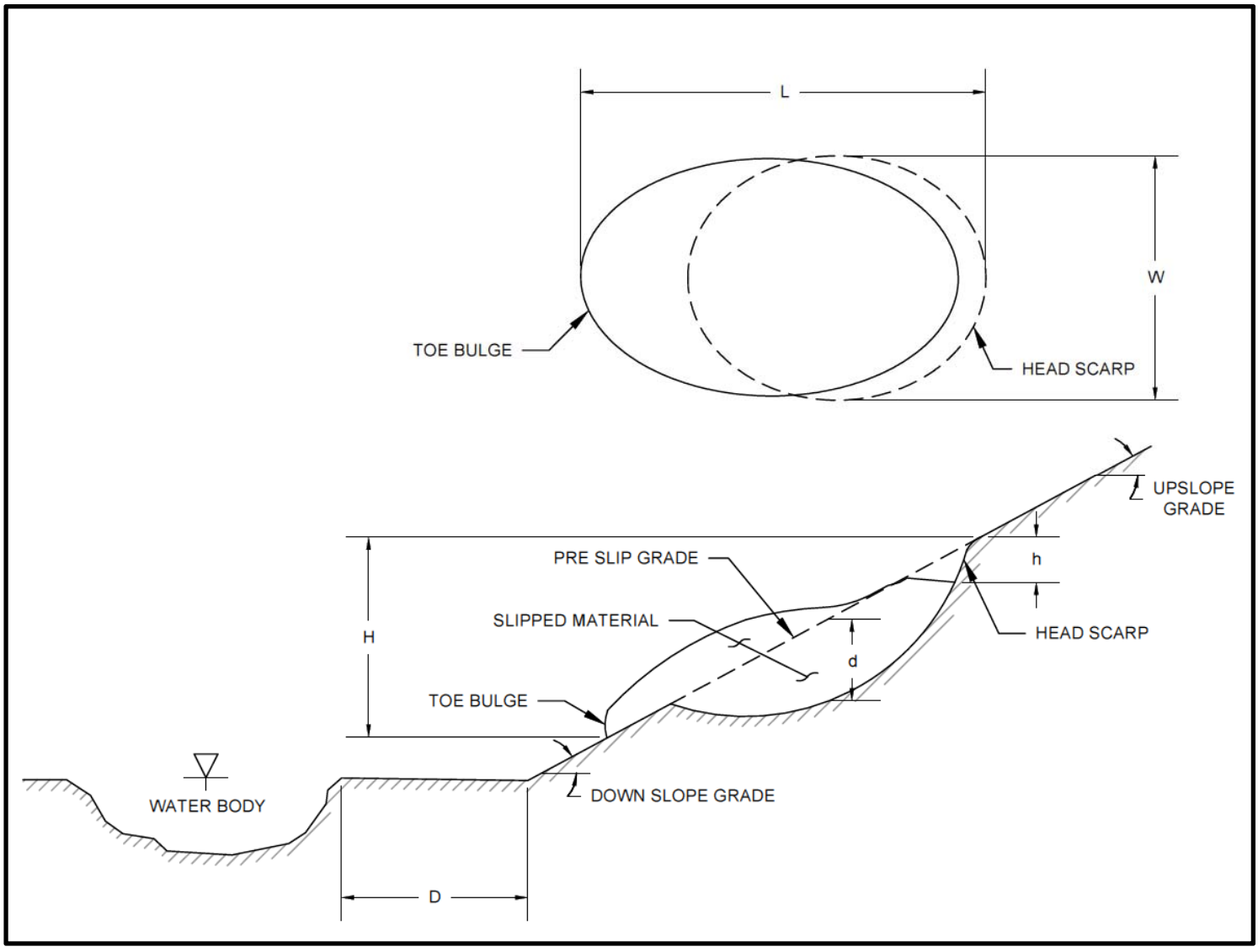
Forms

SLOPE FAILURE INFORMATION AND REPORTING FORM

Pipeline Name	
Slope Failure Station	GPS Coordinates Latitude _____ Longitude _____

Name of Observer	
Date	

Slope Failure Priority per Guidance in Appendix D Policy	○ 1 ○ 2 ○ 3 ○ 4



Slope Characteristics

General dimensions (Rough estimate) *See above sketch for dimension key	Length, ***L*** (ft): _____ Width, ***W*** (ft): _____ Head Scarp Height, ***H*** (ft):_____ Height of total slope failure area, ***h*** (ft):_____ Distance from base of slope to waterbody, ***D*** (ft)_____ Estimated maximum depth of failure surface, ***d*** (ft)_____
Slope Angle	At failure ◯ 20° or flatter ◯ 22° to 30° ◯ 30° to 38° ◯ Steeper than 38°
	Upslope ◯ 20° or flatter ◯ 22° to 30° ◯ 30° to 38° ◯ Steeper than 38°
	Downslope ◯ 20° or flatter ◯ 22° to 30° ◯ 30° to 38° ◯ Steeper than 38°
Slope direction relative to pipeline	◯ Pipeline is parallel to slope (up and down slope) ◯ Some amount of cross slope ◯ Pipeline is perpendicular to slope (cross slope, or sidehilling)
Slope type	◯ Natural ◯ Cut ◯ Fill ◯ Cut and fill
Presence of surface water	◯ Yes ◯ No ◯ Unknown Describe: _____
Presence of groundwater	◯ Yes ◯ No ◯ Unknown Describe: _____
Rock outcrops	◯ Yes ◯ No ◯ Possible Describe location:
Rock type	☐ Shale ☐ Mudstone /Claystone ☐ Siltstone ☐ Sandstone ☐ Limestone ☐ Coal ☐ Interbedded ☐ Others _____
Is there evidence of tree movement?	Perpendicular or leaning tree trunks is evidence of recent movement Describe: _____
Look at trunks	Tree trunk bending and going vertical is evidence of previous slide movement Describe: _____

Slope Failure Characteristics

Failure surface appearance	◯ Circular ◯ Hummocky ◯ Terraced
Type of movement	◯ Rotational slide ◯ Translational block slide ◯ Debris slide ◯ Complex
Failure material(s)	◯ Soil ◯ Rock ◯ Both Describe:
Head scarp	Describe:
Secondary scarps	Describe:
Evidence of toe bulge	◯ Yes ◯ No ◯ Possible
Evidence of erosion	☐ Head ☐ Toe ☐ Flank ☐ Body ☐ None
Is failure within pipeline ROW	◯ Permanent ◯ Temporary ◯ Outside LOD
Current impact to adjacent structures or properties	☐ Waterbody ☐ Pipeline/Utilities ☐ Roads ☐ Railroad ☐ Residential ☐ Buildings ☐ Bridge ☐ None ☐ Others_____ Distance from toe of slope (ft): _____
Potential impact to adjacent structures or properties	☐ Waterbody ☐ Pipeline/Utilities ☐ Roads ☐ Railroad ☐ Residential ☐ Buildings ☐ Bridge ☐ None ☐ Others _____ Horizontal distance from toe of slope (ft): _____

Existing remediation	☐ Drainage ☐ Bio-stabilization ☐ Slope geometry correction ☐ Retaining structures ☐ Internal slope reinforcement ☐ Erosion control ☐ Chemical stabilization ☐ None ☐ Others _____ Describe:

Other

Site access	☐ Site is accessible by permanent road, or active temporary access road ☐ Site access requires traversing steep slopes or long distance along ROW
Contractor availability	☐ Pipeline contractor still on site ☐ Pipeline contractor no longer on site, but still responsible for ROW restoration ☐ Pipeline contractor not contractually obligated for ROW restoration ☐ Specialty contractor required for anticipated repair method

Comments	

Photo Log

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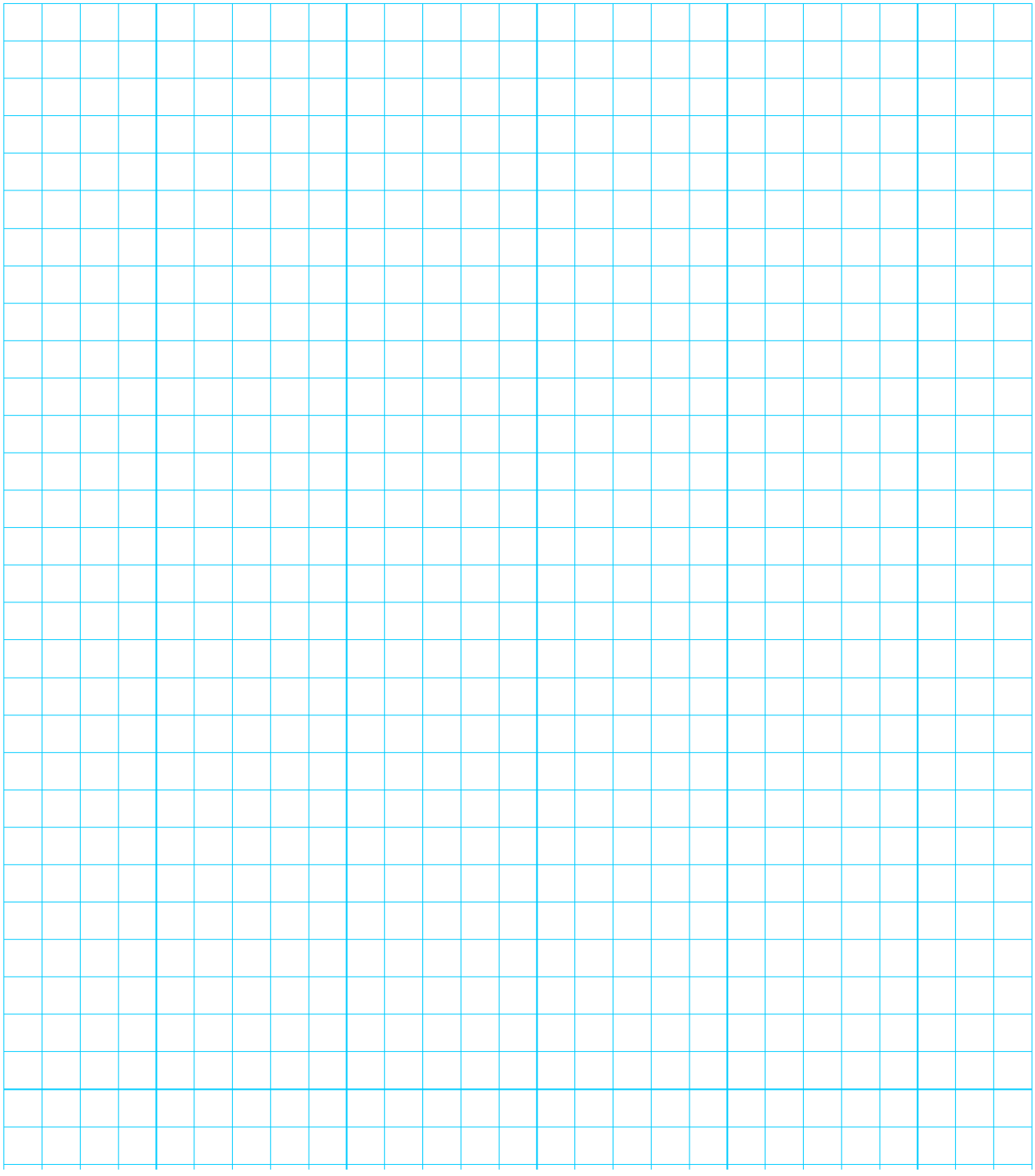
SLOPE FAILURE SKETCH

Plan View and Cross-Section

Pipeline Name	Slope Failure Station



SLOPE FAILURE REPAIR ASSESSMENT FORM

Use this form to evaluate whether repair of an existing slope failure will be field-directed or engineering-directed, and whether to engage a specialist in slope failure evaluation and repair (i.e., geotechnical engineer).

PIPELINE NAME: _____ **SLOPE FAILURE STATION:** _____ **DATE:** _____

FILLED OUT BY: _____ **PROJECT MANAGER:** _____

Criteria	Value	Selected Score
Slope Steepness		
Flatter than 20 degrees	1	
20 degrees to 30 degrees	5	
30 degrees to 38 degrees	10	
Steeper than 38 degrees	20	
Slope Direction Relative to Pipeline		
Pipeline is parallel to slope (i.e., up and down the slope)	1	
Some amount of cross slope	5	
Pipeline is perpendicular to slope (i.e., cross slope, or sidehilling)	10	
Evidence of Pre-existing Slope Failures		
None	1	
Mapped slope failures are present at the site, or pipeline plans indicate this location is a slope failure-prone hazard	5	
Tree trunks in the vicinity bend and go vertical	10	
Slope Failure Location		
Slope failure and material is fully within ROW	1	
Slope failure or material extends beyond ROW	10	
Consequence of Future Movement		
No Potential for Impact to pipeline, water bodies, roadways or private property	1	
Slope failure has potential to cause danger to human health and the environment (compromises other utilities, pipeline rupture, blocked public roadway(s), fish kill, release of pipeline fluids, sediment/debris in stream)	3	
Slope failure has caused an immediate danger to human health and the environment (compromises other utilities, pipeline rupture, blocked public roadway(s), fish kill, release of pipeline fluids, sediment/debris in stream)	5	
Site Access		
Site is accessible by permanent road or active temp. access road	1	
Site access requires traversing steep slopes or long distance along ROW	5	
Contractor Availability		
Pipeline contractor still on site	1	
Pipeline contractor no longer on site, but still responsible for ROW restoration	3	
Pipeline contractor not contractually obligated for ROW restoration	5	
Specialty contractor required for anticipated slope failure repair method	10	
	TOTAL	**0**

	Score
Field-directed repair	7-25
Engineering-directed repair	20-35
Engage third party specialist (i.e., geotechnical engineer)	30-70

APPENDIX D
Slope Failure Priority Guidance

Slope Failure Priority Guidance

- If you identify a slope failure on an *actively permitted construction project*, you must immediately notify the Environmental Compliance Coordinator (ECC). The ECC will coordinate with Energy Environmental Infrastructure Services (EIES) to determine the slope failure priority and the regulatory agency notification requirements. The ECC will notify the appropriate regulatory agencies as applicable.
- The ECC and EIES will work with you to identify the slope failure priority (see below).
- The ECC will provide immediate notification to the appropriate regulatory agency as required. **NOTE**: most regulatory agencies define immediate as "upon awareness and knowledge," and generally expects this to occur within 2 hours.
- If the ECC cannot be reached, contact the permitting lead in EIES. If neither the ECC nor the EIES permitting lead can be reached, please review the Slope Failure Priority Guidance below and prioritize the slope failure. For all priority 1 and 2 slope failures, immediate notification must be made to the appropriate regulatory agency. In most states this is the state emergency Spill Line, but not the National Response Center.

Slope Failure Priority Guidance

Priority 1 Slope Failure:

Definition: A slope failure which has caused an immediate danger to human health and/or the environment. This type of slope failure requires an emergency response.

Criteria: If any one of the following criteria exists, it is a Priority 1 slope failure.

- Compromises or threatens other utilities.
- Active and/or functional pipeline is broken or detached.
- A public roadway which may be used for emergency vehicles is blocked.
- A fish kill has been observed and/or reported in the general vicinity.
- Release of aqueous phase hydrocarbons (i.e. condensate). If aqueous phase hydrocarbons have been released to surface water additional notification to the National Response Center may be required.

Required Actions: Depending on the criteria met above, at least one or more of the following actions must be taken for a Priority 1 slope failure.

- Contact 811 or the appropriate one call for utilities.
- Notify the appropriate state Spill Line.
- Contact responsible party if not Dominion and potential to impact our right of way.
- Contact any other outside agencies for emergency purposes as necessary.

Priority 2 Slope Failure:

Definition: A slope failure or associated migration of sediment and/or debris, which has reached a waterway causing Conditions Not Allowable in state waters.

Criteria: If any one of the following criteria exists, it is a Priority 2 slope failure.

- Slope failure material or sediment laden runoff has entered water body.
- A pipeline is exposed but not broken.

Required Actions: At least one of the following actions must be taken for a Priority 2 slope failure.

- Contact 811 or the appropriate one call for utilities.
- Notify the appropriate state Spill Line.
- Contact responsible party if not Dominion and potential to impact our right of way.
- Contact any other outside agencies for emergency purposes as necessary.

Priority 3 Slope Failure:

Definition: A slope failure, slide or associated migration of sediment and/or debris that has not yet reached state waters.

Criteria: If any one of the following criteria exists, it is a Priority 3 slope failure.

- Impact to the water body is imminent.

Required Actions:

- Notify responsible party if not Dominion and potential to impact our right of way.

Priority 4 Slope Failure:

Definition: A slope failure that poses little or no environmental threat.

Criteria:

- No water body in the immediate area.
- Low/no probability of Conditions Not Allowable (Sediment in water body, E&S controls not maintained).
- Pipeline is not in danger of exposure, severing, detaching or rupture.

Required Action:

- Notify responsible party if not Dominion and potential to impact our right of way.

APPENDIX J

DEQ List of Potential Critical Areas

Appendix J - DEQ List of Potential Critical Areas

DEQ developed the following list of potential critical areas, derived from VESCH and other sources, to aid plan preparers in identifying potential critical areas on a project. These areas should be considered when preparing a plan and identifying critical areas. Extra attention should be directed to these areas if they have potentially serious problems or are sensitive to sediment impacts.

A. Steep Slopes:
    i. Ranges of slope gradient erodibility:
        1. 0-7% → Low erosion hazard
        2. 7-15% → Moderate erosion hazard
        3. ≥ 15% → High erosion hazard
    ii. Erosion hazard becomes greater as the slopes length increases. Erosion hazard will become critical if the slope exceeds:
        1. 0-7% ☐ 300 feet
        2. 7-15% ☐ 150 feet
        3. >15% ☐ 75 feet
B. Areas with high erodibility, high reactivity of soils, etc.
    i. 0.23 and lower → low erodibility
    ii. 0.23 to 0.36 → moderate erodibility
    iii. ≥ 0.36 → high erodibility
    iv. Soil pH
C. Areas that flow to environmentally sensitive areas (e.g. State waters including wetlands)
D. Areas that require Virginia Wetland Protection permits
E. Areas containing threatened or endangered species or their habitat, etc.
F. Sink holes, wet weather/underground springs, karst areas, etc.
G. Sensitive agricultural soils
H. Other Potential Critical areas –
    i. Fragipans
    ii. Lacustrine soils
    iii. Dense basal tills
    iv. Soils with seasonally high water table
    v. Soils with less than 5 feet of depth to bedrock
    vi. Subsurface drainage areas
    vii. Open ditches
    viii. Diversions
    ix. Diversion terraces
    x. Buried utility lines (for farmstead consumptive use)
    xi. Water sources (developed springs, wells, etc…)
    xii. Grassed waterways
    xiii. Water impoundment structures (dams and ponds)
    xiv. Unnamed water flows