APPENDIX G NISOURCE'S ENVIRONMENTAL CONSTRUCTION STANDARDS

ENVIRONMENTAL CONSTRUCTION STANDARDS

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1. INTRODUCTION

NiSource is committed to complying with the applicable environmental rules and regulations of federal, state, and local governments. It is NiSource's goal to meet these requirements in the pursuit of a cleaner, safer environment for future operations.

Recognizing this goal, it is NiSource's practice that all construction, operation, and maintenance activities be conducted in a safe manner that minimize impacts on stream and wetland ecosystems, upland ecosystems, wildlife habitat, cultural resources and the human environment. The Environmental Construction Standards (**ECS**) reflect the minimum requirements to be applied to all construction, operation, and maintenance activities conducted in support of NiSource Gas operations as outlined by federal, state, and local agencies. Construction projects may require permits and/or approvals from governmental authorities prior to actual construction and the ECS is not a substitute for obtaining such authorizations. Contact the NiSource Natural Resources Permitting (**NRP**) Group prior to project construction for permit acquisition.

The general objective of the ECS is to provide NiSource personnel and contractors with instructional information and a practical approach to environmental concerns, which can arise before, during, and after the construction of projects and/or facilities. More specific objectives include:

a. Minimize impacts to environmentally sensitive areas;

b. Use the minimum land required for safe and efficient construction, operation, and maintenance activities;

c. Prevent erosion and sedimentation during construction; and

d. Return work area to preconstruction conditions, or better.

Words and/or phrases which have special meaning (shown in **bold** at first occurrence in text) and acronyms have been defined in Section 10, Definition of Terms.

The intent of the ECS is to confine project-related activities to the identified **construction work areas (CWA)** and to restrict project-related land disturbance in those areas within the defined **limits of disturbance** (**LOD**). The CWAs and LOD are defined on a project-specific basis prior to the start of construction activities. If additional areas are required on a project beyond the defined CWA and LOD, consultation with the NRP Group is required prior to the use of those areas. If the requested project area expansion is approved by the NRP Group, any project-related ground disturbance (including erosion) within the approved expanded areas is subject to compliance with all applicable environmental requirements. This includes all environmental and regulatory mandated surveys such as but not limited to, threatened and endangered species surveys, archeology surveys, wetland delineations, etc.

The ECS shall be used as the base document from which the NRP Group will build individual site-specific **Environmental Compliance Plans (ECP)** where necessary. The ECP will include a written summary of requirements and recommendations from appropriate federal, state, and local agencies. Compliance with these items is required prior to and during construction. If a site-specific ECP is not required, this document will

provide the necessary environmental construction guidance to be followed for those projects covered by a Basic ECP.

Federal, state, delegated county and local agencies having regulations more stringent than the ECS shall supersede those contained within this document. The ECS covers erosion and sedimentation (**E&S**) control plan requirements and construction activity pollution prevention measures but does not address safety codes or regulations. Descriptions within do not supersede any applicable state or federal safety regulations.

The various Best Management Practices (**BMPs**) described herein are primarily utilized during earth disturbances associated with land development and construction activities.

BMPs, when designed according to these standards, and properly implemented and maintained, may be assumed to achieve the regulatory standard of minimizing the potential for accelerated erosion and sedimentation, and minimizing the discharge of pollutants into stormwater runoff or waterbodies from spilled or leaked materials at construction sites.

BMPs that fail after installation must be repaired to function properly or be replaced by alternative BMPs that will serve the intended purpose. Likewise, if unforeseen conditions occur on a site, and the installed BMPs are obviously not effective, then alternate BMPs must be designed and installed. The need for redesign will be determined on a case-by-case basis.

2. ENVIRONMENTAL CONSTRUCTION MANAGEMENT AND INSPECTION

2.1. GENERAL CONSTRUCTION MANAGEMENT

The pertinent NiSource Company is responsible for compliance with the environmental conditions contained in a Project's ECP, which include all permits and other approvals and/or this ECS. It is NiSource's expectation that all personnel on the job site understand and follow the proper site-specific environmental requirements. All personnel will be held accountable for full compliance with this ECS and all permit requirements.

In addition, the following job roles hold specific responsibilities for environmental compliance activities:

2.1.1. Construction Supervisor/Coordinator/Superintendent

On construction projects, certain individuals are given the responsibility to ensure the ECP is being implemented and inspected. Under the direction of the project manager or construction coordinator, construction personnel are responsible for daily review of the site to ensure compliance.

2.1.2. Construction Crew Environmental Foreman

The **Environmental Foreman** will work in cooperation with the company inspectors performing environmental compliance inspections. Both company crews and contractors are required to have at least one qualified Environmental

Foreman on site at all times during construction and restoration work. The construction crew Environmental Foreman will:

a. Become thoroughly familiar with the project-specific ECP for the activity;

b. Become thoroughly familiar with the NiSource Environmental Construction Standards;

c. Have the appropriate training to be able to fulfill the role including but not limited to, training required by NiSource;

d. Be responsible for the construction crew's efforts to correctly identify, install, maintain, and remove environmental control devices;

e. Work in cooperation with the company's employees responsible for environmental inspection and compliance;

f. Provide constructive feedback and solutions that meet the project's compliance requirements and minimize time and cost concerns that may arise from implementation of environmental controls.

The construction crew's Environmental Foreman can work/supervise other functions of the construction, but the Environmental Foreman responsibilities supersede all other construction duties at the project site. They must also have the appropriate number of available employees or contractors to implement the project's ECP and ECS within the required time frames. NiSource reserves the right to require additional Environmental Foremen.

2.1.3. Environmental Inspection Team

As deemed necessary by the NRP Group, NRP will require an **Environmental Inspector (EI)** to support the construction staff and complete the required site inspections documentation.

2.2. CONSTRUCTION PERSONNEL ENVIRONMENTAL REQUIREMENTS AND RESPONSIBILITIES

Construction personnel (both company crews and contractors) at the project site are responsible for the day-to-day routine monitoring and maintenance of the environmental aspects of the job site to ensure compliance with the ECS and ECP. Construction personnel are also responsible for ensuring that changes in locations, installation methods, centerlines, or earth disturbances described in the ECP are reviewed and approved by the NRP Group and incorporated into the ECP and other environmental plans in accordance with HSE 4440.010. Specific contractor requirements and responsibilities related to environmental construction management are defined in the ***Contractor Health, Safety, and Environmental Manual*** **(CHSEM)**.

2.3. ENVIRONMENTAL INSPECTION

Regular environmental monitoring is required to ensure that the construction activity is performed in accordance with the environmental conditions of the ECP and ECP. Trained and certified personnel are required by NiSource to perform environmental monitoring and compliance functions at project sites. These are the Environmental Foreman and Environmental Inspectors.

2.3.1. Environmental Inspector

The EI is responsible for monitoring construction activity for compliance with the environmental conditions of the ECP, NiSource environmental policies, agency permits, regulations, or these Environmental Construction Standards. At a minimum, the EI shall be responsible for:

a. Performing weekly and post-rain event inspections required by stormwater permits;

b. Preparing written environmental compliance inspection reports;

c. Taking photos of environmental conditions at project sites;

d. Communicating inspection findings and required corrective actions, and;

e. Providing technical support to project personnel for implementation of the ECP, these standards or NiSource policies, protocols, or procedures.

2.3.2. Environmental Foreman

At a minimum, the Environmental Foreman will be responsible for:

a. Following the ECP and all applicable NiSource standards, policies, procedures, and protocols;

b. Ensuring that all corrective actions are completed as soon as practicable and within the time frames required by NiSource and applicable permits;

c. Daily routine monitoring of erosion and sediment control measures and construction activity pollution prevention measures, and;

d. Ensuring the site is in good condition prior to leaving at the end of the workday, e.g., check all equipment to ensure it is in proper working condition and not leaking, check all pavement to ensure that sediment resulting from construction activity is swept and removed.

2.3.3. Additional Inspection Requirements

a. Additional project-specific inspection requirements that may be necessary will be outlined in the site-specific ECP.

b. Written documentation of inspections required by local, state, or federal permits will be kept on-site and be available digitally or in hard copy (as per specific requirements) for review at any time.

c. Environmental compliance inspections and monitoring of the site will be carried out as prescribed in the ECP and will continue as necessary until the site meets the requirements of stabilization, permit termination, or authorization is received for inspections to cease.

2.4. OPERATION AND MAINTENANCE OF ENVIRONMENTAL BMPs

Inspection and maintenance of erosion and sediment control BMPs both during and after construction is important to ensure that the BMPs are operating properly and effectively.

During construction, maintenance will include inspection of all E&S control devices near the end of each workday or after any runoff/rain event. All preventative and remedial maintenance work, including BMP clean out, repair, and replacement, will be performed before leaving the project site for the day.

Sediment, saw cut slurry, or broken asphalt/concrete shall be removed from the site regularly. This material should be removed using a shovel or vacuum, hauled from the site, and disposed of according to local, state, and federal regulations as described in NiSource Environmental Protocols. Under no circumstances shall this material be swept or washed into storm water inlets within or adjacent to the construction area.

2.5. ENVIRONMENTAL TRAINING

All individuals fulfilling roles as identified in Section 2.1 of this document must have been trained in all environmental aspects of the activity being undertaken and fully understand the environmental conditions contained in the activity's ECP. Environmental training for company personnel will be provided by the NRP and Environmental Groups. Training requirements for contractor personnel are outlined in the CHSEM.

2.6. STOP WORK AUTHORITY

Anyone, including the EI or representative of the NRP Group, shall have the authority and responsibility to stop work on any construction activity if it deviates from the environmental conditions of the ECP, this ECS, or per the NiSource Stop Work Policy. The invoking of stop work shall be reported **immediately** to the company employee in charge of the activity and the NRP Group. The company employee in charge, the Project Manager, and the NRP Group will be responsible for the resolution of the activity for which work has been stopped.

2.7. ENVIRONMENTAL VARIANCES

Unapproved variances from an ECP and this ECS are not permitted. Any proposed variance from an ECP will require approval from the NRP Group prior to commencing the activity. Examples of proposed variances include but are not limited to design changes, construction scope changes, or alternative BMPs. The approval for a variance will be in writing. In instances where written approval is not practical (e.g., emergencies and weekends) verbal approval may be given provided that written confirmation is provided as soon as possible.

Any proposed variance from this ECS will require written approval from the NRP prior to commencement of the activity. Refer to HSE 4440.010 for examples of project changes that require notification to NRP.

3. UPLAND CONSTRUCTION

3.1. GENERAL

This **Upland Construction** section describes typical upland gas distribution facilities construction and operation and maintenance (**O&M**) activities.

The upland gas distribution pipeline construction is completed as a moving assembly line performing specialized procedures in an efficient, planned sequence. In addition to typical construction, dedicated crews may be used to complete specialized activities such as directional bore, stream or wetland crossing installation, or station construction. A typical construction sequence is illustrated in Figure 1.

While construction work is ongoing, the construction work area will be kept clean of all rubbish and debris resulting from the work. Non-hazardous materials and waste shall be disposed of in an approved landfill and/or recycled at an appropriate facility. Regulated and Hazardous waste shall be disposed of in accordance with NiSource policies and federal, state, and local regulations.

As outlined in Section 4, construction activities within wetlands and/or streams and their buffers will be completed separately from the upland construction methods outlined in this Section 2. Specifically, designated crews will install stream and wetland crossings that are not done by conventional upland techniques, including the use of flumed stream crossings, pump bypass stream crossings, and directional drill of either wetland or stream resources. Stream or wetland crossings of any type require federal and state agency approval and will have a site-specific ECP prepared for the project. Contact the EI prior to project construction for additional guidance on the ECP or to propose E&S plan revisions.

3.2. CONSTRUCTION WORK AREA

The CWA on a project includes any areas of potential land disturbance (or LOD as defined in Section 3.3), as well as construction support areas such as equipment staging yards, material storage areas, access roads, and designated parking

areas. In environmental permitting activities, the CWA is often required to be defined separately from land disturbance areas.

For construction activities associated with gas distribution pipelines (ranging from 2 to 20-inch in diameter) the permanent right-of-way (**ROW**) can range from 10 to 50 feet in width. Generally, the entire permanent ROW is included in the CWA unless there are specific reasons to reduce the CWA. Additionally, expanded construction work areas may be required outside of the permanent ROW to allow for the use of adjacent areas for staging or parking. A typical 30-foot ROW with a defined CWA and LOD is illustrated in Figure 2.

In some cases, the permanent ROW width or public ROW width are insufficient to accommodate construction activities. In these cases, temporary workspace must be identified to accommodate the use of large equipment, stockpiles, or staging. Figures 3 and 4 illustrate typical roadside construction set ups with defined CWA and LOD areas.

For any project with environmental permits requiring CWA identification, the CWA will be identified on the project environmental plans.

3.3. LIMITS OF DISTURBANCE

The limits of disturbance for a project encompass the area where construction activities, such as clearing, grading, grubbing, excavation, repeated access, materials staging, or other land disturbance activities have the potential to or have altered or destroyed the natural vegetative cover and/or non-vegetative cover of the land to expose soils susceptible to erosion.

There may be instances where extra work areas are needed for topsoil conservation, side hill construction, equipment staging, pipe and material storage, temporary and permanent access, and related construction activities. Such areas necessary for the project that do not consist of physical ground disturbance or contain materials prone to erosion will be identified on project plans and considered part of the project construction work area. Areas where clearing, grading, grubbing, excavating, filling, soil stockpiling, or other physical ground disturbance (i.e., rutting, equipment tracking, etc.) which alters land surface to expose underlying soils are considered Limits of Disturbance (LOD). The project LOD will be identified and used to determine state stormwater permit eligibility, associated permit fees, and the need for appropriate local, state, or federal permits. In these cases, the LOD will be identified on the project environmental plans.

Gas distribution pipelines may be constructed through confined areas; alternate construction methods may be required in narrow construction work area situations to safeguard workers, equipment, the pipeline, and the environment. Alternate construction methods shall be reviewed by the Project Manager or NRP Group prior to initiation.

For construction projects that involve the installation of new gas regulating stations, the overall size/footprint of the new station may require landscaping buffers or post-construction stormwater management features to account for increased post-

construction stormwater runoff. These features vary from vegetated swales to stormwater detention basins with controlled release outlet structures to adjacent storm sewers or drainageways.

Oftentimes, the area around the new gas regulating station is utilized as a construction management area for material laydown, equipment/vehicle parking, portable restrooms, concrete washout areas, etc. The additional areas needed for landscaping buffers, post-construction BMPs and construction management activities must be included in the CWA and LOD areas identified during project planning activities. A typical construction site staging area detail depicting this scenario is included in Figure 5.

3.4. ROADSIDE OR IN-ROAD CONSTRUCTION SET UP

When a pipeline is being constructed parallel to a public or private roadway or within or adjacent to the public ROW, a primary concern is controlling polluted stormwater runoff from leaving the work site and reaching surface waters.

Appropriate BMPs must be installed and made functional prior to the start of the earth disturbance activity to effectively limit or prevent the entry of pollutants into surface waters, drainages, and stormwater systems both during and after construction. All BMPs must be installed in accordance with the attached details, related state requirements, and manufacturer's specifications. BMPs must be inspected regularly and maintained as needed to remain functional.

3.4.1. Inlet Protection

For typical roadside or in-road construction, primary concern is given to the protection of stormwater inlets present within the work area. An inlet protection device shall be installed in every inlet opening in the vicinity of the project area that receives drainage from any portion of the work area. Installation of inlet protection must be completed prior to the start of work to prevent soil and sediment from entering the storm sewer system.

There are multiple prefabricated inlet filter options that can accommodate a wide variety of inlet configurations. Two common types are the above-grate option and below-grate inlet filter bags. The proper installation and maintenance requirements for a variety of commonly used inlet protection devices are detailed in the following sections and associated figures.

Inlet filter bags (Figure 6) are designed to fit below the street grate and inside the inlet opening. The filter bags are constructed to filter stormwater runoff after it passes through the street grate and drops into the filter bag. Inlet filter bags shall be installed according to the manufacturer's specifications and properly maintained.

Stone inlet protection (Figure 7 and 8) is also an option for those structures that are not flush with the road surface and will need to remain in place for an extended period. A layer of mesh or filter fabric creates a barrier between the inlet opening and the stone to allow for the passage and treatment of runoff.

Coir Matting (Figure 9) is an approved inlet protection device in some areas. Coir mats are designed to filter stormwater runoff at street level before water enters the storm system. Coir mats shall be attached to the grate of a storm drain with zip ties or an equivalent fastener. Ensure to install to manufacturers specifications. Damaged coir mats shall be replaced immediately. Additional rolled up coir mat fabric or filter sock must cover any existing curb windows to filter water flowing through the curb window. Modifications to alleviate flooding concerns must have written approval from NRP and the local municipality. Please refer to the ECP for any local restrictions.

Filter Sock inlet protection (Figure 10) is an approved inlet protection method in some areas. Filter sock inlet protection is designed to trap sediment by filtering water passing through the berm and allowing water to pond, allowing sediment to settle out of the water column before stormwater enters the storm system. Filter sock must be 8-inch diameter or greater and mulch filled; the use of straw wattles is not permitted. Ensure installation is completed to manufacturers specifications. Damaged filter sock inlet protection shall be replaced immediately when the sock no longer holds its shape or flow capacity is reduced. Any modifications to alleviate flooding concerns must have written approval from NRP and the local municipality. Please refer to the ECP for any local restrictions.

Inlet protection shall be inspected frequently and maintained, cleaned out, or replaced when the bag or structure is half full or when flow capacity has been reduced. Accumulated sediment shall be disposed of in the approved manner. Damaged filter bags or inlet protection shall be replaced immediately.

In order to prevent ponding on roadways or residential areas, care must be taken to anticipate significant rainfall events and other conditions such as breaks in onsite work activities (e.g., construction delays, holidays, etc.) where the site could be left unattended for longer than overnight. These situations, and/or state or local requirements on inlet protection, may require these devices be removed. In these cases, alternate protections, such as temporary stabilization, street cleaning, perimeter controls, and preserved vegetation may be required.

Inlet protection shall be installed and maintained for the duration of onsite activities and until the site meets permit revegetation requirements unless written approval has been obtained by NRP and the local municipality.

3.4.2. Perimeter Control

Sediment barrier BMPs shall be installed on the downslope perimeter of a disturbed area to prevent sediment from leaving the work area. Installation of barriers must occur prior to any land disturbance. Sediment barrier BMPs may also be required around side cast spoil piles and stockpiles. While it may not be practical in all instances to install perimeter controls around construction taking place within or adjacent to the roadway, they

should be included where possible. Refer to Figures 3 and 4 for the proper alignment of sediment barriers adjacent to a roadway.

Compost filter socks (Figure 11) are an effective way of controlling sediment from leaving the work site. Compost filter socks can easily be installed downslope of any work areas (where feasible) or around spoil piles within or adjacent to the roadway. Depending on the site characteristics, filter fabric fence (Figure 12) or straw bale barriers (Figure 13) may also be used as perimeter controls. All types of perimeter controls must be installed in accordance with the attached details and related state specifications. In some cases, silt fence and straw bale barriers may not be allowed as primary measures.

In areas where perimeter controls are not feasible, all erodible surfaces shall be stabilized at the end of each workday. This will include the placement of mulch or covering the area with an erosion control blanket or plastic sheeting.

3.4.3. Ditches and Drainage Swales

When a roadside ditch or drainage channel/swale is present (parallel or perpendicular) to the construction activity, **sediment filter devices** must be put into place where needed to prevent sediment from entering a waterway via the ditch. Compost Filter Sock Check Dams (Figure 14) or Rock Check Dams (Figure 15) should be installed in the ditch or swale to reduce runoff velocity and collect sediments that have entered the ditch during a runoff event.

Filter fabric fence and straw bale barriers are not appropriate for these areas of concentrated flow. However, alternative types of products may be considered for use in accordance with state specifications.

3.4.4. Construction Entrances

Stabilized construction entrances are necessary to minimize off-site tracking of sediment. If construction traffic will be accessing a paved road or other paved surface directly from a disturbed area, a Construction Entrance shall be installed at every point where vehicles enter or exit the site. In flat, low impact areas, where construction access duration will last no more than a few days, a matted construction entrance (Figure 16) may be sufficient. In high-impact, longer duration entrances, rock construction entrances must be installed as shown in Figure 17. All construction entrances must be installed as specified on project specific erosion control drawings.

Maintenance of construction entrances requires daily pavement sweeping, as well as removal of accumulated sediment from the construction entrance.

In some situations, a stabilized construction entrance may not be feasible during construction within or immediately adjacent to roadways, parking

lots, or other hard surfaced features. In these cases, care must be taken to minimize vehicular access in these areas and to keep them swept, shoveled, and scraped as necessary to prevent sediment from being tracked or otherwise carried outside of the area of disturbance.

3.4.5. Removal of Sediment from Impervious Surfaces

For construction activities performed adjacent to or in close proximity to **impervious surfaces** such as paved roads, driveways, sidewalks, parking lots, etc., there is risk that sediment (mud, dirt, soil) can be tracked onto these impervious surfaces by construction vehicles.

To prevent the tracking of mud and sediment onto public roadways, the minimum required frequency for sweeping/removal of sediment from impervious surfaces is at the end of each workday. More frequent sweeping/removal may be required if mitigating circumstances are present, including the following:

a. Precipitation is falling or is forecast during the workday;

b. Sediment buildup on impervious surfaces becomes excessive; or

c. Sediment is being tracked outside the LOD.

Pavement sweeping shall be accomplished using methods or equipment designed to control and suppress the emission of dust into the air. Large areas of sediment on street pavement shall be removed using mechanical sweeping equipment. Required methods of dust suppression for mechanical sweeping include, but are not limited to, filtered vacuuming and water mist suppression. Washing or sweeping sediment into roadway ditches, sewers, culverts, or other drainage ways is not acceptable.

3.4.6. Control of Saw Cutting Slurry

Wastewater and slurry materials generated by saw cutting activities shall not be allowed to enter stormwater systems or waterbodies. Temporary perimeter control BMPs and inlet control BMPs must be used while conducting saw cutting activities. All controls shall be put in place before the start of cutting operations. Controls must be designed to handle the volume of water to be used. Measures to be implemented for saw cutting include the following:

a. Water additives (i.e., surfactants) other than propylene glycol shall not be used without prior NRP Group approval.

b. Wastewater and sediment shall be confined to the immediate work area (within 50 feet) and prevented from entering storm water systems by installing appropriate controls. Examples of these controls include compost filter sock, sandbags, temporary berms, or other barriers. Drop inlet devices or covers shall not be used for primary control. All storm

drain inlets, culverts, and catch basins within 100 feet and downslope of saw cutting shall be located and protected.

c. Collect and remove all wastewater and slurry materials once saw cutting activities are complete; do not wash residual material into a storm water system or waterbody. Residual material should not be allowed to remain on the pavement after the operation has ceased. Material must be disposed of properly as waste in accordance with local, state, and federal regulations.

d. Large volumes of slurry shall be removed by vacuum as near to the point of generation as possible.

e. Residual wastewater and sediment shall be removed no later than the end of the workday and disposed of properly as waste in accordance with local, state, and federal regulations.

f. Residual material trapped behind control measures will be vacuumed, swept, shoveled, and disposed of properly.

g. Efforts should be made to minimize the potential for tracking sediment off site by cars and pedestrians.

h. In addition to basic PPE (safety glasses, hard hat, Class 3 safety apparel, safety toed boots), specialty PPE (hearing protection and face shield) are required during saw cutting activities.

3.4.7. Concrete Washout

Concrete wash-out liquids and slurries are potential stormwater pollutants that must be managed properly. They are highly caustic, contain toxic metals, and pose a potential pollution threat to streams, wetlands, and aquatic life if not managed properly. Federal construction stormwater permits require the use of measures to prevent stormwater pollution resulting from concrete wash-out liquids and wastes during construction. Concrete liquids are not considered a pollutant once dry and disposed of properly.

Concrete wash-out liquids cannot be allowed to flow directly onto the ground, into drains, or into water resources. Approved containments such as slurry sacks, plastic lined pits, and lined containers designed to receive concrete washout liquids and concrete waste must be used for all concrete wash-out activities (see Figure 18). Concrete wash-out containers must be identified by signage and located at least 50 feet away from all storm drains, waterways, and water resources.

Spills of concrete liquids or waste into storm drains, waterways, or water resources must be reported to NiSource immediately.

3.5. GAS SERVICE LINE INSTALLATIONS

The installation of individual gas service lines to a residence or a commercial business that are not part of a larger permitted project require the use of erosion and sediment controls, as well as the prompt restoration of disturbed areas. Typical devices include compost filter sock and above-grate inlet protection devices. Figure 19 provides erosion control guidance for these types of gas service line installations.

3.6. CROSS-COUNTRY CONSTRUCTION SITE PREPARATION

3.6.1. Clearing

When work is necessary outside of a previously cleared and maintained public ROW, the construction work area will be cleared to the width specified in the project plans.

Clearing activities at the start of the construction project should start with the minimum necessary to install rock construction entrances where construction vehicle access points intersect paved roadways.

Immediately upon the completion of timbering and tree removal activities from any given section of the right of way, perimeter controls and sediment trapping facilities shall be placed as the first step in land disturbance.

In some cases, timbering activities may occur in advance of pipeline contractor mobilization with prior approval from NRP. In this case, temporary stabilization measures in the form of annual seed and straw mulch shall be required immediately after clearing in areas where land disturbance has occurred. No grubbing is authorized in this instance.

Additional restrictions or erosion control measures may be required on a project specific basis.

3.6.2. Rock Construction Entrances

Rock Construction Entrances, as illustrated in Figure 17, shall be installed where the construction work area crosses public roads or where construction traffic will exit onto a public or private roadway. The rock construction entrances are needed to maintain safe vehicle operation and to prevent tracking soil and mud outside of the permitted land disturbance area. These installations are designed to remove mud from vehicle tires and tracks before accessing a roadway. Access to the site should be limited to the stabilized construction entrance(s). At a minimum, the rock construction entrance should be constructed to the dimensions shown on Figure 17.

At temporary road entrances, geotextile fabric should be used as illustrated in Figure 17. The underlying bed of the entrance area should be cleared of small stumps and protruding organic material as these tend to puncture the fabric, thereby allowing fine soil particles to mix with the gravel. At

existing gravel access roads, the rock construction entrance does not have to be underlain with geotextile fabric.

As outlined in section 3.4.5., public and private roads, drives and other access routes shall be swept, shoveled, and scraped as necessary to prevent sediment from being tracked or otherwise carried outside the area of disturbance.

If a construction entrance becomes overly compacted and/or filled with soil, it may cease to function correctly. In these circumstances, the rock shall be decompacted by raking to roughen the surface and restore its functionality. Additional rock may also be required to maintain the sediment control function of the entrance.

If no access is required onto the roadway, the installation of a rock construction entrance is not required; however, safety fencing should be installed across the ROW and signs designating “no entrance” can be erected to avoid any unintentional entrances.

3.6.3. Preserving Existing Features

Vegetated areas are very effective sediment filters. Where feasible, retaining vegetative cover within the project area can help reduce the volume of sediment leaving the site.

During clearing operations, all brush and trees will be felled into the construction work area to prevent off-construction work area damage to trees and structures. Large or valuable trees may be retained, provided they will not interfere with the construction, operation, or maintenance of the facility. These trees shall be marked in a manner that allows construction to continue but keeps the trees protected (e.g., ribbons and/or safety fencing). Tree clearing operations may be subject to governmental regulations. Refer to the project ECP for limitations and conditions on vegetation clearing.

3.6.4. Wood Products Disposal

Wood products (saw logs, pulpwood, or cordwood) over 3 inches in diameter will be staged or disposed of as agreed upon with the landowner per the construction plans or documentation from the Company. Wood products should not be used for any purpose unless written permission is first obtained from the Company and landowner. When the landowner requests salvage of these materials, they shall not be stockpiled within floodplains or wetlands.

3.6.5. Brush Disposal

The preferred method for the disposal of cleared brush is to chip the material and haul it offsite for disposal in accordance with all local, state, and federal regulations.

In some cases, with permission from the NRP Group:

a. The brush may be piled at the edge of the construction work area but not within 50 feet of streams, floodplains, or wetlands. Equipment stacking the brush should not leave the construction work area. Brush piles will be constructed approximately 12 feet wide and compacted to approximately 4 feet high, with periodic breaks at a minimum of every 200 feet to permit wildlife travel. The landowner should be consulted to determine acceptable brush pile locations along the construction work area.

b. The brush may be chipped and thinly spread (less than 2 inches thick) over the construction work area or blown off the construction work area (per documented landowner agreement) except in **agricultural lands** or within streams, floodplains, or wetlands. Chipping will be limited to those areas where agreed to with the landowner. During restoration, soil will be augmented by the addition of 12 to 15 pounds of nitrogen per ton of wood chips to aid revegetation. Follow the guidance contained in Section 3.11 for restoration and revegetation guidelines.

c. Brush may be not burned unless permitted by law and approved in writing by the NRP Group.

3.6.6. Tree Stump and Rock Removal (Grubbing) and Disposal

Tree stumps and large rocks can be cut, graded, or removed as necessary to permit construction and to provide adequate clearance for mechanical equipment and other vehicles. Tree stumps that are adjacent to roads will be cut close to the ground (flush cut) or removed.

Initial grubbing activities shall be limited to the minimum necessary for the installation of perimeter controls and sediment filter devices until said controls are installed. All tree and rock removal activities must be kept within the CWA, unless authorized in writing by the NRP Group.

Stumps and large rocks will be disposed of in one of the following approaches:

a. Hauled from the site and disposed of in an approved landfill or other suitable area in accordance with all local, state, and federal laws.

b. Windrowed just off the edge of the construction work area with landowners' and Company's permission. Windrows shall not be located within streams, floodplains, or wetlands.

3.7. ACCESS ROADS

Typically, access roads to the NiSource pipeline system already exist. All public roads are available for use as access roads without further environmental review. However, all private access roads intended for use during a project are subject to applicable environmental reviews.

Access road requirements must be identified during the project planning phase to ensure sufficient timing for permitting activities. Should the need for additional roads be identified during construction, the use or improvement of these roads must be authorized in writing by the NRP group.

New access roads will be built only if existing access is inadequate. The roads will either be temporary (used for access during construction only) or permanent (used during and after construction for operation and maintenance of the facilities). Additional permitting requirements, outside those of a typical construction project, are required for the construction of both temporary and permanent roads and the NRP Group must be contacted in advance of planning access road construction.

Access road gradient will be as flat as local topography will practically allow. By breaking or changing grade frequently, fewer erosion problems will be encountered than on long, straight, continuous gradients. Waterbars (interceptor diversions or slope breakers) and/or other sediment control devices will be installed as needed.

Road crossings of streams and wetlands require special environmental construction standards as described in Section 4. Roads will cross streams and wetlands as close as possible to right angles. Runoff will be dispersed just prior to the crossing by means of an interceptor diversion with a sediment filter device at the outlet. Culverts will be appropriately sized and placed to permit water flow under the access road. In the event an access road must cross a stream or wetland, specific details and requirements will be provided in the project's site-specific ECP.

In situations where frequent use or weather conditions impact road conditions, additional erosion control devices may be required to inhibit erosion and sediment runoff from the road surfaces.

Where temporary access roads are located within agricultural areas, care must be taken to preserve the existing topsoil profile. If rutting is probable due to wet conditions, timber mats shall be placed to minimize the mixing of the topsoil and subsoil.

After construction, temporary access roads must be removed, and the area restored using the same specifications as applied to the construction work area unless landowner agreements and permitting allow for them to remain.

Safe and accessible conditions will be maintained at all roadway crossings and access points during construction and restoration activities.

3.8. GRADING

Required temporary erosion controls shall be installed and made functional prior to the start of initial land disturbance. Applicable erosion control devices for varying situations are referenced throughout this document.

Temporary E&S controls such as perimeter controls and sediment filter devices shall be installed and functioning properly prior to grading activities. All controls

must be installed in accordance with the project ECP unless otherwise approved in writing by the NRP Group. It should be noted that, based upon site usage and weather conditions, additional controls may be required to meet the intent of environmental regulations.

After controls have been installed, grade the minimum amount necessary to provide a smooth and even surface for safe and efficient operation of construction equipment.

All temporary erosion control devices shall be inspected near the end of each workday or after each storm (runoff) event (thresholds determined by individual state requirements) to ensure proper functionality. Any devices damaged beyond functioning will be repaired or replaced as soon as practicable and within the time limits required by permits**.**

The following erosion control devices are suitable for temporary erosion and sedimentation control for implementation before or immediately following clearing and grading operations.

3.8.1. Compost Filter Sock

Compost Filter Sock (Figure 11) may be used to control runoff from disturbed areas or sloped areas where runoff is in the form of sheet flow. Compost filter sock is an efficient and easy way to maintain control of runoff and must be installed according to the specifications in Figure 11. As with other sediment barriers, filter socks should be placed parallel to ground contours with both ends of the sock extended upslope at a 45-degree angle to the rest of the sock to prevent sediment from traveling along the sock and around the ends.

Socks placed on earthen slopes may be anchored with stakes driven through the center of the sock or immediately downslope of the sock at intervals recommended by the manufacturer. Where socks are placed on paved surfaces, concrete blocks may be used immediately downslope of the socks on steep slopes (at the same intervals recommended for the stakes) to help hold the sock in place.

Upon achieving final stabilization of the work area, the filter sock shall be either removed or left in place and vegetated (if specified in ECP). In the latter case, the mesh is typically cut open and the compost spread as a soil supplement. In either case, the stakes shall be removed. Refer to Table 1 for filter sock fabric and compost specifications.

3.8.2. Silt Fence

Silt Fence (Figure 12) may be used to control runoff from disturbed areas or sloped disturbed areas when runoff is in the form of sheet flow and the discharge is to a stable area. The filter fabric fence must be installed according to the specifications outlined in Figure 12, including entrenching and compaction per state requirements and the manufacturer’s recommendations. Silt fence should not be installed on uncompacted fills

or in extremely loose soils since this will likely result in undermining of the fence.

3.8.3. Straw Wattles

Straw Wattles may be used to control runoff from small, level, disturbed areas where silt fence would normally be used. They are not suitable for areas of concentrated flow or on slopes. Because they are lightweight, they must be staked or anchored in accordance with the manufacturer's installation instructions. Straw wattles are not appropriate for use adjacent to water resources.

3.8.4. Straw Bale Barriers

Straw Bale Barriers (Figure 13) may be used in limited situations to control runoff from small, disturbed areas where runoff is in the form of sheet flow. The use of straw bale barriers must be approved by the NRP Group for use as a primary perimeter control measure and may not be allowed in certain locations or jurisdictions.

Straw bales tend to deteriorate within 3 months of installation and should be considered a short-term control measure. Straw bale barriers are best suited as a secondary control measure after the stabilization of sloped areas or where additional protection is needed.

3.8.5. Rock Filter Outlet

Rock Filter Outlets (Figure 20) are considered temporary erosion controls. In areas of concentrated flow, a rock filter outlet should be used as a break in perimeter controls (i.e. silt fence or compost filter sock). A rock filter outlet shall also be installed where failure of a silt fence or compost filter sock has occurred due to an unanticipated concentrated flow.

3.8.6. Waterbars

Waterbars (Figure 21) are a common and effective device used for erosion control on construction ROW. During construction, temporary waterbars are installed to control accumulation of water on the graded ROW slope. During restoration, permanent waterbars are installed to protect the ROW from erosion until vegetation becomes reestablished on the disturbed areas.

Temporary waterbars, or diversions, are generally made by building a curb 18 to 24 inches high across the ROW. The curbs are shaped to allow passage of construction equipment and inspector vehicles. The diversions extend across the entire ROW and should have a gradient of less than 2% and must drain off the ROW. Where water is directed off the ROW, the outlet will be protected by a sediment filter device sufficient to inhibit erosion as water leaves the CWA.

Temporary diversions shall be spaced along the ROW in accordance with Figure 21 or the site-specific erosion control plans. Position the outfall of each waterbar or diversion to prevent sediment discharge into wetlands, waterbodies, or other sensitive areas. Temporary diversions may be broken down by construction equipment during the workday but must be restored by the end of each day. It should be noted that additional controls may be required by the NRP Group, EI, or regulatory agency in conjunction with waterbars (e.g., stone outlets, sumps, compost filter sock) depending on the unforeseen conditions due to site grading and weather conditions.

Permanent waterbars typically consist of a curb 18 to 24 inches high below a shallow swale. The curb is constructed of compacted earth fill with side slopes of 2:1 or flatter to allow passage of maintenance equipment. The diversions should extend across the entire ROW and drain water with a less than 2% gradient. The outlets of final diversions are stabilized with sediment filter devices, rock, brush, or heavy vegetation. Final diversions will be spaced along the ROW in accordance with Figure 21 and will tie into existing waterbars where present. In places where final grade creates side slopes or slopes which break in more than one direction, waterbar installation may need to vary to create an outslope of less than 2% which will carry water off the ROW.

3.8.7. Topsoil Conservation and Replacement

Topsoil conservation shall be completed as practicable on all upland sites and as required per project-specific permits. Unless the NRP Group, and 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. Actively cultivated or rotated croplands and pastures;

b. Residential areas;

c. Hayfields;

d. Other areas at the landowner's or land managing agency's request; and

e. As outlined in the project specific E&S Control Plans or ECP.

In deep soils (more than 12 inches of topsoil), segregate at least 12 inches of topsoil. In soils with less than 12 inches of topsoil make every effort to segregate the entire topsoil layer. Segregated topsoil may not be used for padding the pipe. Figure 2 illustrates topsoil conservation techniques.

The topsoil will be stockpiled separately from all subsoil and will be replaced last during backfilling and **final grading**.

In residential areas, topsoil replacement (i.e., importation of topsoil) is an acceptable alternative to topsoil segregation.

In areas where the existing soil cannot feasibly be modified to provide adequate growth medium (i.e., highly rocky or sandy soils, shallow soils, or toxic/acidic soils) topsoil should be added at a depth of 2 to 4 inches. This also applies to excavations backfilled with sand or other inadequate growth medium.

In areas where topsoil replacement is not required, and subsoils can feasibly be amended to prepare an adequate seedbed, topsoil should not be imported as a substitute for soil testing and lime and fertilizer application.

3.9. TRENCHING

3.9.1. Trenching Specifications

The total length of excavated trench open at any one time must not be greater than the total length of utility line that can be placed in the trench and backfilled in one working day. Additionally, state and/or local regulations may designate a specific length of trench that may be opened at any given time. Exceptions to this requirement must be authorized in the ECP, project specific plans, or in writing by the NRP Group.

When conditions dictate that the trench must remain open for a greater length of time than anticipated, appropriate erosion controls and safety measures will be employed as directed by the Environmental Inspector or Environmental Foreman.

Spoil shall be placed at least two feet from the edge of the trench and on the upslope side whenever practicable. Additional restrictions for trenching within stream and wetland areas are provided in Section 4.

3.9.2. Trench Breakers

Trench breakers preserve groundwater hydrology and reduce water velocity along the pipeline bedding and result in less erosion/scour of the trench bottom.

As the trench is completed, trench breakers required on sloped terrain will be installed at a maximum spacing of 1,000 feet and as specified in Figure 22. They shall be installed upslope of all permanent waterbars, as well as on each side of all stream, waterbody, and wetland crossings regardless of slope. Topsoil shall not be used to construct the trench breakers. Typically, bags consisting of sand, bentonite, and concrete are used for trench breakers. Additionally, state and/or local regulations may specify the type of trench breaker used, such as when adjacent to a water resource.

In instances where the installation of trench breakers is deemed infeasible, and state-specific requirements allow, the requirement for, or spacing of, the trench breakers may be removed with written permission from the NRP Group.

3.9.3. Dewatering Work Areas

Whenever water is pumped from the excavation, it must be treated for sediment removal using a filtering device or structure prior to discharge into a vegetated upland area or storm sewer system. Water impounded in the trench or bore pits shall not be released directly into any waterbody or wetland unless authorized in writing by NRP. Discharge by overland flow is permitted with proper treatment, as described below.

If it is necessary to remove water from the trench or bore pits, a Pumped Water Filter Bag (Figure 23) must be used. Bags shall be located within the LOD or ROW in a flat, well-vegetated (grassy) area and discharge into a stable, erosion-resistant area away from drainage inlets and sensitive environmental areas unless authorized in writing by NRP. At least one spare bag shall be available at the work site.

Wherever well-vegetated areas are not available, multiple options are available to properly install a Pumped Water Filter Bag and associated outflow pathway sediment and erosion control measures. These are specified in Figure 23. The Pumped Water Filter Bag should be designed to trap particles larger than 150 microns. The pump discharge hose shall be inserted into the bags in the manner specified by the manufacturer and securely clamped. When the bag has been filled to half its total capacity, it should be replaced with a new bag and disposed of properly.

Consideration should be given to how the bag will be accessed and removed once it has been half-filled with sediment. A suitable means of accessing the bag with machinery required for disposal purposes shall be provided. Bags shall be placed on straps to facilitate removal unless bags come with lifting straps already attached. Additional requirements are outlined on Figure 23.

For greater dewatering capacity, pumped water could be discharged to a sediment trap (Figure 24) or compost sock sediment trap (Figure 25). Care should be taken to prevent erosion and subsequent sedimentation of streams or wetlands by monitoring and regulating the flow of water into and out of the sediment trap. At no time shall the pumped water overtop the sediment trap.

The filter bag must be monitored to ensure that it is in a suitable location and is working properly for the duration of the dewatering activity.

3.9.4. Blasting

All drilling and blasting will be completed in accordance with the rules and permits issued by the overseeing regulatory agency(s). Areas requiring blasting to adequately cover the pipeline shall be identified to the extent practicable before construction commences. No blasting shall occur until appropriate regulatory permits have been issued; or until the NRP Group has indicated that none are required. All required precautions will be taken

to avoid injury or damage to persons, livestock, environment, or other property.

3.9.5. Temporary Construction Access Over the Trench Line

Where access across the trench line is required, temporary facilities such as wooden mats or steel plates will be constructed or installed to permit safe crossing of livestock, vehicles, equipment, and persons from one side of the trench to the other. Erosion and sediment controls shall be installed to connect to crossings.

3.10. BACKFILLING SPECIFICATIONS

Backfilling will follow pipe installation as closely as practical using the excavated subsoil or imported material suitable for backfill operations in accordance with all related gas standards. Topsoil will not be used to pad the pipe. Excess excavated rock, including blast rock with a dimension not larger than six inches may be returned to the trench, but care should be used to prevent damage to the pipe or coating.

Soil that has been excavated during construction and not used for backfill will be evenly spread over the construction work area or removed from the site and disposed of in accordance with the NiSource spoils management policy. All waste materials such as barrels, cans, drums, stumps, coating and wrap, rubbish, waste, or other refuse will not be placed in the trench but removed from the construction area and disposed of at appropriate facilities in accordance with NiSource policy.

3.11. FINAL GRADING, RESTORATION AND STABILIZATION

Upon completion of construction activities, all disturbed areas will be stabilized with final grading and restoration activities. In cases where final grading and restoration is not immediately feasible, temporary stabilization measures (to prevent erosion and sedimentation until final grading and restoration can be completed) are required.

3.11.1. Final Grading

Final grading shall be completed within 14 calendar days of backfilling, weather and soil conditions permitting or as required by permit. If conditions do not allow for the commencement of final grading, the Inspector will record the conditions and require the installation and maintenance of temporary stabilization measures until favorable conditions for final grading exist. When conditions require a delay, the 14-day time frame will not start until conditions are suitable for grading. In no case shall final grading be delayed beyond the end of the next recommended seeding season.

During final grading, soil over the trench may be mounded to allow for future settling. Where fill in the trench or major depressions have settled below ground level, additional fill will be added as needed and the area brought

to final grade. Segregated and conserved topsoil will be returned to the ROW during final grading.

Excess rock will be removed from at least the top 12 inches of soil to the extent practicable in all rotated and permanent agricultural land, hayfields, pastures, residential areas, and other areas at the landowner's request. The size, density, and distribution of rock on the construction work area should be similar to adjacent areas not disturbed by construction.

Final erosion control devices (compost filter sock, straw bale barrier, waterbars) shall be installed during final grading. Sediment filter devices needed to protect off-construction work area resources shall be installed or rebuilt promptly after final grading. Permanent waterbars will not be installed in agricultural or pastureland without landowner's consent.

3.11.2. Soil Compaction Mitigation

Where deemed necessary by the NRP Group or EI, the top 6-12 inches of soil will be tested for soil compaction at regular intervals to improve conditions for site restoration. Tests should be conducted on the same soil type under similar moisture conditions in undisturbed areas to identify approximate preconstruction conditions. EIs, or other qualified personnel should use a soil penetrometer or other appropriate device to conduct these tests.

Mitigation measures for soil compaction may include discing, tilling, or **scarifying** the compacted areas. The appropriate method should be selected based on the soil type and depth needed to reach for sufficient growth medium.

Severely compacted agricultural areas shall be plowed. In areas where topsoil has been segregated, plow the subsoil before replacing the segregated topsoil. Alternatively, make arrangements with the landowner to plant and plow under a "green manure" cover crop such as alfalfa to decrease soil bulk density and improve soil structure. If subsequent construction and cleanup activities result in further compaction, conduct additional tilling.

Soil compaction testing of subsoil by a geotechnical engineer may also be required in some roadways.

3.11.3. Soil Testing and Amendments

Soil testing shall be completed by the construction/contractor team as required by site-specific erosion control plans and as practical on all other projects to determine the amount and types of soil amendments necessary for providing optimal growing conditions.

Composite soil samples should be collected over the length of the easement at intervals no greater than 1,000 linear feet. Each composite sample should be a mixture of approximately 15 samples taken over the

1,000 linear foot area from depths of zero to six inches. Should soil characteristics change over the 1,000-foot sample area, the sample area should be reduced to include only the soils with similar characteristics. For example, the mineral composition (color, texture) may change, or the landscape may change from a wooded area to a farm field or lawn area. Composite samples should be well mixed and approximately two cups reserved for submittal in a laboratory approved container. Soil tests should be taken from after final grading, if possible.

Lime and fertilizer as recommended per the soil sample results should be placed simultaneously with the soil discing to ensure that it is properly incorporated into the top 4-6 inches of soil. If tests are not available, fertilizer and lime shall be applied per the general rates in Table 2.

3.11.4. Temporary Stabilization

In areas where final grading has been completed, or earth disturbance activity has temporarily ceased, stabilization activities shall be completed as soon as possible, and in accordance with any state or local timing requirements; at least within seven days (four days if working in PA) of when work activities ceased on any specific portion of the project.

If final grade can be established, but conditions are not ideal for permanent seeding or during non-germinating months, temporary stabilization measures shall be installed. Areas that will be subject to earthmoving within 12 months may be stabilized with temporary seed mixtures.

Temporary stabilization measures may consist of mulch, rolled erosion control products, gravel for road shoulders, soil binders, chemical stabilizers, or temporary seeding (predominantly annual grasses) covered by mulch. Concurrent application of final seed mix and mulch may also be considered (refer to Tables, or site-specific plan). The seeding and mulching rates for temporary stabilization are provided in Table 2

These measures shall be implemented on a ground surface prepared by surface roughening, grooving, or tracking of slopes per industry standards. Temporary erosion control BMPs must remain in place and be maintained in working order until permanent stabilization is achieved.

Consideration will be given to the following when determining if temporary stabilization measures are to be implemented prior to placement of permanent restoration measures:

a. The length of time work within a portion of the construction area will be temporarily or permanently ceased;

b. Anticipated weather, soil conditions, and seasonal conditions; and

c. Resources on and off the construction work area to be protected.

If temporary stabilization measures are utilized, final grading and/or restoration must commence as soon as weather and soil conditions permit.

3.11.5. Restoration

As soon as disturbed areas reach final grade, they must be stabilized in accordance with the project restoration plan. If no project specific plan is present, the restoration activities shall occur in accordance with the minimum requirements described in this section. All disturbed areas that have not otherwise been stabilized with a non-erosive surface in accordance with the ECP shall be stabilized with vegetation.

As disturbed areas within a project approach final grade, preparations should be made for seeding and mulching to begin (i.e., anticipate the completion date, order materials, and schedule crews). In no case should an area exceeding 15,000 square feet, which is to be stabilized by vegetation, reach final grade without being seeded and mulched unless approved in writing by NRP. In the absence of project specific erosion control or restoration plans, the recommended seed mixtures, and typical application rates for a variety of locations and land types are listed in the Tables.

Before the seeding begins, topsoil shall be applied/prepped as required and soil amendments (per plans or as directed in Table 2) worked into the soil to a depth of 4 to 6 inches through discing or scarifying. The ground surface shall then be prepared by surface roughening, grooving, or tracking slopes. All seeded areas shall be mulched or blanketed to minimize the potential for failure to establish an adequate vegetative cover.

An erosion control blanket (Figure 26) or equivalent approved by the Inspector may be used on **steep slopes** or areas of concentrated flow to help stabilize the construction work area.

Disturbed areas will be considered stabilized when perennial vegetation that has uniform, 70% coverage (95% in MD), is mature enough to survive, and will inhibit erosion is present.

If **sod** is to be used, install as outlined below.

a. Site Preparation

    1. Install water control (subsurface irrigation) measures as applicable.

    2. Loosen soil surface to a depth of one inch with a shallow tillage tool and dampen soil before laying sod.

b. Selection

    1. Select sod grown from seed of adapted varieties and under cultural practices conducive to high quality sod that will be

free of any serious thatch, weeds, insects, diseases, and other pest problems.

2. Select species and varieties best suited for the sites to be planted and the purpose for which the turf will be used. The type of sod should be composed of plants adapted to the site conditions (dry or wet, full sun or shade, gentle slopes or steep, etc.).

3. Select sod at least one year old, but less than three years. Cultivated turfgrass is usually considered ready for harvest when a cut portion of sod three feet in length and approximately half a foot in width will support its own weight. The most common age of sod when cut is 15 to 24 months.

4. Select sod cuts of width and length suited to the equipment and job. Generally, sod cuts are 12 to 24 inches in width with 12 inches being the most common width. The length of cut varies from four to eight feet. Sod may be cut and rolled or folded in the middle and stacked on pallets. Folded sod is cut shorter than rolled sod, about three to four feet in length. Sod should be cut with a half to one inch layer of soil attached. The thinner the sod is cut (one-half to three-fourths of an inch), the more quickly it will knit to the site soil. About 80% of all rhizomes are in the top three-fourths of an inch of soil.

5. Deliver sod to the site as soon as practical after lifting. During hot weather, delivery should be made within six hours. For best results, sod should not be moved during cold seasons or during July and August. If moved during those periods, sod may need to be cut a quarter inch thick and will require extensive care.

c. Laying Sod

1. Lay strips of sod at right angles to direction of slope or flow of water starting at the lowest elevation. Wedge the edges and ends of the sod strips together and tamp or roll. Stagger joints and make the top of the sod strips flush with the surface of the undisturbed ground.

2. Use wire staples, fine mesh wire or wood pins and binder twine on very steep slopes to hold sod in place until secured in plant growth.

3. After the first growing season, the sod should be inspected to determine if additional fertilization or liming is needed.

Vegetation growth shall be monitored after completion of construction to ensure perennial growth has taken place as required. If sufficient growth has not occurred, contact the NRP Group for remedial action.

3.12. NOISE IMPACT MITIGATION

Construction equipment will be properly muffled and maintained to avoid producing excessive noise near developed or **noise sensitive areas**. Construction hours will be consistent with local or county ordinances, except for emergency construction situations.

3.13. DUST CONTROL

Dust control shall be implemented on construction areas where dust from disturbed soil and/or construction practices create an environmental, health, or visibility hazard. At a minimum, all local or state laws regarding dust control must be followed.

In order to minimize dust on a worksite:

a. Haul roads and stockpiles shall be located away from existing residential housing, businesses, and public areas where practical. Use of haul roads shall be limited to the extent practical and construction equipment should maintain low speeds of 15 miles per hour or less.

b. Trucks leaving a project site shall be covered, especially where conditions may result in blowing of haul material.

c. Areas of disturbed, vegetated soil that are exposed to traffic and wind shall be minimized.

d. Prior to construction activities, work practices shall be evaluated to determine if excess dust could impact adjacent areas.

Standard practices to mitigate dust from construction activities include:

a. Irrigation;

b. Temporary soil stabilization; and

c. Physical barriers such as solid fencing and plastic enclosures.

Other measures such as commercially available dust suppressants may be allowed with prior approval from the NRP Group.

3.14. HYDROSTATIC AND AIR TESTING

Facility integrity can be verified using hydrostatic or nitrogen testing. The withdrawal and/or discharge of hydrostatic test water requires permit approval which must be obtained prior to such activities and may not be completed without written approval from the NRP Group.

The discharge of the hydrostatic test water will be performed in a manner that minimizes erosion. The energy of the released test water will be dissipated, and particulates allowed to settle out by discharging the water:

a. Into a tank(s), or

b. Into a well-vegetated area through a dewatering structure for hydrostatic testing (Figure 27) to filter out various particulate matter prior to soil infiltration.

The water discharge event must be monitored to ensure that the full volume of water is contained, and that erosion and sedimentation are properly controlled.

Water must not be discharged into state designated **exceptional value waters**, waterbodies which provide habitat for federally listed threatened or endangered species, or streams utilized as public water supplies unless an authorized federal, state, or local agency permit has been issued.

This guidance is for hydrostatic testing of new pipe only. Permitting requirements associated with hydrostatic testing of used pipe can be extensive. Contact the NRP Group prior to testing any used pipe.

4. STREAM AND WETLAND CROSSINGS

4.1. GENERAL

In-stream work, stream and wetland crossings, and earth disturbance within 50 feet of a stream or wetland require permit authorization. Contact the NRP Group prior to any work within or adjacent to a waterbody.

The main objective of any waterbody crossing is to construct the pipeline with the least amount of disturbance possible and in a manner which minimizes erosion and subsequent sedimentation into the waterbody. Crossings will be constructed as close as possible to perpendicular with the wetland or waterbody channel. Adequate downstream flow rates will be maintained at all times to protect aquatic life and prevent the interruption of existing downstream uses.

If the facility parallels a waterbody, attempt to maintain at least 10 feet of undisturbed vegetation between the top of bank of the waterbody and the ROW except at the crossing location. Where waterbodies are adjacent to the construction ROW, install sediment barriers along the edge of the construction ROW as necessary to contain spoil and sediment within the ROW (Figures 28 and 29).

Each waterbody crossing will be treated as a separate and distinct construction subproject, such that construction work area set up, trenching, pipe installation, backfilling, and restoration are worked continuously and completed in the minimum number of consecutive calendar days possible. Some permits require continuous work to completion once in-stream activities have commenced. Exceptions may be authorized in writing by NRP based on project-specific scenarios.

Construct stream and wetland crossings during the time windows designated by the appropriate permitting agency. If there are no time of year restrictions, conduct stream crossings during low flow periods, normally July through September and when no heavy rainfall is forecasted. 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.

Horizontal Directional Drilling (HDD) can be done any time throughout the year unless specifically restricted by a state agency; however, these activities may also require permit authorization. Contact the NRP Group prior to any work within 50 feet of a waterbody. Prior to starting HDD activities, preparedness for the HDD shall be confirmed using the NiSource HDD Pre-Job checklist.

Additional work areas that support HDD operations will be located at least 50 feet away from the waterbody's edge (except in agricultural fields and previously disturbed sites) where topographic conditions permit and will be limited to the size needed to construct the crossing. If topographic conditions do not permit a 50-foot setback, these areas must be located at least 10 feet from the top of the waterbody bank. Pipe assembly for the waterbody crossing is usually performed in the extra work areas prior to or concurrently with trenching.

Aboveground facilities will not be located in any wetland except where the location of such facilities outside of wetlands would prohibit compliance with U.S. Department of Transportation (USDOT) regulations, or unless applicable permits are obtained by the NRP Group prior to construction.

Hazardous or potential polluting material storage areas should be located at least 100 feet back from the top of stream bank. Guidance relating to spill prevention at waterbodies is contained in Section 6, "Spill Prevention, Control and Countermeasures".

4.2. VEGETATION CLEARING OF STREAM AND WETLAND CROSSINGS

Vegetation clearing activities limited to felling trees and the cutting of brush may occur outside of the distinct stream or wetland crossing construction window. Vegetation clearing within wetlands and floodplain areas of streams require permits and authorization from NRP and are typically limited to that which is necessary for construction and pipeline integrity management. If mechanized equipment must enter a wetland to complete clearing activities, all permit requirements must be followed during this activity.

Cut vegetation off at ground level, leaving existing root systems in place. No additional instream work or work on stream banks that may disturb the soil surface (i.e., root ball removal, rutting, grubbing) may occur until immediately prior to the actual resource crossing when the work area has been prepared per permit requirements.

All cleared woody materials will be disposed outside the limits of the floodplain. If no Federal Emergency Management Agency (**FEMA**) floodplain maps are

available for a specific area, assume a 50-foot setback from the wetland or waterbody top of bank.

4.3. STREAM CROSSINGS

4.3.1. Installation of Vehicular Crossings

In situations where construction access is required across a stream or waterbody prior to the distinct stream crossing activity, temporary vehicular crossings, as illustrated in Figures 30, 31, and 32, will be installed at all stream crossings prior to vehicular access. Vehicular crossing installations require permit authorization from federal, state and/or local authorities. Accordingly, no stream or waterbody crossing shall occur until such permit has been issued or the NRP Group has indicated that a permit is not required.

Care must be taken to avoid deforming or crushing banks and exposing them to accelerated erosion. Waterbody banks will be graded only where, and as much as necessary to, permit safe and efficient operation of construction equipment and installation of the vehicular crossing. Construction equipment will not enter the water to grade the banks.

Prior to, or immediately after grading activities and/or crossing installation activities begin, sediment filter devices must be installed as close to the water edge as practical. All disturbed areas within 50 feet of the water's edge will be promptly protected from erosion as shown on project plans or via methods approved by the state/federal regulatory agency (i.e., straw mulch, erosion control blanket, etc.). The mulch or blanket will be maintained until the waterbody crossing restoration is complete. Spoil from grading will be piled at least 10 feet from the water's edge and immediately protected with sediment filter devices to minimize erosion into the waterbody.

On waterbody crossings with approaches sloped five percent or greater, waterbars (Figure 21) will be installed to divert surface runoff into adjacent vegetation. If vegetation is sparse or nonexistent, a sediment filter device will be installed at the discharge of the waterbar.

If an equipment bridge is used it must be constructed in accordance with the approved permits for the site and this ECS (Figures 30, 31, and 32).

4.3.2. Stream Crossing Techniques

Stream crossings shall not be constructed without a site-specific crossing plan developed by the NRP Group in accordance with federal, state, and local regulations. Open trench crossings shall utilize dry-ditch methodology including Flumed Stream Crossing or Stream Crossing with Pump Bypass (Figures 33, 34, and 35) as outlined below. The suitability and feasibility of a particular methodology must be considered as part of the activity planning process. Changes to a planned crossing methodology require approval from the NRP Group prior to commencement of activities.

Minor waterbody crossings including swales, ditches, channels, and waterways 10 feet or less in bottom width shall be flumed or pumped past the open trench at the time the crossing is made. All such bypasses shall be completed and stabilized prior to diverting flow. If there is an existing base flow or runoff at the time of the trenching, the flume shall be installed prior to trench excavation. The flume must be of sufficient size to convey normal stream flow over the open trench. Sandbags, or an equivalent measure, should be used to direct flow into the flume.

If no base flow or runoff exists, and the utility crossing will be completed (from initial disturbance to final stabilization) within one day, no flume is required.

A minor waterbody crossing shall be completed within 24 hours (from start to finish) including the trench backfilling, stabilization of stream banks, and stabilization of the areas 50 feet back from the top of each stream bank. If it is anticipated that this requirement will not be met, the NRP Group should be contacted prior to the crossing for approval and mitigation measures may be required.

For **intermediate waterbodies** and streams between 10 and 100 feet in bottom width, directional boring is considered as a preferred alternative for pipeline installation, unless otherwise directed due to local requirements. HDD activities shall be performed as presented in Figure 36, with the layout modified to suit the specific site conditions in a manner that minimizes disturbance.

If open trench methodology is required for intermediate waterbody crossings, pump bypass methodology as outlined in Figure 35 may be used. Other dry-ditch methodologies may be used with prior approval from the NRP Group. For intermediate streams or waterbodies where the above-referenced dry ditch methodologies will be adequate, the crossing, backfilling, and stabilization shall be completed within 48 hours or with prior approval from the NRP Group.

Major waterbodies are classified as a watercourse greater than 100 feet in width. Major waterbody crossings shall not be constructed without a site-specific crossing plan developed by the NRP Group in accordance with federal, state and county regulations.

Facilities for removing sediment from pumped water should be available at the utility line stream crossing site before trenching commences and maintained until trench backfilling is completed. Methods may be used as discussed in the Dewatering section. Assembly areas, temporary equipment areas, and nonhazardous material storage areas should be located at least 50 feet back from the top of stream bank. All excess excavated material shall be immediately removed from the stream crossing.

4.3.3. Trenching in Streams

Prior to trenching within the waterbody, weather conditions should be checked to ensure all work can be completed prior to any expected heavy rain events. When water levels are temporarily high, the EI will direct that the commencement of any waterbody crossing construction activities be postponed until water levels subside. Prior to starting waterbody construction activities, preparedness for the crossing shall be confirmed using the NiSource Open Cut Stream Crossing Pre-Job Checklist.

Sediment filter devices for trench spoil will be installed prior to commencing trenching activities. Sediment filter devices across the trench line can be temporarily removed to allow trenching activities to proceed. Back-up pumps, hoses, secondary containment materials, and additional erosion and sediment control materials shall be kept on-hand at the crossing and ready to be used if needed.

Facilities for removing sediment from pumped water should be available at the utility line stream crossing site before trenching commences and maintained until trench backfilling is completed. Methods may be used as discussed in the Dewatering section. Assembly areas, temporary equipment areas, and nonhazardous material storage areas should be located at least 50 feet back from the top of stream bank. All excess excavated material shall be immediately removed from the stream crossing.

Any in-channel excavations should be done from the top of banks wherever possible unless this would require the removal of mature trees to access the channel. However, in-stream activities may be acceptable as conditions require with agency approval.

All spoil from minor and intermediate waterbody crossings shall be placed in the ROW at least 10 feet from the water's edge or in additional extra work areas. All excavated channel materials that will be subsequently used as backfill should be placed in a temporary stockpile located outside the channel. A sediment barrier or other E&S control device should be installed between the storage pile and the stream channel.

For all new construction activities, the minimum depth of pipeline cover for all waterbody crossings is 36 inches, or as required by applicable regulatory agencies and permits. Trench breakers (Figure 22) shall be installed within the trench on both sides of the water body.

4.3.4. Blasting In Streams

All drilling and blasting will be done in accordance with the rules and permits issued by the overseeing regulatory agency. Areas requiring blasting to adequately cover the pipeline shall be identified to the extent practicable before construction commences. No blasting shall occur in streams or waterbodies until appropriate regulatory permits have been issued; or until the NRP Group has indicated that none are required. All

required precautions will be taken to avoid injury or damage to persons, livestock, environment, or other property.

Upon issuance of a permit, if the waterbody bottom is consolidated rock, it can be drilled and shot at any time prior to commencing the crossing. However, removal of shot rock and any additional drilling, shooting and material removal must be completed within the minimum number of consecutive calendar days practical. The time frame for completing the crossing will immediately commence once a trench of appropriate dimensions is established.

4.3.5. Backfilling Stream Crossings

If dewatering the trench is required before backfilling, pump the water into a properly installed pumped water filter bag or a sediment trap (Figures 23 and 24) or a series of compost filter socks (Figure 11). Dewater the trench in a manner that does not cause erosion and does not result in silt laden water entering the waterbody.

Waterbody bottoms will be returned as near as practical to their original contours and native substrate composition. Spoil from the trench will be used as backfill. Blasted rock shall not be used for pipeline bedding or padding; rather, suitable material should be used to ensure the safety of the pipeline.

All disturbed areas within the existing channel should be completed and stabilized before flow is redirected into it. Erosion controls at the top of bank, or within the bed as needed, will be reinstalled to prevent remaining disturbed areas from impacting the stream.

Upon completion, all channel banks must immediately be restored and stabilized to pre-construction configurations and sediment filter devices replaced across the ROW.

4.1.6 Restoration of Stream Crossings

Upon completion of the stream crossing, the waterbody, its banks, and 50-foot buffers shall be stabilized immediately. In the absence of site-specific seeding recommendations, the specifications listed in Table 3 will be used. If conditions do not permit the preferred method, the construction work area not in use for access will be promptly rough graded and the waterbody banks will be temporarily stabilized with an erosion control blanket (Figure 26) until permanent stabilization can be completed.

For each waterbody crossed install a permanent waterbar (Figure 21) and a trench breaker (Figure 22) at the base of slopes near the waterbody. Locate the trench breaker immediately upslope of the waterbar.

All temporary equipment crossings will be removed once access in the area is no longer required.

Replacement of waterbody banks will be at the approximate original contour. If the waterbody banks are such that an unstable final soil grade would result and vegetative stabilization is inadequate, the EI will require mechanical stabilization of the waterbody banks. Mechanical stabilization includes riprap, gabions, or erosion control fabric. These stabilization methods must be pre-approved by federal, state or county agencies prior to installation. Consult with the NRP Group prior to construction.

Sediment filter devices shall be removed once permanent revegetation is successful.

4.4. WETLAND CROSSINGS

4.4.1. Installation of Vehicular Crossings

Vehicular crossing installations require permit authorization from federal, state, and/or local authorities. Accordingly, no wetland crossing shall occur until such permit has been issued or the NRP Group has indicated that a permit is not required. Crossing wetlands with construction equipment should be avoided wherever possible.

Construction equipment shall use access roads located in upland areas to the maximum extent practicable. 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 work area for access.

In situations where construction access is required across a wetland prior to the distinct wetland crossing activity, a stable vehicular crossing, as illustrated in Figure 37, will be installed prior to vehicular access. The location of the crossing and its orientation must be selected to have the least possible impact upon the wetland. Temporary crossings shall be constructed from materials that can be placed with a minimum disturbance to the soil surface and completely removed when no longer needed, such as equipment pads as shown on Figure 16 or Figure 32.

In situations where flowing water is present within the wetland crossing area, a clean water bypass (Figure 34) must be constructed in conjunction with the stable wetland crossing to keep the vehicular crossing free from standing water.

To accommodate a vehicular crossing, wetlands and adjacent upland banks will be graded only where, and as much as necessary to, permit safe and efficient operation of construction equipment and installation of the vehicular crossing. Prior to, or immediately after grading activities and/or crossing installation activities begin, sediment filter devices must be installed as close to the wetland's edge as practical and must connect to the wetland crossing installation.

All disturbed areas within 50 feet of the wetland will be promptly protected from erosion via methods approved by the state/federal regulatory agency (i.e., straw mulch, erosion control blanket, etc.). The mulch or blanket will

be maintained until the wetland crossing restoration is complete. Spoil from grading will be piled at least 10 feet from the wetland's edge and immediately protected with sediment filter devices to minimize erosion into the waterbody.

On wetland crossings with approaches sloped five percent or greater, waterbars (Figure 21) will be installed to divert surface runoff into adjacent vegetation. If vegetation is sparse or nonexistent, a sediment filter device will be installed at the discharge of the waterbar.

4.4.2. Wetland Crossing Techniques

Wetland crossings with standing water or saturated soils will be constructed as separate and distinct construction subprojects, as presented in Figures 28 and 29. Trenching, pipe installation, backfilling, and restoration will be completed in the minimum number of consecutive calendar days necessary. Limit construction equipment operating in wetland areas to that needed to clear the construction work area, dig the trench, fabricate, and install the pipeline, backfill the trench, and restore the ROW.

Pipeline installation by HDD is the preferred method for wetland areas, where local requirements allow, and shall be performed as presented in Figure 36.

Movement of vehicles across the wetland during construction activities shall utilize a stable wetland crossing as shown in Figure 37. Tree stumps, rock, brush, or soil imported from outside the wetland will not be used to stabilize the construction work area or used as equipment pads in wetlands.

4.4.3. Grading Within Wetlands

Grading in wetlands will consist of that necessary only for safe and efficient equipment operation. Limit pulling of tree stumps and grading activities to directly over the trench line. Do not grade or remove stumps or root systems from the rest of the construction work area in wetlands unless it is deemed necessary for safe construction and approved by the EI.

Where wetlands are adjacent to the construction work area, install sediment barriers along the edge of the construction work area as necessary to prevent sediment flow into the wetland. These sediment filter devices shall be installed prior to grading or excavation activities and maintained until construction work area revegetation is complete.

4.4.4. Trenching Within Wetlands

Sediment filter devices can be temporarily removed from the trench line to allow trenching activities to proceed. Equipment completing trenching and pipe installation activities must operate from the stable wetland crossing as discussed in the previous sections.

Excavated topsoil (with the vegetative root mass) should be carefully removed and stockpiled separately from the subsoil (unless there is standing water or the soil is too saturated to segregate). Spoil piles shall be placed outside of the wetland limits where possible and measures should be taken to minimize the mixing of distinct soil groups by placing soil on plastic, geotextile, straw layer, or timber mats, as appropriate. Spoil piles will be protected with sediment filter devices to prevent the flow of spoil off the construction work area.

4.4.5. Blasting Within Wetlands

Blasting in wetlands is not encouraged. If it is determined blasting is required, a site-specific blasting plan must be prepared by the NRP group prior to initiation of these activities. Additional time frames may be required for permitting activities.

4.4.6. Backfilling Wetland Crossings

If trench dewatering is required prior to backfilling, the water will be discharged through a pumped water filter bag (Figure 23), into a sediment trap (Figure 24) or into a compost sock sediment trap (Figure 25) that drains to a heavily vegetated area outside the wetland to prevent silt-laden water from entering the wetland. Spoil from the trench will be used as backfill. The surface will be restored as closely as practical to the original contours so that drainage patterns will not be changed. In wetlands without standing water or saturated soils, the conserved topsoil layer will be returned to the surface after backfilling. Sediment filter devices will be promptly installed after backfilling per the plans or at the direction of the EI.

Trench breakers should be installed to prevent the trench from draining the wetland or changing its hydrology. For each wetland crossed, install a waterbar and trench breakers at the base of slopes near the boundary between the wetland and adjacent upland areas. Locate the trench breakers immediately upslope of the waterbars.

4.4.7. Restoration of Wetlands

Upon completion of construction in wetland areas with standing water or saturated soils, all access improvements will be promptly removed and restoration activities shall be completed as outlined in the permits and plans.

In the absence of specific recommendations from conservation authorities, annual ryegrass at the rate of 40 lb. /acre should be applied to areas without standing water to allow reestablishment of the native seedbed. Fertilizer, lime, mulch, or erosion mat/blanket shall not be used unless authorization to do so is specifically stated in the permit documents or ECP. In cases where permits require mulch stabilization, weed-free straw mulch shall be used at the rate of 3 tons per acre and without binding agents.

5. HORIZONTAL DIRECTIONAL DRILLING (HDD)

5.1. GENERAL

Horizontal Directional Drilling (HDD) is an alternative to conventional trenched methods and can reduce project impacts if it is done correctly. For the purposes of this document, the terms HDD and HDD activities refers to any part of the drill process from start to finish including the pilot hole, reaming, back-reaming, and pipe pullback.

HDD of streams and wetlands require permit authorization from federal, state and/or county authorities, complete with water management and inadvertent release of drilling fluid contingency mitigation plans. Accordingly, none shall occur until such permit has been issued or the NRP Group has indicated that no permits are required.

Unless specifically permitted to do so, the directional boring equipment shall be set up on an upland site. Perimeter controls shall be installed between the bore entrance and exit pits and the stream or wetland to prevent any bore mud from draining into the waterbody. In areas adjacent to high quality waterbodies, or as required by a permitting agency, bore equipment shall be staged at the EI's discretion using additional measures to prevent release of drilling mud or other pollutants into the water body. See Figure 36 for a typical directional bore layout illustration.

5.2. PREPARATION FOR HDD ACTIVITIES

Prior to the start of HDD activities, proper planning shall be completed to prepare for an immediate and efficient response should an **Inadvertent Release of Drilling Fluid (IR)** occur. Prior to the start of HDD activities, planning discussions must occur to review the site and identify areas that may be impacted in the event an IR occurs, such as storm drain inlets, swales, culverts, or other adjacent, on-site, and offsite waterbody or wetland features. Sufficient equipment and materials necessary for IR response must be available on the project site and staged for immediate access along the drill path throughout HDD activities to ensure proper containment and a prompt, efficient clean up.

5.3. DRILLING FLUID ADDITIVES

Any proposed drilling fluid additives must meet the requirements of the NSF/ANSI 60 Drinking Water Treatment Chemicals list.

Additionally, prior to the use of any drilling fluid additives for work in the vicinity of streams, wetlands, or sensitive environmental areas, the additive must be approved by the Environmental Group. Additives determined likely to have a negative impact if released to the environment, either by a regulatory agency in a particular state or region, or by the NiSource Environmental Group, will be restricted from use under wetlands, waterbodies, or other sensitive areas.

Variances from these requirements must be approved in writing by the NRP Group.

5.4. HDD INADVERTENT RETURN AVOIDANCE AND CONTINGENCY PLAN

5.4.1. Drilling Fluid Monitoring Protocol

Drilling crews and construction inspection personnel shall be responsible for monitoring and detection of any inadvertent releases along the path of the HDD and under all streams, wetlands, or other waterbodies. The most obvious signs of a release are the visible pooling of drilling mud on the surface, a sudden decrease in mud volume returns at the entry site, or loss in drilling mud pump pressure. Drilling and inspection personnel shall monitor the path of the HDD, along with the actual drilling fluid volumes from the pumps and return flow from the borehole.

The HDD rig operator shall record the pertinent drilling conditions and continuously observe and monitor the HDD alignment for evidence of an inadvertent release. The following precautionary measures shall be implemented to avoid the potential for an IR, in the appropriate combinations, if annular pressures are abnormally high or fluid loss is apparent and it is suspected that a release may have occurred:

1. If wetlands or sensitive resources are at risk of being impacted, Contractor's on-site personnel will immediately notify EI or other Company representative of any significant loss of drilling fluid returns at the rig or entry pit during pilot phase. Drill crews are to stop work and communicate with NRP and Engineering to find a solution to minimize the risk of a potential IR and maintain return flow;
2. Dispatch experienced contractor personnel to monitor the area of the drill path;
3. Decrease pump pressure;
4. Decrease penetration rate;
5. Temporarily cease drilling operations and shut down the pump;
6. Restart pump and swab the hole to assist in sealing the release;
7. Consider modifying the drilling fluid with a change in viscosity and/or acceptable circulation additive;
8. HDD rig operator will take a sample of the drilling fluid and hold for future analysis;
9. HDD operator will take steps to restore drilling fluid circulation in accordance with the HDD Plan; and
10. If drilling fluid circulation is not regained, drilling may continue while inspection personnel continue to monitor for any inadvertent releases.

5.4.2. Corrective Action for an Inadvertent Release

Once surface seepage of drilling fluid is detected, the drilling crew shall take immediate corrective action. The only pressure causing the seepage to occur is the pressure from the drilling pumps. Therefore, the most immediate corrective action is to decrease the pump pressure. As soon as surface seepage is detected, the pumps should only be stopped temporarily until the response process has been initiated. Once the

containment and clean-up process has begun, the drilling activities may, with Environmental Group approval, immediately resume.

In the event of an inadvertent release to the surface, the following actions shall be taken.

1. **In general, the contractor shall:**
   i. Immediately implement appropriate containment measures and contain any drilling fluid that has surfaced;
   ii. Reduce or stop circulation pressure and evaluate the circumstances leading to the release; and
   iii. If wetlands or sensitive resources are at risk of being impacted, promptly notify Environmental Group representative and Project Manager.
   iv. The HDD contractor will be required to have the necessary containment and clean-up equipment on-site, at the boring location and readily available for use. At a minimum, a combination of some, or all of, the following material and equipment should be on site and in ample supply depending on the extent of any sensitive areas:
      - Compost filter socks (Required)
      - Sand bags (Required)
      - Vacuum truck and hoses (Required)
      - Shovels (Required)
      - Push brooms (Required)
      - Spill sorbent pads and booms
      - Straw bales (certified weed-free)
      - Wood stakes
      - Silt fence
      - Plastic sheeting
      - Corrugated plastic pipe
      - Centrifugal, trash and sump pumps
      - Rubber tired or wide track back hoe
      - Bobcat (if needed)
      - Storage tanks (if needed)
      - Floating turbidity curtain (may be considered for use on large streams)
      - Timber (enough to cross 50% of the wetland length need to be readily available)

2. **Inadvertent Release in Stream, Wetland or Waterbody – Accessible Location**
   If an inadvertent release occurs in an accessible waterbody or wetland location the contractor shall:
   i. Temporarily suspend the HDD operations and follow the requirements of task 1 above. (Do not resume until NiSource's NRP project Representative reviews and approves that the inadvertent release contingency plan has been implemented accordingly);
   ii. Immediately notify the NRP Representative for the project;

iii. With the assistance of the on-site EI or NRP Representative, evaluate the amount of release to determine if containment structures are warranted and if they will effectively contain the release;

iv. Under the guidance of the on-site EI or NRP Representative, promptly implement appropriate containment measures to contain and recover the release.

v. Allow the NRP Representative or EI to appropriately quantify the return, document its location, photograph the return, and assess the potential impact to the resource(s);

vi. Efforts to contain and recover may result in further disturbance by equipment and personnel and possibly offset the benefit gained in the removal of the release.
If the amount of release is too small to allow the practical collection from the affected area, at the discretion of the NRP Group, the release may be diluted with fresh water or allowed to dry and dissipate naturally.

vii. Remove the release with a vacuum truck or by pumping to a location where a vacuum truck is accessible.

viii. In certain situations, a release point can serve as a relief hole where the release is isolated to a specific area and contained. Relief holes are typically used to relieve excess pressure down hole to further reduce the risks of additional inadvertent release. This may include installing pressure relief wells to minimize the impacts of an uncontrolled release. NRP must approve any proposed relief holes and/ or relief wells in streams or wetlands. NRP approval of the location and all conditions necessary to construct relief holes will ensure the proper management of drilling fluids is maintained and environmental impacts are minimized, ensuring that any drill fluid entering these locations will be removed immediately and not allowed to accumulate.

ix. If the Inadvertent Release Contingency Plan is being deployed accordingly with actions being taken to properly contain and remove the initial release as well as additional releases at this location once the bore continues, the HDD process can resume only with written NRP approval.

x. NiSource's NRP Representative will notify the appropriate regulating agencies.

xi. In the event of any of the following conditions, the HDD process cannot resume without approval from the USACE, state agency, and if applicable, the land management agency where the release is taking place:
- The release cannot be immediately contained,
- Is within high quality aquatic resources or stream,
- Impacts government managed lands.

xii. After the HDD is complete, perform clean up per the "clean up" section of this document (5.4.4).

3. Inadvertent Release in Stream, Wetland or Waterbody – Inaccessible Location

If an inadvertent release occurs in an inaccessible waterbody (such as a large stream or river) or wetland location the contractor shall:

i. STOP work.
ii. Immediately notify the NRP Representative and wait for guidance from the Environmental Group before proceeding with bore activities.
iii. The NRP Representative will attempt to obtain direction from the appropriate regulating agencies to proceed under a specified plan.
iv. Once further guidance from NRP has been received, proceed as directed.

5.4.3. Containment of Drilling Fluid Release

Immediately following detection of an IR, the containment and clean-up operations shall take place. For releases on land, the contractor shall use straw bales, silt fence or compost filter sock, sand bags, and earth berms to prevent fluid from migrating or flowing from the immediate area. If the volume released is too small for containment measures or, if the release occurs in an environmentally sensitive area where the release containments may cause additional damage, the method of removal will be determined by the NRP Representative.

If there is a threat to a sensitive resource or to public safety, HDD drilling activities shall cease immediately until a plan to proceed is agreed upon.

In cases where the IR is within open water or flooded wetlands, it may be impractical or impossible to contain and remove the release. The contractor should attempt to remove the surface release using a wand (i.e., a perforated plastic pipe attached to a suction hose). Methods and measures taken in these instances shall be at the direction of the NRP Representative.

5.4.4. Clean Up of Drilling Fluid Release

Cleanup shall commence after the release is contained. Cleanup shall include removal of all visible drilling fluids located in the accessible area. Removal methods will vary based on the volume of the release and site conditions. Removal may include vacuum trucks, loader and track hoe buckets, small pumps, shovels, and buckets. If the release occurs in a sensitive area, the method of removal will be determined by the Company representative. Mechanized equipment shall not enter any sensitive area without the NRP Representative first receiving prior approval from a permitting agency, with the exception of an event that poses a threat to public health or safety.

Potential for secondary impacts from the cleanup activities shall be evaluated and weighed against the proposed cleanup activities. The following cleanup measures are considered appropriate:

i. Releases will be cleaned up by hand using shovels, buckets, and soft bristled brooms to minimize damage to existing vegetation.
ii. Fresh water washes may be employed if deemed beneficial and feasible by NRP Representative.
iii. Containment structures will be pumped out and the ground surface scraped to minimize loss of topsoil or damage to adjacent vegetation.
iv. Small collection pumps may be necessary to remove released fluids.
v. Vacuum trucks may be used to collect and remove drilling fluids as needed.
vi. Recovered materials will be collected in appropriately labeled containers for temporary storage prior to removal from site.
vii. Recovered drilling fluid will be recycled or disposed of at an approved upland location or disposal facility. No recovered drilling fluid will be disposed of in streams, aquatic resources, or storm drains.
viii. All containment structures will be removed.

6. POLLUTION PREVENTION PLAN

6.1. GENERAL

Although the control and management of sediment is a primary pollutant of concern related to construction activity, there are additional potential discharges of pollutants into stormwater that must be controlled and managed as well. Potential pollutant sources include fuel, oil, construction chemicals, solvents, saw cut slurry, and concrete washout.

While sediment control BMPs (such as Compost Filter Sock and Silt Fence) will prevent some pollutants from leaving (discharging from) a construction site, potential pollutants carried in solution or as surface films on stormwater runoff will pass through most erosion and sediment control practices. Once conveyed/discharged off-site, these types of pollutants are difficult to control, mitigate, and remediate.

Accordingly, construction crews must implement construction site pollution prevention controls to prevent the discharge of pollutants into stormwater runoff resulting from spilled or leaked materials and to manage the disposal of construction products and waste. The items listed in the following section are likely to occur and shall be followed on all NiSource projects.

6.2. POLLUTANT RISK ASSOCIATED WITH GAS DISTRIBUTION CONSTRUCTION ACTIVITIES

There are a wide range of pollutant discharge risks associated with general construction activities. These include, but are not limited to, storage, handling or disposing of the following:

a. General Housekeeping. Proper housekeeping and management of construction materials, equipment, and supplies is critical to ensure non-sediment pollutant discharges do not occur. Through proper management of residual solid waste in covered dumpsters, timely cleaning of portable toilets, and maintenance of equipment the potential of pollutants entering stormwater can be minimized. Contractors are responsible for proper cleaning and management of their work areas to not only control sediment discharges but those non-sediment pollutant discharges as well.

b. Materials Storage. Necessary BMPs shall be implemented in equipment lay down yards or materials storage areas to minimize the exposure of construction materials, products, wastes, etc. to precipitation and stormwater. BMPs may consist of storing materials which may contribute to non-sediment pollutant discharges under cover or within construction trailers. Proper perimeter sediment controls shall be in place in storage areas to minimize off-site sediment discharges.

c. Digging and Excavating. When digging and excavating, underground storage tanks (USTs) or historic contamination (i.e., unresolved spills, illegal waste dumps, or landfills) may be encountered. There are very specific Federal and State rules regarding USTs and historic contamination. If you encounter or suspect ANY USTs or historic contamination in your excavation, STOP work and promptly notify your leader and the Environmental Response Number (ERN) at 219-648-4434.

d. Disposal of Chemical Containing Products. Unwanted, contaminated, and expired chemical containing products (i.e., epoxy [e.g., Denso Protal Parts A and B], paint, gasoline, calibration gas) are considered wastes and must be disposed of properly. Federal and state regulatory agencies prohibit disposing of chemicals/products in trash, dumpsters, or drains. Mixing chemical products for the purpose of disposal is also prohibited. These restrictions apply to in-date as well as expired materials.

e. Waste Storage and Labeling. Federal, state, and local regulations direct how wastes are to be stored and labeled. All wastes generated must be properly stored and labeled. Improper storage of wastes can result in leaks, spills, safety hazards, and/or fines from regulatory agencies. Improperly labeled wastes can result in safety risks to waste transport workers as well as regulatory action.

f. Concrete Wash-Out Waste. Concrete wash-out liquids and slurries are highly caustic, contain toxic metals, and pose a potential pollution threat to streams, wetlands, and aquatic life if not managed properly. Federal construction stormwater permits require the use of measures to prevent stormwater pollution resulting from concrete wash-out liquids and wastes during construction. Concrete liquids are not considered a pollutant once dry and disposed of properly.

g. Portable Toilet Placement and Spill Prevention. The placement of portable toilets is overseen by U.S. EPA regulations and measures must be taken to prevent spills of human waste into storm drains and waterways. Specific

requirements include locating portable toilets away from storm drain inlets and other waterways such as streams, rivers and wetlands and securing them so they will not be tipped or knocked over. Placement of portable toilets on company properties and work sites must be reviewed and approved by NiSource Environmental.

h. Waste Containers. To ensure pollutant discharges are minimized as a result of storm events, Federal regulations require waste container lids to be closed when not in use. This can be done by obtaining dumpsters with covers or covering with tarps. The simple act of closing the lid on a waste container ensures that pollutant discharges are minimized as a result of storm events.

i. Sandblasting. Sandblast media may be composed of a variety of abrasives, including but not limited to black beauty, walnut shells, or steel shot. Sandblasting activities must follow the procedures contained within the sandblasting standard including, but not limited to:
    - All blasting media must be captured and containerized for proper management.
    - Blast media cannot accumulate on the ground, on surrounding trees or buildings, or be allowed to reach water.
    - Sandblasting must be performed in a way to prevent migration off site.
    - Sandblasting overspray is not permitted to leave company boundaries.
    - Never sandblast during windy conditions.

    In addition, consult with health and safety for guidance on safety requirements for sandblasting activities.

a. Construction Equipment. The use of construction equipment such as generators, pumps, compressors, drill rigs, etc., pose a pollution risk from equipment leaks and from spills during refueling or lubrication operations. Daily equipment checks are required to inspect for leaks. In addition to equipment refueling procedures identified in Section 7, conditions for the use of secondary containment to mitigate environmental concerns are as follows:
    - Utilize secondary containment (heavy duty tubs or equivalent BMP measure) for generators, pumps, or compressors located in or near wetlands, streams, or waterbodies.
    - Utilize secondary containment (temporary dikes or equivalent BMP measure) for larger machinery (drill rig, crane, etc.) that will be stationary for an extended period of time.
    - Utilize secondary containment for equipment machinery as specified in project specific ECP.

7. SPILL PREVENTION, CONTROL, AND COUNTERMEASURES

7.1. GENERAL

The following **Spill Prevention, Control, and Countermeasures (SPCC)** guidelines will be followed to help avoid spills and minimize the impact of spills which occur. Spills of any amount of petroleum products or polluting materials are to be prevented in accordance with company policies and the CHSEM.

a. Storage of petroleum products in excess of 1,320 gallons stored in aggregate in containers of 55 gallons or more are prohibited without coordination with the **Environmental Field Compliance (EFC)** Group. Contractors should contact NRP Group prior to bringing any chemicals onto a work site. Safety Data Sheets (**SDSs**) should be readily available for all chemicals brought on-site.

b. Adequate spill containment measures such as containment dikes with impervious lining will be installed before fuel storage tanks are filled and will be maintained throughout the Project. Bulk quantities (500-gallons or greater in a single container) of hazardous liquids (e.g., solvents and lubricants) will be stored at a designated laydown/contractor yard unless prior written approval has been received from NRP.

c. Fuel will be stored at approved, designated equipment staging areas and fueling shall only take place at those areas. Any equipment that must be refueled in the field will be fueled from tanks carried to the work site. Fuel carriers (greater than 110 gallons capacity) should not cross streams or wetlands unless absolutely necessary. If a stream or wetland crossing is unavoidable, fuel carriers should not cross wetlands or ford waterbodies during periods of high water or saturated soils.

d. Equipment refueling shall not be performed within 50 feet upslope of storm drain inlets or within 50 feet of any body of water or wetland. Equipment refueling shall not be performed within 50 to 100 feet of any body of water or wetland except by hand-carried cans (5-gallon maximum capacity). Care shall be taken during refueling to not overfill or spill fuel onto the exterior of equipment. Carry and store fueling equipment and containers with nozzles and spouts not pointing down to prevent spills and drips. Position absorbent pads below all filler necks, nozzles and spouts while refueling to catch drips and spills. In addition, the practices and procedures outlined in project-specific Stormwater Pollution Prevention Plans and SPCC plans shall be followed at all times.

e. Lesser quantities of fuel (up to 500 gallons), solvents, and lubricants (e.g., motor oils, hydraulic fluid) may be stored along the construction work area as necessary to service equipment used on the project (quantities vary depending on the size of the construction spread being used) provided that this storage does not conflict with other parts of this plan. All chemicals will be stored in proper containment. An adequate supply of sorbent booms and spill kits will be readily available at all times.

f. All fuel storage areas will be located at least 100 feet from streams, ponds, or wetlands, as well as drainage inlets and other stormwater collection systems; at least 200 feet from active private water wells, and at least 400 feet from municipal water wells except where using an operational fuel storage area established on company property.

g. No fuel storage shall be located within any designated municipal watershed area (except at locations designated for these purposes by an appropriate

governmental authority). Equipment servicing, lubricating, and refueling will also be in accordance with these requirements whenever possible.

h. Use of products for vehicle maintenance will follow the same requirements mentioned above for equipment refueling. Impervious or sorbent materials will be placed under the work area before the work begins. Additional sorbent materials will also be readily available. Waste materials created during maintenance will be collected for proper disposal. The work site and the vehicle will be checked by a company inspector after the maintenance work is complete to ensure that all hazardous materials are properly contained. All waste material, including partially used or empty containers, discarded parts, clean up rags, and used sorbent materials, as well as discarded hazardous materials containers will be collected for proper disposal. Ownership and disposal of materials generated during the maintenance of Contractor equipment is the sole responsibility of the Contractor.

i. All waste materials generated by NiSource or by a contractor on behalf of NiSource will be managed and disposed of in accordance with guidance provided by the EFC Group. Waste materials generated by a NiSource Contractor on the contractor's behalf will be the sole responsibility of the Contractor and shall be managed in compliance with all appropriate federal or state guidelines.

j. All motor fuel, lube oil, chemicals, and other polluting substance containers will be tightly sealed and clearly labeled during transportation and storage.

k. Fuel trucks, pumps, mechanics' vehicles, the Contractors' foremen's vehicles, and company Inspectors' vehicles will be equipped with appropriately sized spill kits containing absorbent materials approved for petroleum products.

l. Construction equipment may only be washed onsite if with written permission from the NRP Group and if all wash water is collected and transported off-site for proper disposal at a Publicly Owned Treatment Works (POTW). No wash water shall be permitted to leave the property or enter any drain or water body. All costs associated with equipment washing, managing wash waters and subsequent disposal shall be the responsibility of the Contractor.

m. Construction equipment, vehicles, materials, hazardous materials, chemicals, fuels, lubricating oils, and petroleum products will not be parked, stored, or serviced within 100 feet of all bodies of water or wetlands.

n. Prior to the use of any construction equipment or other vehicles on the work site, each vehicle shall be inspected to ensure that it is in good working condition to minimize the threat of oil, fuel, or hydraulic fluid spill/leaks. In addition, at the end of the workday, all equipment shall be inspected to ensure it is in proper working condition and not leaking. Leaking equipment shall be removed from service and addressed accordingly so as not to create an environmental compliance concern. Proper spill containments shall be utilized until the spills are repaired.

o. All equipment will be checked by a company inspector daily for leaks prior to beginning work in bodies of water or wetlands. Steps will be taken to repair leaks or remove the equipment from service, if necessary.

p. If barge mounted equipment is to be employed, or petroleum products will be transferred over water, the contractor will develop specific SPCCs (SPCC or OPA-90, as appropriate) to be reviewed and approved by the NRP Group.

7.2. SPILL CLEANUP

Spills occurring during construction or operation and maintenance are to be reported immediately to the ERN in accordance with company policies and the CHSEM.

If a spill should occur, contractors will take immediate action to minimize the impact of the spill and see that appropriate cleanup action is immediately taken.

In the event of a spill into or in the vicinity of bodies of water or wetlands, the following will occur immediately:

1. The source will be immediately stopped;

2. The spill will be contained by appropriate means;

3. **The ERN (219-648-4434) shall be called;**

4. The spill will be collected with sorbing materials, skimmed off water surfaces with booms, and/or the contaminated soil will be excavated; and

5. The waste materials will be properly stored and disposed of in accordance with company policy.

The affected areas will be restored as closely as possible to their previous condition.

8. RIGHT-OF-WAY MAINTENANCE

ROWs shall be maintained in a manner consistent with the integrity of the pipeline and operational needs. All ROW maintenance activities within streams, wetlands, and other sensitive environmental areas (i.e., parks, designated forests, resource management areas) must be coordinated with the NRP Group.

Individual ROWs will be maintained in accordance with a site-specific integrated vegetation management (**IVM**) plan. IVM plans for new or newly restored ROW will be developed in a manner that will promote the desired and/or required land coverage for a specific area.

Where applicable, NiSource's IVM program will involve the use of general use, low volume, or ultra-low volume selective herbicides, which are used in a specific manner that targets undesirable vegetation along the ROW. Use of these herbicides within the IVM program will promote the development of a stable, native plant community, and eliminate

the repeated need for mechanical methods that disturb wildlife habitat, like mowing or cutting. Initial follow up herbicide applications will normally take place within a year of the first restoration, followed by spot treatment every few years.

Deviations from any vegetation management plan, should be coordinated with the Vegetation Management Group and/or the NRP Group prior to implementation.

9. EMERGENCY CONSTRUCTION

In the event of an **emergency**, the Company employee in responsible charge will take such action as is necessary to contain the emergency giving due regard to minimizing environmental impact. An emergency is defined as an immediate danger to life, health, or the environment. In conjunction with other company policies, the requirements contained in this ECS will be followed as closely as possible. Emergency construction in wetland, streams or waterbodies will require the notification of the permit issuing agency; the NRP Group shall contact these agencies. It is the responsibility of the company employee undertaking the emergency activity to inform the NRP of the activity in a timely manner.

Emergency construction may trigger additional environmental and regulatory mandated surveys such as but not limited to, threatened and endangered species surveys, archaeology surveys, or wetland delineations. These surveys will be completed in the fewest number of days from the emergency determination.

10. DEFINITION OF TERMS

AGRICULTURAL LANDS: Permanent or rotated croplands, hayfields, and pastures.

BMPs: Best Management Practices

CHSEM: Contractor Health, Safety and Environmental Manual

CONSTRUCTION WORK AREA (CWA): The overall project area where construction activities are expected and allowed to enter during construction project activities.

ECS: Environmental Construction Standards

EFC: Environmental Field Compliance

EPA: United States Environmental Protection Agency

EMERGENCY: An immediate danger to life, health or the environment.

ENVIRONMENTAL COMPLIANCE PLAN (ECP): A NiSource company-specific document prepared and issued by the NRP Group for a specific project that provides project specific environmental clearances (Site-Specific ECP) or verifies that no specific permits are required (Basic ECP). An ECP must be received by the Engineer, Project Manager, and/or Construction Personnel before a Project can begin.

ENVIRONMENTAL FOREMAN: The contractor or company foreman responsible for implementation of environmental compliance requirements.

ENVIRONMENTAL INSPECTOR: The Inspector assigned to a project by the NRP Group and responsible for environmental compliance on a construction project.

E&S: Erosion and Sediment

EXCEPTIONAL VALUE WATER(S): Generically, a stream or waterbody which constitutes an outstanding national, State, regional, or local resource, such as waters of national, State, or county parks or forests, or waters which are used as a source of unfiltered potable water supply, or waters of wildlife refuges or State game lands, and other waters of substantial recreational or ecological significance.

FEMA: Federal Emergency Management Agency

FINAL GRADING: Includes returning the construction work area as closely as practical to its original contour, redistributing conserved topsoil, soil compaction testing in agricultural lands, and installing final interceptor diversions.

HIGH QUALITY STREAM: Surface waters having quality which exceeds levels necessary to support propagation of fish, shellfish, and wildlife; and recreation in and on the water.

HDD: Horizontal Directional Drilling

IMMEDIATE: Without interval of time; "right now".

IMPERVIOUS SURFACE: Any land surface with a low or no capacity for soil infiltration including, but not limited to, pavement, sidewalks, parking areas and driveways, packed gravel or soil, or rooftops.

INADVERTENT RELEASE OF DRILLING FLUID (IR): Directional bore/drill process when the bore fluid seeps to the surface through cracks or voids in the soil and enters an upland, wetland, or waterbody.

INSPECTOR: Collectively: The Company Inspector, Chief Inspector, Environmental Inspector, Utility Inspector, or any other inspector assigned to do an environmental task.

INTERMEDIATE WATERBODY: A waterbody greater than 10 feet wide (at normal flow depth) at the water's edge at the time of construction but less than or equal to 100 feet wide.

INTEGRATED VEGETATION MANAGEMENT (IVM): the removal of incompatible plants, leaving compatibles to thrive and increasing the biodiversity of lands managed by NiSource.

LIMITS OF DISTURBANCE (LOD): Area where construction activities, such as clearing, grading, excavation, repeated access, materials staging or other land disturbance activities, have the potential to or have altered or destroyed the natural vegetative cover and/or non-vegetative cover of the land to expose soils susceptible to erosion.

MAJOR WATERBODY: A waterbody greater than 100 feet wide (at normal flow depth) at the water's edge at the time of construction.

MINOR WATERBODY: A waterbody less than or equal to 10 feet wide (at normal flow depth) at the water's edge at the time of construction.

NRP: Natural Resources Permitting

NOISE SENSITIVE AREA: Includes residences, schools, churches, cemeteries, hospitals, farms, camping facilities and outdoor amphitheaters and playgrounds.

NISOURCE: This ECS refers specifically to all of NiSource's gas distribution subsidiaries.

O&M: Operation and Maintenance activities

PROMPTLY: By the end of the workday.

RESTORATION: Includes fertilizing, liming, disking, seeding, and mulching, and crimping mulch.

ROW: Right-of-Way

SCARIFY: To make shallow cuts into the soil surface. This should be accomplished with a disk, rake, tracked equipment (grousers) or other suitable means.

SDS: Safety Data Sheets

SEDIMENT FILTER DEVICE: Compost filter sock or rock check dam.

SOD: Lawn that comes packaged with roots held together in rolls that include all parts of the lawn including the surface layer of soil and roots.

SPCC: Spill Prevention, Containment and Control Plan

STEEP SLOPE: Slope of 33% or greater; this represents a slope greater than 1 foot of elevation change over a 3-foot horizontal distance change (3:1 slope).

STREAM: A system including permanent or seasonally flowing water, often with a defined channel (bed and bank), flood plain, and riparian ecosystem.

TEMPORARY STABILIZATION: Includes installing temporary waterbars and sediment filter devices, mulching critical areas and at times, seeding to hold soil in place until final grading and restoration can be accomplished.

TRENCH BREAKER: For the purposes of this manual a trench breaker is synonymous with "Trench Plug".

UPLAND CONSTRUCTION: All areas which are not waterbodies, streams, or wetlands.

WATERBODY: Includes any natural or artificial waterbody or drainage with perceptible flow at the time of crossing, and other permanent waterbodies such as ponds and lakes.

WETLAND: An area of special concern with soils prone to holding water for long periods of time, generally also characterized by distinctive plants such as rushes, sedges, cattails, or certain trees. Includes any area that satisfies the requirements of the current Federal methodology for identifying and delineating wetlands.

TABLES

TABLE 1
COMPOST SOCK FABRIC MINIMUM REQUIREMENTS

Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)
Material Characteristics	Photo-degradable	Photo-degradable	Bio-degradable	Photo-degradable	Photo-degradable
Sock Diameters	12” 18”	12” 18” 24” 32”	12” 18” 24” 32”	12” 18” 24” 32”	12” 18” 24” 32”
Mesh Opening	3/8”	3/8”	3/8”	3/8”	1/8”
Tensile Strength		26 psi	26 psi	44 psi	202 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
Minimum Functional Longevity	6 months	9 months	6 months	1 year	2 years
Two-ply systems					
Inner Containment Netting			HDPE biaxial net		
			Continuously wound		
			Fusion-welded junctures		
			¾” x ¾” Max. aperture size		
Outer Filtration Mesh			Composite Polypropylene Fabric (Woven layer and non-woven fleece mechanically fused via needle punch)		
			3/16” Max. aperture size		
Sock fabrics composed of burlap may be used on projects lasting 6 months or less.					

COMPOST STANDARDS

Organic Matter Content	25% - 100% (dry weight basis)
Organic Portion	Fibrous and elongated
pH	5.5 – 8.5
Moisture Content	30% - 60%
Particle Size	30% - 50% pass through 3/8” sieve
Soluble Salt Concentration	5.0 dS/m (mmhos/cm) Maximum

TABLE 2
SOIL AMENDMENT APPLICATION RATE EQUIVALENTS

Soil Amendment	Permanent Seeding Application Rate			Notes
	Per Acre	Per 1,000 sq. ft.	Per 1,000 sq. yd.	
Agricultural lime	6 tons	240 lb.	2,480 lb.	Or as per soil test; may not be required in agricultural fields
10-10-20 fertilizer	1,000 lb.	25 lb.	210 lb.	Or as per soil test; may not be required in agricultural fields
Temporary Seeding Application Rate				
Agricultural lime	1 ton	40 lb.	410 lb.	Typically not required for soil stockpiles
10-10-10 fertilizer	500 lb.	12.5 lb.	100 lb.	Typically not required for soil stockpiles

MULCH APPLICATION RATES

Mulch Type	Application Rate (Min.)			Notes
	Per Acre	Per 1,000 sq. ft.	Per 1,000 sq. yd.	
Straw	3 tons	140 lb.	1,240 lb.	Either wheat or oat straw, free of weeds, not chopped or finely broken
Hay	3 tons	140 lb.	1,240 lb.	Timothy, mixed clover and timothy or other native forage grasses
Wood Chips	4 – 6 tons	185 – 275 lb.	1,650 – 2,500 lb.	May prevent germination of grasses and legumes
Hydromulch	1 ton	47 lb.	415	See limitations above

TABLE 3

EROSION CONTROL (SYSTEM-WIDE) PERMANENT SEEDING SPECIFICATIONS

LAND USES:
Roadside Areas
High-Risk Erosion Areas
General Slope (3:1 or less)
Minimum Care Lawn

Common Name	**Scientific Name**	**% of Mix**
Annual Ryegrass	*Lolium perenne multiflorum*	35%
Perennial Ryegrass	*Lolium perenne*	25%
Redtop	*Agrostis gigantea*	20%
Crimson Clover	*Trifolium incarnatum*	10%
Brown Top Millet	*Urochloa ramosa*	10%
Total	--	**100%**

Notes:
1. Seed at a rate of 30 to 35 pounds per acre.

The purpose of this seed mix is to establish vegetative cover as quickly as possible to stabilize the soil surface. It includes a combination of warm and cool season species that will grow throughout the entire year. This seed mix has been designed to be planted at any time during the calendar year.

TABLE 4
TURF GRASS (SYSTEM-WIDE) PERMANENT SEEDING SPECIFICATIONS

LAND USES:
High-Maintenance Lawns
Residential Areas

Common Name	**Scientific Name**	**% of Mix**
Kentucky Bluegrass	*Poa pratensis*	25%
Creeping Red Fescue	*Festuca rubra*	30%
Perennial Ryegrass	*Lolium perenne*	30%
Annual Ryegrass	*Lolium perenne multiflorum*	15%
Total	--	**100%**

Notes:
1. Seed at a rate of 200 pounds per acre.

The purpose of this seed mix is to establish turf grasses that will be mowed and fertilized on a regular basis. It includes species that thrive in sunny and shady environmental settings. This seed mix has been designed to be planted at any time during the calendar year. Depending on the setting (aesthetic lawns), the seeding rate will need to be doubled.

TABLE 5
PASTURE (SYSTEM-WIDE) PERMANENT SEEDING SPECIFICATIONS

LAND USES:
Pasture Areas
Livestock Forage Areas
Wildlife Forage Areas

Common Name	Scientific Name	% of Mix
Orchardgrass	*Dactylis glomerata*	20%
Timothy	*Phleum pratense*	15%
Perennial Rye	*Lolium perenne*	15%
Red Top	*Agrostis gigantea*	10%
Annual Ryegrass	*Lolium perenne multiflorum*	10%
White Clover	*Trifolium repens*	10%
Alsike Clover	*Trifolium hybridum*	10%
Brown Top Millet	*Urochloa ramosa*	10%
Total	--	**100%**

Notes:
1. Seed at a rate of 30 to 35 pounds per acre.
2. Subject to landowner approval.

The purpose of this seed mix is to establish vegetative species that will be used for forage and/or hay production. This seed mix has been designed to be planted at any time during the calendar year.

TABLE 6
WETLAND (SYSTEM-WIDE) PERMANENT SEEDING SPECIFICATIONS

LAND USES:
Recommended Wetland Areas

Common Name	Scientific Name	% of Mix
Permanent Grasses/Sedges/Rushes		
River Bulrush	*Bolboschoenus fluviatilis*	3.7%
Bristly Sedge	*Carex comosa*	3.7%
Common Lake Sedge	*Carex lacustris*	1.2%
Bottlebrush Sedge	*Carex lurida*	4.9%
Common Tussock Sedge	*Carex stricta*	4.9%
Brown Fox Sedge	*Carex vulpinoidea*	4.9%
Great Spike Rush	*Eleocharis palustris*	1.2%
Common Rush	*Juncus effusus*	7.3%
Chairmaker's Rush	*Schoenoplectus pungens*	2.4%
Great Bulrush	*Schoenoplectus tabernaemontani*	7.3%
Forbs		
Sweet Flag	*Acorus americanus*	4.9%
Common Water Plantain	*Alisma subcordatum*	2.4%
Swamp Milkweed	*Asclepias incarnata*	4.9%
New England Aster	*Symphyotrichum novae-angliae*	4.9%
Golden Alexander	*Zizia aurea*	8.5%
Spotted Joe-Pye Weed	*Eutrochium maculatum*	2.4%
Blue Flag	*Iris virginica v. shrevei*	7.3%
Cardinal Flower	*Lobelia cardinalis*	4.9%
Great Blue Lobelia	*Lobelia siphilitica*	4.9%
Common Arrowhead	*Sagittaria latifolia*	6.1%
Blue Vervain	*Verbena hastata*	7.3%
Total		**100%**

Notes:
1. Seed at a rate of 6 to 8 to pounds per acre.
2. Add an additional 5 pounds annual ryegrass (*Lolium multiflorum*) and 20 pounds common oats (*Avena sativa*) per acre to provide temporary cover until the permanent mix is established.

The purpose of this seed mix is to establish native wetland species to areas that have been designated as categorized wetlands. It includes a combination of warm and cool season species that will grow throughout the entire year. This seed mix has been designed to be planted at any time during the calendar year.

TABLE 7
MIDWEST POLLINATOR PERMANENT SEEDING SPECIFICATIONS

UPLAND USES:
Non-Agricultural Uplands
Meadow / Naturalized Areas

Botanical Name	Common Name	PLS Oz/Acre
Schizachyrium scoparium	Little Bluestem	36.00
Sorghastrum nutans	Indian Grass	2.00
Sporobolus heterolepis	Prairie Dropseed	6.00
Agastache foeniculum	Lavender Hyssop	2.00
Allium cernuum	Nodding Onion	2.00
Amorpha canescens	Lead Plant	2.00
Asclepias syriaca	Common Milkweed	10.00
Asclepias tuberosa	Butterfly Weed	4.00
Baptisia bracteata	Cream Wild Indigo	1.00
Chamaecrista fasciculata	Partridge Pea	8.00
Dalea candida	White Prairie Clover	3.00
Echinacea pallida	Pale Purple Coneflower	4.00
Echinacea purpurea	Eastern Purple Coneflower	8.00
Eryngium yuccifolium	Rattlesnake Master	2.00
Liatris pycnostachya	Prairie Blazing Star	1.00
Lupinus perennis v. occidentalis	Wild Lupine	4.00
Monarda fistulosa	Wild Bergamot	2.00
Penstemon digitalis	Foxglove Beard Tongue	1.00
Penstemon hirsutus	Hairy Beard Tongue	1.00
Pycnanthemum virginianum	Common Mountain Mint	0.50
Senna hebecarpa	Wild Senna	4.00
Solidago speciosa	Showy Goldenrod	1.00
Symphyotrichum laeve	Smooth Blue Aster	1.00
Symphyotrichum novae-angliae	New England Aster	0.50
Tradescantia ohiensis	Common Spiderwort	2.00
Verbena stricta	Hoary Vervain	2.00
Verbesina alternifolia	Wingstem	2.00
Vernonia gigantea	Smooth Tall Ironweed	1.00
Total	**--**	**625.00**

The purpose of this seed mix is to establish both native grasses and beneficial pollinator species for insects that have the ability to pollinate between species. Areas receiving this seed mix will benefit from habitat preservation and/or expansion. It includes a combination of warm and cool season species that will grow throughout the entire year. Apply at a rate of 39.00 Pure Live Seed (PLS) per acre. Add an additional 32 pounds of common oats (*Avena sativa*) per acre to provide temporary cover until the permanent mix is established.

TABLE 8
INDIANA UPLAND MEADOW PERMANENT SEEDING SPECIFICATIONS

UPLAND USES:
Non-Agricultural Uplands
Meadow Areas

Common Name	Scientific Name	% of Mix
Little Bluestem	*Schizachyrium scoparium*	30%
Indiangrass	*Sorghastrum nutans*	5%
Sideoats Grama	*Bouteloua curtipendula*	10%
Big Bluestem	*Andropogon gerardii*	10%
Canada Wildrye	*Elymus canadensis*	10%
Foxglove Beard Tongue	*Penstemon digitalis*	3%
Purple Coneflower	*Echinacea purpurea*	3%
Wild Bergamot	*Monarda fistulosa*	5%
Common Milkweed	*Asclepias syriaca*	3%
Showy Goldenrod	*Solidago speciosa*	1%
Butterfly Milkweed	*Asclepias tuberoso*	5%
Plains Coreopsis	*Coreopsis tinctoria*	1%
New England Aster	*Symphyotrichum novae-angliae*	2%
Culver's Root	*Veronicastrum virginicum*	2%
Rattlesnake Master	*Eryngium yuccifolium*	
Stiff Goldenrod	*Oligoneuron rigidum*	
Smooth-Blue Aster	*Symphyotrichum laeve*	1%
Hairy Beard Tonge	*Penstemon hirsutus*	2%
Yellow Coneflower	*Ratibida pinnata*	5%
Lancelead Coreopsis	*Coreopsis lanceolata*	2%
Total	**--**	**100%**

Notes:
1. Seed at a rate of 12 to 15 pounds per acre.
2. Add an additional 32 pounds Seed Oats (*Avena sativa*) per acre to provide temporary cover until the permanent mix is established.

The purpose of this seed mix is to establish both meadow grasses and pollinator species for insects that have the ability to pollinate between species. Areas receiving this seed mix will benefit from habitat preservation and/or expansion. It includes a combination of warm and cool season species that will grow throughout the entire year. This seed mix has been designed to be planted at any time during the calendar year.

TABLE 9
INDIANA SANDY SOIL PERMANENT SEEDING SPECIFICATIONS

LAND USES:
Sandy Soil Areas
Sandy Prairies

Common Name	Scientific Name	% of Mix
Little Bluestem	*Schizachyrium scoparium*	25%
Sand Reed	*Calamovilfa longifolia*	10%
June Grass		
Side oats Grama	*Bouteloua curtipendula*	17%
Canada Wildrye	*Elymus canadensis*	15%
Switch Grass	*Panicum virgatum*	1%
Lupine	*Lupinus perennis*	5%
Partridge Pea	*Chamaecrista fasciculata*	10%
Lance leaf Coreopsis	*Coreopsis lanceolata*	5%
Common Milkweed	*Asclepias syriaca*	2%
Butterfly Milkweed	*Asclepias tuberosa*	3%
Black-Eyed Susan	*Rudbeckia hirta*	2%
Round-Headed Bush Clover	*Lespedeza capitata*	2%
Plains coreopsis	*Coreopsis tinctoria*	1%
Illinois bundleflower	*Desmanthus illinoensis*	1%
Bergamot	*Monarda fistulosa*	1%
Total	--	**100%**

Notes:
1. Seed at a rate of 12 to 15 pounds per acre.
2. Add an additional 40 pounds of common oats (*Avena sativa*) per acre to provide temporary cover until the permanent mix is established.

The purpose of this seed mix is to establish native vegetative species that have adapted to sandy soils. Vegetative species that have adapted to well-drained conditions, as well as low fertility conditions, were selected for this seed mix. It includes a combination of warm and cool season species that will grow throughout the entire year. This seed mix has been designed to be planted at any time during the calendar year.

TABLE 10
INDIANA STEEP SLOPE PERMANENT SEEDING SPECIFICATIONS

LAND USES:
Steep Slope Stabilization
General Slope (3:1 or less)

Common Name	**Scientific Name**	**% of Mix**
Indiangrass	*Sorghastrum nutans*	25%
Canada Wildrye	*Elymus canadensis*	25%
Switchgrass	*Panicum virgatum*	15%
Virginia Wild Rye	*Elymus virginicus*	15%
Little Blue Stem	*Schizachyrium scoparium*	10%
Partridge Pea	*Chamaecrista fasciculata*	3%
Common Milkweed	*Asclepias syriaca*	1%
Purple coneflower	*Echinacea purpurea*	1%
Black-Eyed Susan	*Rudbeckia hirta*	5%
Total	--	**100%**

Notes:
1. Seed at a rate of 15 to 20 to pounds per acre.
2. Add an additional 47 pounds common oats (*Avena sativa*) per acre to provide temporary cover until the permanent mix is established.

The purpose of this seed mix is to establish native, deep rooting vegetative species that will aid in stabilizing steep slopes. It includes a combination of warm and cool season species that will grow throughout the entire year. This seed mix has been designed to be planted at any time during the calendar year.

TABLE 11
KENTUCKY UPLAND MEADOW PERMANENT SEEDING SPECIFICATIONS

LAND USES:
Pollinator Species
Meadow Areas

Common Name	Scientific Name	% of Mix
Little Bluestem	*Schizachyrium scoparium*	20%
Annual Ryegrass	*Lolium perenne multiflorum*	20%
Sideoats Grama	*Bouteloua curtipendula*	15%
Virginia Wildrye	*Elymus virginicus*	15%
Switchgrass	*Panicum virgatum*	10%
White Clover	*Trifolium repens*	1%
Red Clover	*Trifolium pratense*	1%
Blackeyed Susan	*Rudbeckia hirta*	5%
Oxeye Sunflower	*Heliopsis helianthoides*	2%
Partridge Pea	*Chamaecrista fasciculata*	4%
Butterfly Milkweed	*Asclepias tuberosa*	1%
Common Milkweed	*Asclepias syriaca*	1%
Early Goldenrod	*Solidago nemoralis*	1%
Wild Bergamot	*Monarda fistulosa*	1%
Lance leaf coreopsis	*Coreopsis lanceolata*	1%
Purple coneflower	*Echinacea purpurea*	1%
Illinois bundleflower	*Desmanthus illinoensis*	1%
Total	--	**100%**

Notes:
1. Seed at a rate of 12 to 15 pounds per acre.
2. Add an additional 15 to pounds annual ryegrass (*Lolium multiflorum*) per acre to provide temporary cover until the permanent mix is established.

The purpose of this seed mix is to establish both meadow grasses and pollinator species for insects that have the ability to pollinate between species. Areas receiving this seed mix will benefit from habitat preservation and/or expansion. It includes a combination of warm and cool season species that will grow throughout the entire year. This seed mix has been designed to be planted at any time during the calendar year.

TABLE 12
MARYLAND UPLAND MEADOW PERMANENT SEEDING SPECIFICATIONS

LAND USES:
Pollinator Species
Meadow Areas

Common Name	**Scientific Name**	**% of Mix**
Little Bluestem	*Schizachyrium scoparium*	30%
Indiangrass	*Sorghastrum nutans*	20%
Timothy	*Phleum pratense*	20%
Big Bluestem	*Andropogon gerardii*	10%
White Clover	*Trifolium repens*	1%
Red Clover	*Trifolium pratense*	1%
Blackeyed Susan	*Rudbeckia hirta*	8%
False Sunflower	*Heliopsis helianthoides*	2%
Early Goldenrod	*Solidago nemoralis*	2%
Butterfly Milkweed	*Asclepias tuberosa*	1%
Common Milkweed	*Asclepias syriaca*	1%
Early Goldenrod	*Solidago nemoralis*	1%
Tall coreopsis	*Coreopsis tripteris*	1%
Iron weed	*Vernonia altissima*	1%
Brown-eyed Susan	*Rudbeckia triloba*	1%
Total	--	100%

Notes:
1. Seed at a rate of 12 to 15 pounds per acre.
2. Add an additional 15 to 20 pounds annual ryegrass (*Lolium multiflorum*) per acre to provide temporary cover until the permanent mix is established.
3.

The purpose of this seed mix is to establish both meadow grasses and pollinator species for insects that have the ability to pollinate between species. Areas receiving this seed mix will benefit from habitat preservation and/or expansion. It includes a combination of warm and cool season species that will grow throughout the entire year. This seed mix has been designed to be planted at any time during the calendar year.

TABLE 13
OHIO UPLAND MEADOW PERMANENT SEEDING SPECIFICATIONS

LAND USES:
Pollinator Species
Meadow Areas

Common Name	Scientific Name	% of Mix
Little Bluestem	*Schizachyrium scoparium*	30%
Sideoats Grama	*Bouteloua curtipendula*	20%
Switchgrass	*Panicum virgatum*	15%
Orchard grass	*Dactylis glomerata*	15%
White Clover	*Trifolium repens*	1%
Crimson Clover	*Trifolium incarnatum*	1%
Purple Coneflower	*Echinacea purpurea*	2%
Lanceleaf Coreopsis	*Coreopsis lanceolata*	2%
Early Goldenrod	*Solidago nemoralis*	1%
Butterfly Milkweed	*Asclepias tuberosa*	1%
Common Milkweed	*Asclepias syriaca*	1%
Partridge Pea	*Chamaecrista fasciculata*	1%
Dense Blazing Star	*Liatris spicata*	1%
Tall coreopsis	*Coreopsis tripteris*	1%
Black-eyed Susan	*Rudbeckia hirta*	4%
Brown-eyed Susan	*Rudbeckia triloba*	1%
Lance leaf coreopsis	*Coreopsis lanceolata*	3
Total	--	**100%**

Notes:
1. Seed at a rate of 12 to 15 pounds per acre.
2. Add an additional 15 pounds annual ryegrass (*Lolium multiflorum*) per acre to provide temporary cover until the permanent mix is established.

The purpose of this seed mix is to establish both meadow grasses and pollinator species for insects that have the ability to pollinate between species. Areas receiving this seed mix will benefit from habitat preservation and/or expansion. It includes a combination of warm and cool season species that will grow throughout the entire year. This seed mix has been designed to be planted at any time during the calendar year.

TABLE 14
OHIO SANDY SOIL PERMANENT SEEDING SPECIFICATIONS

LAND USES:
Sandy Soil Areas
Sandy Prairies

Common Name	Scientific Name	% of Mix
Little Bluestem	*Schizachyrium scoparium*	25%
Autumn Bentgrass	*Agrostis perennans*	3%
Sideoats Grama	*Bouteloua curtipendula*	25%
Canada Wildrye	*Elymus canadensis*	20%
Partridge Pea	*Chamaecrista fasciculata*	5%
Lanceleaf Coreopsis	*Coreopsis lanceolata*	5%
Common Milkweed	*Asclepias syriaca*	5%
Butterfly Milkweed	*Asclepias tuberosa*	5%
Crimson Clover	*Trifolium incarnatum*	1%
Blackeyed Susan	*Rudbeckia hirta*	5%
Purple coneflower	*Echinacea purpurea*	1%
Total	--	**100%**

Notes:
1. Seed at a rate of 12 to 15 pounds per acre.
2. Add an additional 15 pounds annual ryegrass (*Lolium multiflorum*) and 20 pounds common oats (*Avena sativa*) per acre to provide temporary cover until the permanent mix is established.

The purpose of this seed mix is to establish native vegetative species that have adapted to sandy soils. Vegetative species that have adapted to well-drained conditions, as well as low fertility conditions, were selected for this seed mix. It includes a combination of warm and cool season species that will grow throughout the entire year. This seed mix has been designed to be planted at any time during the calendar year.

TABLE 15
PENNSYLVANIA UPLAND MEADOW PERMANENT SEEDING SPECIFICATIONS

LAND USES:
Pollinator Species
Meadow Areas

Common Name	Scientific Name	% of Mix
Little Bluestem	*Schizachyrium scoparium*	30%
Indiangrass	*Sorghastrum nutans*	15%
Virginia Wildrye	*Elymus virginicus*	20%
Switchgrass	*Panicum virgatum*	5%
White Clover	*Trifolium repens*	1%
Red Clover	*Trifolium pratense*	1%
Blackeyed Susan	*Rudbeckia hirta*	7%
Lanceleaf Coreopsis	*Coreopsis lanceolata*	5%
Partridge Pea	*Chamaecrista fasciculata*	5%
Butterfly Milkweed	*Asclepias tuberosa*	5%
Common Milkweed	*Asclepias syriaca*	1%
Early Goldenrod	*Solidago nemoralis*	1%
Hoary Mountainmint	*Pycnanthemum incanum*	1%
Brown-eyed Susan	*Rudbeckia triloba*	1%
Purple coneflower	*Echinacea purpurea*	1%
Tall coreopsis	*Coreopsis tripteris*	1%
Total	--	**100%**

Notes:
1. Seed at a rate of 12 to 15 pounds per acre.
2. Add an additional 15 pounds annual ryegrass (*Lolium multiflorum*) per acre to provide temporary cover until the permanent mix is established.

The purpose of this seed mix is to establish both meadow grasses and pollinator species for insects that have the ability to pollinate between species. Areas receiving this seed mix will benefit from habitat preservation and/or expansion. It includes a combination of warm and cool season species that will grow throughout the entire year. This seed mix has been designed to be planted at any time during the calendar year.

TABLE 16
PENNSYLVANIA STEEP SLOPE PERMANENT SEEDING SPECIFICATIONS

LAND USES:
Steep Slope Stabilization
General Slope (3:1 or less)

Common Name	Scientific Name	% of Mix
Indiangrass	*Sorghastrum nutans*	25%
Virginia Wildrye	*Elymus virginicus*	20%
Switchgrass	*Panicum virgatum*	15%
Little Bluestem	*Schizachyrium scoparium*	20%
False Sunflower	*Heliopsis helianthoides*	5%
Crimson Clover	*Trifolium incarnatum*	1%
Ladino White Clover	*Trifolium repens latum*	1%
Purpletop	*Tridens flavus*	1%
Deertongue	*Dichanthelium clandestinum*	4%
Partridge Pea	*Chamaecrista fasciculata*	5%
Common Milkweed	*Asclepias syriaca*	1%
Black-eyed Susan	*Rudbeckia hirta*	1%
Tall coreopsis	*Coreopsis tripteris*	1%
Total	--	**100%**

Notes:
1. Seed at a rate of 12 to 15 pounds per acre.
2. Add an additional 15 pounds annual ryegrass (*Lolium multiflorum*) and 20 pounds common oats (*Avena sativa*) per acre to provide temporary cover until the permanent mix is established.

The purpose of this seed mix is to establish native, deep rooting vegetative species that will aid in stabilizing steep slopes. It includes a combination of warm and cool season species that will grow throughout the entire year. This seed mix has been designed to be planted at any time during the calendar year.

TABLE 17
VIRGINIA UPLAND MEADOW PERMANENT SEEDING SPECIFICATIONS

LAND USES:
Pollinator Species
Meadow Areas

Common Name	Scientific Name	% of Mix
Little Bluestem	*Schizachyrium scoparium*	30%
Indiangrass	*Sorghastrum nutans*	15%
Virginia Wildrye	*Elymus virginicus*	25%
Switchgrass	*Panicum virgatum*	10%
White Clover	*Trifolium repens*	1%
Red Clover	*Trifolium pratense*	1%
Blackeyed Susan	*Rudbeckia hirta*	5%
Lanceleaf Coreopsis	*Coreopsis lanceolata*	3%
Partridge Pea	*Chamaecrista fasciculata*	3%
Butterfly Milkweed	*Asclepias tuberosa*	1%
Common Milkweed	*Asclepias syriaca*	1%
Early Goldenrod	*Solidago nemoralis*	1%
Hoary Mountainmint	*Pycnanthemum incanum*	1%
Brown-eyed Susan	*Rudbeckia triloba*	1%
Iron weed	*Vernonia altissina*	1%
Tall coreopsis	*Coreopsis tripteris*	1%
Total	--	**100%**

Notes:
1. Seed at a rate of 12 to 15 pounds per acre.
2. Add an additional 15 pounds annual ryegrass (*Lolium multiflorum*) per acre to provide temporary cover until the permanent mix is established.

The purpose of this seed mix is to establish both meadow grasses and pollinator species for insects that have the ability to pollinate between species. Areas receiving this seed mix will benefit from habitat preservation and/or expansion. It includes a combination of warm and cool season species that will grow throughout the entire year. This seed mix has been designed to be planted at any time during the calendar year.

TABLE 18
VIRGINIA SANDY SOIL PERMANENT SEEDING SPECIFICATIONS

LAND USES:
Sandy Soil Areas
Sandy Prairies

Common Name	Scientific Name	% of Mix
Little Bluestem	*Schizachyrium scoparium*	30%
Indiangrass	*Sorghastrum nutans*	15%
Sideoats Grama	*Bouteloua curtipendula*	20%
Canada Wildrye	*Elymus canadensis*	20%
Crimson Clover	*Trifolium incarnatum*	1%
Ladino White Clover	*Trifolium repens latum*	1%
Common Milkweed	*Asclepias syriaca*	1%
Butterfly Milkweed	*Asclepias tuberosa*	1%
Lanceleaf Coreopsis	*Coreopsis lanceolata*	5%
Black-eyed Susan	*Rudbeckia hirta*	5%
Bergamot	*Monarda fistulosa*	1%
Total	--	**100%**

Notes:
1. Seed at a rate of 12 to 15 pounds per acre.
2. Add an additional 12 pounds annual ryegrass (*Lolium multiflorum*) and 20 pounds common oats (*Avena sativa*) per acre to provide temporary cover until the permanent mix is established.

The purpose of this seed mix is to establish native vegetative species that have adapted to sandy soils. Vegetative species that have adapted to well-drained conditions, as well as low fertility conditions, were selected for this seed mix. It includes a combination of warm and cool season species that will grow throughout the entire year. This seed mix has been designed to be planted at any time during the calendar year.

TABLE 19
VIRGINIA STEEP SLOPE PERMANENT SEEDING SPECIFICATIONS

LAND USES:
Steep Slope Stabilization
General Slope (3:1 or less)

Common Name	Scientific Name	% of Mix
Indiangrass	*Sorghastrum nutans*	20%
Canada Wildrye	*Elymus canadensis*	25%
Switchgrass	*Panicum virgatum*	20%
Big Bluestem	*Andropogon gerardii*	15%
Red Top	*Agrostis gigantea*	5%
Crimson Clover	*Trifolium incarnatum*	1%
Ladino White Clover	*Trifolium repens latum*	1%
Lanceleaf Coreopsis	*Coreopsis lanceolata*	4%
Deertongue	*Dichanthelium clandestinum*	5%
Black-eyed Susan	*Rudbeckia hirta*	1%
Common Milkweed	*Asclepias syriaca*	1%
Partridge pea	*Chamaecrista fasciculata*	1%
Brown-eyed Susan	*Rudbeckia triloba*	1%
Total	--	**100%**

Notes:
1. Seed at a rate of 12 to 15 pounds per acre.
2. Add an additional 15 pounds annual ryegrass (*Lolium multiflorum*) and 20 pounds common oats (*Avena sativa*) per acre to provide temporary cover until the permanent mix is established.

The purpose of this seed mix is to establish native, deep rooting vegetative species that will aid in stabilizing steep slopes. It includes a combination of warm and cool season species that will grow throughout the entire year. This seed mix has been designed to be planted at any time during the calendar year.

FIGURES

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No.	**Name**
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2	Typical Cross Country Construction Footprint & Soil Segregation
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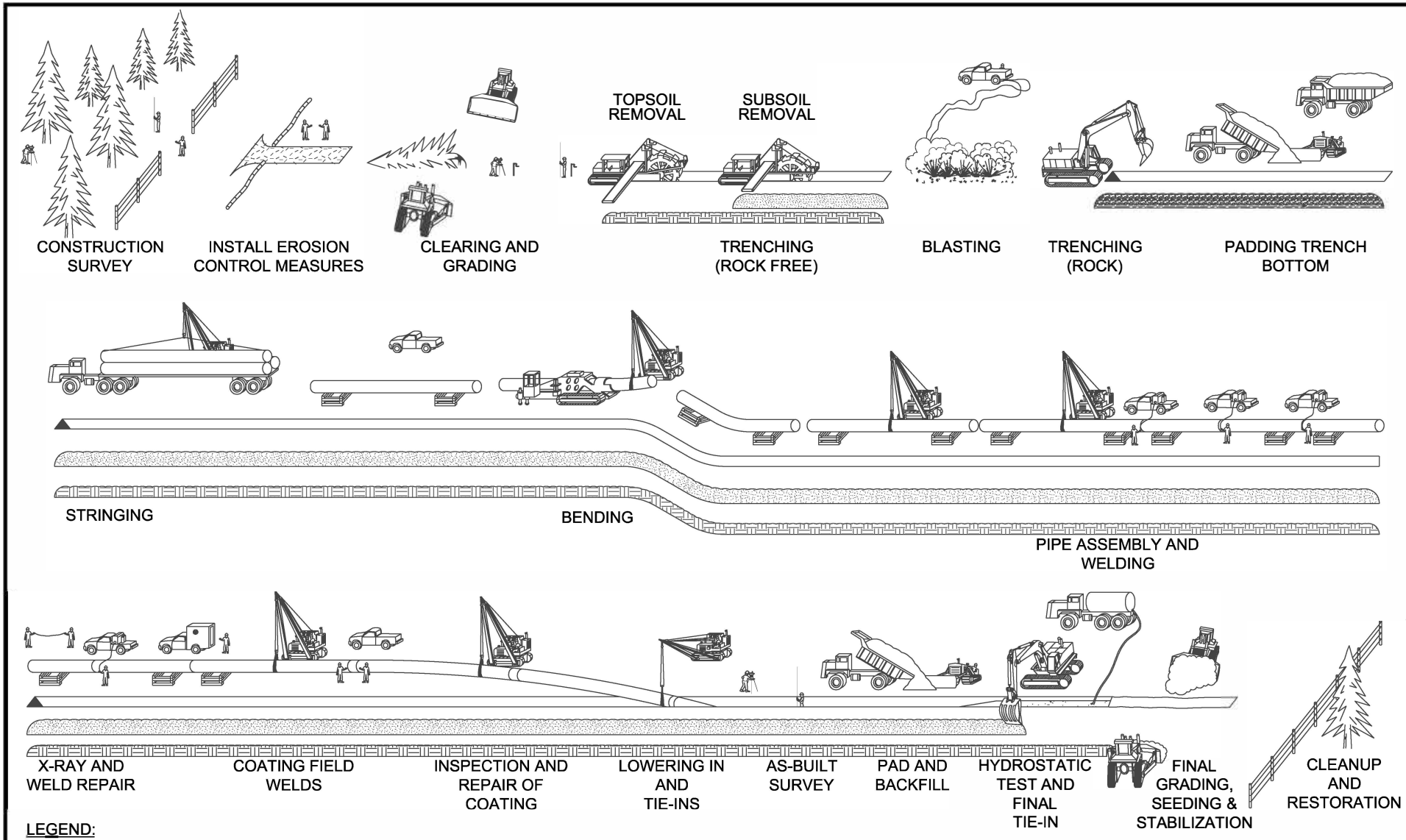

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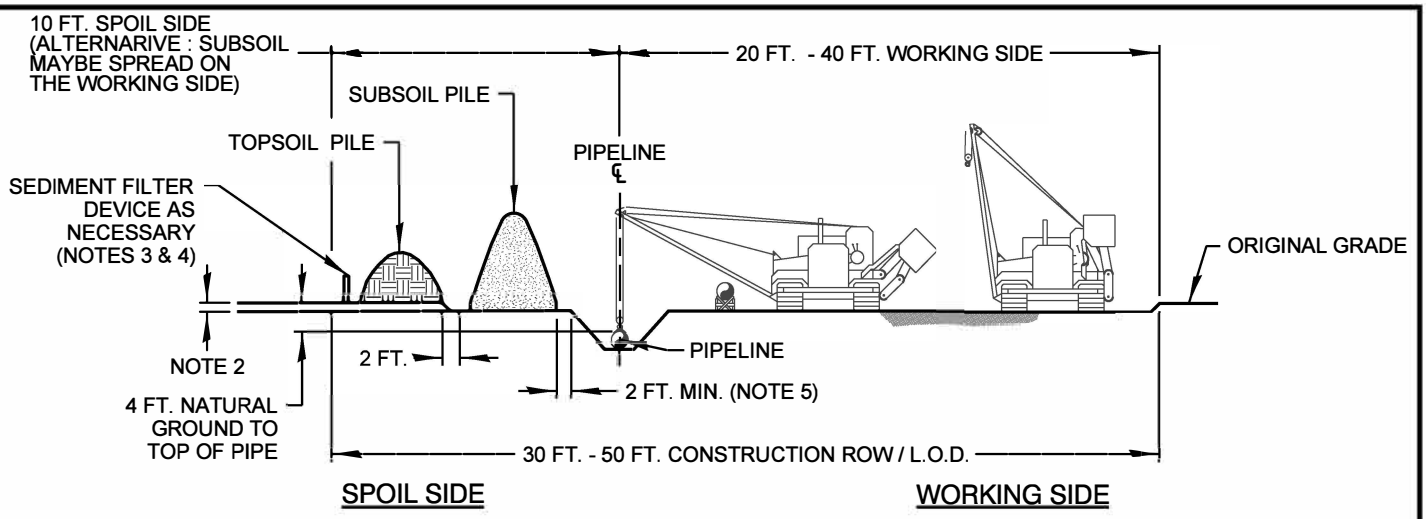
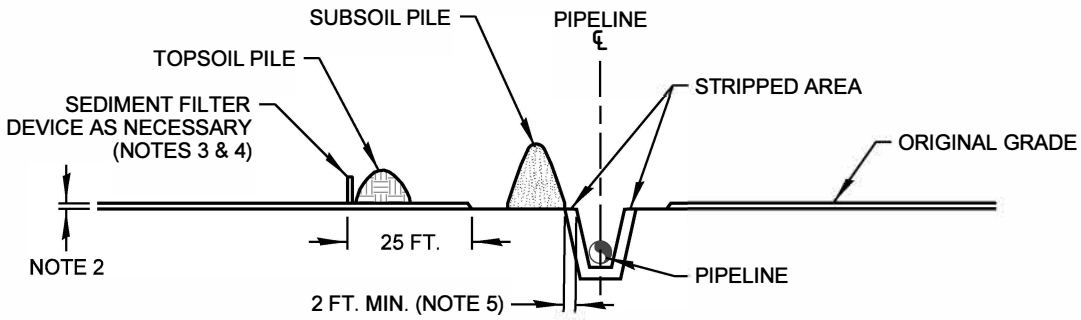
ENVIRONMENTAL CONSTRUCTION STANDARDS

TYPICAL UPLAND PIPELINE CONSTRUCTION SEQUENCE

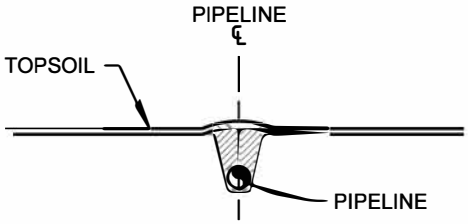
FIGURE-1
REVISED 10/2023
NOT TO SCALE



ENTIRE CONSTRUCTION ROW METHOD



TRENCHLINE AND SPOIL SIDE METHOD

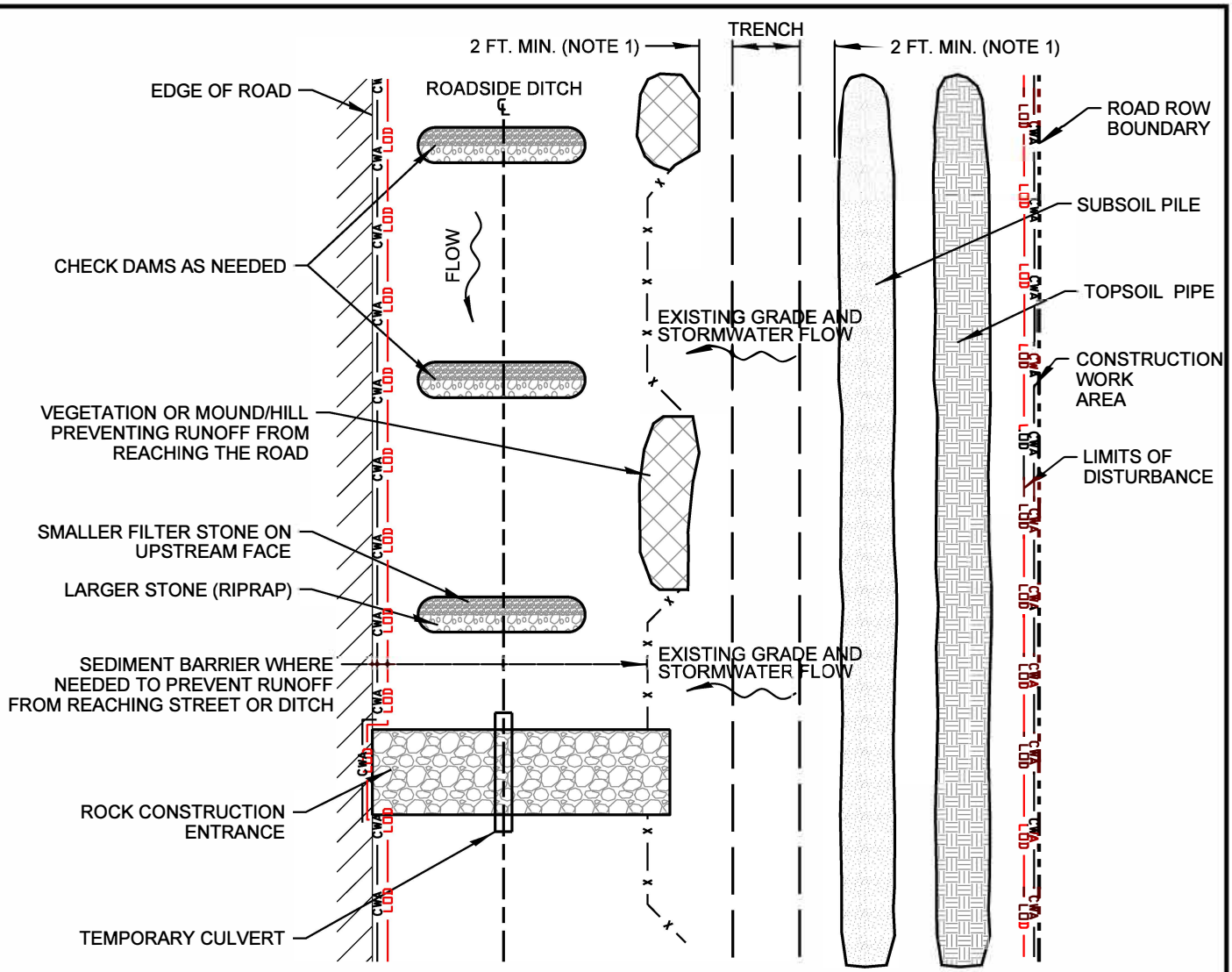


REPLACED

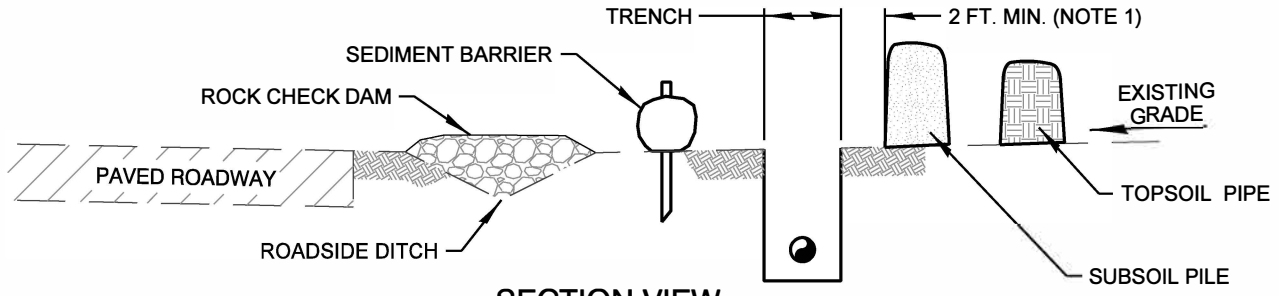
NOTES:

1. OTHER CONFIGURATIONS OF TOPSOIL AND SUBSOIL ARE ACCEPTABLE PROVIDED THEY ARE KEPT SEPARATE.
2. UP TO 12 INCHES OF TOPSOIL REMOVED AND SEGREGATED.
3. PERIMETER SEDIMENT BARRIERS SHALL BE PLACED ALONG THE DOWNGRADIENT ROW SLOPE IF THE TRENCH IS TO REMAIN OPEN AND AREA IS UNSTABILIZED FOR LONGER THAN ONE WORKING DAY.
4. TOPSOIL AND SUBSOIL PILES WILL BE ADEQUATELY PROTECTED FROM EROSION AND SEDIMENTATION THROUGH THE USE OF TEMPORARY STABILIZATION (PER ECS REQUIREMENTS) IF THEY WILL REMAIN FOR LONGER THAN ONE DAY.
5. SPOIL SHALL BE PLACED A MINIMUM OF TWO (2) FEET FROM THE TRENCH PER 29 CFR 1926.650 (j) (2).
6. IF SOIL IS SATURATED OR CONDUCIVE TO MIXING, APPROVED MATTING MUST BE USED FOR VEHICULAR TRAFFIC.
7. DURING RESTORATION, ENSURE DECOMPACTION OF AREAS IMPACTED BY EQUIPMENT PER ECS REQUIREMENTS.

MSource® ENVIRONMENTAL CONSTRUCTION STANDARDS	TYPICAL CROSS-COUNTRY CONSTRUCTION FOOTPRINT & SOIL SEGREGATION	FIGURE-2 REVISED 10 /2023 NOT TO SCALE



PLAN VIEW



SECTION VIEW

NOTES:

1. SPOIL SHALL BE PLACED A MINIMUM OF TWO (2) FEET FROM THE TRENCH PER 29 CFR 1926.650 (j) (2).
2. PERIMETER SEDIMENT BARRIERS SHALL BE PLACED ALONG THE DOWNGRADIENT ROW SLOPE IF THE TRENCH IS TO REMAIN OPEN AND AREA IS UNSTABILIZED FOR LONGER THAN ONE WORKING DAY.
3. THE ROADWAY SHALL BE SWEPT AS FREQUENTLY AS NEEDED BUT ALWAYS AT THE END OF EACH WORK DAY TO ENSURE THAT NO DISTURBED EARTH OR CONSTRUCTION MATERIALS ARE LEFT THAT COULD CAUSE SEDIMENT TO MIGRATE FROM THE WORK SITE.
4. TOPSOIL AND SUBSOIL PILES WILL BE ADEQUATELY PROTECTED FROM EROSION AND SEDIMENTATION THROUGH THE USE OF TEMPORARY STABILIZATION (PER ECS REQUIREMENTS) IF THEY WILL REMAIN FOR LONGER THAN ONE DAY.
5. TOPSOIL OR ORGANIC LAYER SEGREGATION SHOULD BE COMPLETED WHEN FEASIBLE, BUT ALTERNATIVES MAY BE REVIEWED WITH ONSITE PERSONNEL AT THE TIME OF CONSTRUCTION.

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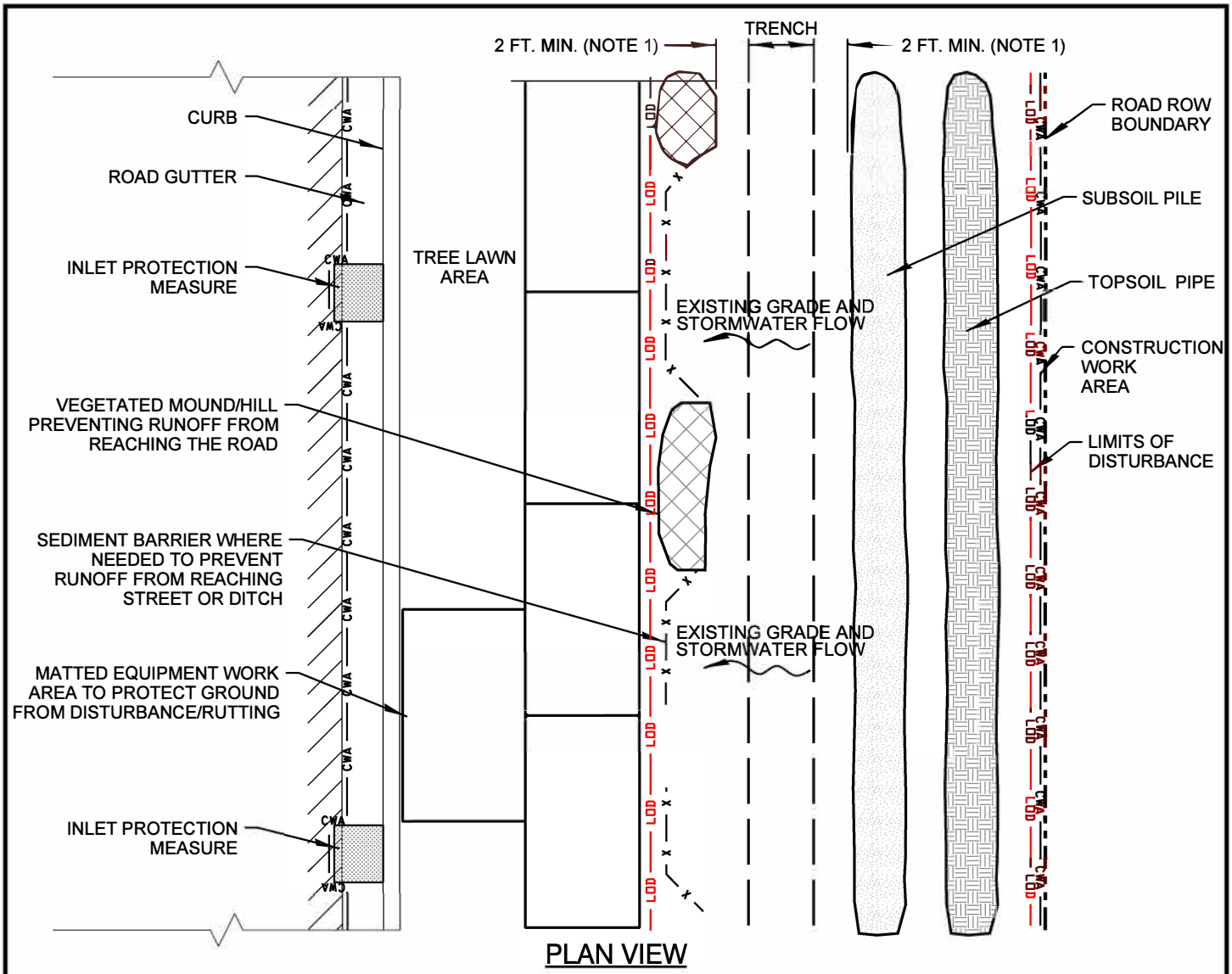
ENVIRONMENTAL CONSTRUCTION STANDARDS

TYPICAL ROADSIDE CONSTRUCTION WITH DITCH OR SWALE

FIGURE-3
REVISED 10/2023
NOT TO SCALE



NOTES:

1. SPOIL SHALL BE PLACED A MINIMUM OF TWO (2) FEET FROM THE TRENCH PER 29 CFR 1926.650 (j) (2).
2. PERIMETER SEDIMENT BARRIERS SHALL BE PLACED ALONG THE DOWNGRADIENT ROW SLOPE IF THE TRENCH IS TO REMAIN OPEN AND AREA IS UNSTABILIZED FOR LONGER THAN ONE WORKING DAY.
3. THE ROADWAY SHALL BE SWEPT AS FREQUENTLY AS NEEDED BUT ALWAYS AT THE END OF EACH WORK DAY TO ENSURE THAT NO DISTURBED EARTH OR CONSTRUCTION MATERIALS ARE LEFT THAT COULD CAUSE SEDIMENT TO MIGRATE FROM THE WORK SITE.
4. TOPSOIL AND SUBSOIL PILES WILL BE ADEQUATELY PROTECTED FROM EROSION AND SEDIMENTATION THROUGH THE USE OF TEMPORARY STABILIZATION (PER ECS REQUIREMENTS) IF THEY WILL REMAIN FOR LONGER THAN ONE DAY.
5. TOPSOIL OR ORGANIC LAYER SEGREGATION SHOULD BE COMPLETED WHEN FEASIBLE, BUT ALTERNATIVES MAY BE REVIEWED WITH ONSITE PERSONNEL AT THE TIME OF CONSTRUCTION.

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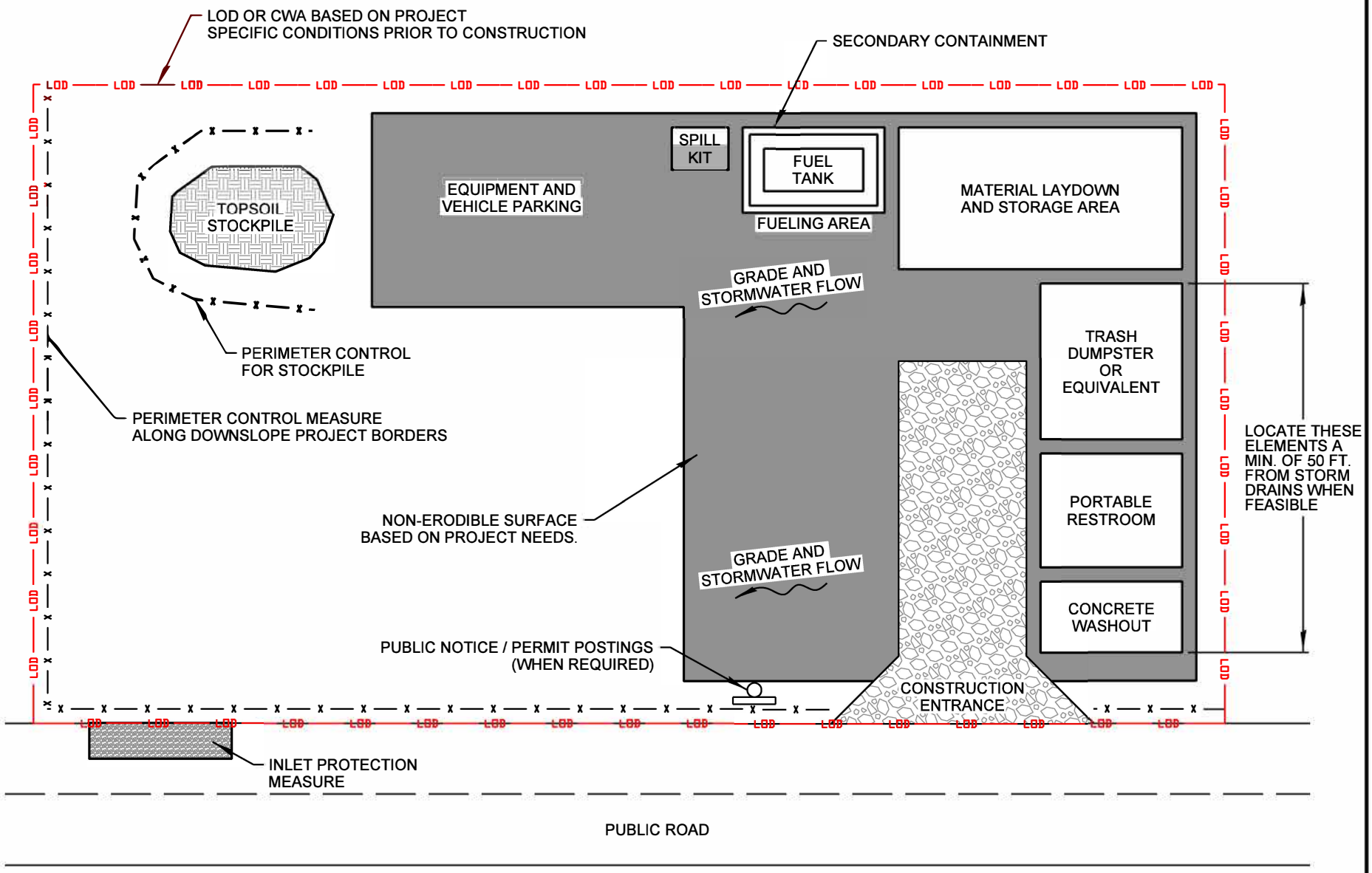
ENVIRONMENTAL CONSTRUCTION STANDARDS

TYPICAL ROADSIDE CONSTRUCTION WITH CURB AND GUTTER

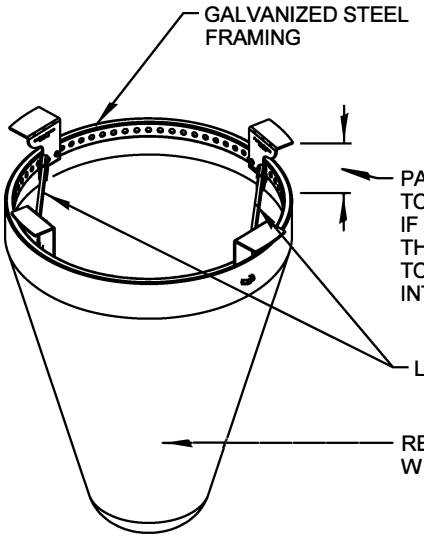
FIGURE-4
REVISED 10/2023
NOT TO SCALE



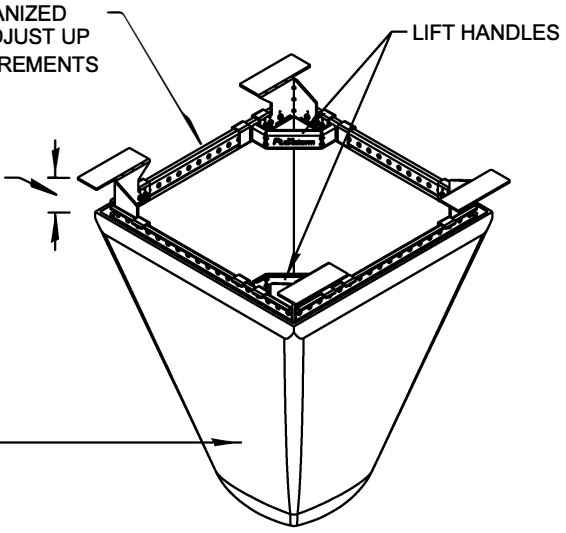
MiSource®
ENVIRONMENTAL CONSTRUCTION STANDARDS

TYPICAL CONSTRUCTED STAGING AREA DETAIL

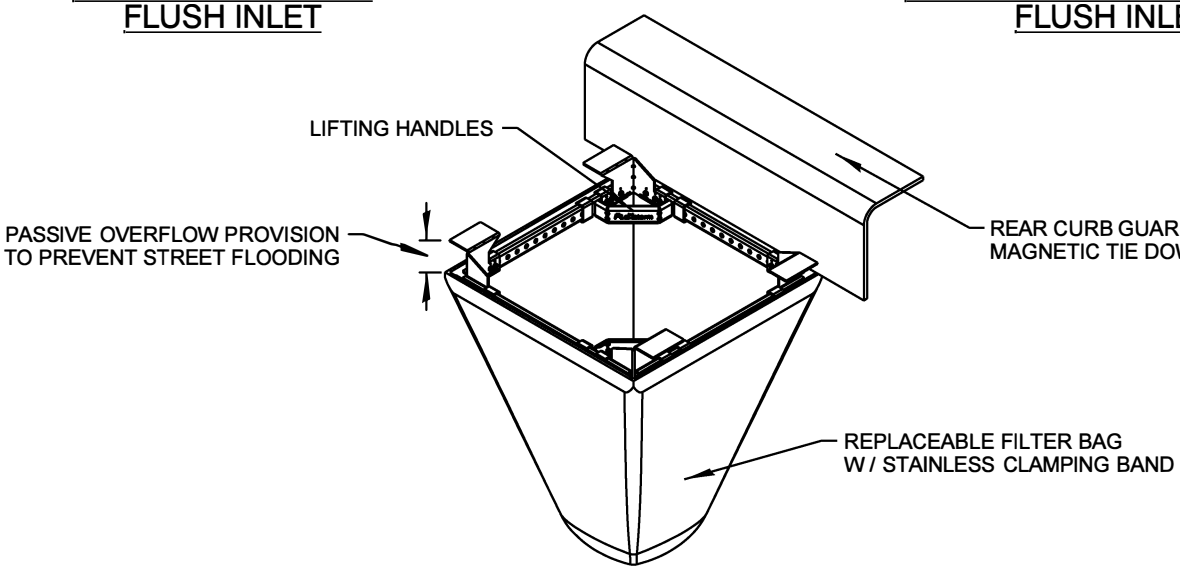
FIGURE-5
REVISED 10 /2023
NOT TO SCALE



DROP INLET (DI) PROTECTION
FOR ROUND GRATE
FLUSH INLET



DROP INLET (DI) PROTECTION
FOR RECTANGULAR GRATE
FLUSH INLET



DROP INLET (DI) PROTECTION
FOR CURB OPENING

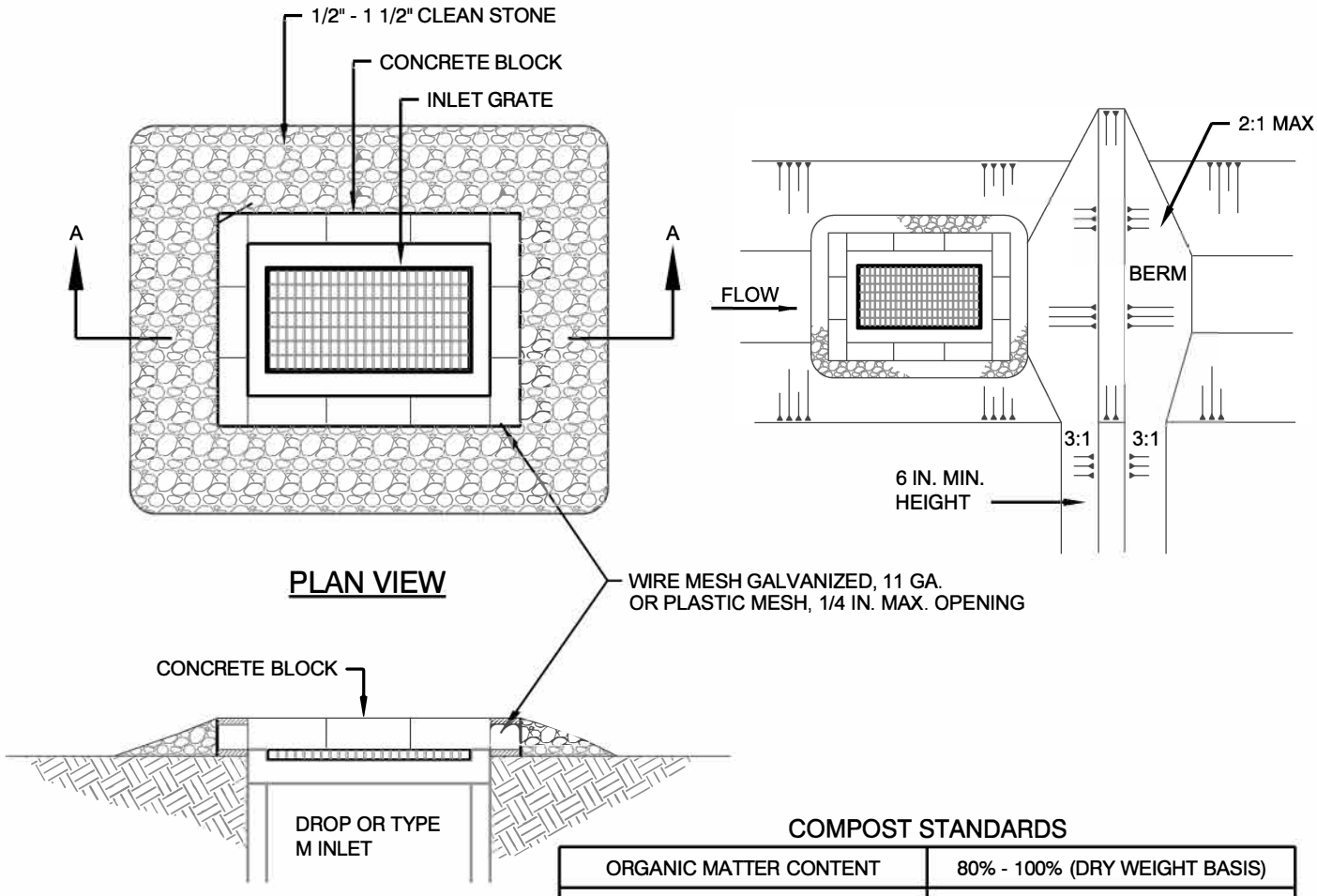
NOTES:

1. MATERIAL AND PERFORMANCE: FILTER BAG MATERIAL SHOULD BE RATED FOR 200 GPM/SQ FT WITH A REMOVAL EFFICIENCY OF 82% WHEN FILTERING USDA SANDY LOAM SEDIMENT. THE DROP INLET FILTER BAG MUST BE SUSPENDED BELOW THE GRATE TO ALLOW FOR FULL STORMWATER FLOW INTO THE DRAINAGE STRUCTURE IF THE FILTER BAG IS COMPLETELY FULL OF SEDIMENT.

2. INSTALLATION: REMOVE STORM GRATE FROM CASTING. CLEAN THE LEDGE OF THE CASTING FRAME TO REMOVE DIRT AND STONE. PLACE DROP INLET FILTER BAG DEVICE THROUGH THE OPENING. ENSURE UNIT IS SUPPORTED FIRMLY ON THE CASTING. REPLACE THE STORM GRATE.

3. INSPECTION: DROP INLET FILTER BAGS SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT. FILTER BAGS SHALL BE EMPTIED AND RINSED OR REPLACED WHEN HALF FULL OR WHEN FLOW CAPACITY HAS BEEN REDUCED. DAMAGED OR CLOGGED FILTER BAGS SHALL BE REPLACED. A SUPPLY SHALL BE MAINTAINED ON SITE FOR REPLACEMENT OF BAGS. ALL NEEDED REPAIRS SHALL BE INITIATED IMMEDIATELY AFTER THE INSPECTION. DISPOSE OF ACCUMULATED SEDIMENT AS WELL AS ALL USED FILTER BAGS ACCORDING TO PLAN NOTES.

4. ALTERNATE PREFAB MATERIALS MAY BE USED IF SIMILAR STANDARDS ARE MET.



COMPOST STANDARDS

ORGANIC MATTER CONTENT	80% - 100% (DRY WEIGHT BASIS)
ORGANIC PORTION	FABROUS AND ELONGATED
pH	5.5 - 8.0
MOISTURE CONTENT	35% - 55%
PARTICLE SIZE	98% PASS THROUGH 1" SCREEN
SOLUBLE SALT CONCENTRATION	5.0 dS/m (mmhos/cm) MAXIMUM

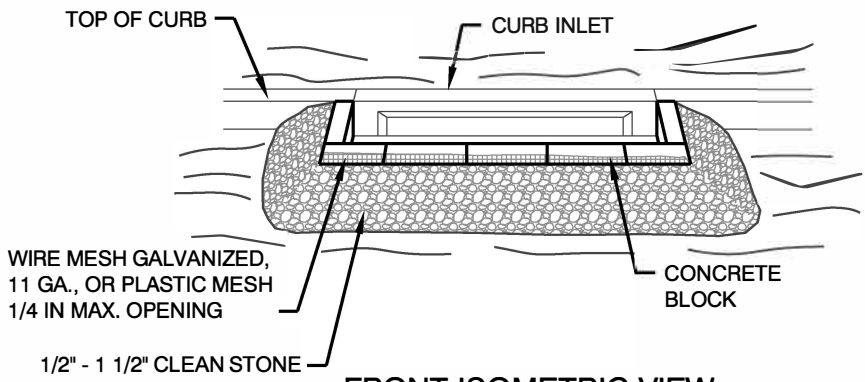
NOTES:

1. MAXIMUM DRAINAGE AREA =1 ACRE.
2. INLET PROTECTION SHALL NOT BE REQUIRED FOR INLET TRIBUTARY TO SEDIMENT BASIN OR TRAP. BERMS SHALL BE REQUIRED FOR ALL INSTALLATIONS NOT LOCATED AT A LOW POINT.
3. TOP OF BLOCK SHALL BE AT LEAST 6 INCHES BELOW ADJACENT ROADS IF PONDED WATER WOULD POSE A SAFETY HAZARD TO TRAFFIC.
4. SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE HEIGHT OF THE STONE. DAMAGED OR CLOGGED INSTALLATIONS SHALL BE REPAIRED OR REPLACED IMMEDIATELY.
5. FOR SYSTEMS DISCHARGING TO HQ OR EV SURFACE WATER, A 6-INCH THICK COMPOST LAYER SHALL BE SECURELY ANCHORED ON OUTSIDE AND OVER TOP OF STONE. COMPOST SHALL MEET THE STANDARDS IN THE "COMPOST STANDARDS" TABLE ABOVE.
6. IF CONDITIONS WARRANT, ALTERNATE METHOD/ MATERIALS MAY BE USED PER STATE REQUIREMENTS.
7. FLOOD PROTECTION FOR APPROACHING SEVER STORMS: IN SITUATIONS WHERE FLOODING MAY BE A CONCERN, INLET FILTER DEVICES MAY REQUIRE REMOVAL PRIOR TO RAINFALL EVENTS. IN THESE CASES, CARE SHOULD BE TAKEN TO ENSURE THAT TEMPORARY STABILIZATION OF ALL DISTURBED AREAS IS COMPLETED PRIOR TO THE RAINFALL EVENT AND REMOVAL OF THE INLET FILTER DEVICE.

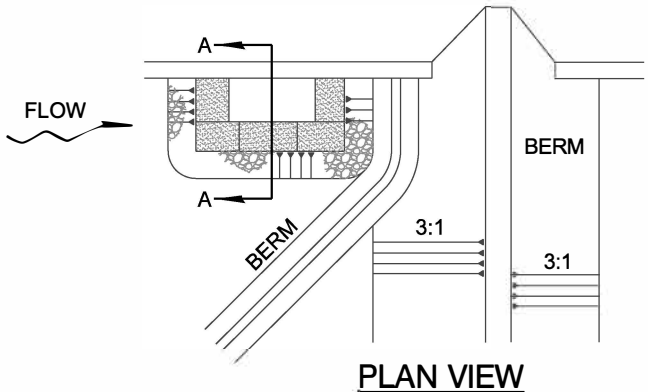
MnSource®
ENVIRONMENTAL CONSTRUCTION STANDARDS

DROP INLET PROTECTION
FLUSH INLET TOP
"CONSTRUCTED"

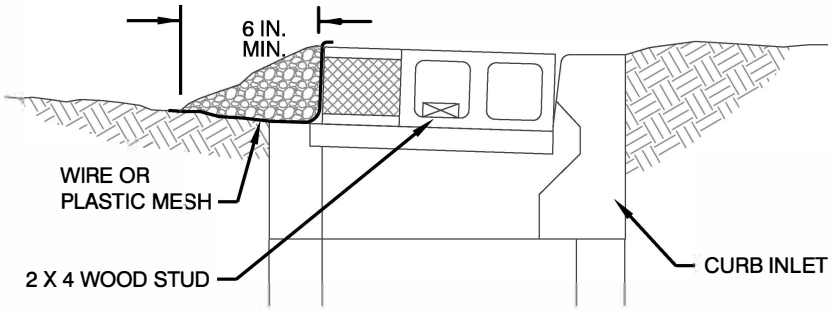
FIGURE-7
REVISED 10/2023
NOT TO SCALE



FRONT ISOMETRIC VIEW



PLAN VIEW



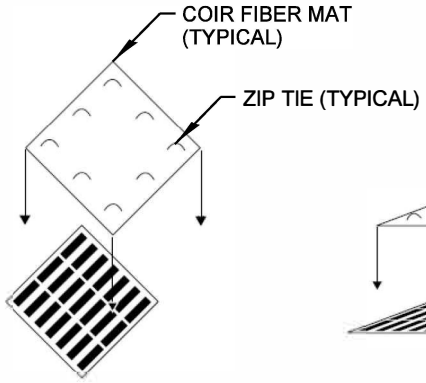
SECTION A-A

NOTES:

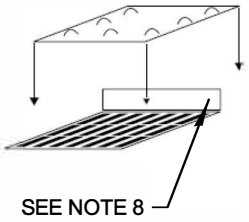
1. OTHER CONFIGURATIONS OF TOPSOIL AND SUBSOIL ARE ACCEPTABLE PROVIDED THEY ARE KEPT SEPARATE.
2. UP TO 12 INCHES OF TOPSOIL REMOVED.
3. PERIMETER SEDIMENT BARRIERS SHALL BE PLACED ALONG THE DOWNGRADIENT ROW SLOPE IF THE TRENCH IS TO REMAIN OPEN FOR LONGER THAN ONE WORKING DAY.
4. TOPSOIL AND SUBSOIL PILES WILL BE ADEQUATELY PROTECTED FROM EROSION AND SEDIMENTATION THROUGH THE USE OF TEMPORARY STABILIZATION IF THEY WILL REMAIN FOR LONGER THAN ONE DAY.
5. SPOIL SHALL BE PLACED A MINIMUM OF TWO (2) FEET FROM THE TRENCH PER 29 CFR 1926.650 (j) (2).
6. FLOOD PROTECTION FOR APPROACHING SEVER STORMS: IN SITUATIONS WHERE FLOODING MAY BE A CONCERN, INLET FILTER DEVICES MAY REQUIRE REMOVAL PRIOR TO RAINFALL EVENTS. IN THESE CASES, CARE SHOULD BE TAKEN TO ENSURE THAT TEMPORARY STABILIZATION OF ALL DISTURBED AREAS IS COMPLETED PRIOR TO THE RAINFALL EVENT AND REMOVAL OF THE INLET FILTER DEVICE.

MSource® ENVIRONMENTAL CONSTRUCTION STANDARDS	CURB INLET PROTECTION "CONSTRUCTED"	FIGURE-8 REVISED 10/2023 NOT TO SCALE

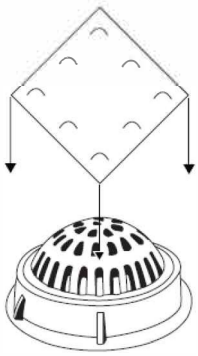
GRATE OPTIONS:



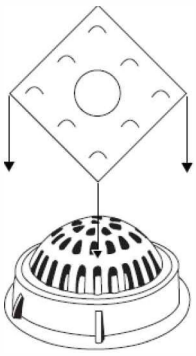
FLAT STREET GRATE
(SECURE WITH 8 ZIP TIES)



STREET CURB INLET GRATE
(SECURE WITH 7 ZIP TIES)



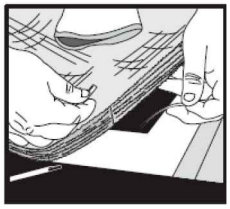
BEEHIVE INLET GRATE
(SECURE WITH 8 ZIP TIES)



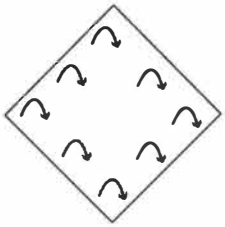
BEEHIVE INLET GRATE WITH
OVERFLOW CUT-OUT
(SECURE WITH 8 ZIP TIES)

INSTALLATION GUIDANCE:

SEE NOTE 4



SEE NOTE 5

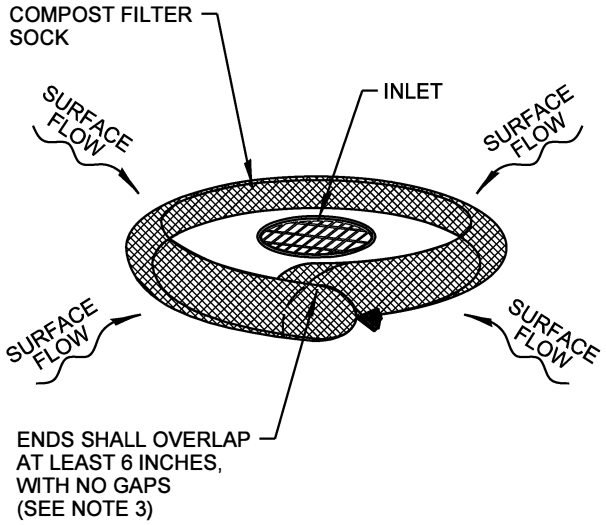


SEE NOTE 5

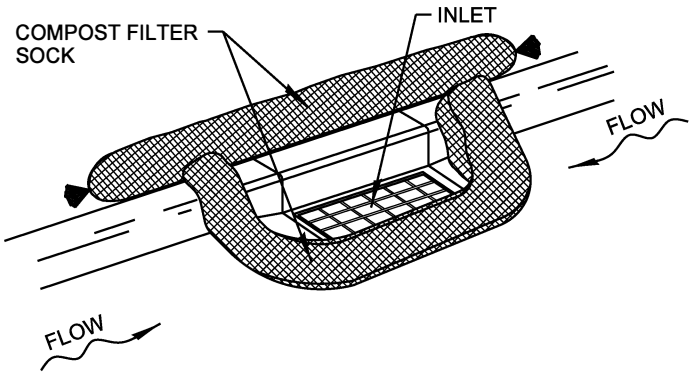
NOTES:

1. REMOVE SEDIMENT, DEBRIS, ICE AND SNOW FROM THE INLET GRATE SURFACE AND SURROUNDING AREA.
2. VERIFY FIT BY PLACING FILTER OVER INLET GRATE TO ENSURE THAT INLET FILTER EXTENDS AT LEAST 1" BEYOND THE FRONT AND BOTH CURB ENDS. THE OVERLAP SLOWS WATER FLOW AND STARTS FILTERING SEDIMENT AND DEBRIS BEFORE WATER DROPS INTO THE INLET.
3. POSITION THE MAT: PLACE INLET FILTER ON GRATE WITH THE NET SIDE DOWN, FLUSH TO THE BACK EDGE AND EXTENDING BEYOND THE GRATE OPENING ON THE FRONT AND BOTH SIDES. THE ZIP TIES ATTACH THE INLET FILTER TO THE INLET GRATE COVER WITHOUT HAVING TO LIFT THE GRATE COVER.
4. INSERT ZIP TIES: LIFT INLET FILTER SLIGHTLY TO ENABLE YOU TO SEE THE FIRST GRATE BAR FROM THE EDGE OF THE GRATE COVER.
5. PUSH THE ZIP TIE DOWN THROUGH THE INLET FILTER AND LOOP UNDER THE GRATE BAR. INSERT THE POINTED END OF THE ZIP TIE ABOUT 2”AWAY FROM THE FIRST ZIP TIE PENETRATION AND PUSH BACK UP THROUGH THE FILTER.
6. PUSH THE POINTED END OF THE ZIP TIE INTO THE RECEIVING END, JUST ENOUGH TO HOLD ENDS LOOSELY. LEAVE ZIP TIES LOOSE UNTIL ALL TIES ARE LOOPED THROUGH THE MATS AROUND THE GRATES. REPEAT STEP 4 UNTIL ALL ZIP TIES ARE INSTALLED LOOSELY.
7. TIGHTEN ZIP TIES: AFTER ATTACHING ALL OF THE ZIP TIES, RE-POSITION INLET FILTER TO COMPLETELY COVER AND OVERLAP THE GRATE. PULL FREE END OF ZIP-TIES HAND TIGHT TO ANCHOR INLET FILTER TO THE GRATE. CUT OFF FREE END OF ZIP TIES TO LEAVE A 1”TAIL.
8. CURB COVER OPENING REQUIRES ADDITIONAL PROTECTION (COMPOST FILTER SOCK OR ROLLED COIR FIBER MAT).
9. EXTREME FLOW INSTALLATION REQUIREMENTS: IF REQUIRED, PROVIDE AN EXPOSED OVERFLOW ON BEEHIVE INLET GRATES. PROVIDING AN EMERGENCY OVERFLOW ALLOWS UNFILTERED FLOW WHEN WATER DEPTH EXCEEDS INLET FILTER HEIGHT TO PREVENT LOCALIZED FLOODING. CUT INLET FILTER WITH A KNIFE OR SHEARS TO EXPOSE THE UPPER PORTION OF THE OVERFLOW SECTION. ALLOW THE STANDARD OVERLAP ON ALL SIDES OF INLET FILTER BEFORE CUTTING.
10. FLOOD PROTECTION FOR APPROACHING SEVER STORMS: IN SITUATIONS WHERE FLOODING MAY BE A CONCERN, INLET FILTER DEVICES MAY REQUIRE REMOVAL PRIOR TO RAINFALL EVENTS. IN THESE CASES, CARE SHOULD BE TAKEN TO ENSURE THAT TEMPORARY STABILIZATION OF ALL DISTURBED AREAS IS COMPLETED PRIOR TO THE RAINFALL EVENT AND REMOVAL OF THE INLET FILTER DEVICE.
11. MAINTENANCE: INLET FILTER WILL COLLECT SIGNIFICANT AMOUNTS OF SEDIMENT AND MUST BE KEPT CLEAN. SWEEP TOP AND SIDES OF INLET FILTER TO REMOVE SEDIMENT AND DEBRIS AFTER EACH ½”RAIN EVENT. IN CASE OF STANDING WATER AT INLET, SWEEPING AWAY BUILT-UP DEBRIS ALLOWS WATER TO DRAIN THROUGH INLET FILTER.

MSource® ENVIRONMENTAL CONSTRUCTION STANDARDS	COIR FIBER MAT INLET PROTECTION	FIGURE-9 REVISED 10/2023 NOT TO SCALE



DRAIN INLET PROTECTION



CURB INLET PROTECTION

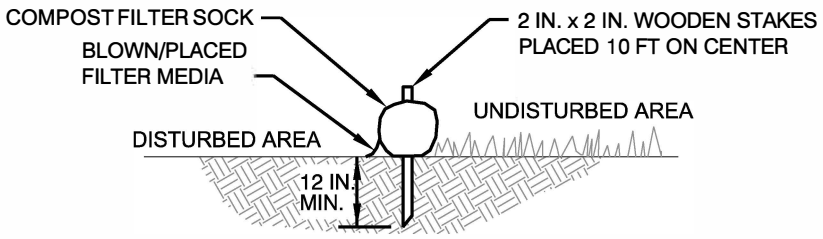
NOTES:

1. FILTER SOCK INLET PROTECTION SHALL BE 8-INCH DIAMETER OR LARGER WHERE NEEDED.
2. FILTER SOCK INLET PROTECTION SHALL BE MULCH FILTER BARRIER, THE USE OF STRAW WATTLES IS NOT PERMITTED.
3. FILTER SOCK SHALL FULLY ENCIRLE THE STORM DRAIN INLET. IF OVERLAP IS NEEDED, ENDS SHALL BE OVERLAPPED AT LEAST 6 INCHES SO THERE ARE NO GAPS.
4. INLET PROTECTION SHALL BE INSPECTED WEEKLY AND AFTER EACH RAINFALL EVENT. DO NOT CAUSE FLOODING.

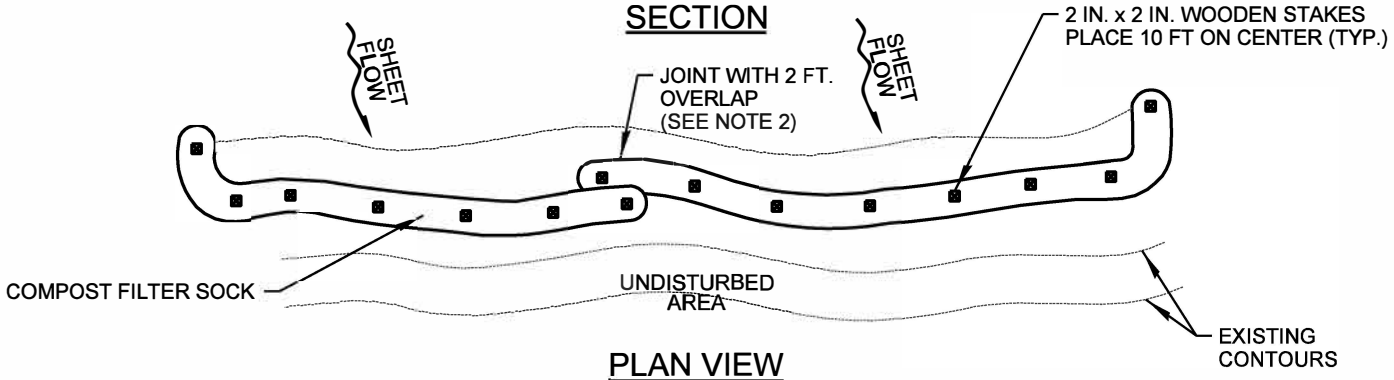
MAINTENANCE:

1. THE INLET PROTECTION SHALL BE ROUTINELY INSPECTED UNTIL THE RIGHT OF WAY ACHIEVES > 70% UNIFORM VEGETATION LEVELS.
2. IF THE INLET PROTECTION HAS BEEN DAMAGED, IT SHALL BE REPAIRED, OR REPLACED IF BEYOND REPAIR. FILTER SOCK SHALL BE REPLACED WHEN IT NO LONGER HOLDS ITS SHAPE OR WHEN FLOW CAPACITY IS REDUCED.
3. THE CONTRACTOR SHALL REMOVE SEDIMENT AT THE BASE OF THE UPSLOPE SIDE OF THE INLET PROTECTION WHEN ACCUMULATION HAS REACHED 1/3 (ONE-THIRD) OF THE EFFECTIVE HEIGHT OF THE INLET PROTECTION, OR AS DIRECTED BY THE EI. SEDIMENT SHALL NOT BE WASHED INTO THE INLET. SEDIMENT SHALL BE REMOVED AND PLACED IN A LOCATION WHERE IT IS STABLE AND NOT SUBJECT TO EROSION. ALTERNATIVELY, FOR DRAIN INLET PROTECTION, A NEW SOCK MAY BE PLACED ON TOP OF THE ORIGINAL INCREASING THE SEDIMENT STORAGE CAPACITY WITHOUT SOIL DISTURBANCE.
4. INLET PROTECTION SHALL BE MAINTAINED UNTIL DISTURBED AREA ABOVE OR AROUND THE DEVICE HAS BEEN PERMANENTLY STABILIZED AND CONSTRUCTION ACTIVITY HAS CEASED.
5. REGULAR MAINTENANCE INCLUDES LIFTING THE INLET PROTECTION AND CLEANING AROUND AND UNDER THEM AS SEDIMENT COLLECTS.
6. INLET PROTECTION MAY BE REMOVED ONCE THE SURROUNDING DISTURBED AREA HAS ACHIEVED > 70% UNIFORM VEGETATION LEVELS AND CONSTRUCTION ACTIVITY HAS CEASED, OR AS DETERMINED BY THE EI.

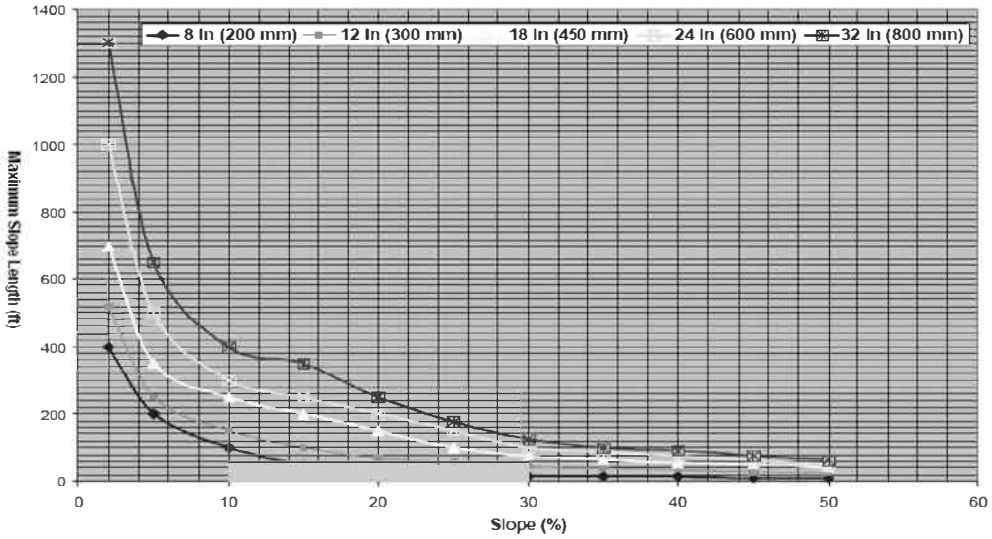
MSource® ENVIRONMENTAL CONSTRUCTION STANDARDS	FILTER SOCK INLET PROTECTION CONSTRUCTION DETAIL	FIGURE-10 REVISED 10/2023 NOT TO SCALE



SECTION



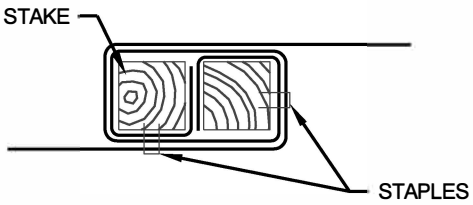
PLAN VIEW



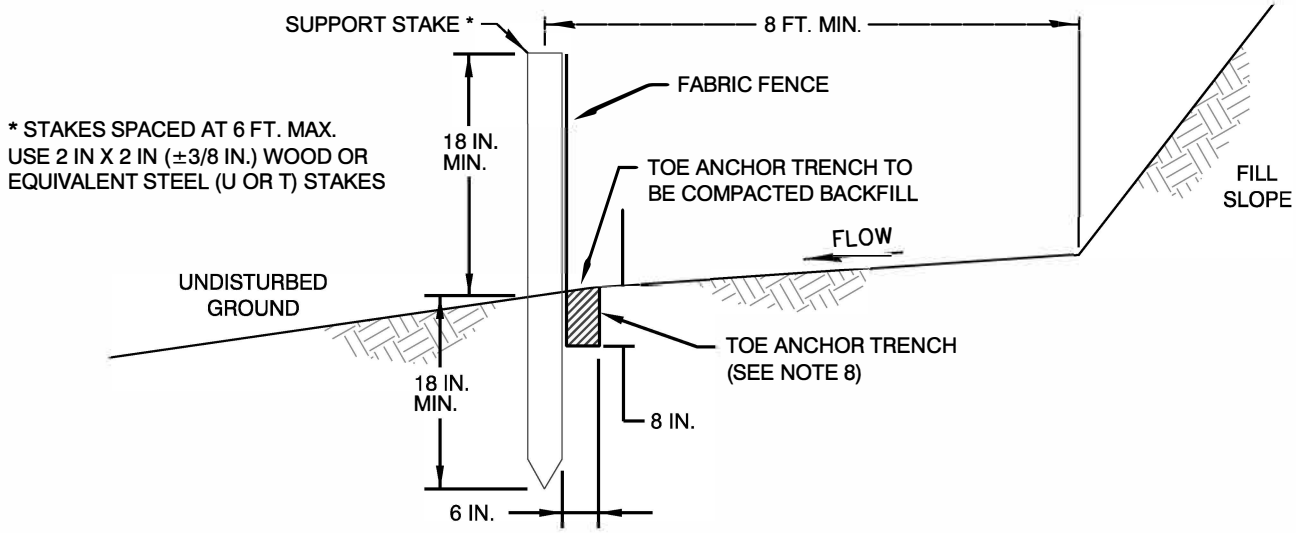
NOTES:

1. FILL MATERIAL OF COMPOST FILTER SOCK MUST BE 2" WOOD FILLER (OR APPROVED ALTERNATE) AND MUST BE WEED FREE, SEED FREE, AND DISEASE FREE.
2. COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BARRIER SHALL BE EXTENDED UPSLOPE TO AN EXTENT WHERE THE ENDS ARE HIGHER THAN THE TOP OF THE CONTROL. MAXIMUM SLOPE LENGTH ABOVE ANY BARRIER SHALL NOT EXCEED THAT SHOWN IN THE SIZING CHART ABOVE.
3. AT COMPOST FILTER SOCK JOINTS: OVERLAP ADJOINING ENDS; THE OVERLAP MUST BE A MINIMUM OF 2 FEET; TIGHTLY BUTT TOGETHER THE OVERLAPPING JOINTS; PLACE A STAKE THROUGH EACH END. SEE JOINT DETAIL IN PLAN VIEW ABOVE.
4. TO PREVENT UNDERCUTTING OF THE COMPOST FILTER SOCK, INSPECT SURFACE TO ENSURE FULL CONTACT CAN BE MADE BETWEEN THE BOTTOM OF THE COMPOST FILTER SOCK AND THE SURFACE. TRIM OR REMOVE EXCESS VEGETATION AS REQUIRED TO ENSURE FULL CONTACT IS ACHIEVED.
5. TRAFFIC SHALL NOT BE PERMITTED TO CROSS COMPOST FILTER SOCKS.
6. SOCK PLACED ON EARTHEN SLOPES SHALL BE ANCHORED WITH STAKES DRIVEN THROUGH THE CENTER OF THE SOCK OR IMMEDIATELY DOWNSLOPE OF THE SOCK AT RECOMMENDED INTERVALS.
7. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE BARRIER AND DISPOSED AT AN APPROPRIATE LOCATION. SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.
8. UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

MSource® ENVIRONMENTAL CONSTRUCTION STANDARDS	COMPOST FILTER SOCK	FIGURE-11 REVISED 10/2023 NOT TO SCALE



JOINING FENCE SECTIONS



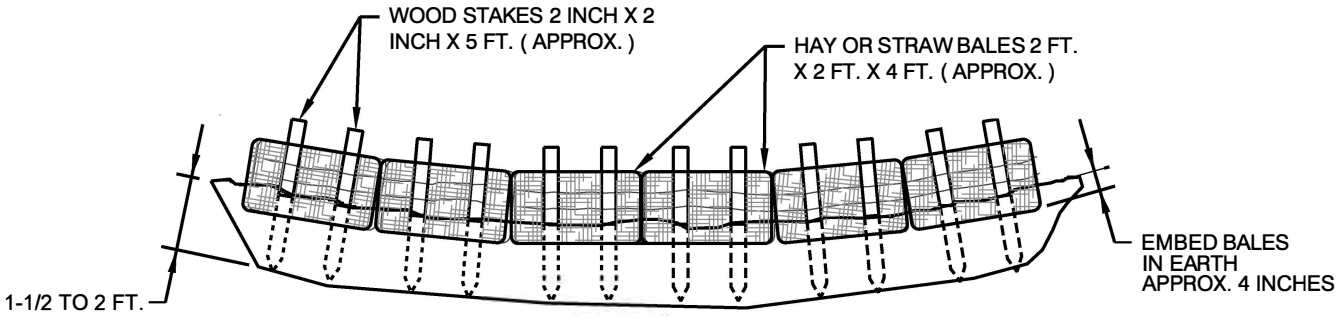
SECTION VIEW

MAXIMUM SLOPE LENGTH FOR SILT FENCE

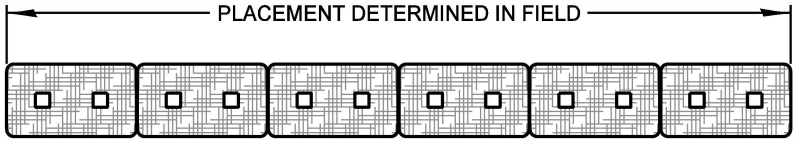
SLOPE - PERCENT	MAXIMUM SLOPE LENGTH (FT.) ABOVE FENCE
	STANDARD (18" HIGH) SILT FENCE
2 (OR LESS)	100
5 - 10	50
10 - 20	25
20 - 40	15
40 - 50	10

NOTES:

1. FABRIC SHALL HAVE THE MINIMUM PROPERTIES AS REQUIRED BY STATE SPECIFIC SPECIFICATIONS. FABRIC SHALL BE IN USE NO LONGER THAN THE MANUFACTURERS RECOMMENDED LIFE SPAN AND SHALL BE REPLACED WITH NEW FABRIC AFTER THE LIFE SPAN HAS BEEN EXCEEDED.
2. FABRIC WIDTH SHALL BE 30 IN. MINIMUM. STAKES SHALL BE HARDWOOD OR EQUIVALENT STEEL (U OR T) STAKES.
3. SILT FENCE SHALL BE PLACED AT LEVEL EXISTING GRADE. BOTH ENDS OF THE FENCE SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT.
4. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH HALF THE ABOVE GROUND HEIGHT OF THE FENCE.
5. ANY SECTION OF SILT FENCE WHICH HAS BEEN UNDERMINED OR TOPPED SHALL BE IMMEDIATELY REPLACED WITH A ROCK FILTER OUTLET.
6. FENCE SHALL BE REMOVED AND PROPERLY DISPOSED OF WHEN TRIBUTARY AREA IS PERMANENTLY STABILIZED.
7. SILT FENCE THAT HAS BECOME CLOGGED WITH SEDIMENT AND CAN NO LONGER BE CLEANED SHALL BE REPLACED.
8. TOE ANCHOR TRENCH MEASUREMENTS MAY BE REDUCED IN STATE SPECIFIC INSTANCES:
   VIRGINIA = 4" VERT. x 4" HORZ.
   PENNSYLVANIA & KENTUCKY = 6" VERT. x 6" HORZ.
   INDIANA = 8" VERT. x 4" HORZ.
   OHIO & MARYLAND = 8" VERT.



SIDE VIEW



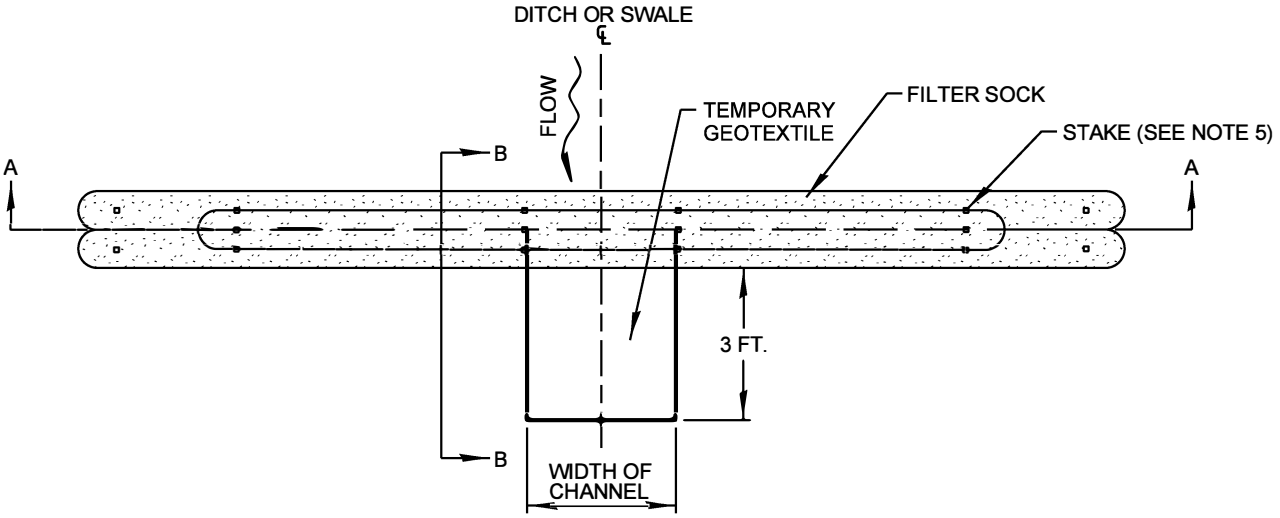
PLAN VIEW

MAXIMUM SLOPE LENGTH FOR STRAW BALE BARRIERS AND WOOD CHIP FILTER BERMS

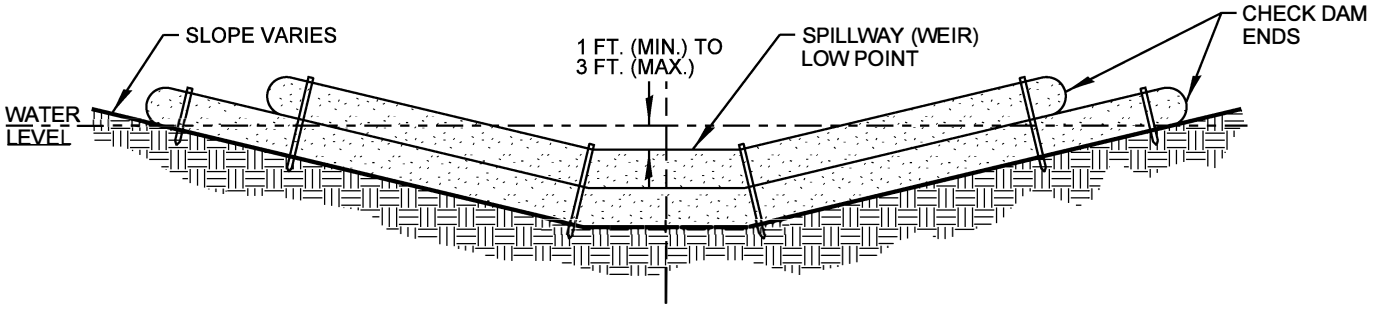
SLOPE - PERCENT	MAXIMUM SLOPE LENGTH (FT.) ABOVE BARRIER
2 (OR LESS)	150
5	100
10	50
15	35
20	25
25	20
30	15
35	15
40	15
45	10
>50	NOT PERMITTED

NOTES:

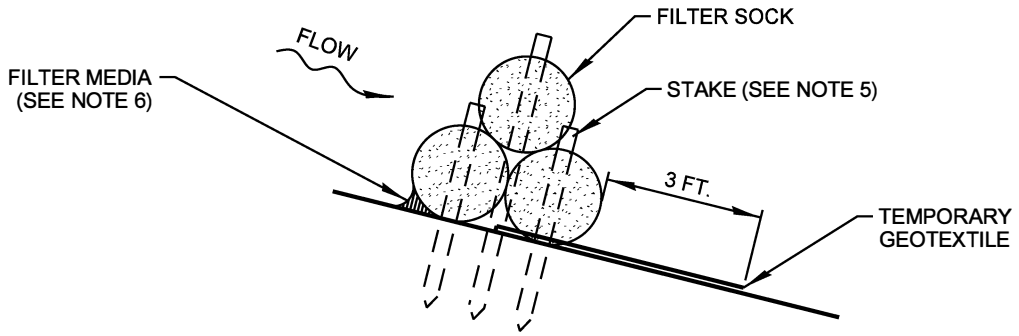
1. STRAW BALE BARRIERS SHALL NOT BE USED AS A PRIMARY SEDIMENT FILTER DEVICE UNLESS SPECIFICALLY AUTHORIZED BY AN ENVIRONMENTAL REPRESENTATIVE AND ALLOWED BY STATE REGULATIONS.
2. STRAW BALE BARRIERS SHALL BE PLACED AT EXISTING LEVEL GRADE WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES. FIRST STAKE OF EACH BALE SHALL BE ANGLED TOWARD ADJACENT BALE TO DRAW BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE TOP OF THE BALE. BOTH ENDS OF THE BARRIER SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT.
3. COMPACTED BACKFILL SHALL EXTEND APPROXIMATELY 4 INCHES ABOVE GROUND LEVEL.
4. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE ABOVEGROUND HEIGHT OF THE BARRIER. DAMAGED OR DETERIORATED BALES SHALL BE REPLACED IMMEDIATELY UPON INSPECTION.
5. ANY SECTION OF STRAW BALE BARRIER WHICH HAS BEEN UNDERMINED OR TOPPED SHALL BE IMMEDIATELY REPLACED WITH A ROCK FILTER OUTLET.
6. BALES SHALL BE REMOVED AND PROPERLY DISPOSED OF WHEN AREA IS PERMANENTLY STABILIZED.



PLAN VIEW



SECTION A-A



SECTION B-B

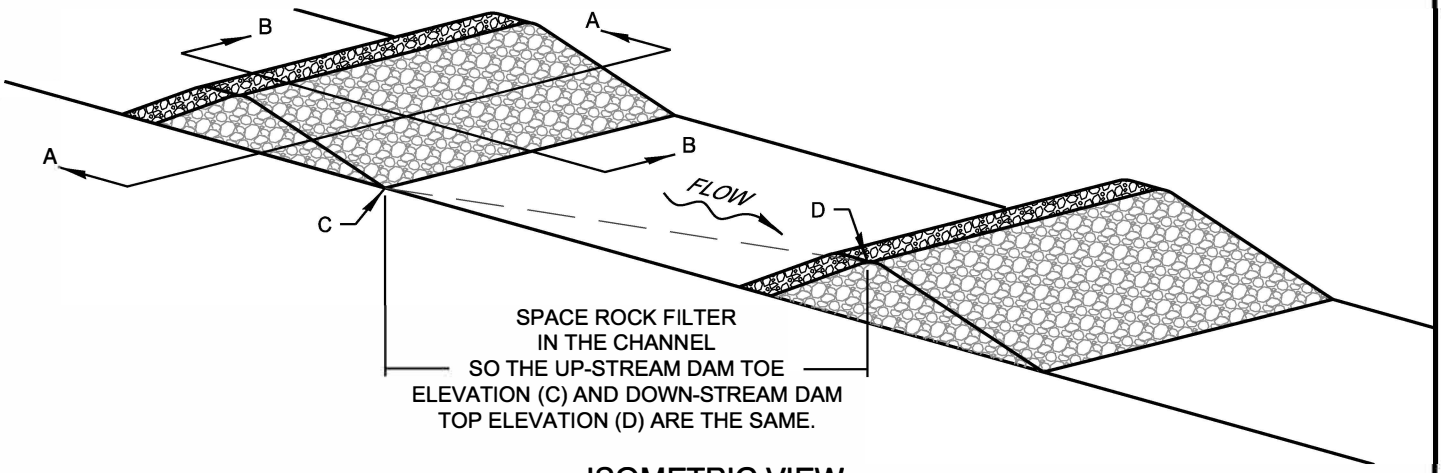
NOTES:

1. CHECK DAMS SHALL BE PLACED PERPENDICULAR TO THE FLOW OF WATER.
2. CHECK DAM ENDS SHALL BE POSITIONED AS SHOWN SUCH THAT STORM WATER FLOWS OVER THE WEIR LOW POINT AND DOES NOT FLOW AROUND ENDS.
3. CHECK DAMS SHALL REMAIN IN PLACE UNTIL ALL UPSTREAM AREAS BECOME STABLE.
4. FILTER SOCK SHALL BE SECURED AS SHOWN OR IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
5. STAKE LENGTH SHALL BE SUFFICIENT TO WEDGE FILTER SOCK TO THE GROUND TO PREVENT MOVEMENT AND UNDERCUTTING.
6. WHEN UNDERCUTTING IS IDENTIFIED, COMPACTED FILTER STONE SHALL BE PLACED AS SHOWN.

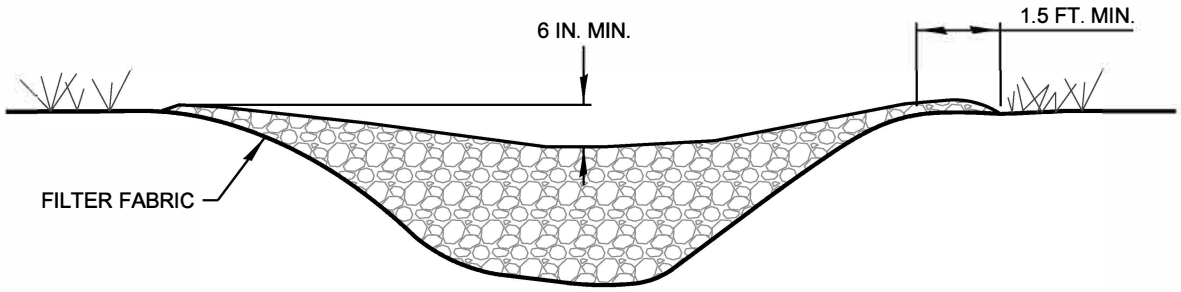
MSource®
ENVIRONMENTAL CONSTRUCTION STANDARDS

FILTER SOCK CHECK DAM FOR DITCH OR SWALE

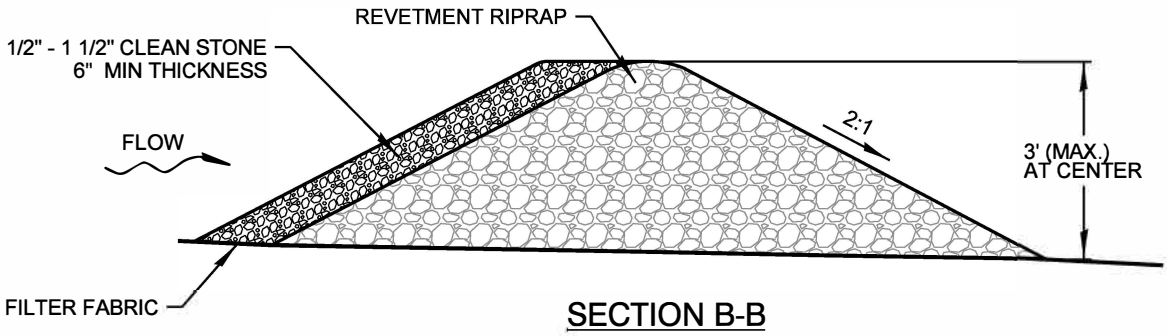
FIGURE-14
REVISED 10/2023
NOT TO SCALE



ISOMETRIC VIEW



SECTION A-A



SECTION B-B

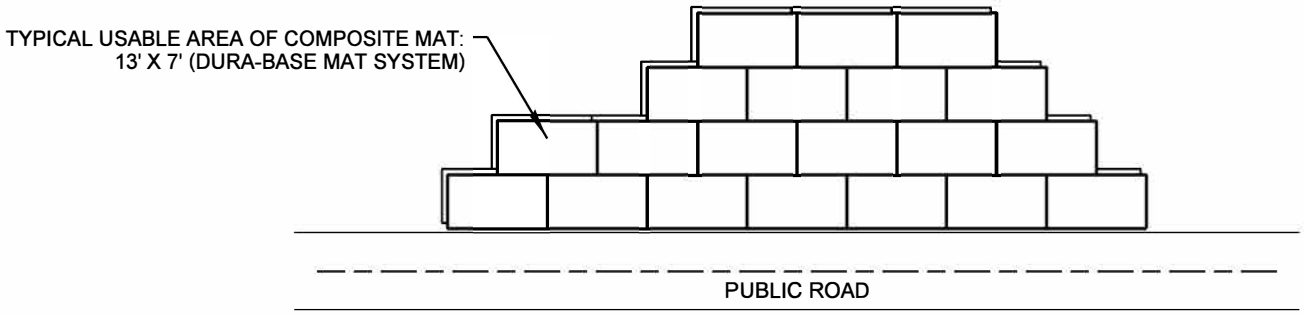
NOTES:

1. THIS DETAIL TO BE USED TO CONTROL RUNOFF WITHIN CONSTRUCTED CHANNELS.
2. CONTRIBUTING DRAINAGE AREA: 2 ACRES MAXIMUM. DAM CENTER: 3 FT. MAXIMUM HEIGHT BUT AT LEAST 6 IN. LOWER THAN THE OUTER EDGES AT NATURAL GROUND ELEVATION.
3. DISTANCE BETWEEN DAMS: SPACED SO THE TOE OF THE UPSTREAM DAM IS THE SAME AS ELEVATION AS THE TOP OF THE DOWNSTREAM DAM.
4. DAM SIDE SLOPE: 2:1 OR FLATTER.
5. ROCK FILTERS SHOULD BE CONSTRUCTED WITH RIPRAP SIZED AS FOLLOWS:
   -FOR CHANNELS WITH TOTAL DEPTH > 3 FEET, USE 6" - 12" ROCK.
   -FOR CHANNELS WITH TOTAL DEPTH BETWEEN 2 AND 3 FEET, USE 3" - 6" ROCK.
6. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH HALF THE HEIGHT OF THE FILTER.

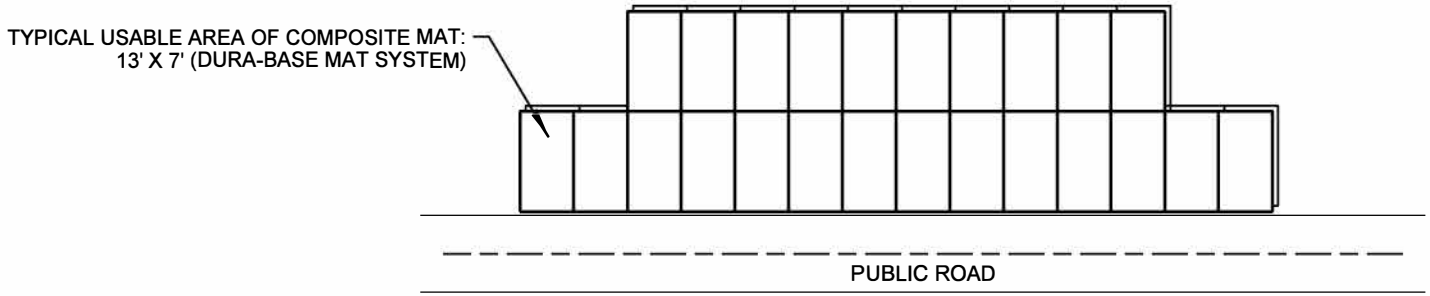
MSource®
ENVIRONMENTAL CONSTRUCTION STANDARDS

ROCK CHECK DAM
FOR DITCH OR SWALE

FIGURE-15
REVISED 10/2023
NOT TO SCALE



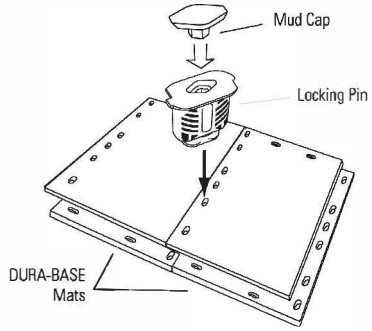
LONGITUDINAL INSTALLATION OF GROUND PROTECTION MATS (PARALLEL TO ROAD)



TRANSVERSE INSTALLATION OF GROUND PROTECTION MATS (PERPENDICULAR TO ROAD)

NOTES:

1. FOR LOW IMPACT SITUATIONS WHERE A ROCK CONSTRUCTION ENTRANCE MAY BE INFEASIBLE. THE USE OF COMPOSITE OR TIMBER GROUND PROTECTION MATS MAY BE USED WITH PRIOR APPROVAL OF NISOURCE NRP STAFF.
2. COMPOSITE GROUND PROTECTION MATS ARE SHOWN IN THE DETAILS OF THIS FIGURE
3. GROUND PROTECTION MATS CAN BE USED TO PROTECT OFF ROAD SURFACES FROM RUTTING DUE TO VEHICLE TRAFFIC. EXPANDED AREAS OF GROUND PROTECTION MATS CAN BE USED AT TEMPORARY EQUIPMENT LAYDOWN AREAS OR FOR TEMPORARY SMALL SOIL STOCKPILING.
4. PLACE GROUND PROTECTION MATS ON FLAT SURFACES.
5. FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS WHEN INSTALLING GROUND PROTECTION MATS. THESE MAY INCLUDE CONNECTING ADJACENT MATS TO EACH OTHER WITH LOCKING PINS. SEE ADJACENT DETAIL.
6. WHEN USING GROUND PROTECTION MATS, MONITOR ADJACENT ROADWAY FOR SIGNS OF SEDIMENT DEPOSITION ON THE ROADWAY. PUBLIC AND PRIVATE ROADS, DRIVES AND OTHER ACCESS ROUTES SHALL BE SWEPT, SHOVELED AND SCRAPPED AS NECESSARY TO PREVENT SEDIMENT FROM BEING TRACKED OR OTHERWISE CARRIED OUTSIDE THE AREA OF DISTURBANCE.



TYPICAL GROUND PROTECTION MAT LOCKING DETAIL

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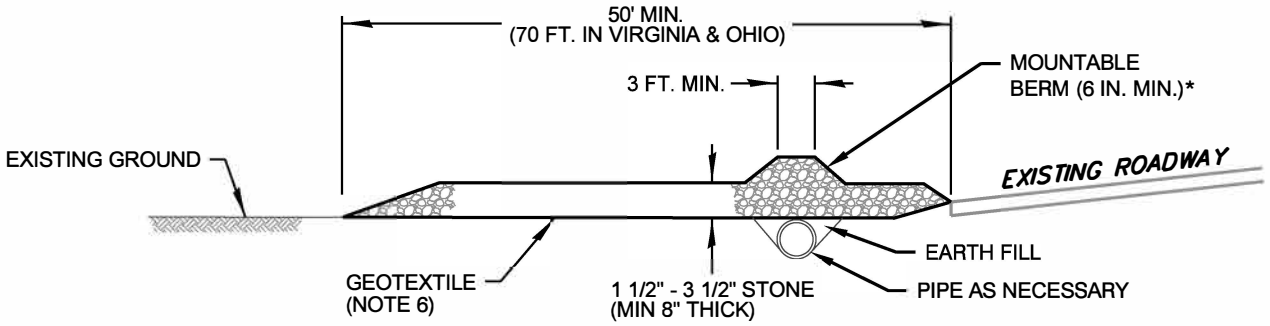
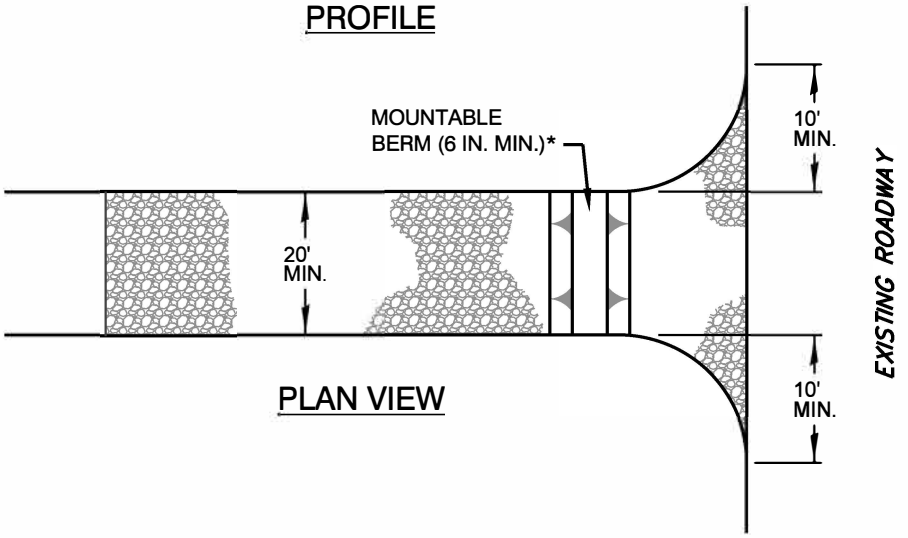
SMALL TIMBER MAT FOR
SURFACE PROTECTION

FIGURE-16
REVISED 10/2023

NOT TO SCALE



PROFILE



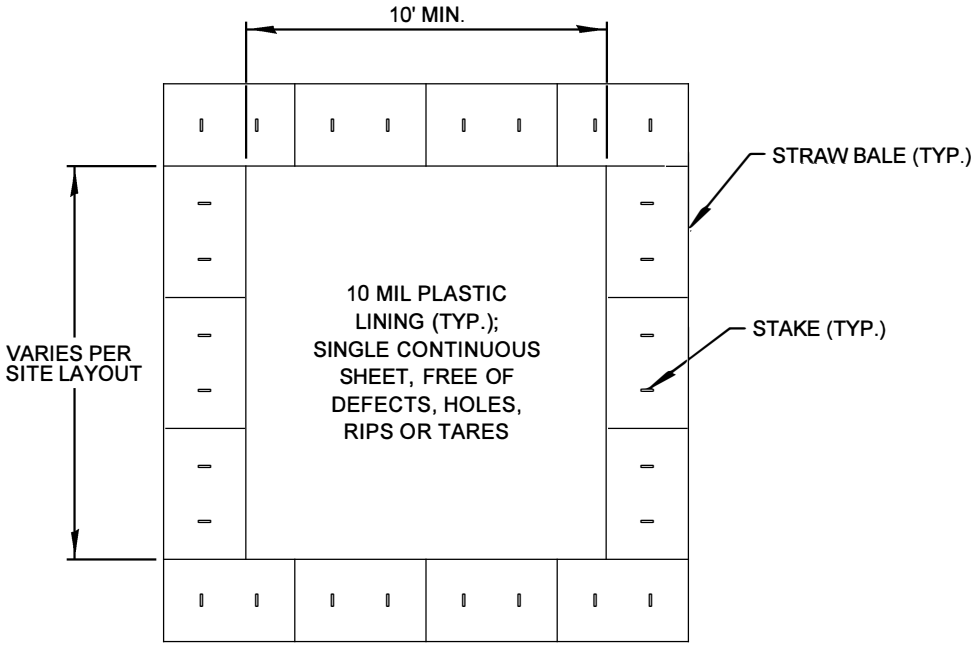
PLAN VIEW

* MOUNTABLE BERM USED TO PROVIDE PROPER COVER FOR PIPE

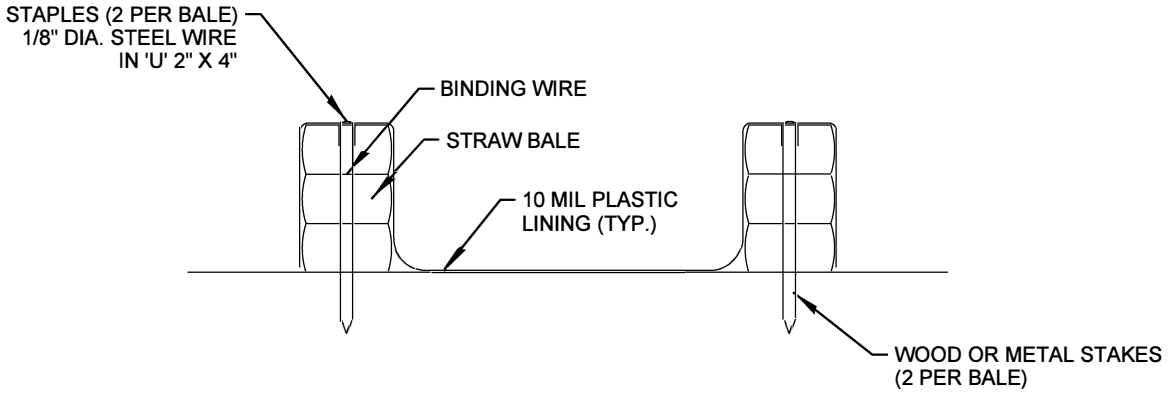
NOTES:

1. REMOVE TOPSOIL PRIOR TO INSTALLATION OF ROCK CONSTRUCTION ENTRANCE. EXTEND ROCK OVER FULL WIDTH OF ENTRANCE.
2. RUNOFF SHALL BE DIVERTED FROM ROADWAY TO A SUITABLE SEDIMENT REMOVAL BMP PRIOR TO ENTERING ROCK CONSTRUCTION ENTRANCE.
3. MOUNTABLE BERM SHALL BE INSTALLED WHEREVER OPTIONAL CULVERT PIPE IS USED AND PROPER PIPE COVER AS SPECIFIED BY MANUFACTURER IS NOT OTHERWISE PROVIDED. PIPE SHALL BE SIZED APPROPRIATELY FOR SIZE OF DITCH BEING CROSSED.
4. MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. IF EXCESSIVE AMOUNTS OF SEDIMENT ARE BEING DEPOSITED ON ROADWAY, EXTEND LENGTH OF ROCK CONSTRUCTION ENTRANCE BY 50 FOOT INCREMENTS UNTIL CONDITION IS ALLEVIATED OR INSTALL WASH RACK. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.
5. ADDITIONAL METHODS FOR DECOMPACTION OF ROCK AND REMOVAL OF SEDIMENT MAY BE ACCEPTABLE. COORDINATE WITH NRP FOR APPROVAL.
6. GEOTEXTILE SPECIFICATIONS SHOULD MEET STATE SPECIFIC REQUIREMENTS.

MSource® ENVIRONMENTAL CONSTRUCTION STANDARDS	ROCK CONSTRUCTION ENTRANCE	FIGURE-17 REVISED 10/2023 NOT TO SCALE



PLAN



SECTION

NOTES:

1. CONCRETE WASHOUT FACILITIES SHALL BE INSTALLED PRIOR TO PLACEMENT OF CONCRETE ON SITE.
2. NEVER ALLOW WASH-OUT LIQUIDS TO FLOW DIRECTLY ONTO THE GROUND OR INTO DRAINS.
3. NEVER MIX OR TRANSFER CONCRETE WHILE ABOVE OR IMMEDIATELY TO THE SIDE OF STORM DRAINS.
4. RECYCLE OR REUSE EXCESS CONCRETE MIX WHENEVER POSSIBLE.
5. LOCATE WASHOUTS SO THEY ARE AT LEAST 50 FEET AWAY FROM STORM DRAINS, WETLANDS AND WATERWAYS.
6. LOCATE CONTAINMENT IN FLAT AREAS.
7. LOCATE CONTAINMENT IN AREAS THAT PROVIDE ACCESS FOR VEHICLES/EQUIPMENT THAT WILL BE UTILIZING THE WASHOUT FACILITY.
8. THE STORAGE VOLUME OF THE CONTAINMENT STRUCTURE FOR THE WASHWATER SHOULD CORRELATE TO THE ANTICIPATED AMOUNT OF PLASTIC CEMENTITIOUS MATERIALS USED FOR CONSTRUCTION.
9. ENSURE THERE ARE LABELS OR SIGNS ON THE WASH-OUT CONTAINERS TO SHOW WHAT TYPE OF WASTE IS IN THEM.
10. USE SPILL KIT MATERIALS OR SOIL DIKES TO CONTAIN SPILLS OF CONCRETE WASH-OUT LIQUIDS.
11. USE APPROVED CONTAINMENTS SUCH AS ON-SITE CONSTRUCTED ABOVE-GRADE STRUCTURE (SHOWN ABOVE), COMMERCIALLY AVAILABLE SLURRY SACKS/PACKS, AND LINED CONTAINERS DESIGNED TO RECEIVE CONCRETE WASH-OUT LIQUIDS AND CONCRETE WASTE. ON-SITE CONSTRUCTED BELOW-GRADE CONTAINMENT STRUCTURES REQUIRE PRE-APPROVAL BY NISOURCE NRP STAFF.

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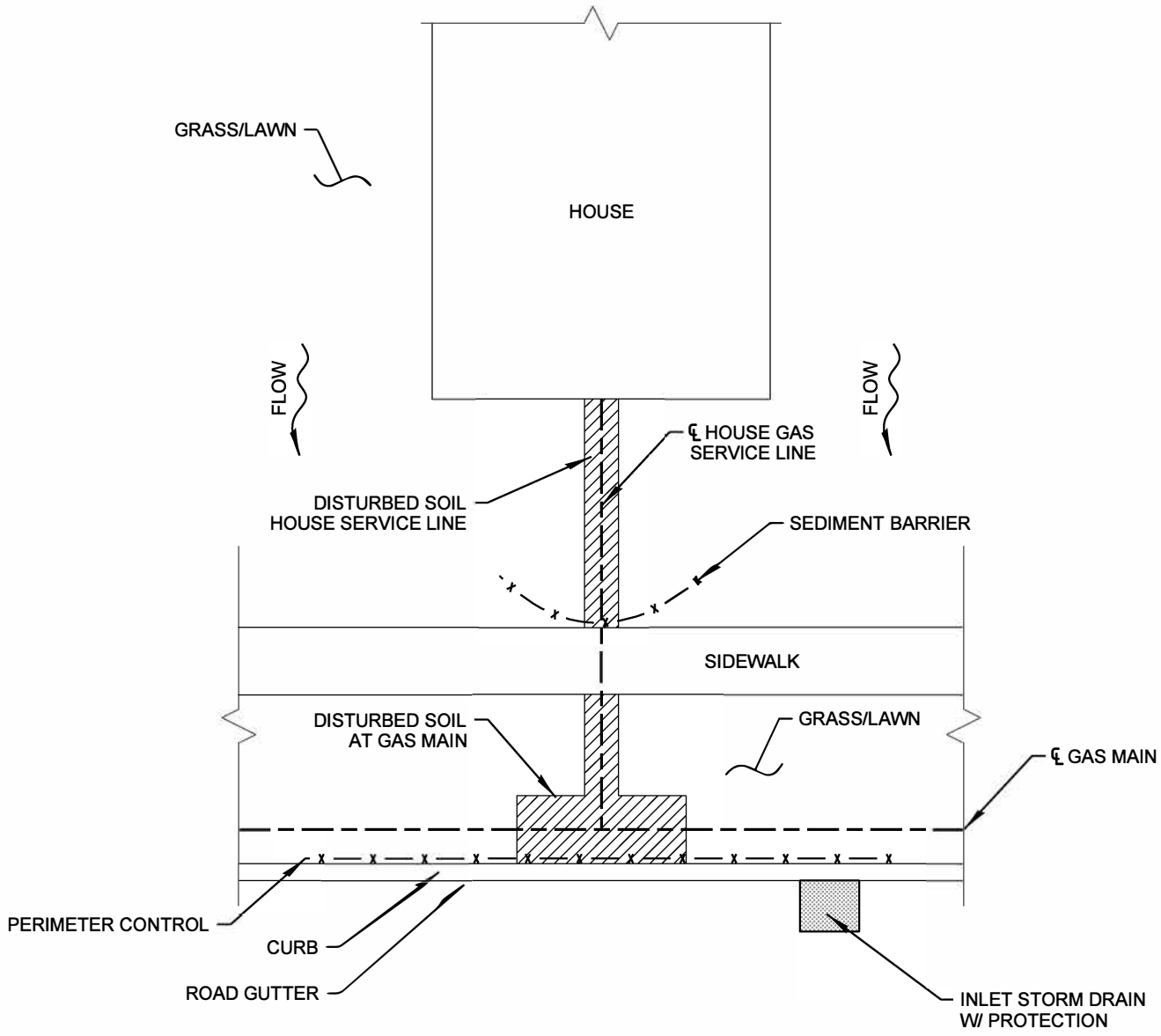
CONCRETE WASHOUT
ON-SITE CONSTRUCTED
ABOVE-GRADE

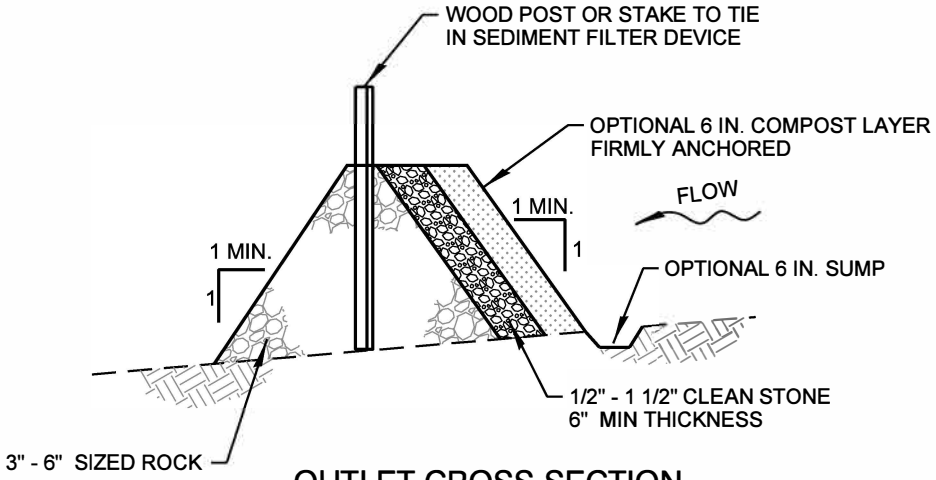
FIGURE-18
REVISED 10/2023
NOT TO SCALE



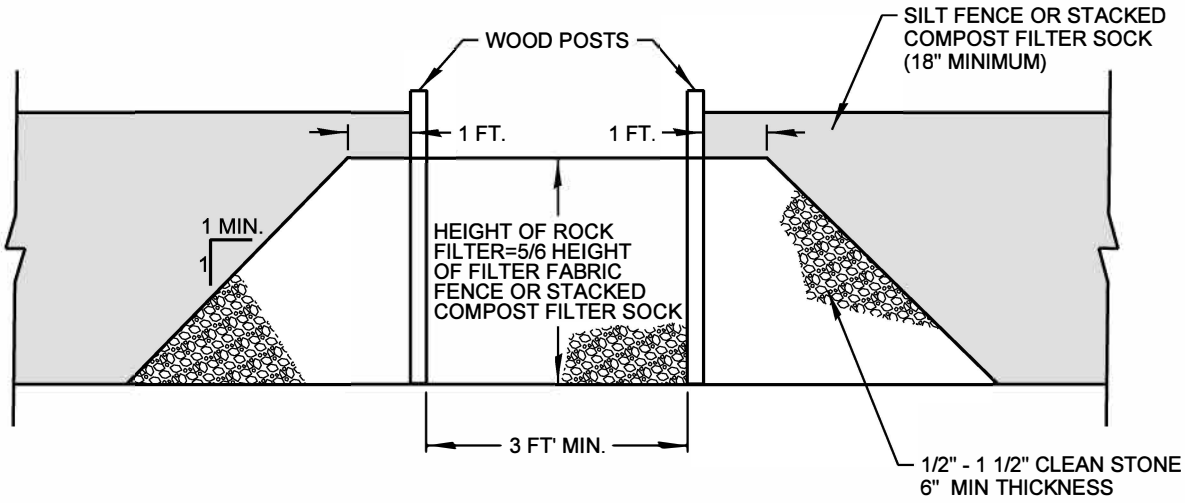
NOTES:

1. INSTALL SEDIMENT BARRIER AS SHOWN WHEN DISTANCE BETWEEN CURB AND DISTURBED SOIL IS LESS THAN 24" OR NO VEGETATION IS PRESENT.
2. TEMPORARY STABILIZE DISTURBED AREAS AT THE END OF EACH WORK DAY UNLESS PERIMETER CONTROLS ARE INSTALLED.

MSource® ENVIRONMENTAL CONSTRUCTION STANDARDS	TYPICAL EROSION CONTROL MEASURES FOR GAS SERVICE LINE INSTALLATION	FIGURE-19 REVISED 10/2023 NOT TO SCALE



OUTLET CROSS-SECTION

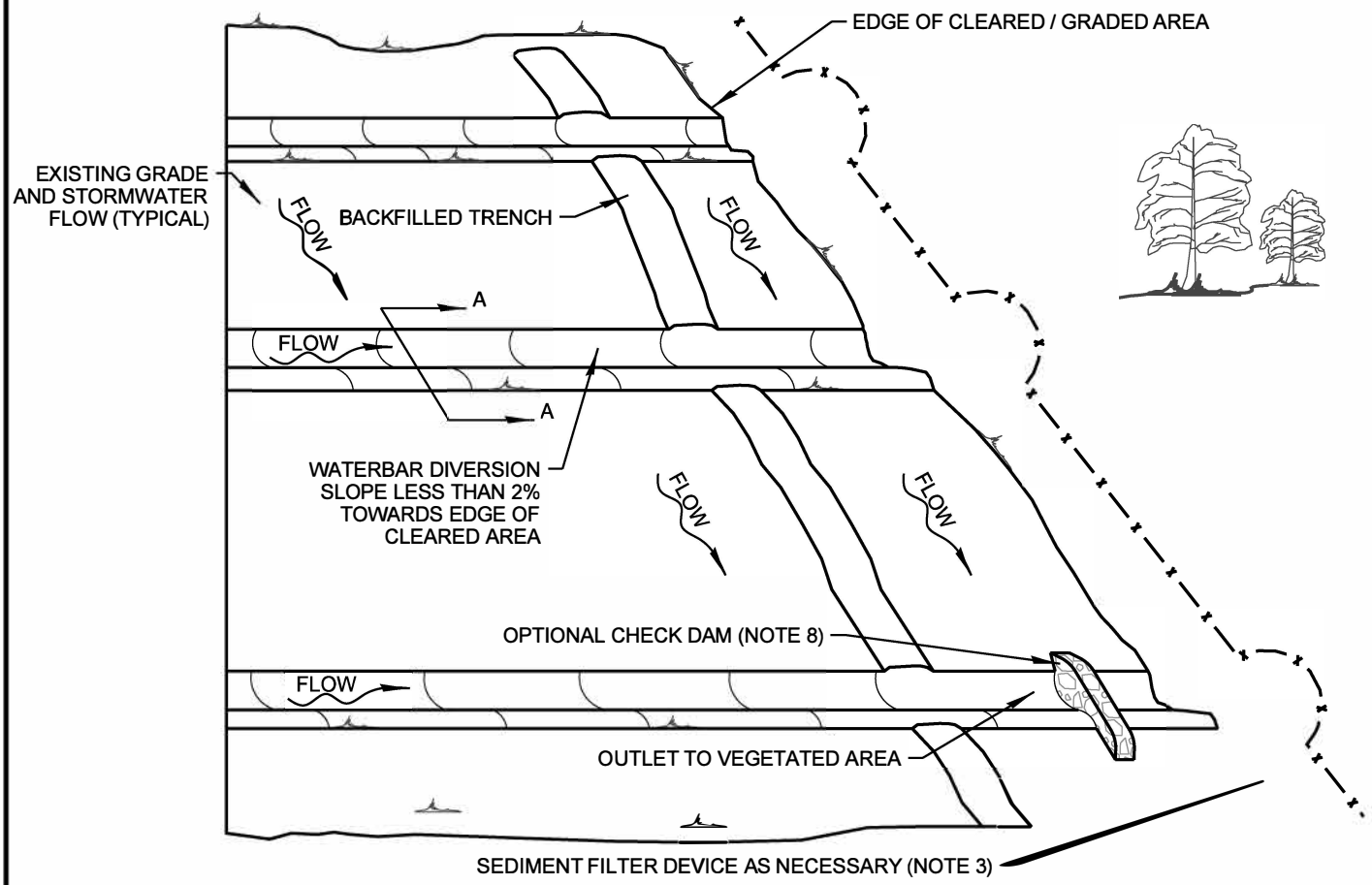


UP-SLOPE FACE

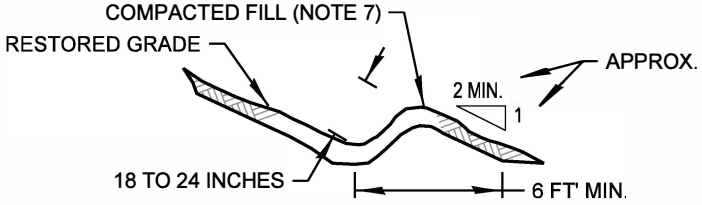
NOTES:

1. A ROCK FILTER OUTLET SHALL BE INSTALLED WHERE FAILURE OF A SILT FENCE OR STRAW BALE BARRIER HAS OCCURRED DUE TO CONCENTRATED FLOW. ANCHORED COMPOST LAYER SHALL BE USED ON UPSLOPE FACE IN HIGH QUALITY AND EXCEPTIONAL VALUE WATERSHEDS.
2. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE HEIGHT OF THE OUTLET.

MSource® ENVIRONMENTAL CONSTRUCTION STANDARDS	ROCK FILTER OUTLET FOR CONCENTRATED FLOW	FIGURE-20 REVISED 10/2023 NOT TO SCALE



ISOMETRIC VIEW



FINAL DIVERSION CROSS-SECTION A-A

NOTE 1	
SLOPE	SPACING
<7%	100 FEET
7-25%	75 FEET
25-40%	50 FEET
>40+%	25 FEET
MINIMUM WATERBAR SPACING	

NOTES:

1. SPACING USED FOR BOTH TEMPORARY AND FINAL WATERBAR DIVERSIONS.
2. TEMPORARY WATERBARS WILL BE MAINTAINED DURING THE CONSTRUCTION PHASE UNTIL FINAL WATERBARS ARE INSTALLED.
3. IF EXISTING GROUND COVER IS SPARSE, SECURE SEDIMENT FILTER DEVICE IN OUTLET. IF LARGER DIAMETER FILTER SOCK IS NEEDED BASED ON WATER FLOW VOLUMES, UTILIZE A TRIPLE FILTER SOCK.
4. THE DIVERSION MAY BE EXTENDED UP TO 5 FEET OFF THE ROW, IF NECESSARY, TO PROVIDE AN ADEQUATE OUTLET.
5. DIVERSION OUTLETS WILL ALTERNATE FROM SIDE TO SIDE WHENEVER POSSIBLE.
6. WATERBARS SHALL BE INSPECTED WEEKLY (DAILY ON ACTIVE ROADS) AND AFTER EACH RUNOFF EVENT. DAMAGED OR ERODED WATERBARS SHALL BE RESTORED TO ORIGINAL DIMENSIONS WITHIN 24 HOURS OF INSPECTION.
7. MACHINE OR HAND COMPACTED IN 8" LIFTS.
8. BASED ON FLOW VELOCITIES AT THE WATERBAR OUTLET/DISCHARGE, A ROCK CHECK DAM MAY BE NEEDED TO PROTECT AGAINST EROSION IN THIS CONCENTRATED FLOW SITUATION.

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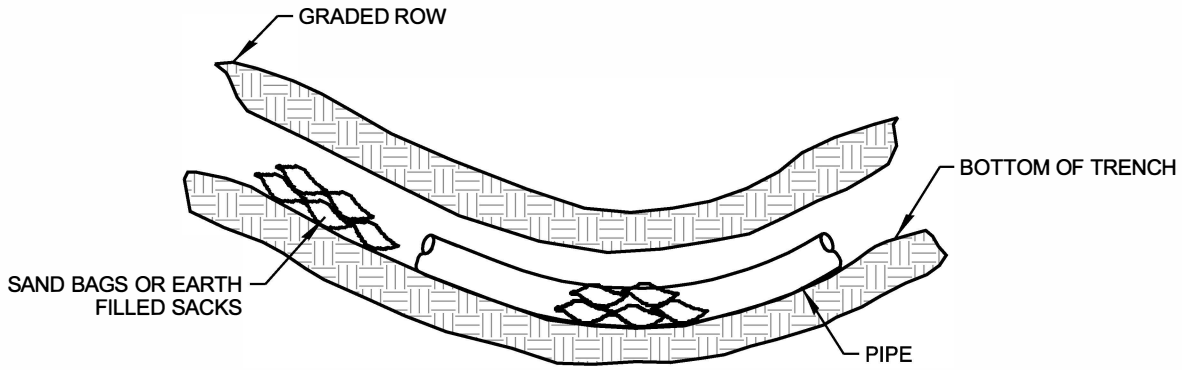
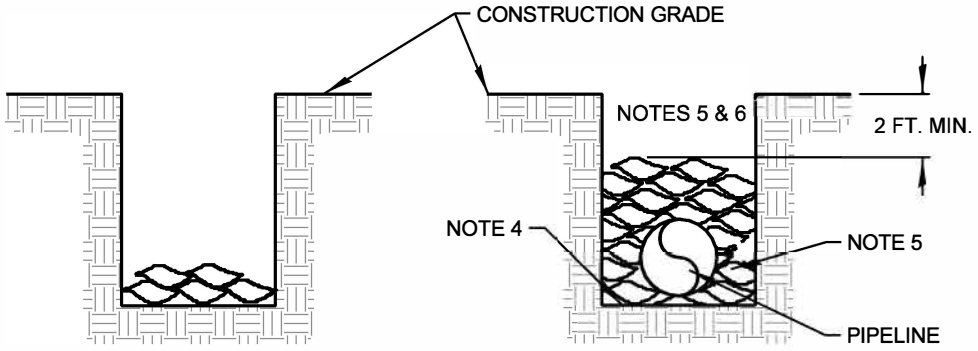
WATERBARS

FIGURE-21
REVISED 10/2023
NOT TO SCALE



SIDE VIEW



BEFORE PIPE INSTALLATION BREAKER

AFTER PIPE INSTALLATION BREAKER

FRONT VIEW

MAXIMUM SPACING AND MATERIAL FOR TRENCH BREAKERS*
(SEE NOTE 1 FOR SPACING REQUIREMENTS ADJACENT TO WETLANDS)

TRENCH SLOPE (%)	SPACING - L (FT)
< 5	1,000*
5 - 15	500
15 - 25	300
25 - 35	200
25 - 100	100
> 100	50

*SEE NOTE 2 FOR EXCEPTION

NOTES:

1. REGARDLESS OF SLOPE, WHEN CROSSING A WETLAND: INSTALL A WATERBAR AND TRENCH BREAKERS AT THE BASE OF SLOPES NEAR THE BOUNDARY BETWEEN THE WETLAND AND ADJACENT UPLAND AREAS. LOCATE THE TRENCH BREAKERS IMMEDIATELY UPSLOPE OF THE WATERBARS.
2. FOR TYPICAL PLASTIC PIPELINE PROJECT WITHIN FLAT AREAS (LESS THAN 5% SLOPE), TRENCH BREAKERS ARE NOT TYPICALLY REQUIRED.
3. TRENCH BREAKERS SHALL BE INSTALLED PER THE SPACING TABLE ABOVE.
4. PRIOR TO LOWERING IN, REMOVE ALL DECOMPOSED MATERIAL AND ROCKS.
5. INSTALL SACKS TO TOP OF TRENCH ON STEEP GRADES THAT ARE NOT USED FOR FARMING.
6. TOP OF TRENCH BREAKERS WILL BE BELOW PLOW DEPTH IN AGRICULTURAL LAND.
7. DOUBLE STAKED HAY / STRAW BALES MAY BE SUBSTITUTED FOR SAND BAGS (EARTH FILLED SACKS) AS TEMPORARY BREAKERS WHERE APPROPRIATE.
8. WHERE BREAKERS ARE ADJACENT TO STREAMS OR WETLANDS, PLUGS SHALL CONSIST OF CLAY, BENTONITE OR CONCRETE FILLED SACKS PER STATE REQUIREMENTS.

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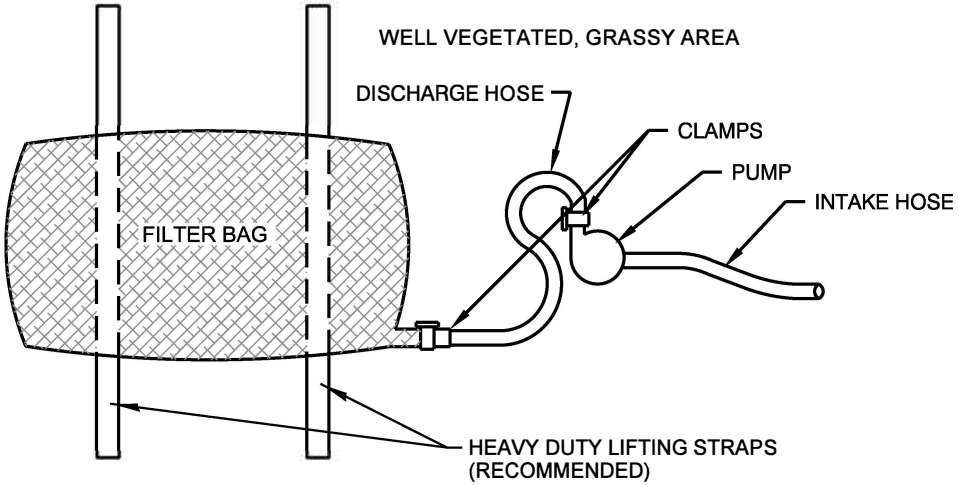
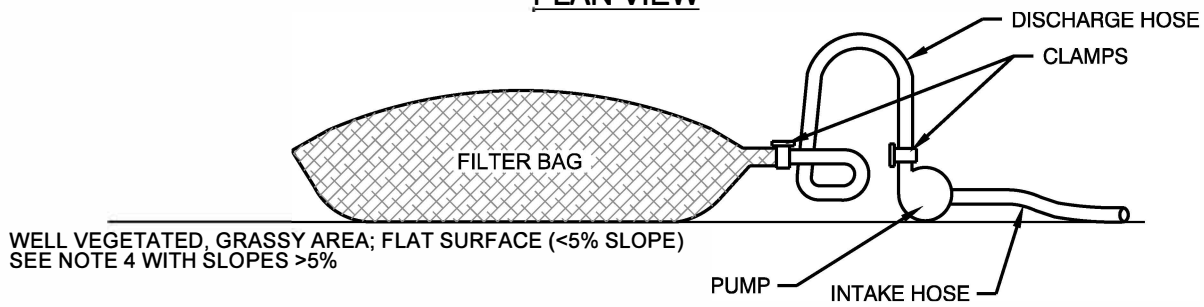
TRENCH BREAKERS AND BARRIERS

FIGURE-22
REVISED 10/2023
NOT TO SCALE



PLAN VIEW

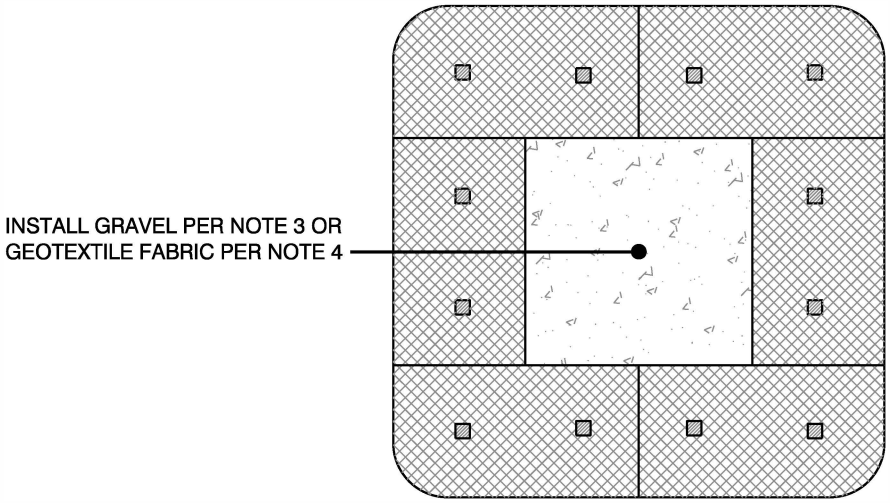


ELEVATION VIEW

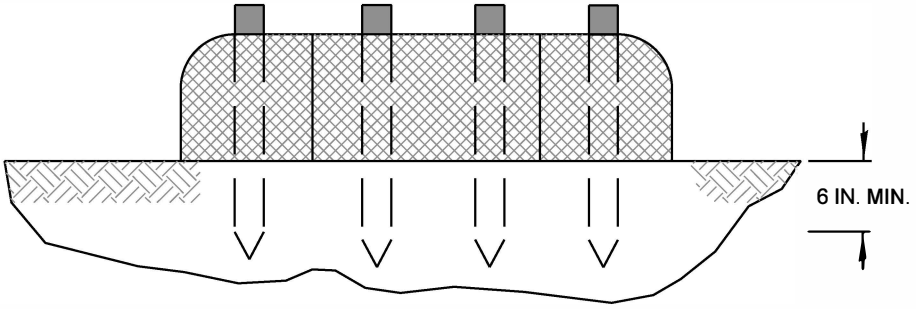
NOTES:

1. LOW VOLUME FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED "J" TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS. FILTER BAGS SHALL BE PROPERLY SIZED; REFER TO THE MANUFACTURER SPECIFICATIONS TO DETERMINE APPROPRIATE SIZE.
2. A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES SHALL BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME 1/2 FULL OF SEDIMENT. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED. BAGS SHALL BE PLACED ON STRAPS TO FACILITATE REMOVAL UNLESS BAGS COME WITH LIFTING STRAPS ALREADY ATTACHED.
3. BAGS SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE UNDERLAYMENT AND FLOW PATH OR SECONDARY CONTAINMENT SHALL BE PROVIDED. BAGS MAY BE PLACED ON FILTER STONE TO INCREASE DISCHARGE CAPACITY. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
4. FOR SLOPES EXCEEDING 5%, CLEAN ROCK OR OTHER NON-ERODIBLE AND NON-POLLUTING MATERIAL SHALL BE PLACED UNDER THE BAG TO REDUCE SLOPE STEEPNESS. THIS IS REQUIRED TO PREVENT ROLLING OF THE FILTER BAG. THE LEVELING PAD (ROCK OR OTHER MATERIAL) MUST EXTEND A MINIMUM OF 1 FOOT BEYOND THE FOOTPRINT OF THE FILTER BAG.
5. NO DOWNSLOPE SEDIMENT BARRIER IS REQUIRED FOR MOST INSTALLATIONS. COMPOST BERM OR COMPOST FILTER SOCK SHALL BE INSTALLED BELOW BAGS LOCATED IN HQ OR EV WATERSHEDS, WITHIN 50 FEET OF ANY RECEIVING SURFACE WATER OR WHERE GRASSY AREA IS NOT AVAILABLE.
6. IF THE FILTER BAG IS LOCATED ON AN IMPERVIOUS SURFACE, A PAD MUST BE PLACED UNDER THE FILTER BAG TO ALLOW/ FACILITATE OUTFLOWS FROM THE FILTER BAG'S BOTTOM SIDE. THIS BELOW BAG DRAINAGE PAD MUST BE A MINIMUM OF 6 INCHES THICK AND CAN BE MADE OF CLEAN ROCK, WOOD MULCH/TREE GRINDINGS,STRAW PAD OF BALES, OR WOOD PALLETS. ALL DRAINAGE PAD MATERIALS MUST BE FREE OF SHARP OBJECTS TO AVOID PUNCTURING THE FILTER BAG.
7. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED. A PIECE OF PVC PIPE IS RECOMMENDED FOR THIS PURPOSE.
8. THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHALL BE FLOATING AND SCREENED.
9. FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED.

MSource® ENVIRONMENTAL CONSTRUCTION STANDARDS	PUMPED WATER FILTER BAG DEWATERING DEVICE	FIGURE-23 REVISED 10/2023 NOT TO SCALE



PLAN VIEW

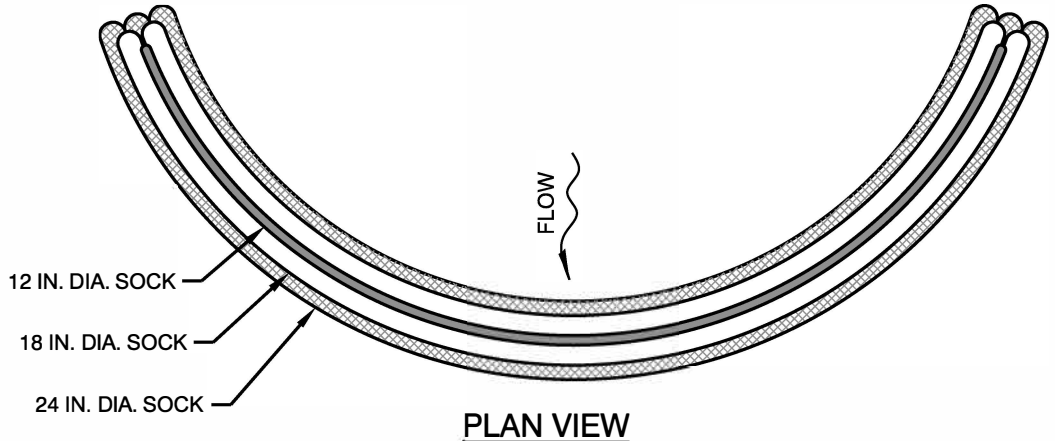


SIDE VIEW

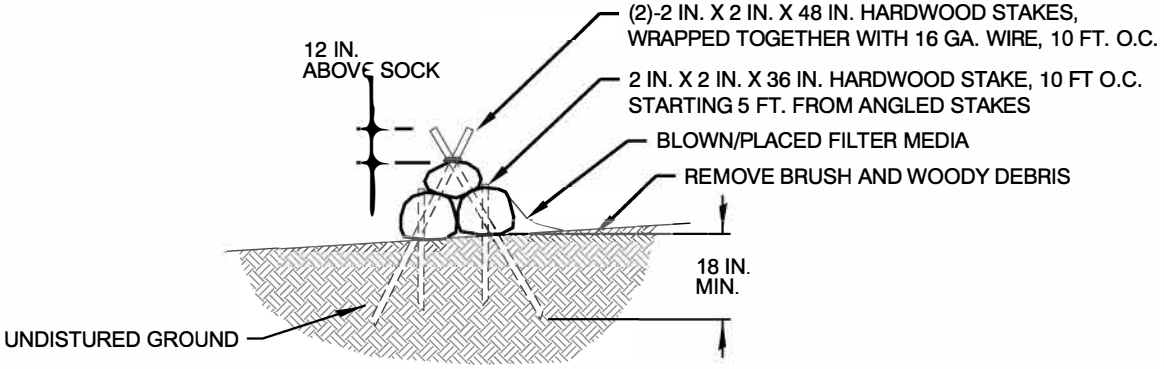
NOTES:

1. INSTALL BALES AS SHOWN. IF ADDITIONAL STORAGE VOLUME IS NECESSARY, SECURE ADDITIONAL BALES ON TOP OF INITIAL BOTTOM LAYER AND/OR BY INCREASING THE NUMBER BALES IN BOTTOM LAYER.
2. SECURE EACH BALE & EACH LAYER OF BALES USING EITHER TWO REBARS OR TWO WOODEN STAKES PER BALE.
3. PLACE A 5 TO 6 INCH DEEP LAYER OF 3/4 TO 1.0 INCH CLEAN STONE ON GROUND COVER INSIDE BALES.
4. LINE TRAP WITH GEOTEXTILE FABRIC AND SECURE OVER HAY BALES USING STAKES.
5. THE SEDIMENT TRAP WILL NOT BE GREATER THAN TWO BALES IN HEIGHT FOR SIX-BALE BOTTOM CONSTRUCTION WITHOUT ADDITIONAL REINFORCEMENT OF TRAP WALLS.
6. CONSTRUCT DEWATERING STRUCTURE TO ACCOMODATE ANTICIPATED PUMPING RATES:
   EXAMPLE PUMPING RATE = 200 G.P.M.
   STORAGE VOLUME (C.F.) = 16 x 200 G.P.M. = 3,200 C.F.
   HEIGHT OF STRAW BALES STRUCTURE = 3 FEET (2 BALES STACKED)
   INSIDE DIMENSIONS OF STURCURE = 33 x 33 FEET SQUARE

MSource® ENVIRONMENTAL CONSTRUCTION STANDARDS	SEDIMENT TRAP DEWATERING DEVICE	FIGURE-24 REVISED 10/2023 NOT TO SCALE



PLAN VIEW



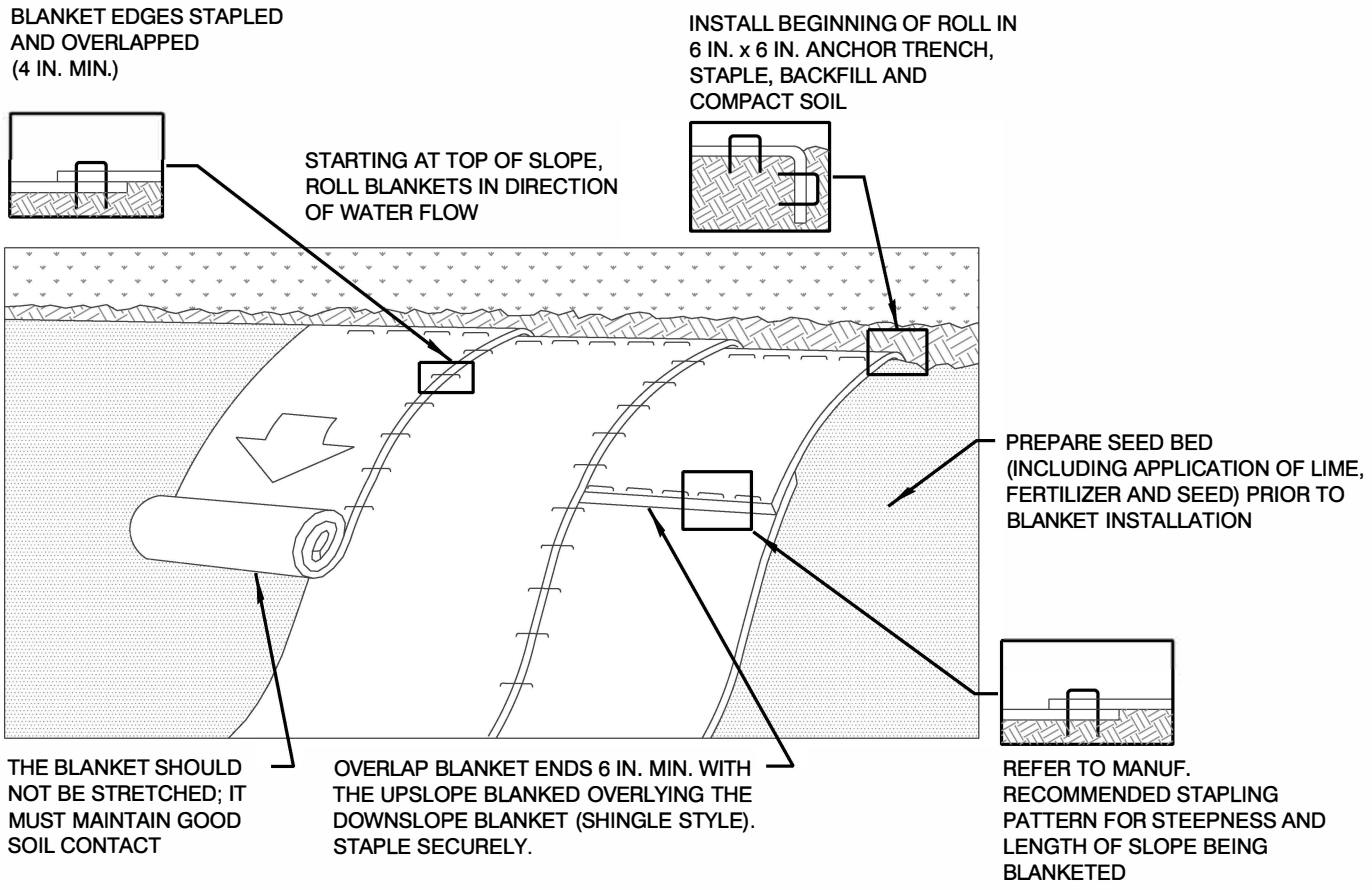
STAKING DETAIL

DESIGN NOTES:

1. COMPOST SOCK SEDIMENT TRAP SHALL BE SIZED TO PROVIDE 2000 CUBIC FEET OF STORAGE CAPACITY FOR EACH ACRE TRIBUTARY TO THE TRAP.
2. MINIMUM BASE WIDTH IS EQUAL TO THE HEIGHT.
3. SEDIMENT ACCUMULATION SHALL NOT EXCEED 1/3 THE TOTAL HEIGHT OF THE TRAP.
4. SOCKS SHALL BE OF LARGER DIAMETER AT THE BASE OF THE TRAP AND DECREASE IN DIAMETER FOR SUCCESSIVE LAYERS AS SHOWN ON THE PLAN VIEW.
5. ENDS OF THE TRAP SHALL BE A MINIMUM OF 1 FOOT HIGHER IN ELEVATION THAN THE MID-SECTION, WHICH SHALL BE LOCATED AT THE POINT OF DISCHARGE.

NOTES:

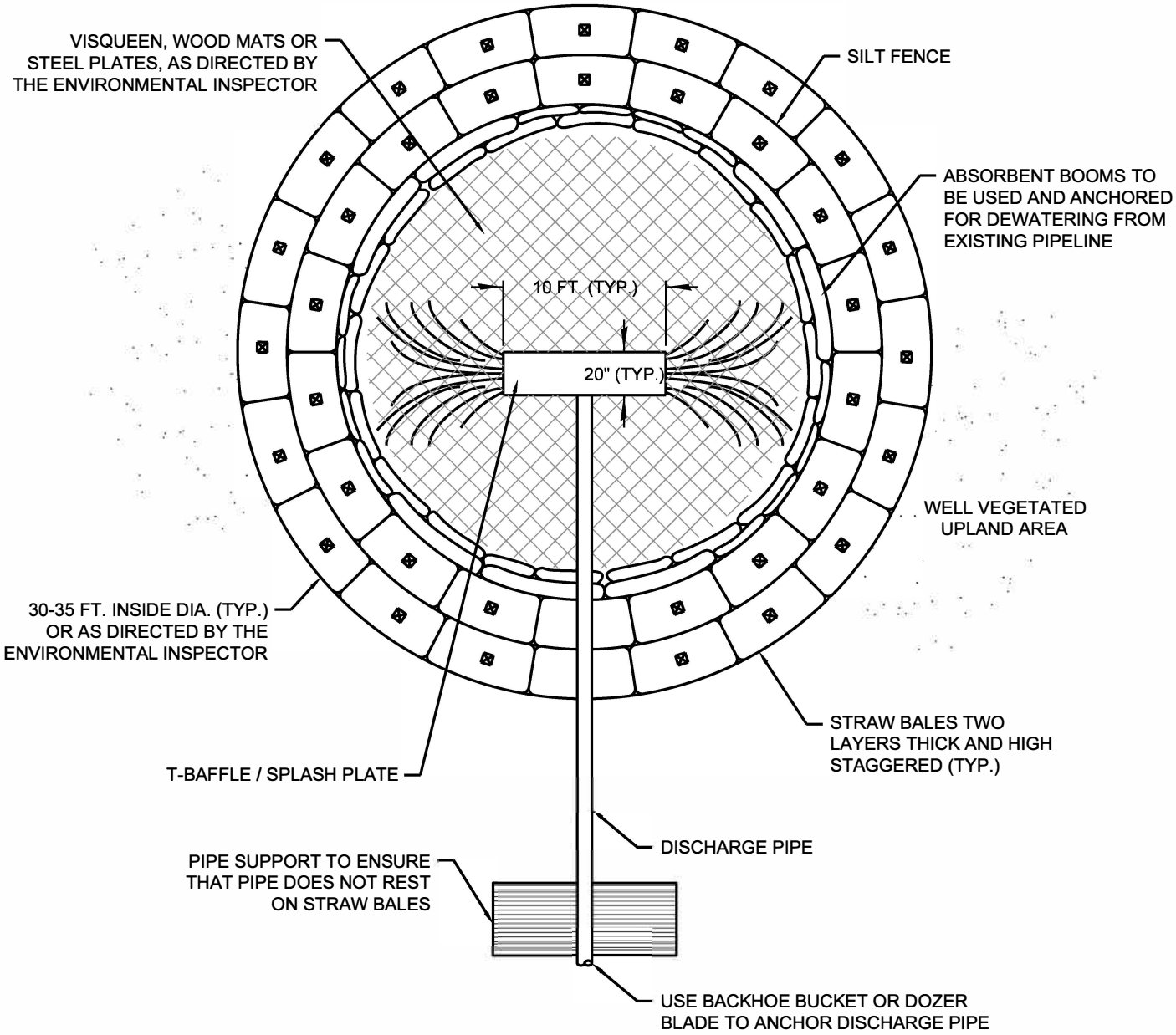
1. COMPOST SOCK SEDIMENT TRAPS SHALL NOT EXCEED THREE SOCKS IN HEIGHT AND SHALL BE STACKED IN PYRAMIDAL FORM AS SHOWN ABOVE. MINIMUM TRAP HEIGHT IS ONE 24" DIAMETER SOCK. ADDITIONAL STORAGE MAY BE PROVIDED BY MEANS OF AN EXCAVATED SUMP 12" DEEP EXTENDING 1 TO 3 FEET UPSLOPE OF THE SOCKS ALONG THE LOWER SIDE OF THE TRAP.
2. COMPOST SOCK SEDIMENT TRAPS SHALL PROVIDE 2,000 CUBIC FEET STORAGE CAPACITY WITH 12" FREEBOARD FOR EACH TRIBUTARY DRAINAGE ACRE. (SEE MANUFACTURER FOR ANTICIPATED SETTLEMENT.)
3. THE MAXIMUM TRIBUTARY DRAINAGE AREA IS 5.0 ACRES. SINCE COMPOST SOCKS ARE "FLOW-THROUGH," NO SPILLWAY IS REQUIRED.
4. COMPOST SOCK SEDIMENT TRAPS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/3 THE HEIGHT OF THE SOCKS.
5. PHOTODEGRADABLE AND BIODEGRADABLE SOCKS SHALL NOT BE USED FOR MORE THAN 1 YEAR.



NOTES:

1. SEED AND SOIL AMENDMENTS SHALL BE APPLIED ACCORDING TO THE RATES IN THE PLAN DRAWINGS PRIOR TO INSTALLING THE BLANKET.
2. PROVIDE ANCHOR TRENCH AT TOE OF SLOPE IN SIMILAR FASHION AS AT TOP OF SLOPE.
3. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS, AND GRASS.
4. BLANKET SHALL HAVE GOOD CONTINUOUS CONTACT WITH UNDERLYING SOIL THROUGHOUT ENTIRE LENGTH. LAY BLANKET LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH SOIL. DO NOT STRETCH BLANKET.
5. THE BLANKET SHALL BE STAPLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. FOR TYPICAL APPLICATIONS WITH A MANUFACTURER'S RECOMMENDATION TO USE 6" METAL STAPLES OR SIMILAR FASTENER TO SECURE THE EROSION CONTROL BLANKET IN PLACE, THE USE OF GREENSTAKE BIODEGRADABLE STAKES CAN BE USED. SINCE GREENSTAKES ARE DESIGNED WITH A LARGER SURFACE AREA AND LARGE BARBS AT THE BASE, THE 4" GREENSTAKE BIODEGRADABLE STAKE IS THE EQUIVALENT OF A 6" METAL STAPLE. FOR LOOSE, SANDY OR UNSTABLE SOILS AND/OR WHEN THE MANUFACTURER'S RECOMMENDATION IS THE USE OF METAL STAPLES LONGER THAN 6", GREENSTAKE FASTENERS SHOULD NOT BE USED WITHOUT PRIOR ENGINEERING APPROVAL.
6. BLANKETED AREAS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT UNTIL PERENNIAL VEGETATION IS ESTABLISHED TO A MINIMUM UNIFORM 70% COVERAGE THROUGHOUT THE BLANKETED AREA. DAMAGED OR DISPLACED BLANKETS SHALL BE RESTORED OR REPLACED WITHIN 4 CALENDAR DAYS.
7. 100% BIODEGRADABLE BLANKET SHOULD BE USED WHEN AVAILABLE AND SHALL BE USED IN ENVIRONMENTALLY SENSITIVE AREAS.

MSource® ENVIRONMENTAL CONSTRUCTION STANDARDS	EROSION CONTROL BLANKET INSTALLATION	FIGURE-26 REVISED 10/2023 NOT TO SCALE



TOP VIEW

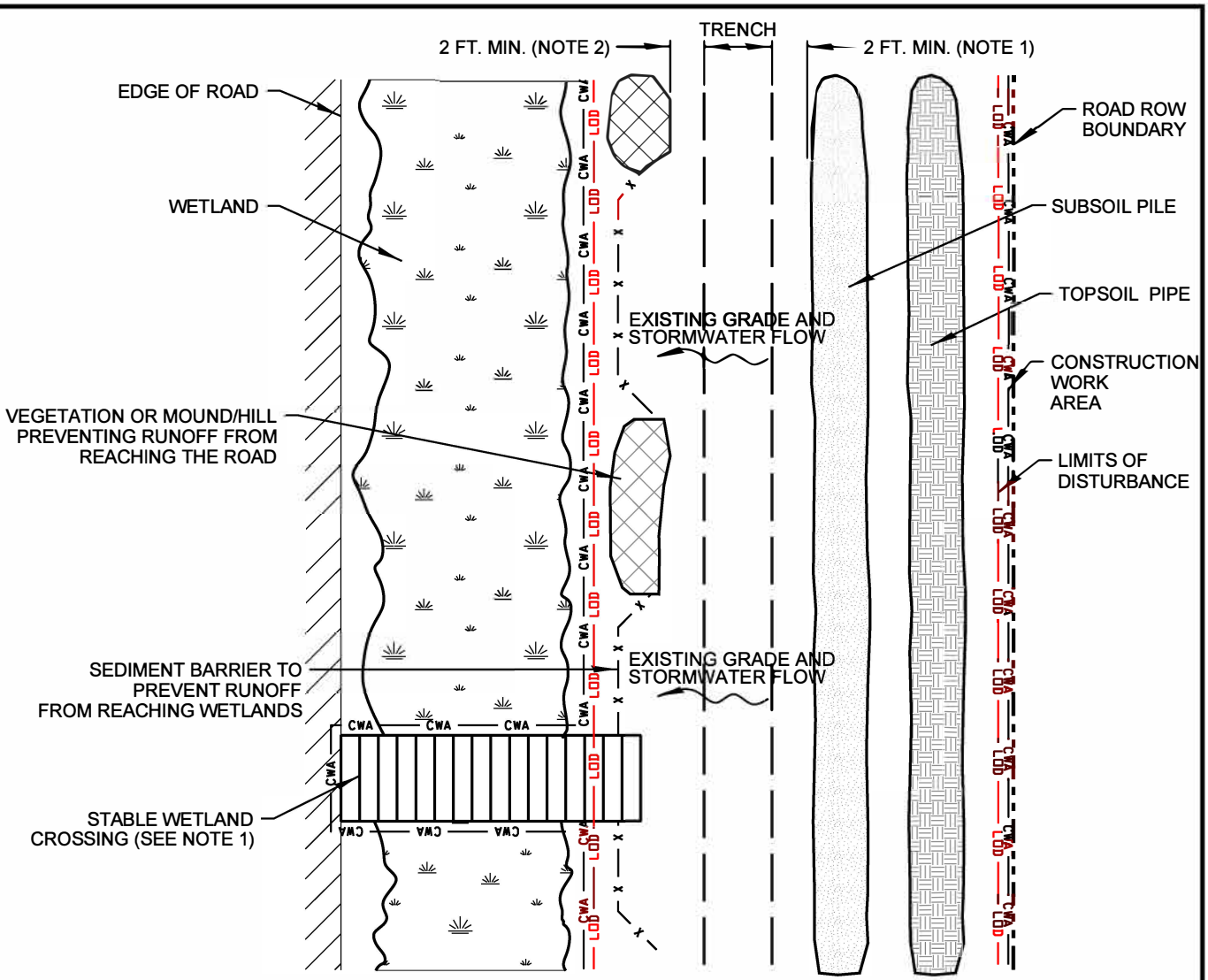
NOTES:

1. THE SHAPE AND CONFIGURATION CAN BE MODIFIED WITH COORDINATION WITH NATURAL RESOURCES PERMITTING COORDINATOR.

MSource®
ENVIRONMENTAL CONSTRUCTION STANDARDS

TYPICAL DEWATERING STRUCTURE FOR HYDROSTATIC TESTING

FIGURE-27
REVISED 10/2023
NOT TO SCALE



NOTES:

1. INSTALL A STABLE WETLAND CROSSING FOR ACCESS ACROSS WETLANDS TO JOBSITE.
2. SPOIL SHALL BE PLACED A MINIMUM OF TWO (2) FEET FROM THE TRENCH PER 29 CFR 1926.650 (j) (2).
3. PERIMETER SEDIMENT BARRIERS SHALL BE PLACED ALONG THE DOWNGRADIENT ROW SLOPE TO PROTECT THE WETLANDS.
4. THE ROADWAY SHALL BE SWEPT AS FREQUENTLY AS NEEDED BUT ALWAYS AT THE END OF EACH WORK DAY TO ENSURE THAT NO DISTURBED EARTH OR CONSTRUCTION MATERIALS ARE LEFT THAT COULD CAUSE SEDIMENT TO MIGRATE FROM THE WORK SITE.
5. TOPSOIL AND SUBSOIL PILES WILL BE ADEQUATELY PROTECTED FROM EROSION AND SEDIMENTATION THROUGH THE USE OF TEMPORARY STABILIZATION (PER ECS REQUIREMENTS) IF THEY WILL REMAIN FOR LONGER THAN ONE DAY.
6. TOPSOIL OR ORGANIC LAYER SEGREGATION SHOULD BE COMPLETED WHEN FEASIBLE, BUT ALTERNATIVES MAY BE REVIEWED WITH ONSITE PERSONNEL AT THE TIME OF CONSTRUCTION.

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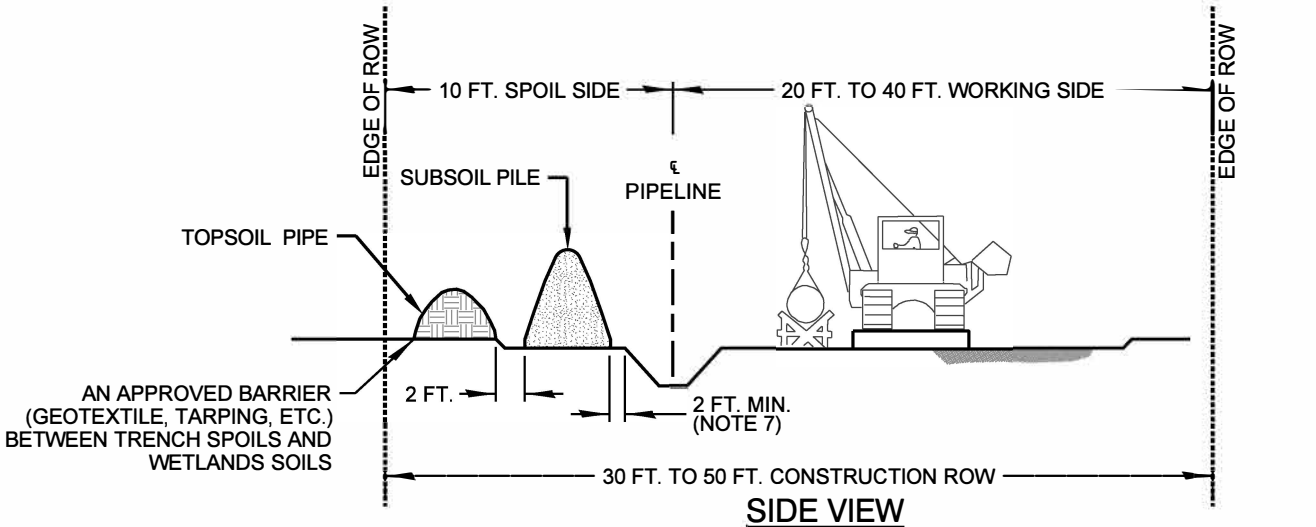
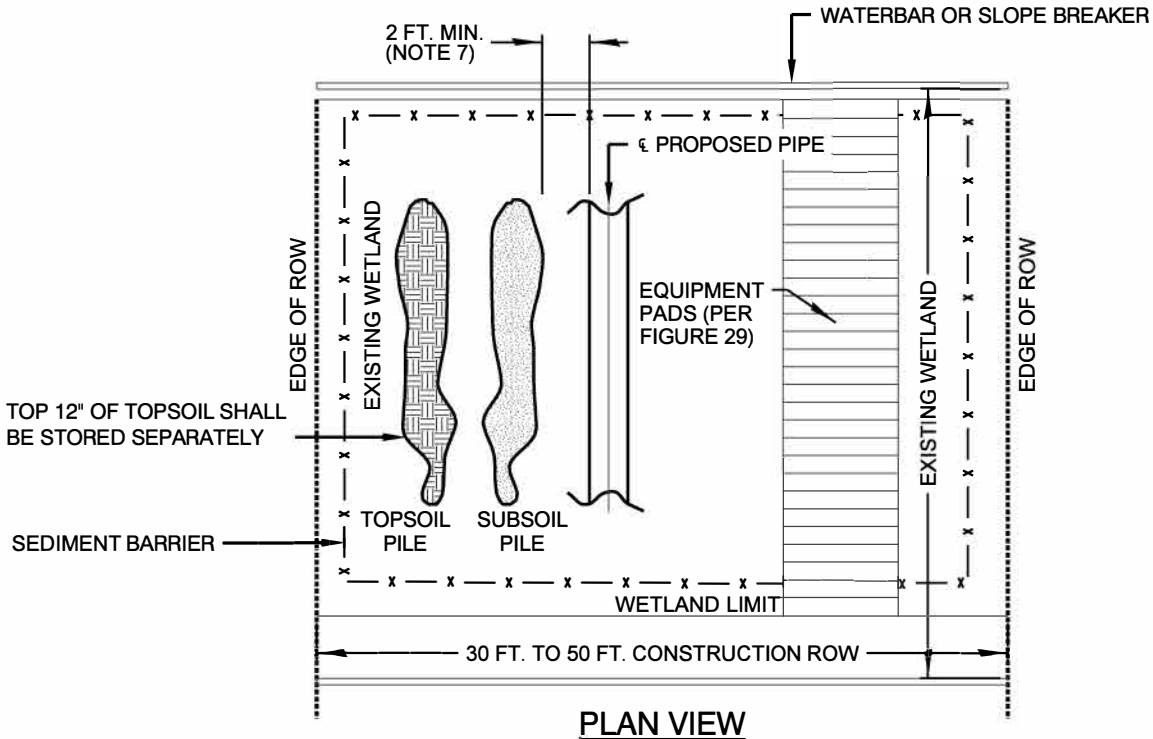
ENVIRONMENTAL CONSTRUCTION STANDARDS

TYPICAL ROADSIDE CONSTRUCTION WITH ADJACENT WETLANDS

FIGURE-28
REVISED 10/2023
NOT TO SCALE



SIDE VIEW

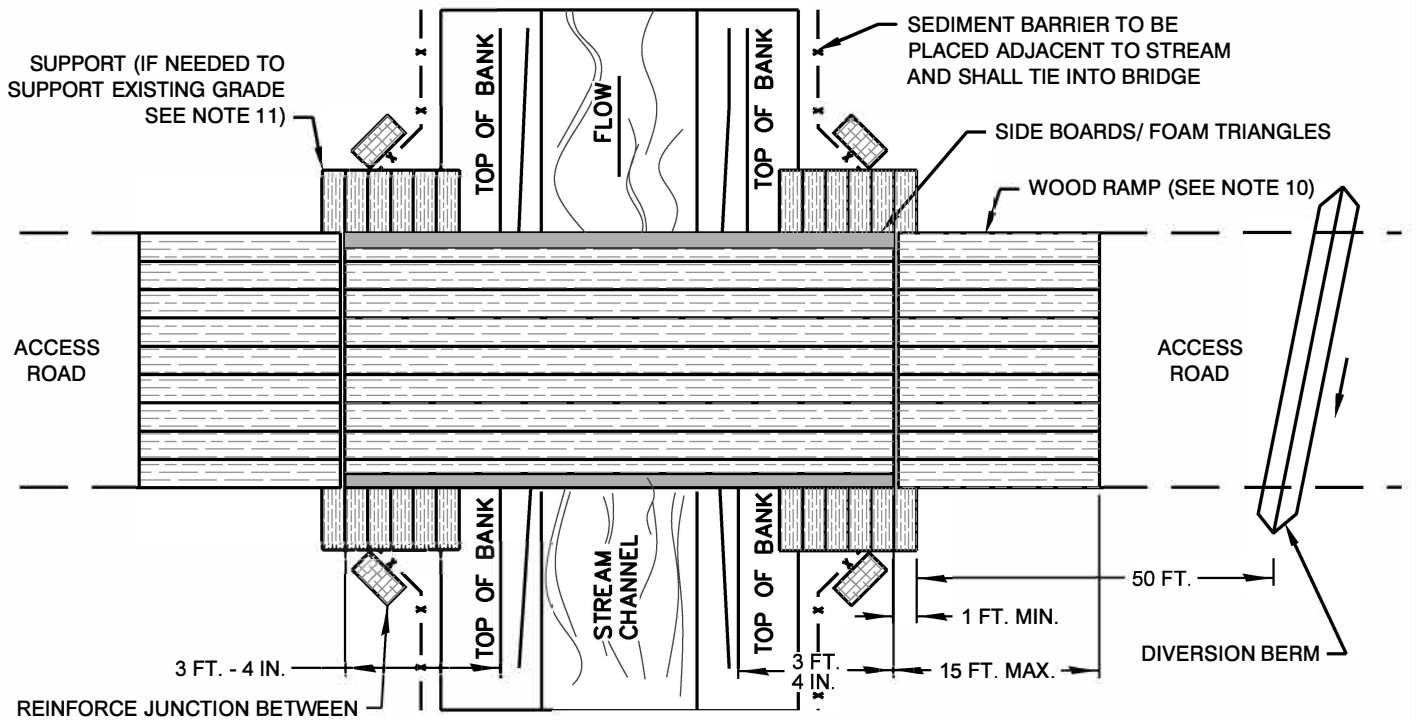


PLAN VIEW

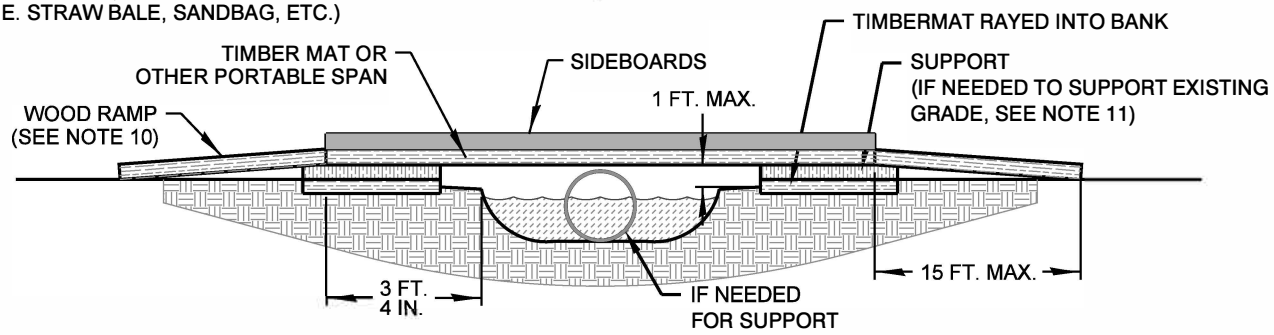
NOTES:

1. THE DIMENSIONS SHOWN ON THIS FIGURE ARE TYPICAL.
2. VARIATIONS FOR STAGING AREAS MAY BE NECESSARY.
3. FILTER FABRIC FENCE INSTALLED ALONG DOWNGRADIENT ROW SLOPE ONLY IF TRENCH REMAINS OPEN LONGER THAN 24 HOURS.
4. A SEDIMENT FILTER DEVICE WILL BE PLACED ACROSS THE ROW AT THE WETLAND EDGE, AS NECESSARY.
5. DEWATERING OF EXCAVATION AREA, IF REQUIRED, WILL BE COMPLETED WITH A PUMP AND PUMPED WATER FILTERED BAG.
6. IF FLOWING OR EXCESS SURFACE WATER IS PRESENT, A FLUME PIPE MAY BE INSTALLED.
7. IN-STREAM WORK, STREAM CROSSINGS, AND EARTH DISTURBANCE WITHIN 50 FEET OF A STREAM REQUIRE PERMIT AUTHORIZATION.
8. SPOIL SHALL BE PLACED A MINIMUM OF TWO (2) FEET FROM THE TRENCH PER 29 CFR 1926.650 (j) (2) AND MUST BE PROTECTED WITH SEDIMENT TRAPPING DEVICE/ MEASURES.

MSource® ENVIRONMENTAL CONSTRUCTION STANDARDS	TYPICAL WETLAND CONSTRUCTION	FIGURE-29 REVISED 10/2023 NOT TO SCALE



PLAN VIEW

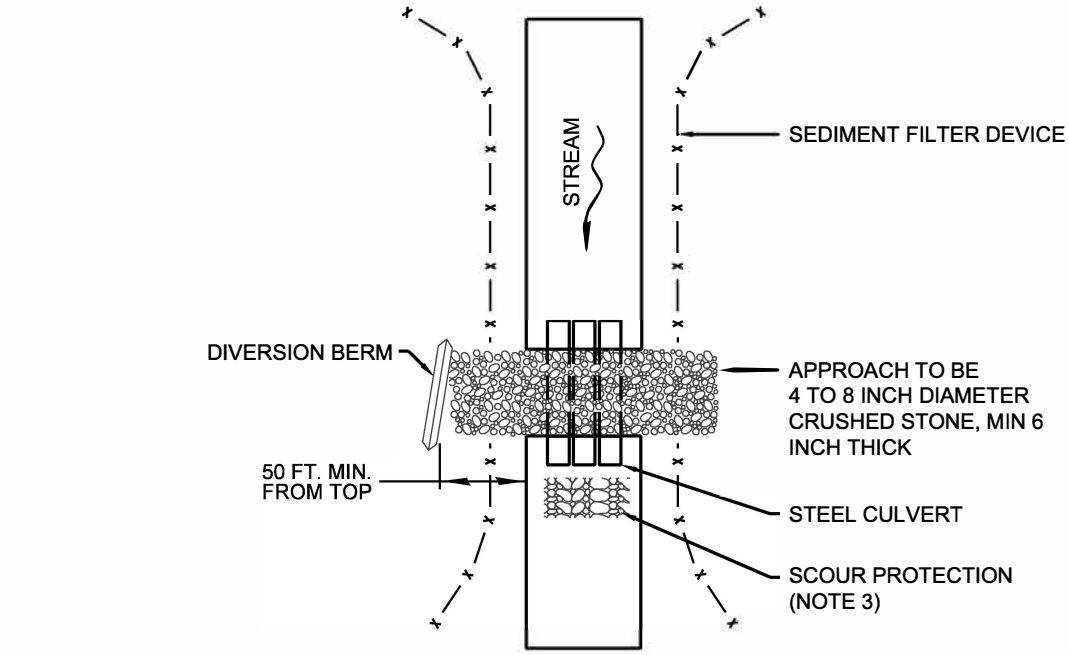


SECTION VIEW

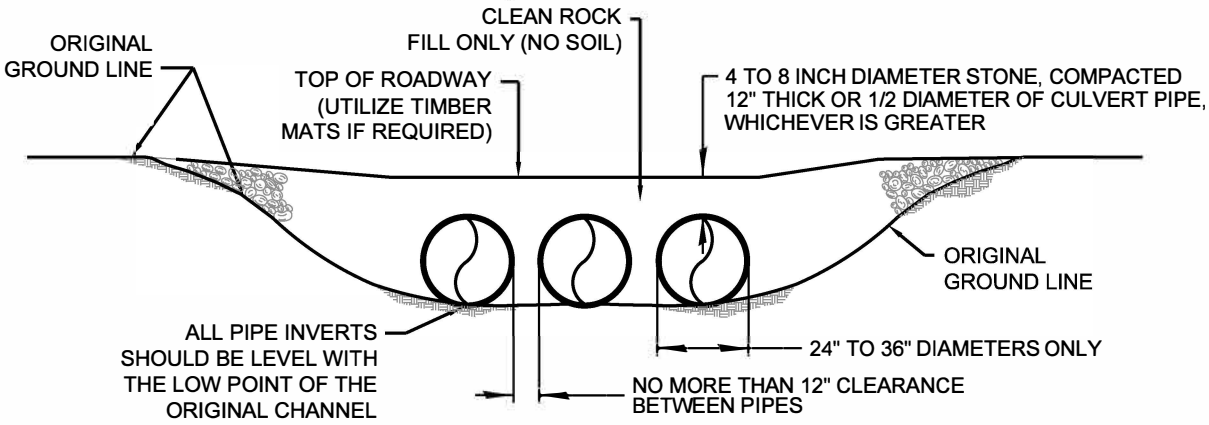
NOTES:

1. CULVERT PIPE CAN BE UTILIZED IF ADDITIONAL SUPPORT IS REQUIRED. ALIGN CULVERT TO PREVENT SCOUR OR BANK EROSION, MUST BE ANCHORED TO STREAM BOTTOM AND MAY NOT BE SUPPORTED WITH FILL. MINIMUM CULVERT DIAMETER 20 INCHES (OR EQUIVALENT).
2. ADDITIONAL PADS CAN BE PUT SIDE BY SIDE IF EXTRA WIDTH IS REQUIRED.
3. STEEL CABLE OR CHAIN SHOULD BE USED TO ANCHOR THE EQUIPMENT PAD TO PREVENT WASH AWAY DURING A STORM EVENT.
4. EQUIPMENT PAD TYPICALLY CONSTRUCTED OF HARD WOOD; MUST ACCOMMODATE THE LARGEST PIECE OF EQUIPMENT BEING USED.
5. PADS MUST BE CONSTRUCTED WITH SIDEBOARDS AND GEOTEXTILE FABRIC PER FIGURE.
6. INSPECT BRIDGE ELEVATIONS SO BRIDGE REMAINS SUPPORTED ABOVE HIGH BANK AND DOES NOT SINK INTO BANK.
7. THE BRIDGE MUST SPAN FROM TOP OF BANK TO TOP OF BANK AND BRIDGE SUPPORTS SHALL BE SET BACK FROM THE TOP OF BANK A SUFFICIENT DISTANCE TO ABOVE DISTURBANCE OF THE CHANNEL BANKS.
8. ADDITIONAL SUPPORT MUST BE ADDED ON TOP OF BANK AND UNDER SPAN IF INITIAL SUPPORT STARTS TO SETTLE; GEOTEXTILE FABRIC SHOULD BE USED UNDER SUPPORTS IN SOFT OR SATURATED SOILS.
9. RAMP APPROACHES CAN EITHER BE GRADED OR DUG INTO GROUND. IF NECESSARY, CRUSHED STONE WILL BE USED TO RAMP UP TO THE EQUIPMENT PADS.
10. IF PHYSICAL CIRCUMSTANCES PROHIBIT WOOD OR METAL RAMPS, EARTHEN RAMPS MAY BE USED AS APPROVED.
11. EARTHEN RAMP CANNOT BE TALLER THAN 1' AND CANNOT EXTEND FOR MORE THEN 15' ON EITHER SIDE OF THE CROSSING.
12. TEMPORARY FILTER DEVICES SHALL BE PLACED ACROSS BRIDGE OPENINGS AT THE END OF EACH DAY.
13. TEMPORARY STREAM CROSSING SHOULD BE INSPECTED ON A DAILY BASIS. DAMAGED CROSSING SHALL BE REPAIRED WITHIN 24 HOURS OF THE INSPECTION. REMOVE ANY DEBRIS RESTRICTING FLOW AND DEPOSIT IT AT AN UPLAND SITE OUTSIDE OF FLOODPLAIN.
14. AS SOON AS THE TEMPORARY CROSSING IS NO LONGER NEEDED, IT SHALL BE REMOVED. ALL MATERIALS SHALL BE DISPOSED OF PROPERLY AND DISTURBED AREAS STABILIZED.
15. IN-STREAM WORK, STREAM CROSSINGS, AND EARTH DISTURBANCE WITHIN 50 FEET OF A STREAM REQUIRE PERMIT AUTHORIZATION.

MSource® ENVIRONMENTAL CONSTRUCTION STANDARDS	TEMPORARY EQUIPMENT CROSSING EQUIPMENT PADS	FIGURE-30 REVISED 10/2023 NOT TO SCALE



PLAN VIEW



SECTION VIEW

NOTES:

1. MINIMUM CONTOURING OF THE BOTTOM AS NECESSARY TO LAY THE CULVERTS LEVEL IS PERMISSIBLE.
2. USE AS MANY CULVERTS AS REQUIRED TO SPAN ENTIRE STREAM BED. (CULVERTS SHALL BE PLACED SIDE BY SIDE)
3. STONES WILL BE PLACED AT THE OUTLET OF ALL CULVERTS TO PROVIDE SCOUR PROTECTION (MIN. ROCK SIZE 8-10 INCHES).
4. MINIMUM CULVERT DIAMETER 20 INCHES.
5. MAINTAIN ROCK AS NOT TO ALLOW MUD TO ENTER THE STREAM.
6. ALIGN CULVERTS TO PREVENT BANK EROSION.
7. TEMPORARY STREAM CROSSINGS SHOULD BE INSPECTED ON A DAILY BASIS. DAMAGED CROSSINGS SHALL BE REPAIRED WITHIN 24 HOURS OF THE INSPECTION AND BEFORE ANY SUBSEQUENT USE. SEDIMENT DEPOSITS ON THE CROSSING OR ITS APPROACHES SHALL BE REMOVED WITHIN 24 HOURS OF THE INSPECTION.
8. AS SOON AS THE TEMPORARY CROSSING IS NO LONGER NEEDED, IT SHALL BE REMOVED. ALL MATERIALS SHALL BE DISPOSED OF PROPERLY AND DISTURBED AREAS STABILIZED.
9. IN-STREAM WORK, STREAM CROSSINGS, AND EARTH DISTURBANCE WITHIN 50 FEET OF A STREAM REQUIRE PERMIT AUTHORIZATION.
10. PIPE DIAMETER TO MEET MIN. STATE REQUIREMENT.

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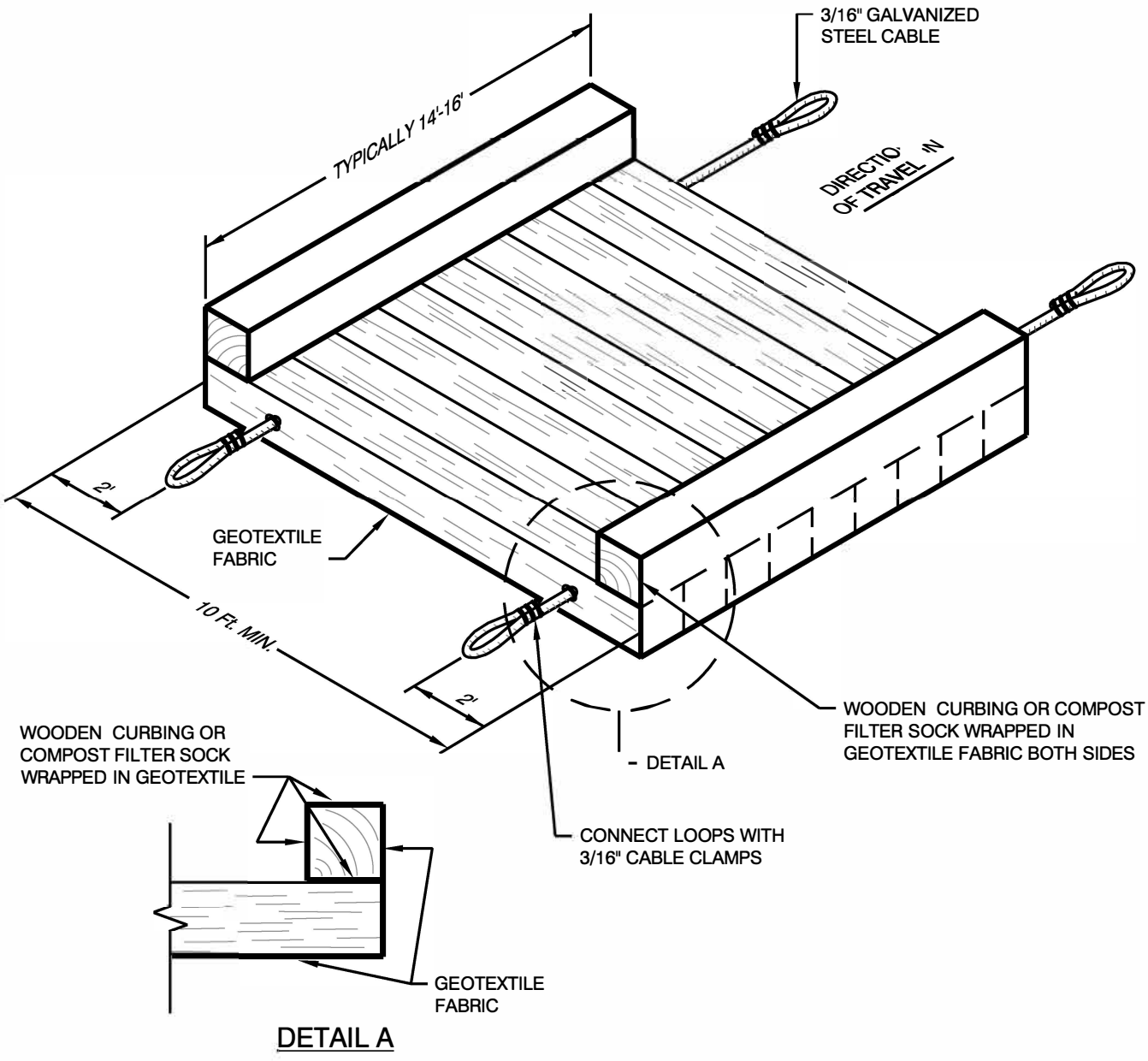
ENVIRONMENTAL CONSTRUCTION STANDARDS

TEMPORARY EQUIPMENT CROSSING
CULVERT AND STONE

FIGURE-31
REVISED 10/2023

NOT TO SCALE



DETAIL A

NOTES:

1. A GEOTEXTILE UNDERLAYMENT SHALL BE USED UNDER THE WOOD MAT, WRAPPED UP THE SIDES, AND ANCHORED TO CURBING.
2. MATS ARE MADE FROM ALL WOOD MEMBERS AND ARE MINIMUM 4"X4" HARDWOOD AND ARE CABLED TOGETHER TO FORM A SINGLE LAYER CROSSING. LONGER LOGS ARE MORE USEFUL IN THE CASE OF A HEAVY LOAD OR VERY LOOSE SOIL.
3. WOOD MATS CAN BE CONSTRUCTED ON SITE AND ARE EASY TO BUILD AND MAINTAIN. UNDER NORMAL USE, A WOOD MAT IS EXPECTED TO LAST FOR SEVERAL YEARS. INDIVIDUAL WOOD MATS CAN BE CONNECTED TO CONSTRUCT A COMPLETE CROSSING.
4. IN-STREAM WORK, STREAM CROSSINGS, AND EARTH DISTURBANCE WITHIN 50' FEET OF A STREAM REQUIRE PERMIT AUTHORIZATION.

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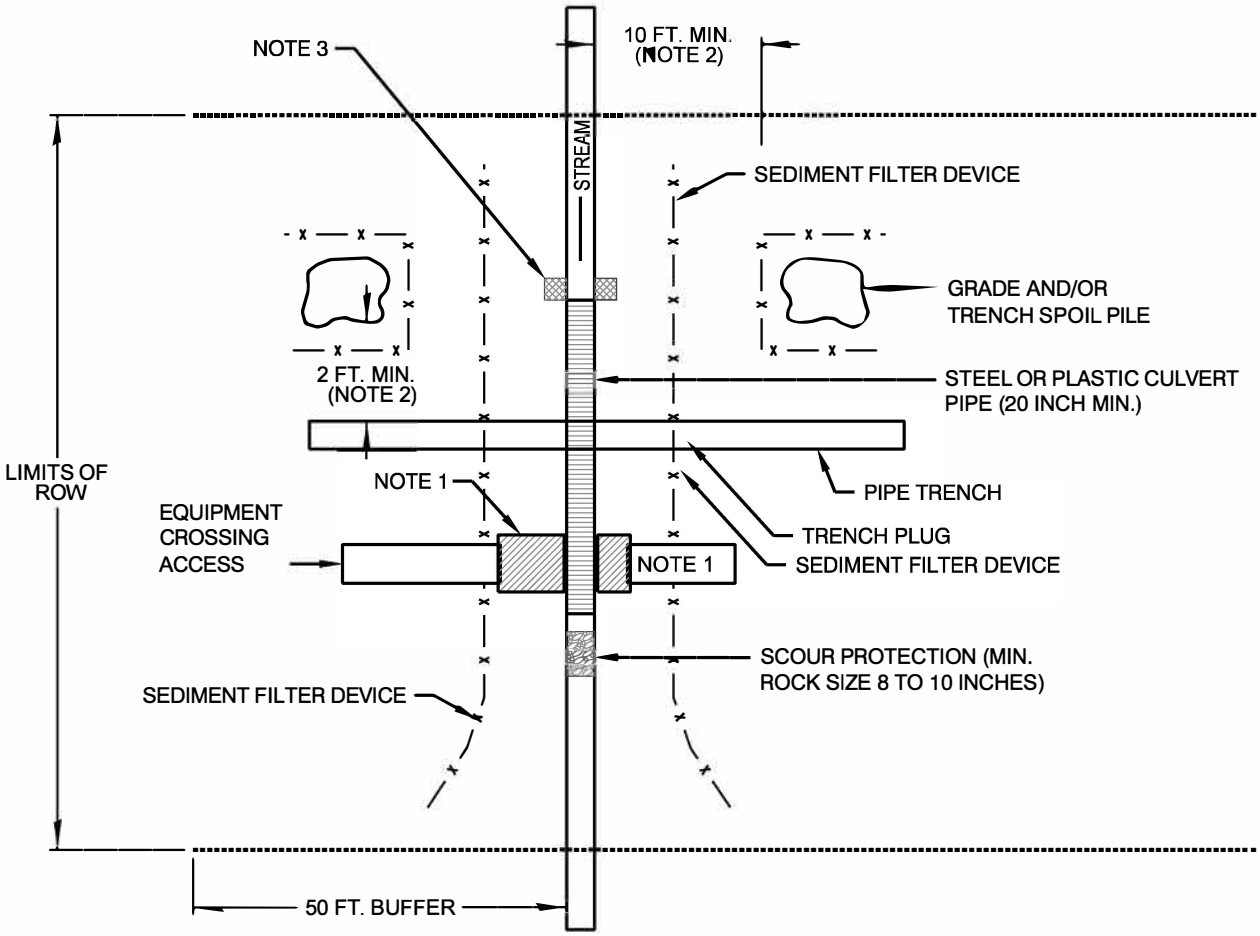
ENVIRONMENTAL CONSTRUCTION STANDARDS

TEMPORARY EQUIPMENT CROSSING
WOOD MAT

FIGURE-32
REVISED 10/2023
NOT TO SCALE



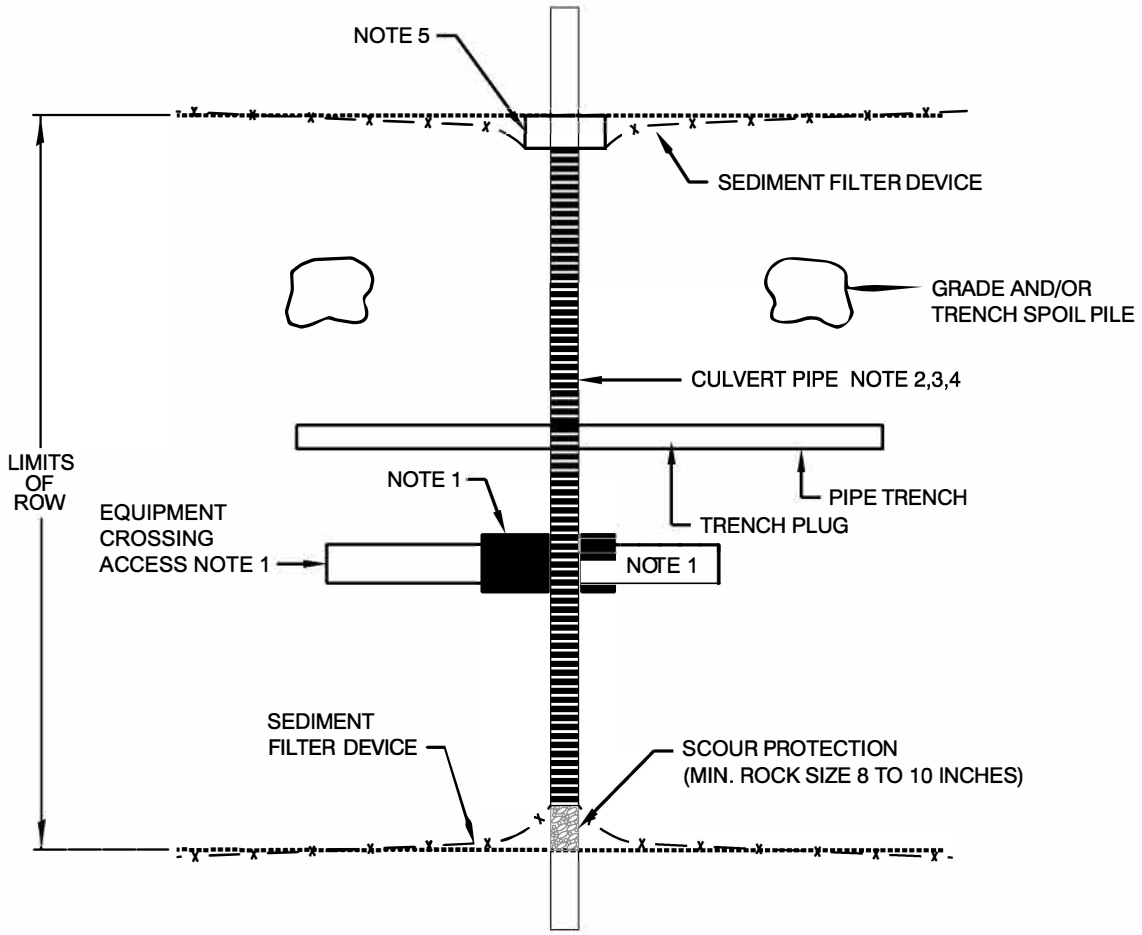
NOTES:

1. EQUIPMENT CROSSINGS ARE TO BE PREPARED AS ILLUSTRATED IN ASSOCIATED FIGURES.
2. GRADE AND TRENCH SPOIL WILL BE STOCKPILED AT LEAST 10 FEET FROM THE WATER'S EDGE, TOPOGRAPHY PERMITTING.
3. SAND BAGS OR EARTH FILLED SACKS WILL BE PLACED AT UPSTREAM END OF CULVERT TO CHANNEL FLOW INTO THE CULVERT.
4. PIPE CULVERT FOR ACCESS ROAD AND FLUME PIPE MAY BE ONE CONTINUOUS PIPE.
5. TRENCH PLUGS SHALL BE INSTALLED WITHIN THE TRENCH ON BOTH SIDES OF THE STREAM CHANNEL.
6. WATER ACCUMULATING IN THE WORK AREA SHALL BE PUMPED TO A PUMPED WATER FILTER BAG OR SEDIMENT TRAP PRIOR TO DISCHARGING INTO ANY SURFACE WATER.
7. IN-STREAM WORK, STREAM CROSSINGS, AND EARTH DISTURBANCE WITHIN 50 FEET OF A STREAM REQUIRE PERMIT AUTHORIZATION.
8. SPOIL SHALL BE PLACED A MINIMUM OF TWO (2) FEET FROM THE TRENCH PER 29 CFR 1926.650 (j) (2).
9. EXCAVATION OF TRENCH SHALL BE COMPLETED IN THE DRY. FLOWING WATER SHALL NOT BE ALLOWED TO RETURN TO THE STREAM BED UNTIL BED/ BANK RESTORATION ACTIVITIES HAVE BEEN COMPLETED.
10. METHOD TO BE USED ON MINOR WATER BODY CROSSING NO GREATER THAN 10' IN BOTTOM WIDTH.

MSource®
ENVIRONMENTAL CONSTRUCTION STANDARDS

TYPICAL FLUMED
STREAM CROSSING

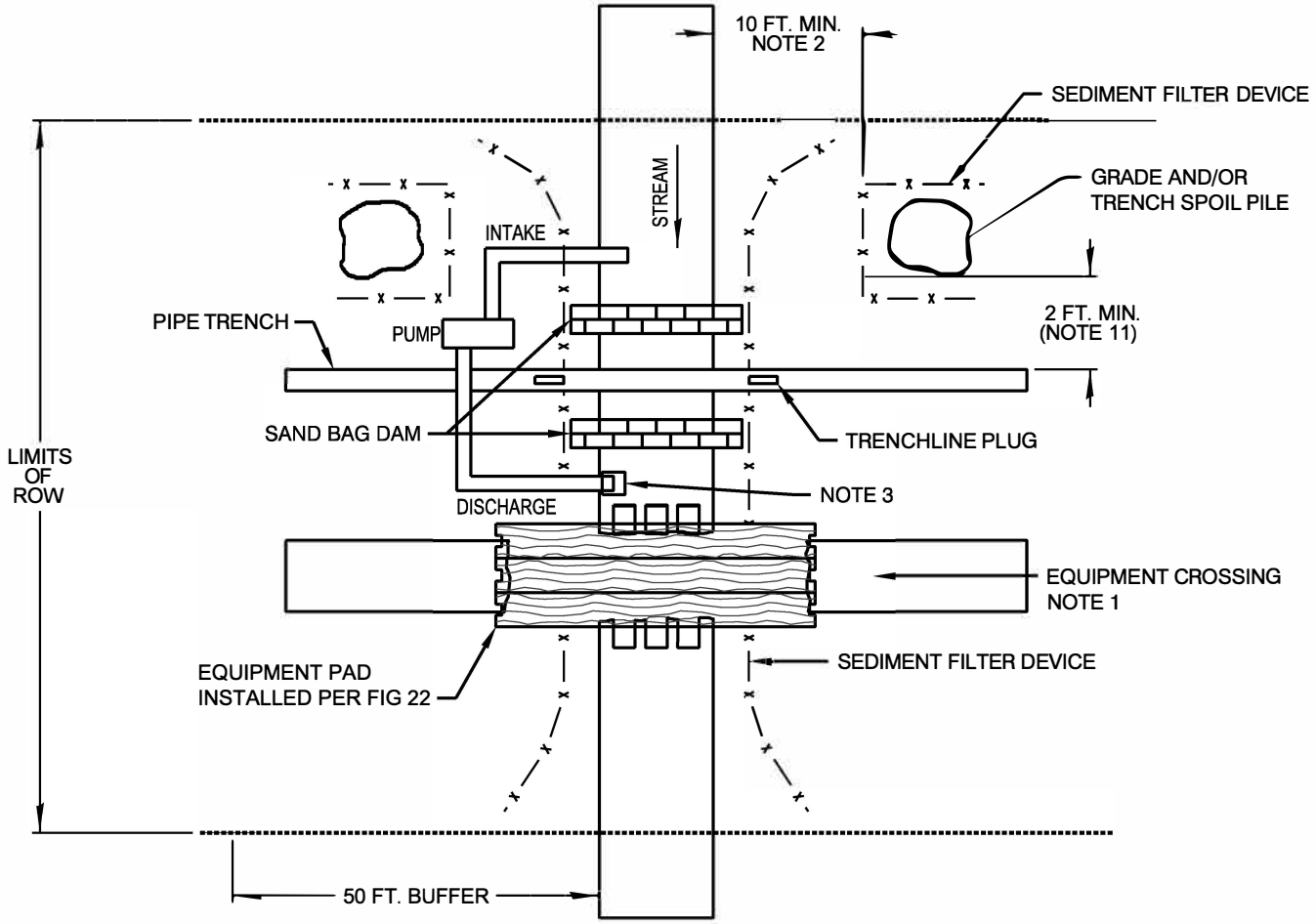
FIGURE-33
REVISED 10/2023
NOT TO SCALE



NOTES:

1. IF REQUIRED BY PERMIT , EQUIPMENT CROSSINGS ARE TO BE PREPARED AS ILLUSTRATED IN **ASSOCIATED FIGURES.**
2. IN AREAS WITHOUT JURISDICTIONAL WATER FEATURES, EARTH OR STONE FILL MAY BE PLACED OVER THE PIPE FOR ACCESS. DEPTH OF COVER SHOULD BE EQUAL TO $\frac{1}{2}$ THE DIAMETER OF THE CULVERT OR 12 INCHES, WHICHEVER IS GREATER. IF MINIMUM COVER CANNOT BE ACHIEVED, CLASS "V" PIPE SHALL BE USED.
3. IF THIS DETAIL IS APPLIED TO PERMITTED WETLAND CROSSINGS BASED ON FIELD CONDITIONS AND THE CROSSING IS BRIDGED, FLEXIBLE PLASTIC CULVERT MAY BE USED FOR EASY REMOVAL DURING PIPE INSTALLATION. PIPE CULVERT SHOULD BE ONE CONTINUOUS PIPE AND SHOULD BE APPROPRIATELY SIZED FOR DRAINAGE AREA, MINIMUM 18 INCHES DIAMETER.
4. SAND BAGS OR EARTH FILLED SACKS WILL BE PLACED AT UPSTREAM END OF CULVERT TO CHANNEL FLOW INTO THE CULVERT.
5. WATER ACCUMULATING IN THE WORK AREA SHALL BE PUMPED TO A PUMPED WATER FILTER BAG OR SEDIMENT TRAP PRIOR TO DISCHARGING INTO ANY SURFACE WATER.

MSource® ENVIRONMENTAL CONSTRUCTION STANDARDS	BYPASS PIPE FLUME DETAIL	FIGURE-34 REVISED 10/2023 NOT TO SCALE



NOTES:

1 EQUIPMENT CROSSINGS ARE TO BE INSTALLED PERPENDICULAR TO STREAM, AS ILLUSTRATED.

2 GRADE AND TRENCH SPOIL WILL BE STOCKPILED AT LEAST 10 FEET FROM THE TOP OF BANK, TOPOGRAPHY PERMITTING.

3 PUMP INTAKES WILL BE SCREENED. PREVENT STREAMBED SCOUR AT DISCHARGE.

4 SUFFICIENT PUMP CAPACITY WILL BE USED TO MAINTAIN STREAM FLOW AT ALL TIMES UNTIL BACKFILL AND REMOVAL OF SANDBAG DAM.

5 BACKUP PUMPS (AS SAME NUMBER AND CAPACITY AS ACTIVE PUMPS) WILL BE READILY AVAILABLE IN WORKING CONDITION ON SITE AT CROSSING. PUMPS SHALL BE PLACED WITHIN SECONDARY CONTAINMENT WHEN IN USE TO PREVENT SPILLS ADJACENT TO THE WATER BODY.

6 CONSTRUCT DAMS WITH MATERIAL THAT PREVENT SEDIMENT AND OTHER POLLUTANTS FROM ENTERING THE WATER BODY.

7 DAM AND PUMPS MUST BE MONITORED IN PERSON AT ALL TIMES WHILE CROSSING WORK IS IN PROGRESS AND DAMS AND PUMPS ARE ROUTING WATER FLOWS.

8 TRENCH BREAKERS SHALL BE INSTALLED WITHIN THE TRENCH ON BOTH SIDES OF THE STREAM CHANNEL.

9 WATER ACCUMULATING IN THE WORK AREA SHALL BE PUMPED TO A PUMPED WATER FILTER BAG OR SEDIMENT TRAP PRIOR TO DISCHARGING INTO ANY SURFACE WATER.

10 IN-STREAM WORK, STREAM CROSSINGS, AND EARTH DISTURBANCE WITHIN 50 FEET OF A STREAM REQUIRE PERMIT AUTHORIZATION.

11 SPOIL SHALL BE PLACED A MINIMUM OF TWO (2) FEET FROM THE TRENCH PER 29 CFR 1926.650 (j) (2).

12 EXCAVATION OF TRENCH SHALL BE COMPLETED IN THE DRY. FLOWING WATER SHALL NOT BE ALLOWED TO RETURN TO THE STREAM BED UNTIL BED/ BANK RESTORATION ACTIVITIES HAVE BEEN COMPLETED.

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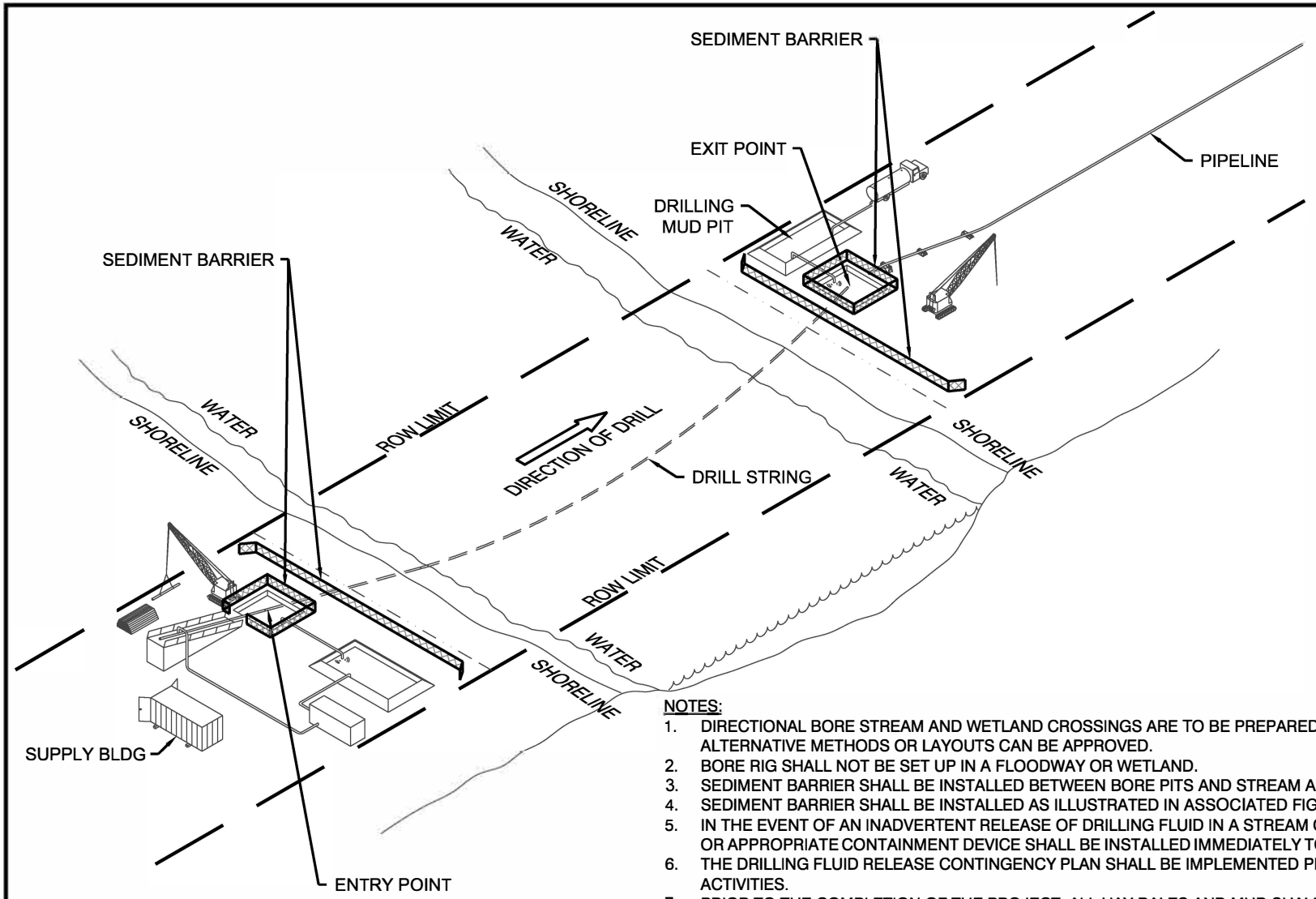
ENVIRONMENTAL CONSTRUCTION STANDARDS

TYPICAL STREAM CROSSING
WITH PUMP BYPASS

FIGURE-35
REVISED 10/2023
NOT TO SCALE



NOTES:

1. DIRECTIONAL BORE STREAM AND WETLAND CROSSINGS ARE TO BE PREPARED AS ILLUSTRATED; HOWEVER ALTERNATIVE METHODS OR LAYOUTS CAN BE APPROVED.
2. BORE RIG SHALL NOT BE SET UP IN A FLOODWAY OR WETLAND.
3. SEDIMENT BARRIER SHALL BE INSTALLED BETWEEN BORE PITS AND STREAM AND/OR WETLAND.
4. SEDIMENT BARRIER SHALL BE INSTALLED AS ILLUSTRATED IN ASSOCIATED FIGURES.
5. IN THE EVENT OF AN INADVERTENT RELEASE OF DRILLING FLUID IN A STREAM OR WETLAND, STRAW BALES OR APPROPRIATE CONTAINMENT DEVICE SHALL BE INSTALLED IMMEDIATELY TO CONTAIN MUD.
6. THE DRILLING FLUID RELEASE CONTINGENCY PLAN SHALL BE IMPLEMENTED PRIOR TO CONTINUING BORING ACTIVITIES.
7. PRIOR TO THE COMPLETION OF THE PROJECT, ALL HAY BALES AND MUD SHALL BE REMOVED FROM THE PROJECT AREA.
8. ALL SEDIMENT BARRIERS SHALL BE REMOVED UPON SUCCESSFUL REVEGETATION OF THE PROJECT AREA.
9. IN-STREAM WORK, STREAM CROSSINGS, AND EARTH DISTURBANCE WITHIN 50 FEET OF A STEAM REQUIRE PERMIT AUTHORIZATION.
10. CONSIDER CONSTRUCTING SPILL CONTAINMENT UNDER DRILL RIG FOR LOCATIONS WHERE THERE ARE INCREASED CONSEQUENCES SHOULD A SPILL OR LEAK OCCUR.

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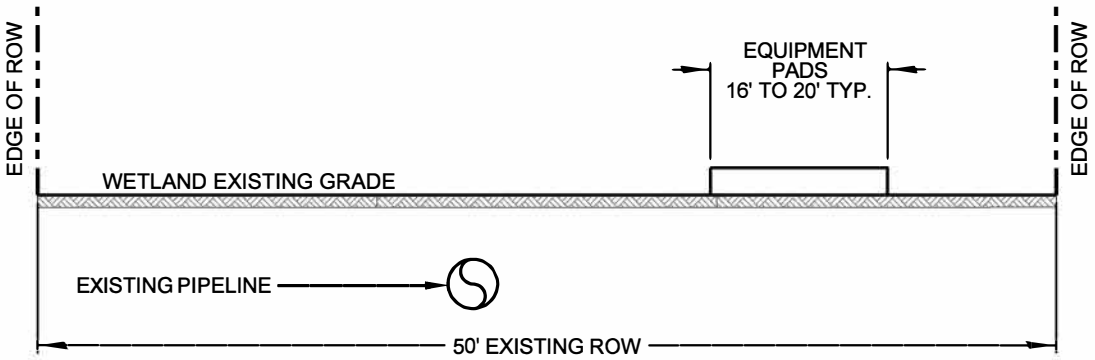
ENVIRONMENTAL CONSTRUCTION STANDARDS

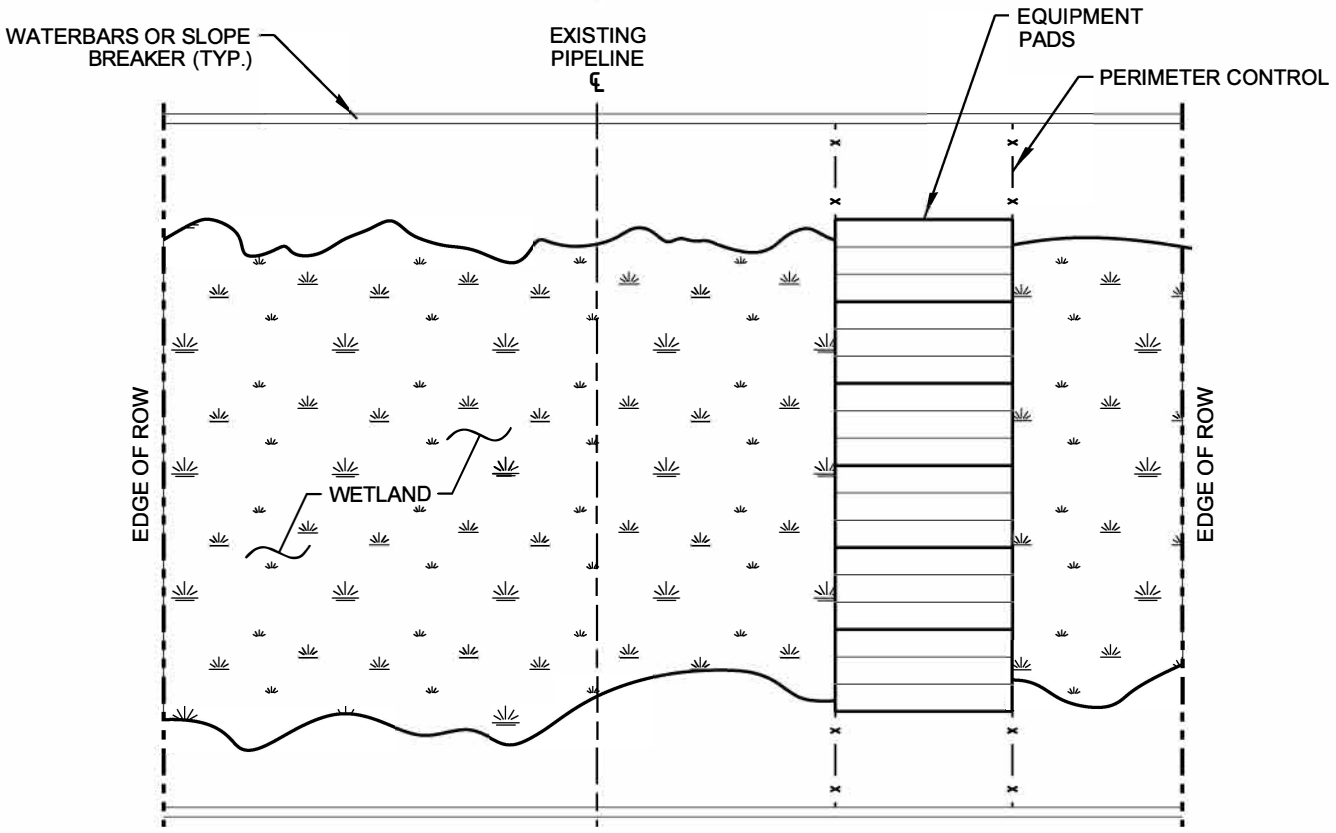
HORIZONTAL DIRECTIONAL DRILL
TYPICAL WORKSPACE LAYOUT

FIGURE-36
REVISED 10/2023

NOT TO SCALE



SIDE VIEW



PLAN VIEW

NOTES:

1. EQUIPMENT PADS WILL BE USED TO PROVIDE STABLE WETLAND CROSSING AND ACCESS WHEN SOIL CONDITIONS WILL NOT SUPPORT EQUIPMENT WEIGHT.
2. SEE ASSOCIATED FIGURE FOR PAD CONSTRUCTION DETAILS.
3. A SEDIMENT FILTER DEVICE WILL BE PLACED ACROSS THE ROW AT THE WETLAND EDGE, AS NECESSARY.
4. BEFORE EXCAVATION OR LAND DISTURBANCE OCCURS IN WETLANDS, SEDIMENT BARRIER MUST BE INSTALLED ALONG THE EDGE OF THE RIGHT OF WAY AS REQUIRED BY PERMIT.
5. IF FLOWING OR EXCESS SURFACE WATER IS PRESENT, A FLUME PIPE MAY BE INSTALLED AS OUTLINED IN ASSOCIATED FIGURE.

MSource® ENVIRONMENTAL CONSTRUCTION STANDARDS	STABLE WETLAND CROSSING	FIGURE-37 REVISED 10/2023 NOT TO SCALE