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APPLICATION FOR ARTICLE 24 PERMIT

SUBMITTED TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FOR THE

GREENBUSH FY2020 PIPELINE INSTALLATION PROJECT
TOWN OF NEWSTEAD
ERIE COUNTY, NEW YORK

by Haley & Aldrich of New York
Rochester, New York

for National Fuel Gas Distribution Corporation
Williamsville, New York

File No. 134374-002
April 2020

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Permit Application Forms

HALEY ALDRICH

NEW YORK STATE | Department of Environmental Conservation | Office of General Services | Department of State

US Army Corps of Engineers

JOINT APPLICATION FORM

For Permits for activities activities affecting streams, waterways, waterbodies, wetlands, coastal areas, sources of water, and endangered and threatened species.

You must separately apply for and obtain Permits from each involved agency before starting work. Please read all instructions.

1. **Applications To:**

>NYS Department of Environmental Conservation ☑ Check here to confirm you sent this form to NYSDEC.

Check all permits that apply:

- ☐ Stream Disturbance
- ☐ Excavation and Fill in Navigable Waters
- ☐ Docks, Moorings or Platforms
- ☐ Dams and Impoundment Structures
- ☑ 401 Water Quality Certification
- ☑ Freshwater Wetlands
- ☐ Tidal Wetlands
- ☐ Wild, Scenic and Recreational Rivers
- ☐ Coastal Erosion Management
- ☐ Water Withdrawal
- ☐ Long Island Well
- ☐ Incidental Take of Endangered / Threatened Species

>US Army Corps of Engineers ☐ Check here to confirm you sent this form to USACE.

Check all permits that apply: ☐ Section 404 Clean Water Act ☐ Section 10 Rivers and Harbors Act

Is the project Federally funded? ☐ Yes ☑ No

If yes, name of Federal Agency:

General Permit Type(s), if known: NWP 12

Preconstruction Notification: ☐ Yes ☑ No

>NYS Office of General Services ☐ Check here to confirm you sent this form to NYSOGS.

Check all permits that apply:

- ☐ State Owned Lands Under Water
- ☐ Utility Easement (pipelines, conduits, cables, etc.)
- ☐ Docks, Moorings or Platforms

>NYS Department of State ☐ Check here to confirm you sent this form to NYSDOS.

Check if this applies: ☐ Coastal Consistency Concurrence

2. **Name of Applicant**

National Fuel Gas Distribution Corporation

Taxpayer ID (if applicant is NOT an individual): 12-2759381

Mailing Address: 6363 Main Street

Post Office / City: Williamsville

State: NY

Zip: 14221

Telephone: 716-857-7962

Email: LibertyV@natfuel.com

Applicant Must be (check all that apply): ☐ Owner ☑ Operator ☑ Lessee

3. **Name of Property Owner (if different than Applicant)**

N/A

Mailing Address:

Post Office / City:

State:

Zip:

Telephone:

Email:

For Agency Use Only	Agency Application Number:

4. **Name of Contact / Agent**

Mr. Steve Phillips

Mailing Address	Post Office / City	State	Zip
200 Town Centre Drive, Suite 2	Rochester	NY	14632-4264

Telephone 585-321-4240 Email sphillips@haleyaldrich.com

5. **Project / Facility Name**

Greenbush FY2020 Pipeline Installation Project

Property Tax Map Section / Block / Lot Number: Multiple

Project Street Address, if applicable	Post Office / City	State	Zip
Rapids Road, Greenbush Road, Swift Mills Road, and Mill Road	Newstead	NY	14001

Provide directions and distances to roads, intersections, bridges and bodies of water

Located along and paralleling Rapids Road, Greenbush Road, Swift Mills Road, and Mill Road in the Town of Newstead, NY. - 43°03'23.6"N 78°31'47.1"W (Center of Project).

☑ Town ☐ Village ☐ City

County	Stream/Waterbody Name
Erie	Multiple

Newstead

Project Location Coordinates: Enter Latitude and Longitude in degrees, minutes, seconds:

Latitude: Attached ° ' " Longitude: ° ' "

6. **Project Description:** Provide the following information about your project. Continue each response and provide any additional information on other pages. **Attach plans on separate pages.**

a. Purpose of the proposed project:

National Fuel Gas Distribution Corporation is planning to install approximately 8,580-feet of new 2 to 4-inch plastic natural gas distribution pipeline. The pipeline will be installed by open-cut methods and directional boring methods will be implemented in areas of delineated streams, wetlands, and NYSDEC 100-ft regulated wetland adjacent areas.

b. Description of current site conditions:

Pipeline construction is proposed to occur along the the edge of the existing roadways in previously disturbed utility and road Rights-of-Way (ROW). The Project area includes exiting utility ROW (existing water, electrical, telecommunication and existing road ROW).

c. Proposed site changes:

Installation of approximately 930-feet of new 2-inch plastic natural gas distribution pipeline and 7,650-feet of new plastic 4-inch natural gas distribution pipeline within an approximately 45-foot-wide pipeline right- of-way (ROW).

d. Type of structures and fill materials to be installed, and quantity of materials to be used (e.g., square feet of coverage, cubic yards of fill material, structures below ordinary/mean high water, etc.):

The pipeline will cross three delineated streams (one unmapped and two Class C streams), four delineated wetlands (one of which is NYSDEC-jurisdictional, and the regulated 100-ft adjacent areas of two mapped NYSDEC-wetlands (WO-22 and WO-35). There are a total of three workspaces for pipeline borings which are located within the 100-ft regulated adjacent area of these delineated wetlands (see attached mapping).

e. Area of excavation or dredging, volume of material to be removed, location of dredged material placement:

N/A

f. Is tree cutting or clearing proposed? ☐ Yes If Yes, explain below. ☑ No

Timing of the proposed cutting or clearing (month/year): N/A

Number of trees to be cut: n/a Acreage of trees to be cleared: n/a

g. Work methods and type of equipment to be used:

See Attached narrative report.

h. Describe the planned sequence of activities:

See Attached narrative report.

i. Pollution control methods and other actions proposed to mitigate environmental impacts:

See Attached narrative report.

j. Erosion and silt control methods that will be used to prevent water quality impacts:

See Attached narrative report.

k. Alternatives considered to avoid regulated areas. If no feasible alternatives exist, explain how the project will minimize impacts:

See Attached narrative report.

l. Proposed use: ☐ Private ☐ Public ☑ Commercial

m. Proposed Start Date: Spring/Summer 2020 Estimated Completion Date: Winter 2020/21

n. Has work begun on project? ☐ Yes If Yes, explain below. ☑ No

o. Will project occupy Federal, State, or Municipal Land? ☐ Yes If Yes, explain below. ☑ No

p. List any previous DEC, USACE, OGS or DOS Permit / Application numbers for activities at this location:

N/A

q. Will this project require additional Federal, State, or Local authorizations, including zoning changes?

☑ Yes If Yes, list below. ☐ No

USACE NWP 12, SHPO No Effect Determination

7. **Signatures.**
Applicant and Owner (If different) must sign the application.
Append additional pages of this Signature section if there are multiple Applicants, Owners or Contact/Agents.

I hereby affirm that information provided on this form and all attachments submitted herewith is true to the best of my knowledge and belief.

Permission to Inspect - I hereby consent to Agency inspection of the project site and adjacent property areas. Agency staff may enter the property without notice between 7:00 am and 7:00 pm, Monday - Friday. Inspection may occur without the owner, applicant or agent present. If the property is posted with "keep out" signs or fenced with an unlocked gate, Agency staff may still enter the property. Agency staff may take measurements, analyze site physical characteristics, take soil and vegetation samples, sketch and photograph the site. I understand that failure to give this consent may result in denial of the permit(s) sought by this application.

False statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the NYS Penal Law. Further, the applicant accepts full responsibility for all damage, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and agrees to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from said project. In addition, Federal Law, 18 U.S.C., Section 1001 provides for a fine of not more than $10,000 or imprisonment for not more than 5 years, or both where an applicant knowingly and willingly falsifies, conceals, or covers up a material fact; or knowingly makes or uses a false, fictitious or fraudulent statement.

Signature of Applicant | Date: 4-16-20

Applicant Must be (check all that apply): ☒ Owner ☒ Operator ☐ Lessee

Printed Name: Matthew Frank | Title: Assistant Vice President

Signature of Owner (if different than Applicant) | Date:

Printed Name: | Title:

Signature of Contact / Agent | Date: 04-16-2020

Printed Name: Steven H. Phillips | Title: Senior Project Manager | Associate

For Agency Use Only **DETERMINATION OF NO PERMIT REQUIRED**

Agency Application Number:

_____ (Agency Name) has determined that No Permit is required from this Agency for the project described in this application.

Agency Representative:

Printed Name: | Title:

Signature: | Date:

Short Environmental Assessment Form
Part 1 - Project Information

Instructions for Completing

Part 1 – Project Information. The applicant or project sponsor is responsible for the completion of Part 1. Responses become part of the application for approval or funding, are subject to public review, and may be subject to further verification. Complete Part 1 based on information currently available. If additional research or investigation would be needed to fully respond to any item, please answer as thoroughly as possible based on current information.

Complete all items in Part 1. You may also provide any additional information which you believe will be needed by or useful to the lead agency; attach additional pages as necessary to supplement any item.

Part 1 – Project and Sponsor Information

Name of Action or Project:

Greenbush FY2020 Pipeline Installation Project

Project Location (describe, and attach a location map):

Parallels Rapids, Greenbush, Swift Mills, and Mill Road in the Town of Newstead, New York, extends approximately 8,580 feet.

Brief Description of Proposed Action:

National Fuel is planning to install approximately 930-feet of new 2-inch plastic natural gas distribution pipeline and 7,650-feet of new plastic 4-inch natural gas distribution pipeline. The pipelines will be installed by a combination of direct bury/open cut methods and horizontal boring pipe installation in areas of streams, wetlands, and the 100-ft regulated adjacent areas of NYSDEC wetlands WO-22 and WO-35. Haley & Aldrich has delineated several wetlands which are located adjacent to the proposed pipeline installation activities, some of which represent the boundaries or apparent extensions of NYSDEC jurisdictional wetlands. As such, a few of the proposed boring workspaces are located within the 100-ft regulated adjacent areas for portions of Wetlands WO-22 and WO-35. All boring pits will be located outside of the direct wetland/stream limits. Pipeline construction activities will occur along the edges of existing roadways in previously disturbed utility and/or roadway rights-of-way (ROW).

Name of Applicant or Sponsor:	Telephone: 716-857-7962
National Fuel Gas Distribution Corporation	E-Mail: LibertyV@natfuel.com

Address:

6363 Main Street

City/PO:	State:	Zip Code:
Williamsville	NY	14221

	NO	YES
1. Does the proposed action only involve the legislative adoption of a plan, local law, ordinance, administrative rule, or regulation? If Yes, attach a narrative description of the intent of the proposed action and the environmental resources that may be affected in the municipality and proceed to Part 2. If no, continue to question 2.	☑	☐
2. Does the proposed action require a permit, approval or funding from any other government Agency? If Yes, list agency(s) name and permit or approval: USACE Nationwide Permit 12	☐	☑

3. a. Total acreage of the site of the proposed action? <1 acres
   b. Total acreage to be physically disturbed? <1 acres
   c. Total acreage (project site and any contiguous properties) owned or controlled by the applicant or project sponsor? 1 acres

4. Check all land uses that occur on, are adjoining or near the proposed action:

5. ☐ Urban ☑ Rural (non-agriculture) ☐ Industrial ☐ Commercial ☑ Residential (suburban)
   ☐ Forest ☑ Agriculture ☑ Aquatic ☑ Other(Specify): Existing road/utility ROW
   ☐ Parkland

	NO	YES	N/A
5. Is the proposed action,			
a. A permitted use under the zoning regulations?	☐	☑	☐
b. Consistent with the adopted comprehensive plan?	☐	☑	☐

	NO	YES
6. Is the proposed action consistent with the predominant character of the existing built or natural landscape?	☐	☑

	NO	YES
7. Is the site of the proposed action located in, or does it adjoin, a state listed Critical Environmental Area?		
If Yes, identify: _____	☑	☐

	NO	YES
8. a. Will the proposed action result in a substantial increase in traffic above present levels?	☑	☐
b. Are public transportation services available at or near the site of the proposed action?	☐	☑
c. Are any pedestrian accommodations or bicycle routes available on or near the site of the proposed action?	☑	☐

	NO	YES
9. Does the proposed action meet or exceed the state energy code requirements?		
If the proposed action will exceed requirements, describe design features and technologies: _____ _____	☐	☑

	NO	YES
10. Will the proposed action connect to an existing public/private water supply?		
If No, describe method for providing potable water: _____ This is a gas utility project, water supply not applicable. _____	☑	☐

	NO	YES
11. Will the proposed action connect to existing wastewater utilities?		
If No, describe method for providing wastewater treatment: _____ If needed during construction, portable temporary toilets to be used on-site, with all wastes hauled off-site. _____	☑	☐

	NO	YES
12. a. Does the project site contain, or is it substantially contiguous to, a building, archaeological site, or district which is listed on the National or State Register of Historic Places, or that has been determined by the Commissioner of the NYS Office of Parks, Recreation and Historic Preservation to be eligible for listing on the State Register of Historic Places?	☑	☐
b. Is the project site, or any portion of it, located in or adjacent to an area designated as sensitive for archaeological sites on the NY State Historic Preservation Office (SHPO) archaeological site inventory?	☐	☑

	NO	YES
13. a. Does any portion of the site of the proposed action, or lands adjoining the proposed action, contain wetlands or other waterbodies regulated by a federal, state or local agency?	☐	☑
b. Would the proposed action physically alter, or encroach into, any existing wetland or waterbody?	☑	☐
If Yes, identify the wetland or waterbody and extent of alterations in square feet or acres: _____ Direct impacts to wetlands/waterbodies will be avoided by the use of horizontal directional boring installation of the pipeline. Approx. _____ 0.04 acres (total combined) of the regulated adjacent areas for DEC wetlands WO-35 and WO-22 will be temporarily impacted by _____ project activities.		

Portions of the Project area were determined to be potentially sensitive for archaeological sites by SHPO. At their request, a cultural survey company, Panamerican Consultants, Inc. (Panam) was contracted to determine if any sensitive resources existed within the Project area of potential effect (APE). Panam conducted a Phase 1AB cultural resources investigation of the site, No historic cultural resources listed or potentially elgible for listing in the State or National Registers of Historic Places were identified in the projects APE, and no further cultural investigations were recommended.

14. Identify the typical habitat types that occur on, or are likely to be found on the project site. Check all that apply:

☐ Shoreline ☐ Forest ☑ Agricultural/grasslands ☐ Early mid-successional

☑ Wetland ☑ Urban ☐ Suburban

	NO	YES
15. Does the site of the proposed action contain any species of animal, or associated habitats, listed by the State or Federal government as threatened or endangered? Federally listed (USFWS) threatened NLEB. State-listed (nynhp) NLEB hibernaculum located within 3.4-miles of Project site. State listings of 4 protected freshwater mussel species, located in Murder Creek, which is located east and north of the Project site.	☐	☑
16. Is the project site located in the 100-year flood plan?	☑	☐
17. Will the proposed action create storm water discharge, either from point or non-point sources?	☐	☑
If Yes, a. Will storm water discharges flow to adjacent properties?	☐	☑
b. Will storm water discharges be directed to established conveyance systems (runoff and storm drains)?	☐	☑
If Yes, briefly describe: Stormwater on-site will discharge to existing conveyances along adjacent roadways. Due to the nature of the site construction, small areas of construction, and immediate stabilization of previously disturbed areas with seed/mulch, it is not anticipated that site construction will result in a large volume of stormwater runoff.		
18. Does the proposed action include construction or other activities that would result in the impoundment of water or other liquids (e.g., retention pond, waste lagoon, dam)? If Yes, explain the purpose and size of the impoundment:	☑	☐
19. Has the site of the proposed action or an adjoining property been the location of an active or closed solid waste management facility? If Yes, describe:	☑	☐
20.Has the site of the proposed action or an adjoining property been the subject of remediation (ongoing or completed) for hazardous waste? If Yes, describe:	☑	☐

I CERTIFY THAT THE INFORMATION PROVIDED ABOVE IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE

Applicant/sponsor/name: Victoria Liberty Date: 4/16/2020

Signature: Victoria Liberty Title: Engineer II

PRINT FORM

Application Information

1. Introduction

National Fuel Gas Distribution Corporation (National Fuel) is proposing to install approximately 930-feet of new 2-inch plastic natural gas distribution pipeline and 7,650-feet of new plastic 4-inch natural gas distribution pipeline located along four roadways within the Town of Newstead, Erie County, New York (Greenbush FY2020 Pipeline Installation Project or project). See Figures in Appendix A for the project location.

National Fuel is submitting this application to the New York State Department of Environmental Conservation for a Freshwater Wetlands Permit per Article 24 of the New York State Environmental Conservation Law (ECL) (6NYCRR Part 663, Part 664, and Part 665) [or determination of no jurisdiction letter] and a Water Quality Certification [per Section 401 (a) (1) of the Federal CWA (33 U.S.C. Sec 1341)]. This project will also be completed in accordance with the conditions of the U.S. Army Corps of Engineers (USACE) Nationwide Permit # 12 per Section 404 of the Clean Water Act [(CWA) (33 U.S.C. 1344)].

1.1 PROJECT DESCRIPTION

The project consists of the installation of approximately 930-feet of new 2-inch plastic natural gas distribution pipeline and 7,650-feet of new plastic 4-inch natural gas distribution pipeline which will tie into National Fuels existing distribution network. The new pipeline will be installed by a combination of open cut/direct bury methods and directional boring methods in areas of streams, wetlands, or the regulated wetland adjacent areas to minimize direct impacts to these sensitive resources as well as existing roads, and/or driveways. The project will not require any tree clearing and will avoid forested areas.

Access to project work areas will be directly from adjacent roadways, which include Rapids Road, Greenbush Road, Swift Mills Road, and Mill Road. No access roads are proposed or required for the project. Existing road rights-of-way will be utilized to the greatest extent possible to minimize impacts to previously undisturbed areas. No above-ground facilities are included or proposed as part of the project work.

The project pipeline installation areas and temporary workspaces are depicted in figures included with Appendix A.

Plan and profiles of each of the jurisdictional crossings and a typical boring workspace layout are provided for the directional borings and are included in Appendix A. As shown on the attached figures, the project limits of disturbance (LOD), inclusive of boring workspaces and areas of open cut pipe installation is 4.9-acres. However, during contractor constructability review areas of open cut pipe installation will be reduced and select areas will be bored instead to bring the overall LOD to less than 1 acre.

1.1.1 Access Roads

Access to project work areas will be directly from existing roadways and no access roads are proposed for the project. National Fuel will utilize public roads, which are available for use as access roads without further approvals, subject to posted weight restrictions. Safe and accessible conditions (e.g., appropriate posted warnings, roadways clear of significant debris) will be maintained at public roadway crossings and access points during project activities.

1.1.2 Temporary Construction Workspaces

The project will involve the use of temporary construction workspaces to facilitate environmentally sound and safe construction practices. These temporary workspaces will collectively be used for boring pit locations, soil management, staging, pipe laying, vehicle access, and safe construction space for all activities.

The size and configuration of the temporary workspaces are dependent on the intended purpose along with the existing site conditions. Boring pit locations are currently proposed to be approximately 30-feet wide by 20-feet long or less (where feasible while avoiding surrounding resources). The construction workspaces, as currently planned, are depicted on the figures included as Appendix A. Note that if certain field conditions are encountered (i.e. rocky soils, saturated soils, or unexpected utilities, etc.), minor field changes to the limits of disturbance associated with boring workspaces may be required. However, boring workspaces will stay along the proposed pipeline alignment, will entail essentially the same size and configuration depicted, and workspaces will not be located in wetlands or within 50-feet of streams.

1.2 PROJECT PURPOSE

The purpose for this project is to expand National Fuel's distribution pipeline network to allow for natural gas distribution to new customers and households.

1.3 PROJECT SCHEDULE

The project construction is proposed to start in Summer/Fall of 2020, and construction would be expected to take approximately two to three months from initial site construction to restoration, with the potential for final or additional restoration measures to be completed following this timeframe (Spring 2021 as needed).

2. Project Area Description

The project is located in the Eastern Lake physiographic section of the larger Central Lowland province. This portion of the Eastern Lake section is characterized as level to nearly level and is located within the footprint of glacial Lake Warren. Elevations within the project are nearly level, ranging from approximately 610 feet above mean sea level (ft. AMSL) at the northeastern end of the project to approximately 630 ft. AMSL at the southwestern end of the project.

The project falls within the Niagara Watershed (HUC 04120104). Surface water within this watershed flows towards the major rivers and streams in the system including Tonawanda Creek, Cattaraugus Creek, and the Buffalo River. The majority of surface hydrology within the project area is generated by precipitation and surface water sheet flow from adjacent areas at higher elevations with a total average annual precipitation of 37.08 inches, (Source: http://usclimatedata.com as measured in nearby Lockport, New York).

According to NYSDEC mapping, there are no state mapped wetlands or streams located within the project limits of disturbance. However, two state-mapped wetlands (WO-22 and WO-35) are mapped approximately 22-feet north, and 40-feet north, respectively of the project. As a result, there will be impacts to the 100-feet adjacent areas of these two wetlands. There are two mapped Class C streams crossed by the project, both of which are unnamed tributaries to Murder Creek (per USGS 7.5-minute topographic mapping – Wolcottsville, NY 7.5-minute Quad).

Haley & Aldrich of New York conducted a wetland and stream delineation in the Fall of 2019 in accordance with the *Corps of Engineers Wetlands Delineation Manual, (USACE 1987)* and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0, (USACE, 2012)*. Delineations were performed within the proposed workspaces and adjacent areas, the (Study Area). The Greenbush site was one of five separate projects delineated during this field event, so the overall Study Area encompassed all five of these sites. Specific to the Greenbush site, a total of seven wetlands and five streams were identified within the Greenbush site Study Area. Of these, three streams and four wetlands are crossed by the project (but not directly impacted by the proposed project activities). The delineated wetlands include palustrine emergent wetlands, palustrine forested wetlands, and palustrine scrub shrub wetlands. Wetlands were generally located along stream corridors and associated riparian areas. The dominant vegetation observed in the delineated wetlands were sensitive fern (*Onoclea sensibilis*), reed canary grass (*Phalaris arundinacea*), narrowleaf cattail (*Typha angustifolia*), soft rush (*Juncus effusus*), purple loosestrife (*Lythrum salicaria*), silky dogwood (*Cornus amomum*), red osier dogwood (*Cornus sericea*), red maple (Acer rubrum), eastern cottonwood (*Populus deltoides*), and Swamp white oak (*Quercus bicolor).*

Three wetlands (KLD, KLE, and KLF) delineated by Haley & Aldrich of New York for the project appear to represent the actual wetland boundaries of state-regulated wetlands WO-22 and WO-35. Wetland KLD appears to represent the southern boundary of Wetland WO-35, north of Rapids Road. Wetland KLE appears to represent the northern boundary of Wetland WO-35, south of Rapids Road. Wetland KLF appears to represent the southern boundary of Wetland W0-22, north of Swift Mills Road. Portions of the project pipeline installation activities are located within the 100-feet regulated adjacent area of these areas of the two NYSDEC-jurisdictional wetlands.

The three delineated streams crossed by the project (KL1, KL4, and KL14) are all tributaries to Murder Creek. All three of these streams will be crossed by means of directional boring. Stream KL1 is an unmapped approximately 3-feet-wide intermittent stream with visible flow to the north, and a channel substrate of silt loam. Stream KL4 is a mapped Class C perennial stream which flows northwest through the project area, crossing Rapids Road beneath a 12-feet-wide bridge. This stream is approximately 8-feet wide, 12-18 inches deep, and has a silt loam channel substrate. KL14 is a mapped Class C stream located within the northeastern end of the project. The stream flows northeast, crossing Swift Mills Road underneath a 12-feet-wide bridge. The stream is approximately 8-feet-wide and 8-10 inches deep, with a silt loam substrate.

3. Jurisdictional Impacts

Through project design and planning, siting efforts have been made to avoid and/or minimize potential impacts to delineated wetland and streams. No direct disturbances or losses to Waters of the U.S. will result from proposed project activities. The limits of disturbance have been reduced to the minimum practicable size while still facilitating safe access and project construction, and temporary workspaces including boring pit locations have been sited to avoid streams and wetlands. Directional boring methods of pipeline installation beneath sensitive resources within the project, proper sediment and erosion control measures, and construction measures summarized in the project's Erosion and Sediment Control and Agricultural Mitigation Plan (ESCAMP) which is included as Appendix C, will minimize or prevent impacts to sensitive resources.

- The stream and wetlands within the project area will be crossed by directional boring methods, with all disturbances (boring pits) being located a minimum of 50-feet away from the streams and borings being completed a minimum of 5-feet below the beds of the streams.
- No direct impacts to wetlands or streams within the project.
- No tree clearing is proposed for the project.
- No permanent fill will be placed in any wetlands/streams as a result of construction.
- Other direct impacts associated with construction will be temporary in nature and will be restored following construction.

Based on current engineering plans and conservative assumptions regarding the extent of construction disturbance, construction activities will result in only the temporary disturbance of 0.04 acres (1,622 square feet) of the 100-feet adjacent areas of NYSDEC-protected wetlands WO-22 and WO-35. Figure 3 in Appendix A depicts project impacts to jurisdictional Waters of the U.S and depicts a plan view of the proposed directional borings. Figure 4 provides directional boring profiles for each of the NYSDEC-jurisdictional crossings located within the project. Figure 5 depicts the typical anticipated layout of the boring workspaces for the project. These impacts are also described in the following sub sections.

3.1 STREAM IMPACTS

The construction of the project will not result in any direct impacts to streams. One unmapped stream and two mapped Class C streams will be crossed by the proposed pipeline by directional boring method beneath the streams at the crossing areas. The bore pits for these crossings will be located a minimum of 50-feet outside the streams and thus the limits of disturbance for the Project will avoid the streams.

Additional information on construction activities for streams is outlined in Section 5.0 of the project's ESCAMP - see Appendix C. The directional boring method provides the least disturbance and most expedient crossing to prevent impacts to the stream.

- **Directional Boring Methods**. Involves horizontal directional boring (HDD) and installation of the 2 to 4-inch pipelines at a minimum of 5-feet below the stream beds at the proposed crossings, avoiding disturbances to the stream bed and water quality. National Fuel is proposing to use this method to all three streams within the project footprint, with no direct impacts to the bed or banks of these streams. The streams will be further protected through the installation perimeter erosion and sediment controls downgradient of bore pit locations, outside the stream corridors. An HDD Inadvertent Return Contingency Plan is provided as Appendix F.

Table 1 below provides a summary of stream impacts for the project.

Table I. Summary of Temporary Impacts to Streams.

Stream ID [1]	Location (Figure 3)	Waterbody Name [2]	Waterbody Type [3]	NYSDEC Stream Classification[4]	Stream Impact (Square Feet)	Temporary Linear Stream Impact (Feet)	Proposed Crossing Method
Greenbush FY2020 Pipeline Installation Project							
KL1	Sheet 6 of 8	Unnamed tributary to Murder Creek	Intermittent	N/A	0	0	Directional boring[5]
KL4	Sheet 2 of 8	Unnamed tributary to Murder Creek	Perennial	C	0	0	Directional boring[5]
KL14	Sheet 8 of 8	Unnamed tributary to Murder Creek	Perennial	C	0	0	Directional boring[5]
				Total Impacts:	**0**	**0**	

Notes:

[1] Field designations represent unique identifiers assigned to each stream based on numeric order during field surveys.

[2] Waterbody name as identified on USGS Topographic Series 7.5-minute maps.

[3] Waterbody type includes perennial, intermittent and ephemeral.

- A perennial stream has flowing water year-round during a typical year. Perennial streams are identified as solid blue lines on the USGS Topographic maps.
- An intermittent stream has flowing water during certain times of the year when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Intermittent streams are identified as dashed blue lines on the USGS Topographic maps.
- An ephemeral drainage feature has flowing water only during and for a short duration after, precipitation events in a typical year. Ephemeral drainage features are not identified on the USGS Topographic map.

[4] Designated by NYSDEC, (Environmental Resource Mapper 2020).

[5] Stream impacts will be avoided as the stream will be crossed by means of directional boring pipeline installation.

3.2 WETLAND IMPACTS

The construction of the project will not result in any direct impacts to wetlands, as project workspaces including boring pits have been cited outside of these locations. No permanent fill will be placed in wetlands as a result of construction. There will also not be any tree clearing as a result of the project. Indirect impacts to wetlands and surface waters may result from sedimentation and erosion caused by adjacent construction activities (e.g., soil and stream sediment disturbance). This indirect impact may occur at wetlands adjacent to work areas where no direct wetland impacts are anticipated. The project's ESCAMP (see Appendix C) will be implemented throughout construction to control any indirect impacts to nearby wetlands and streams. Table 2 below provides a summary of impacts to wetlands crossed by the project.

Table II. Summary of Impacts to Wetlands

Wetland ID [1]	Location (Figure 3)	Temporary Impact (Acres) [2]	Permanent Fill (Acres)	Permanent Conversion (Acres)	Jurisdiction/ Classification	NWI Class [3]
KLE	Sheet 2 of 8	N/A – (Crossing by Directional Boring)[4]	-	-	NYSDEC (Class 3)	PFO
KLC	Sheet 6 of 8	N/A – (Crossing by Directional Boring)[4]	-	-	USACE	PEM
KLB	Sheet 7 of 8	N/A – (Crossing by Directional Boring)[4]	-	-	USACE	PSS
KLA	Sheet 8 of 8	N/A – (Crossing by Directional Boring)[4]	-	-	USACE	PFO
TOTALS:		**0**	-	-		

Notes:

[1] Field designations represent unique identifiers assigned to each wetland based on alphabetic sequential order during field surveys.

[2] Temporarily impacted wetlands within the right-of-way (ROW) will be restored and allowed to revert to ecologically stable wetland; as required for corrosion testing and/or pipeline integrity testing, a reduced width may be permanently maintained in accordance with the ESCAMP operations maintenance procedures.

[3] Wetland classifications are based on the NWI referenced Cowardin classification system whereby: (P = Palustrine; OW = Open Water; EM = Emergent; SS = Shrub Scrub; FO = Forested)

[4] Wetland impacts will be avoided as the wetland will be crossed by means of directional boring pipeline installation.

The project will result in temporary impacts to upland areas that are located within the 100-feet adjacent area of state protected wetlands. The total amount of impacts within the 100-feet adjacent areas is approximately 0.04 acres (1,622 square feet). Table 3 below provides a summary of project impacts to NYSDEC-protected 100-feet adjacent areas.

Table III. Summary of Impacts to 100-feet Adjacent Areas

NYSDEC Wetland ID	Associated Delineated Wetland ID(s)	Temporary Impact (acres)
WO-35	Wetland KLF (PSS, PFO), Wetland KLE	0.02
WO-22	Wetland KLD	0.02
	TOTALS:	**0.04**

4. Avoidance, Minimization, and Mitigation

The existing road right-of-way (ROW) will be utilized as available for the proposed project and the construction limits of disturbance have been limited to the minimum amount of land needed to safely construct the project. The sensitive resource crossings (stream and wetland areas) will be crossed via directional boring methods. As such, National Fuel has minimized impacts while still maintaining appropriate workspace for safe access and construction.

Sediment and erosion control measures will be implemented wherever project construction occurs within, or adjacent to, wetlands and/or streams. National Fuel will implement stream construction and restoration measures in the project's ESCAMP (see Appendix C) to minimize impacts.

National Fuel will utilize a variety of BMPs to minimize potential adverse impacts to nearby streams as a result of the construction of the proposed facilities. BMPs will be implemented throughout project construction and until the project ROW is restored and stabilized. In addition, an Invasive Species Control Plan (see Appendix D) has been developed for the project that will assist in preventing the introduction or spread of invasive non-native plant species resulting from the construction and operation of the project.

4.1 MITIGATION

No permanent fill will be placed in any Waters of the U.S. and no forested (PFO) wetland conversion will occur because of the proposed project. Therefore, no compensatory mitigation is proposed.

5. Compliance with Federal and State Endangered Species Acts

The New York State Natural Heritage Program (NYNHP) records for rare plants and animals were reviewed within the project area through a review of the New York State Environment Resource Mapper (EnviroMapper). Review of the NYSDEC's EnviroMapper indicated the potential for state-designated rare, threatened, or endangered species, associated protected habitats, or significant natural communities to be present within the project area. A letter was submitted to the New York State Natural Heritage Program (NYNHP) to verify any potential state-listed species or data within the vicinity of the project Area. A response was received from the NYNHP on 16 December 2019 which indicated no records of rare or state-listed animals or plants, or significant natural communities located within the project site. The letter indicated that a Northern Long-eared Bat (*Myotis septentrionalis*, or NLEB) hibernaculum has been documented within 3.4-miles of the project site. Given the documented hibernacula location is approximately 3.4-miles away and that the project will not involve tree clearing, direct impacts to the northern long-eared bats are not anticipated. In addition, four rare freshwater mussel species including the Rainbow mussel (*Villosa iris*), Wabash Pigtoe (*Fusconaia flava*), Round Pigtoe (*Pleurobema sintoxia*), and Slippershell Mussel (*Alasmidonta viridis*) have been identified in nearby Murder Creek, located approximately 50-feet east of the project. Impacts to the mussel species would not be anticipated to result from the project as the project avoids direct impacts to this stream. Additionally, erosion and sediment controls will be implemented which will mitigate the potential for indirect impacts such as runoff, erosion, and sedimentation from reaching this off-site location.

The USFWS Information, Planning, and Consultation System (IPAC System) was also consulted to obtain an informal list of endangered species, critical habitat, migratory birds, wildlife refuges, and wetlands (collectively referred to as trust resources) for the project. The only federally listed species that is listed with potential presence within the projects the northern long eared bat (NLEB), which is a federally listed threatened species. If the NLEB were to be present in the project area, potential impacts include direct mortality resulting from removal of roost trees and habitat loss resulting from tree clearing along the existing right-of-way. No known hibernacula are present within 0.25-mile and no known roost trees are present within 150-feet of the project. Given that the project will not involve tree clearing, and absence of known roost sites and winter hibernacula within the project site, direct impacts on northern long-eared bats are not anticipated.

National Fuel has field reviewed the project area and undertaken consultation with appropriate agency staff regarding existing critical habitat or protected species (including trees, plants or other flora) in the project area. No other species, plants, or protected habitats were identified with respect to the project area.

Copies of agency correspondence, consultation letters, and/or clearances are included in Appendix E (Agency Correspondence).

6. Compliance with the New York State Historic Preservation Act

No archaeological cultural resources were previously reported/documented within or adjacent to the project area. No cultural resources listed or potentially eligible for listing in the State or National Registers of Historic Places are present in the project area.

On behalf of National Fuel, Haley & Aldrich of New York submitted a consultation request with the New York State Historic Preservation Office (SHPO) through its Cultural Resource Information System (CRIS) on 14 November 2019. The SHPO reviewed the project consultation request and identified the project location as being located within a potentially sensitive archaeological area. Further consultation with the SHPO, via phone correspondence, indicated that select areas of the project area of potential effect "APE" were potentially sensitive due to their location with respect to nearby topographical and stream resources and known historic uses in the area. Panamerican Consultants, Inc. (Panam), a cultural consultant was engaged to conduct a Phase 1AB of the project APE. Panam completed its investigation in March 2020 in which it determined that no cultural resources listed or potentially eligible for listing in the State or National Registers of Historic Places are present in the project's APE. No further cultural investigations were recommended. The Phase 1AB report and findings were submitted to the SHPO on 16 March 2020.

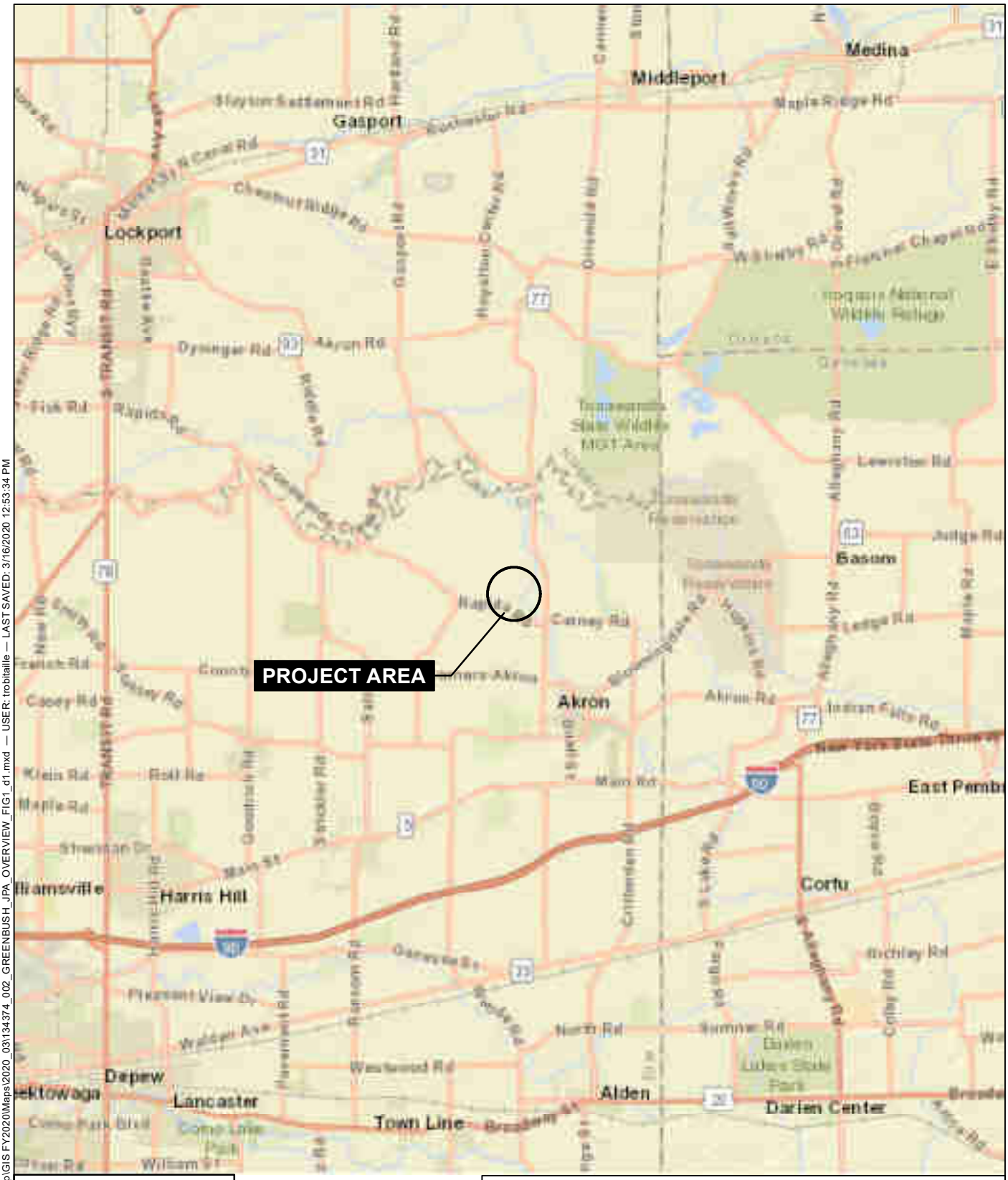
A response from the SHPO was received on 27 March 2020 which indicated that no historic properties, including archaeological and/or historic resources, will be impacted by the project. A copy of the correspondence from the SHPO is provided in Appendix E (Agency Correspondence).

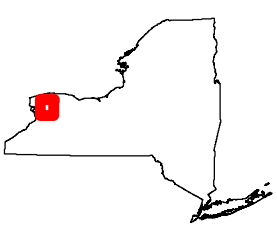
References

1. Cowardin, L.M., et al. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, Washington D.C. 131 pp.
2. Edinger, G.J., et al. 2002. Ecological Communities of New York State, Second Edition. New York Heritage Program, NYS Department of Environmental Conservation, Albany, NY, 134 pp.
3. National Fuel Gas (NFG). Erosion and Sedimentation Control & Agricultural Mitigation Plan (ESCAMP), Revised 30 May 2018, and Best Management Practices (BMP) Typicals. 2018.
4. NYSDEC. New York Environmental Resource Mapper. Natural Resources and Environmental Features. 2020. Accessed March 2020. http://www.dec.ny.gov/gis/erm/
5. Reschke, Carol. 1990. Ecological Communities of New York State. New York Heritage Program, NYS Department of Environmental Conservation, Latham, NY 96 pp. and maps.
6. U.S. Fish & Wildlife Service (USFWS), National Wetlands Inventory, Wetlands Mapper, March 2020. https://www.fws.gov/wetlands/Data/Mapper.html Accessed March 2020.
7. USACE. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, C. V. Noble, and J. F. Berkowitz. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
8. United States Geological Survey (USGS). 2020. National Hydrography Dataset. U.S. Geological Survey, Washington D.C. Accessed March 2020. http://nhd.usgs.gov/data.html.

APPENDIX A

PROJECT FIGURES





0 2 4
SCALE IN MILES

MAP SOURCE: ESRI
SITE COORDINATES: 43°3'32.38"N
78°31'45.863"W

HALEY ALDRICH

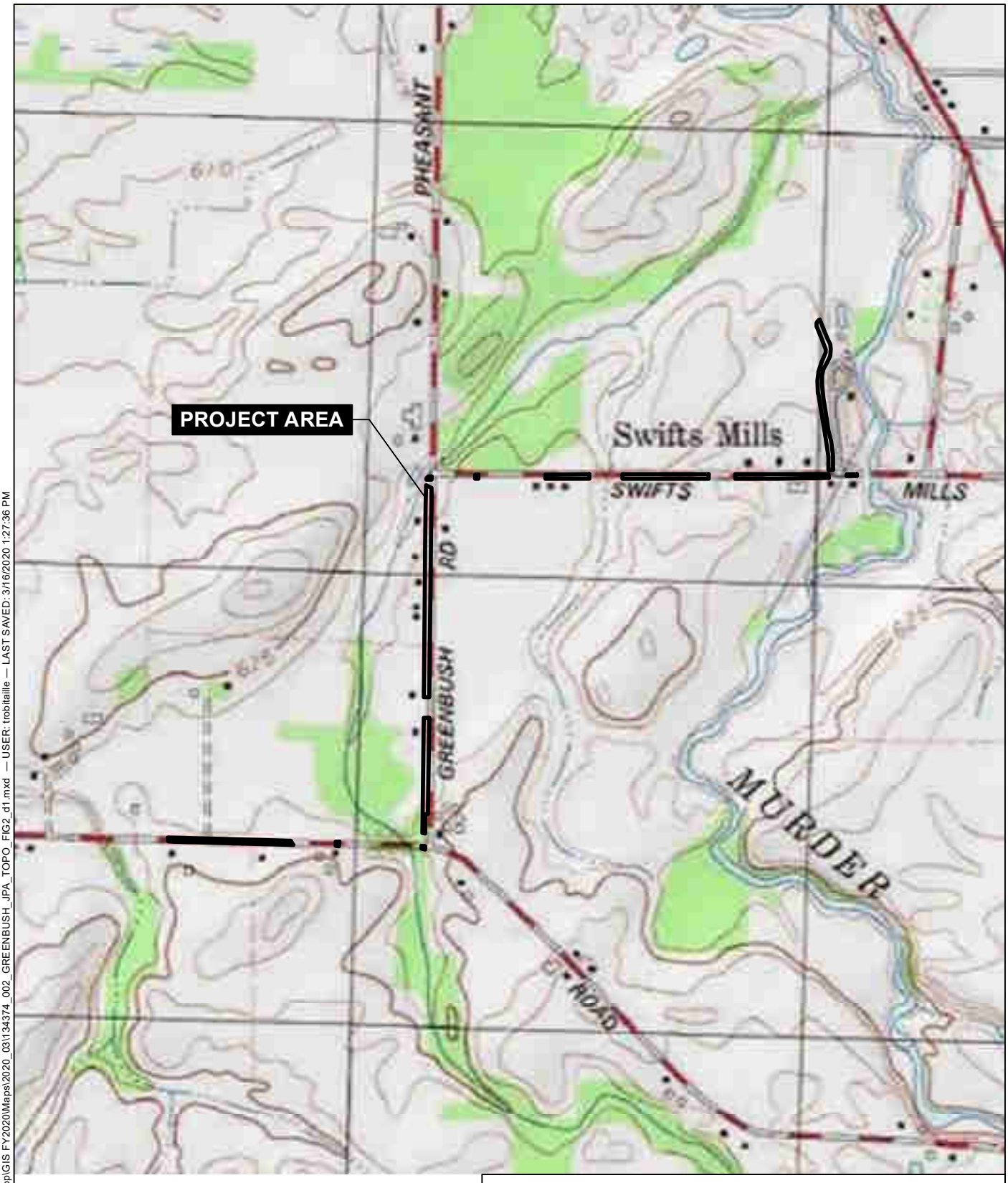
NATIONAL FUEL GAS DISTRIBUTION CORPORATION
GREENBUSH FY2020 PIPELINE INSTALLATION PROJECT
TOWN OF NEWSTEAD
ERIE COUNTY, NEW YORK

PROJECT OVERVIEW

APPROXIMATE SCALE: 1 IN = 4 MI
MARCH 2020

FIGURE 1

GIS FILE PATH: C:\Users\trobitaille\Desktop\GIS FY2020\Maps\2020_03\134374_002_GREENBUSH_JPA_OVERVIEW_FIG1_d1.mxd — USER: trobitaille — LAST SAVED: 3/16/2020 12:53:34 PM



LEGEND

LIMITS OF DISTURBANCE

N

0 500 1,000
SCALE IN FEET

NOTES
1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. BASE MAP SOURCE: ESRI

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ERIE COUNTY, NEW YORK

USGS TOPOGRAPHIC MAPPING

SCALE: AS SHOWN
MARCH 2020

FIGURE 2

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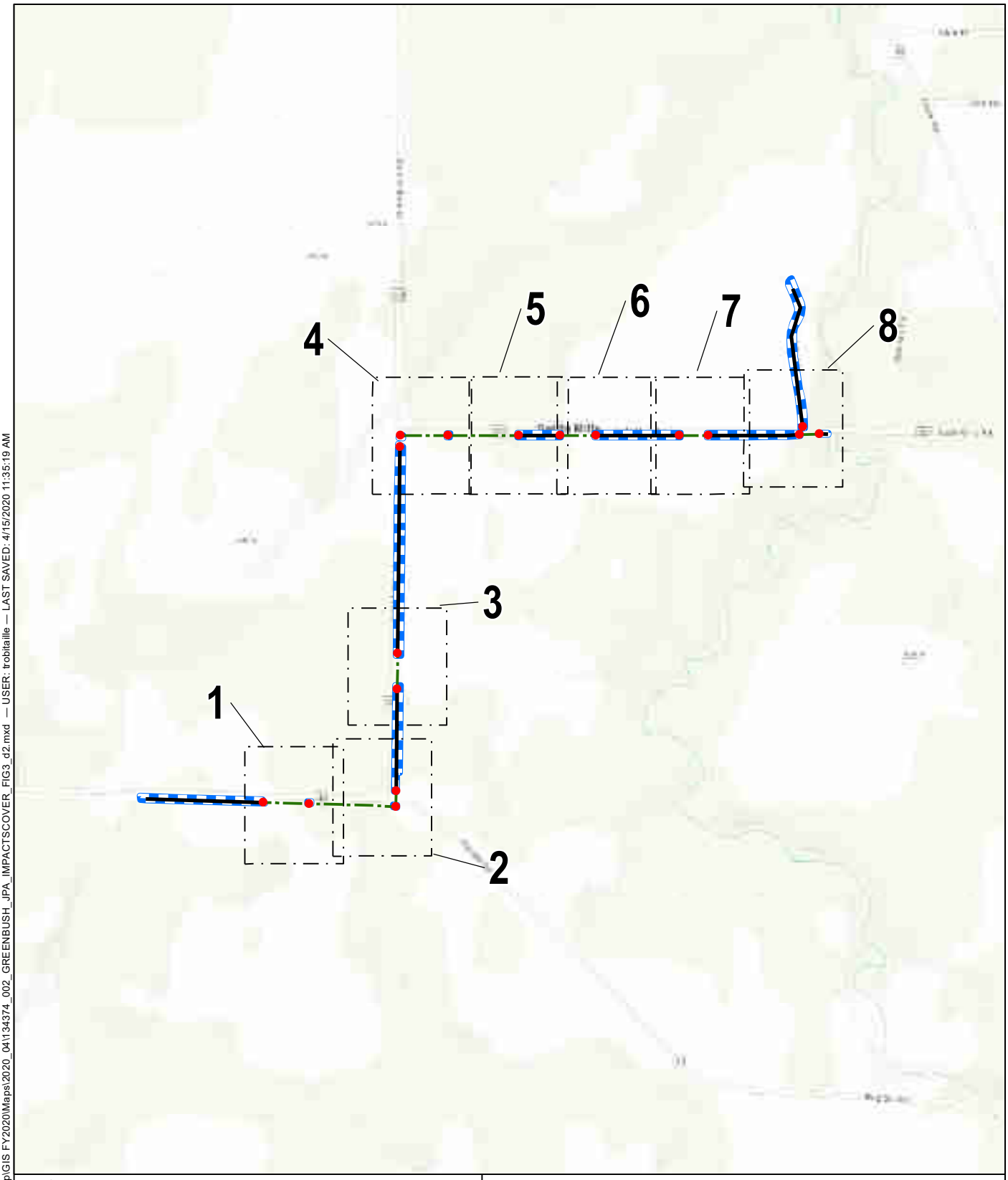

LEGEND

- LIMITS OF DISTURBANCE
- MAP SHEET
- BORE PIT LOCATION
- PROPOSED HORIZONTAL DRILL PIPELINE INSTALLATION
- PROPOSED DIRECT BURY 4" PIPELINE

NOTES
1. BASE MAP SOURCE: ESRI

N

0 1,000
SCALE IN FEET

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TOWN OF NEWSTEAD
ERIE COUNTY, NEW YORK

PROPOSED JURISDICTIONAL IMPACTS

SCALE: AS SHOWN
APRIL 2020

FIGURE 3
INDEX SHEET

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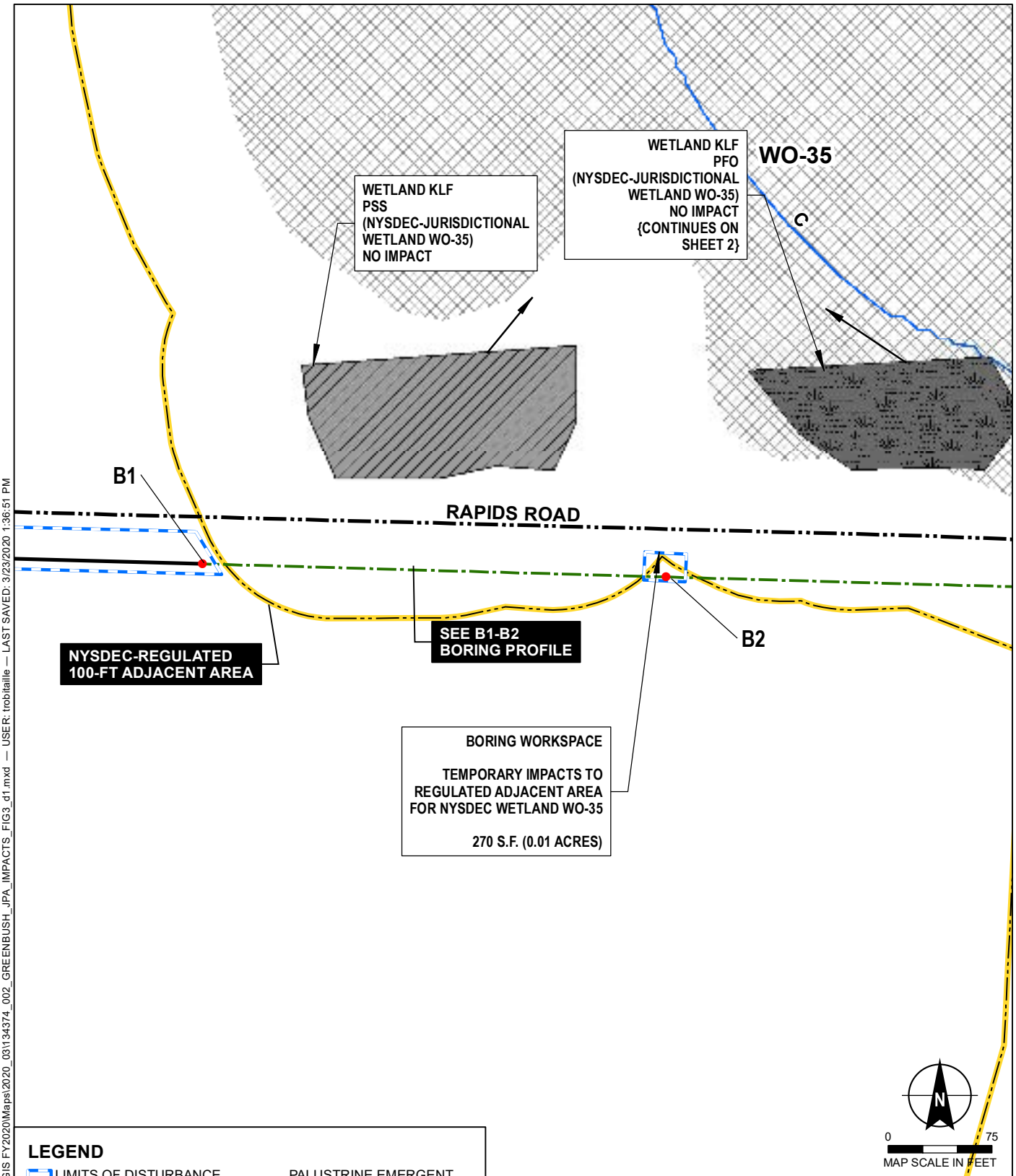

LEGEND

- LIMITS OF DISTURBANCE
- PROPOSED HDD PIPELINE INSTALLATION
- PROPOSED DIRECT BURY 4" PIPELINE
- BORE PIT LOCATION
- FEATURE CONTINUES
- NYSDEC-MAPPED WETLAND
- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)
- PALUSTRINE SCRUB SHRUB (PSS)
- DELINEATED POND
- DELINEATED STREAM
- NYSDEC-REGULATED 100-FT ADJACENT AREA

NOTES
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2. DELINEATED WETLAND TYPES BASED ON COWARDIN CLASSIFICATION.

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TOWN OF NEWSTEAD
ERIE COUNTY, NEW YORK

PROPOSED JURISDICTIONAL IMPACTS

SCALE: AS SHOWN
APRIL 2020

FIGURE 3
SHEET 1 OF 8

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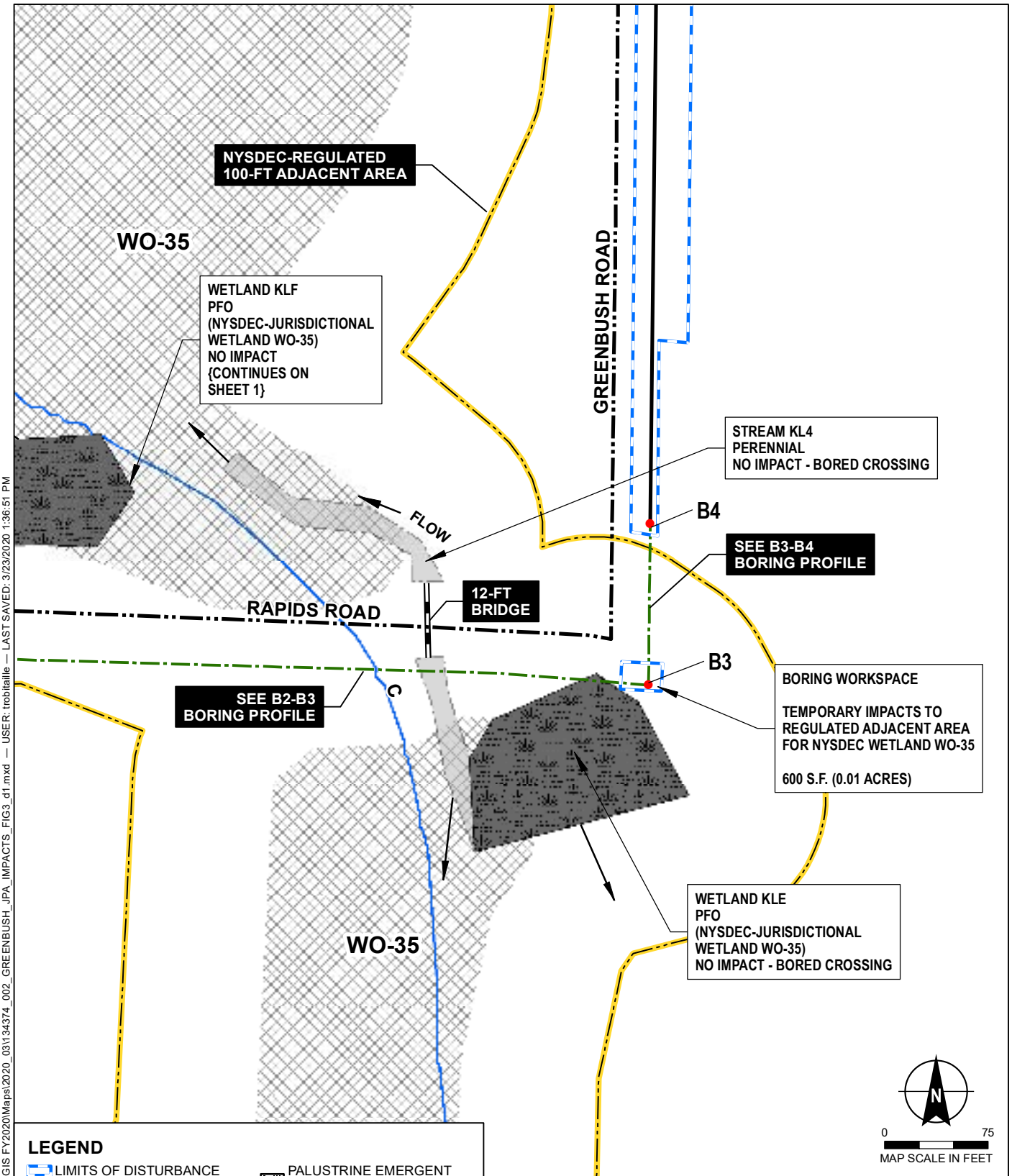

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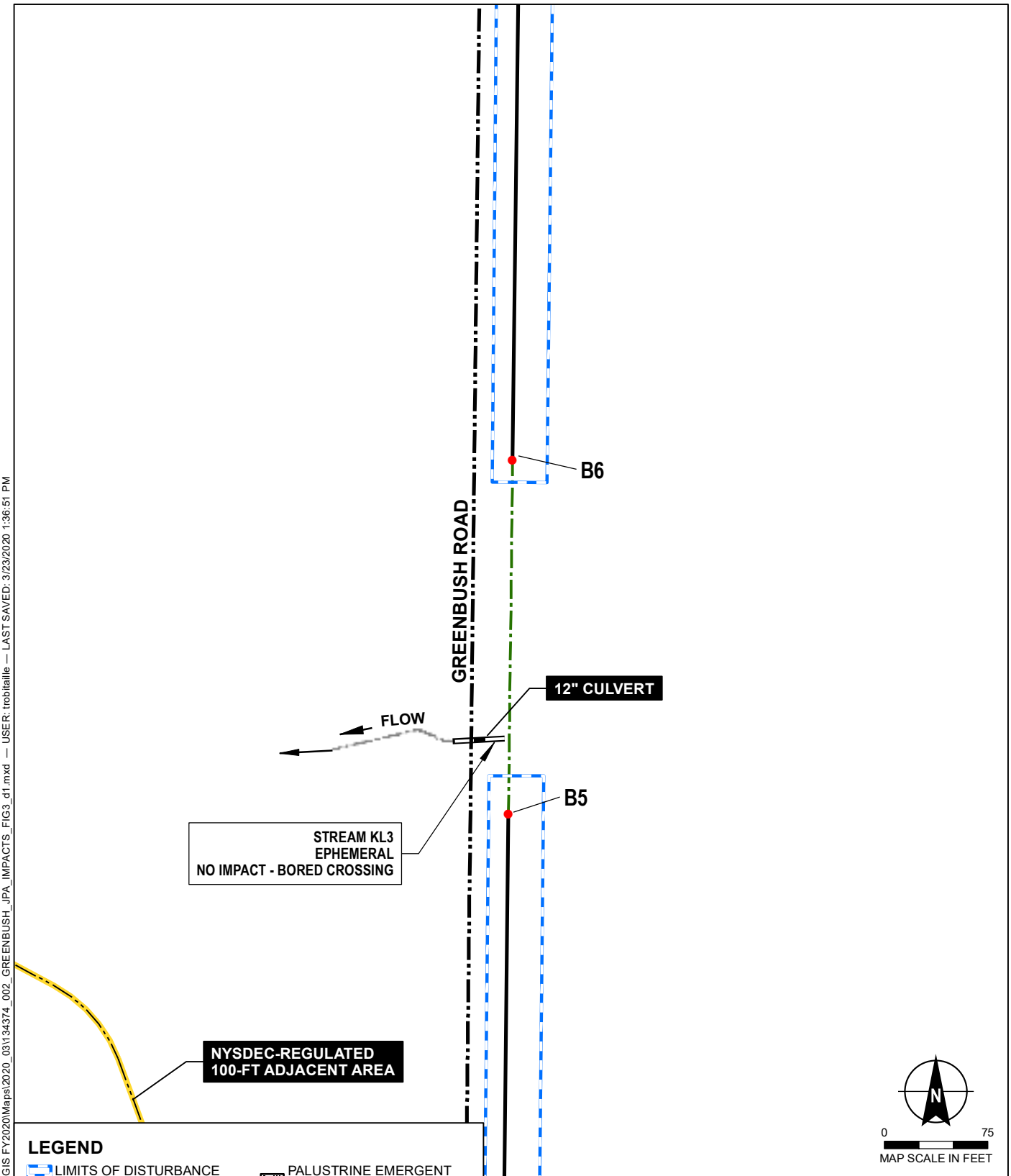
ERIE COUNTY, NEW YORK

PROPOSED JURISDICTIONAL IMPACTS

SCALE: AS SHOWN
APRIL 2020

FIGURE 3
SHEET 2 OF 8



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TOWN OF NEWSTEAD
ERIE COUNTY, NEW YORK

PROPOSED JURISDICTIONAL IMPACTS

SCALE: AS SHOWN
APRIL 2020

FIGURE 3
SHEET 3 OF 8

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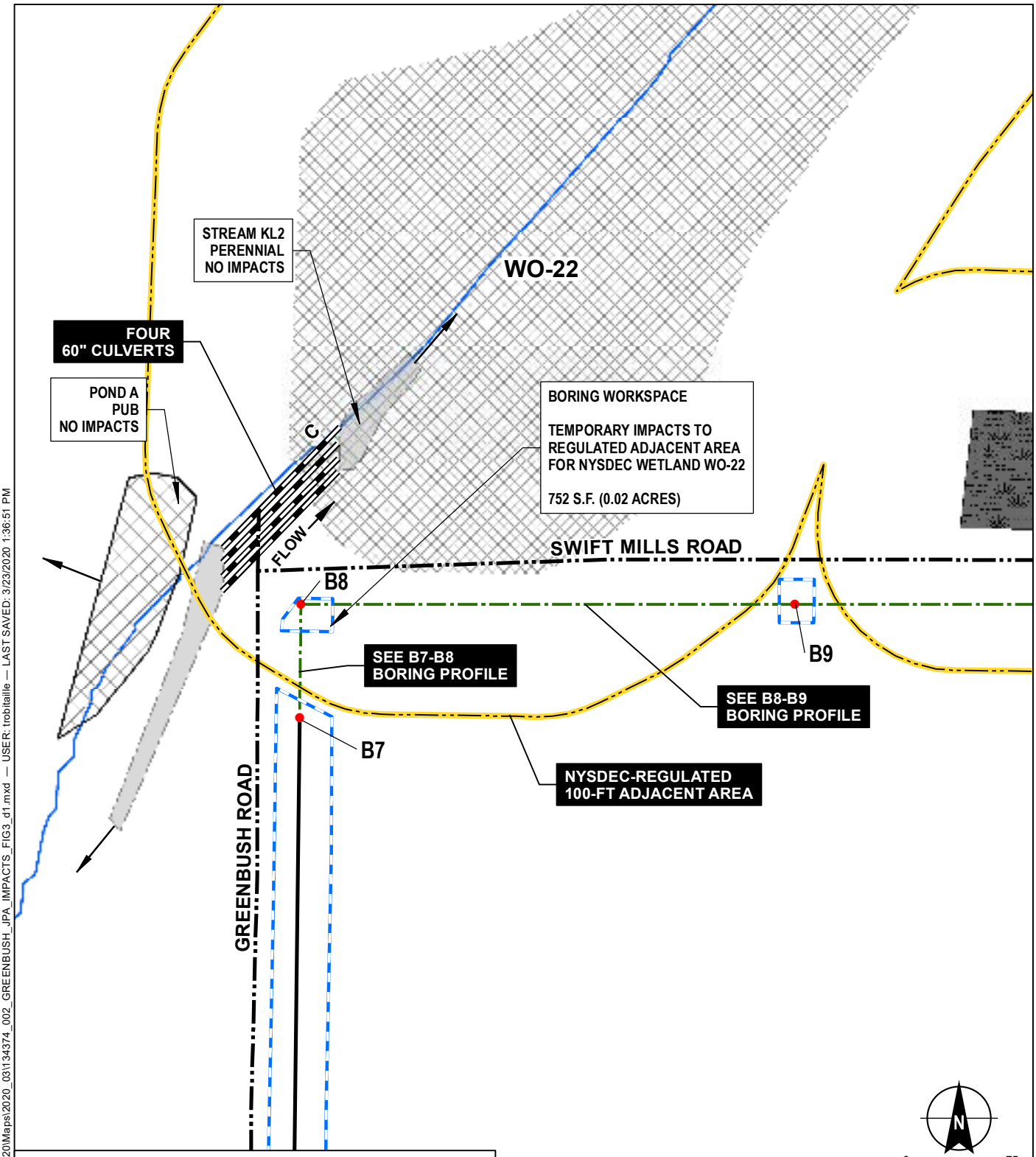

LEGEND

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PROPOSED JURISDICTIONAL IMPACTS

SCALE: AS SHOWN
APRIL 2020

FIGURE 3
SHEET 4 OF 8

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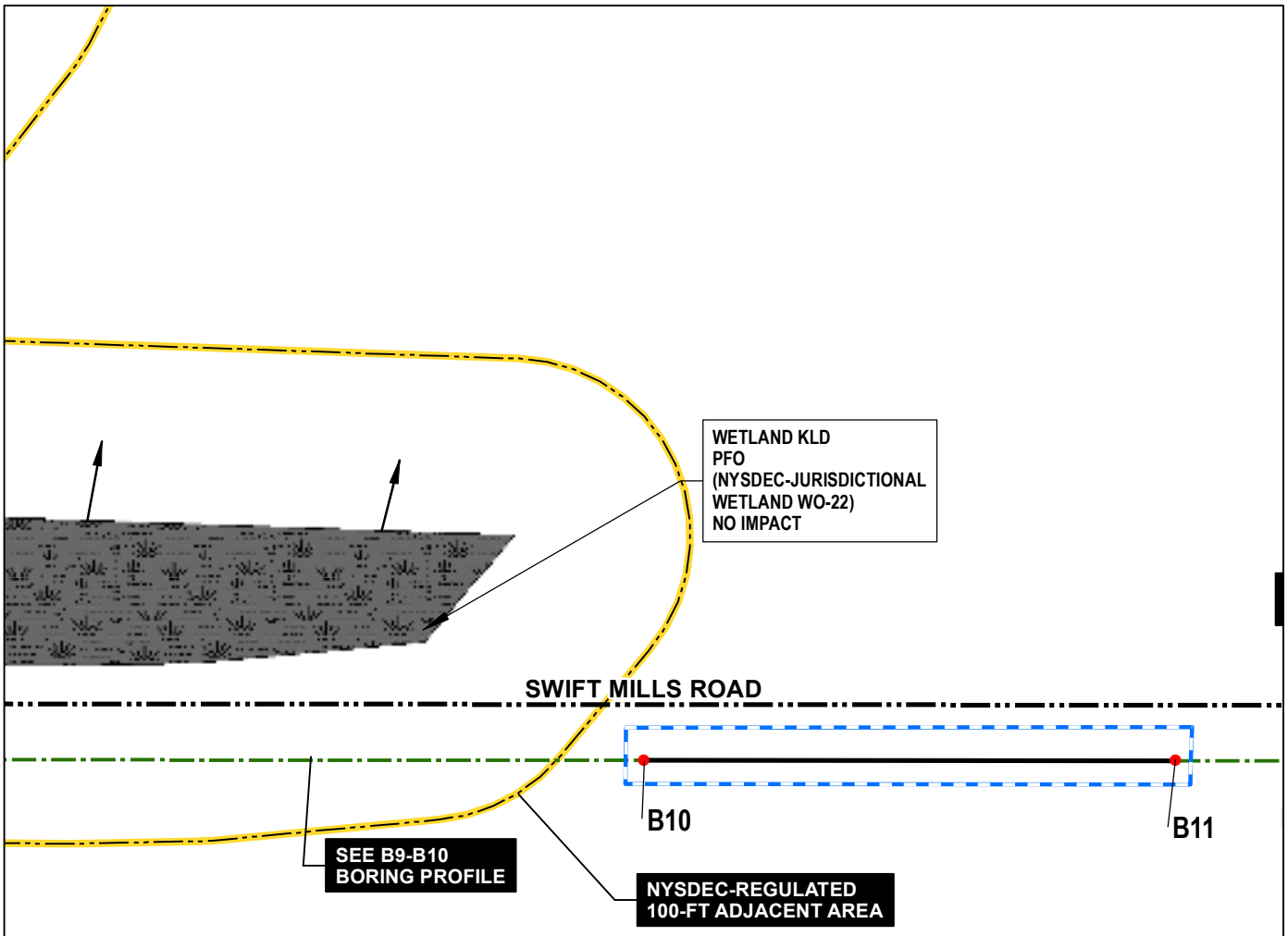

N

0 75

MAP SCALE IN FEET

LEGEND

- LIMITS OF DISTURBANCE
- PROPOSED HDD PIPELINE INSTALLATION
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TOWN OF NEWSTEAD
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PROPOSED JURISDICTIONAL IMPACTS

SCALE: AS SHOWN
APRIL 2020

FIGURE 3
SHEET 5 OF 8

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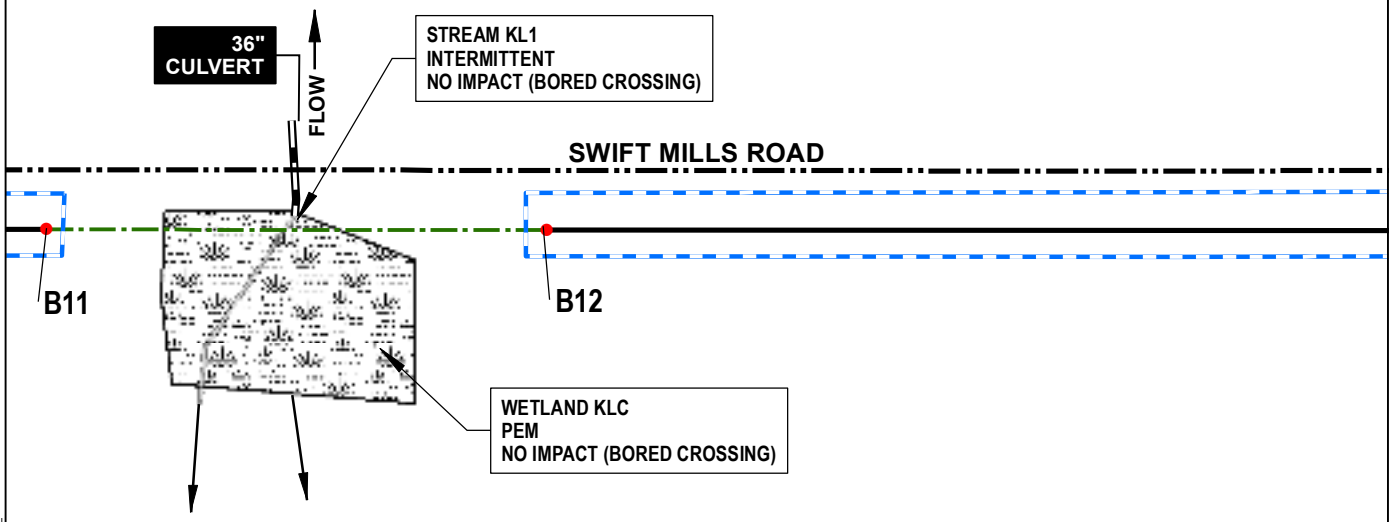

LEGEND

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N

0 75

MAP SCALE IN FEET

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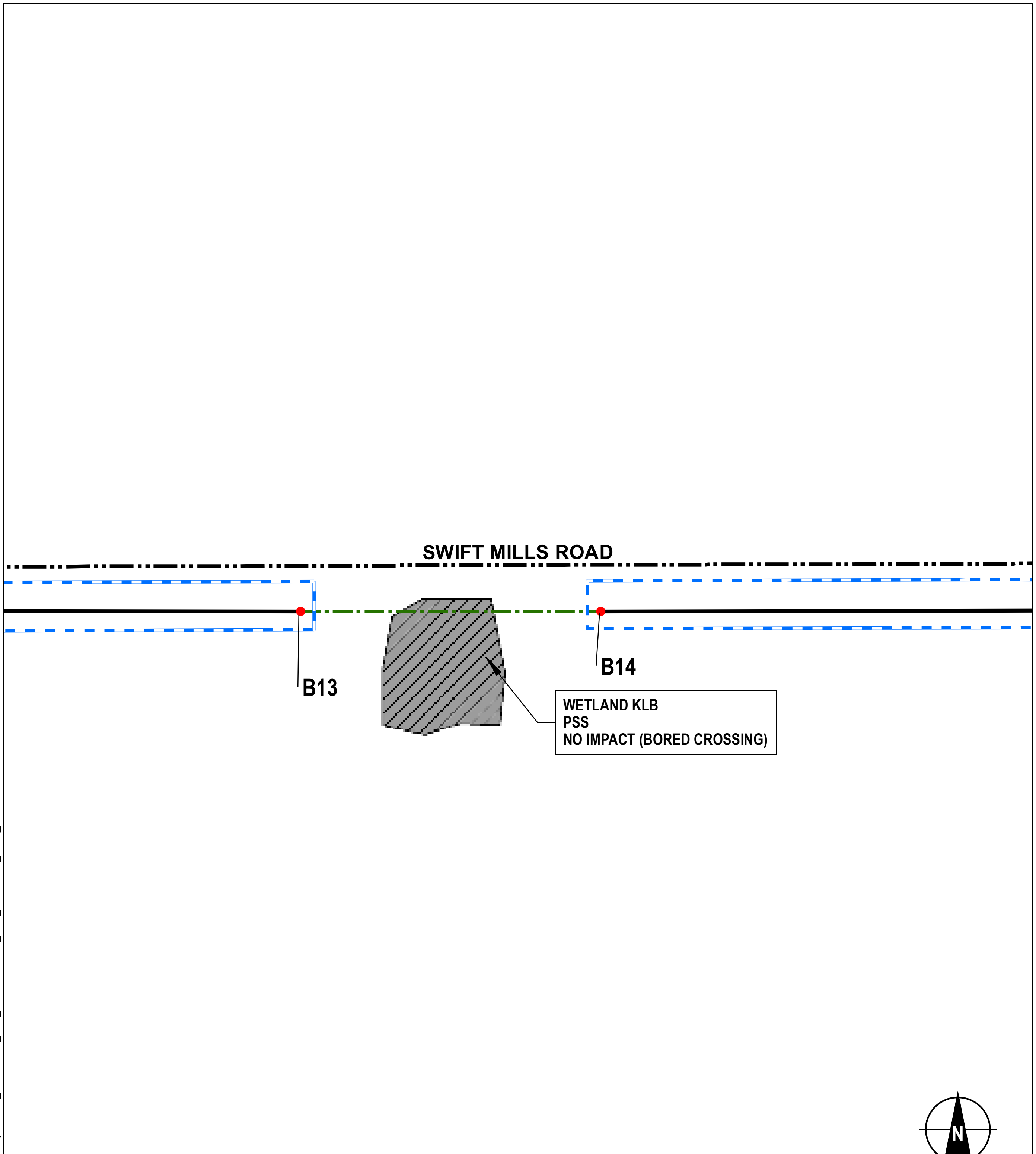
GREENBUSH FY2020 PIPELINE INSTALLATION PROJECT
TOWN OF NEWSTEAD
ERIE COUNTY, NEW YORK

PROPOSED JURISDICTIONAL IMPACTS

SCALE: AS SHOWN
APRIL 2020

FIGURE 3
SHEET 6 OF 8

GIS FILE PATH: C:\Users\trobitaille\Desktop\GIS FY2020\Maps\2020_03134374_002_GREENBUSH_JPA_IMPACTS_FIG3_d1.mxd — USER: trobitaille — LAST SAVED: 3/23/2020 1:36:51 PM



LEGEND

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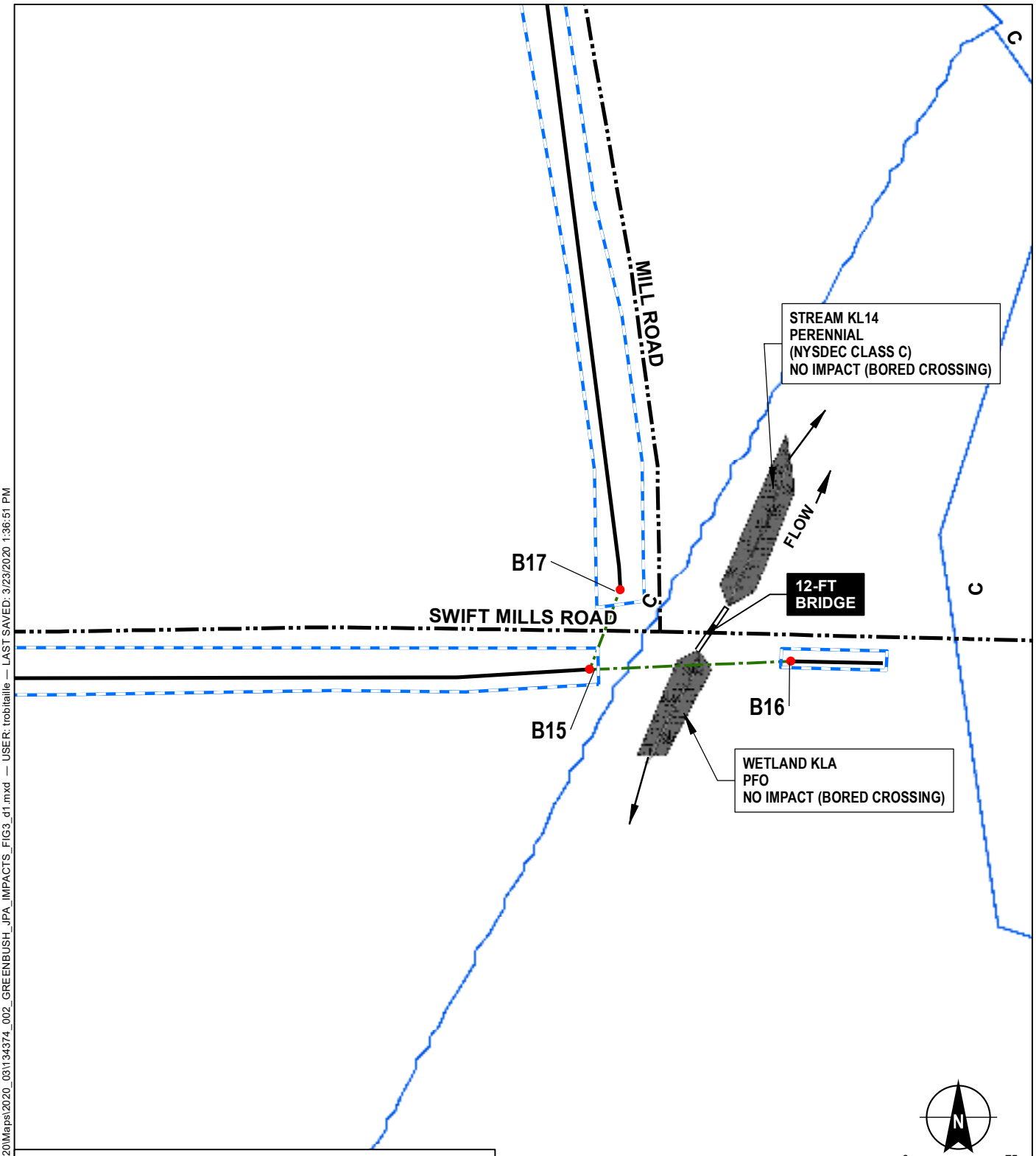
GREENBUSH FY2020 PIPELINE INSTALLATION PROJECT
TOWN OF NEWSTEAD
ERIE COUNTY, NEW YORK

PROPOSED JURISDICTIONAL IMPACTS

SCALE: AS SHOWN
APRIL 2020

FIGURE 3
SHEET 7 OF 8



LEGEND

- LIMITS OF DISTURBANCE
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NATIONAL FUEL GAS DISTRIBUTION CORPORATION
GREENBUSH FY2020 PIPELINE INSTALLATION PROJECT
TOWN OF NEWSTEAD
ERIE COUNTY, NEW YORK

PROPOSED JURISDICTIONAL IMPACTS

SCALE: AS SHOWN
APRIL 2020

FIGURE 3
SHEET 8 OF 8

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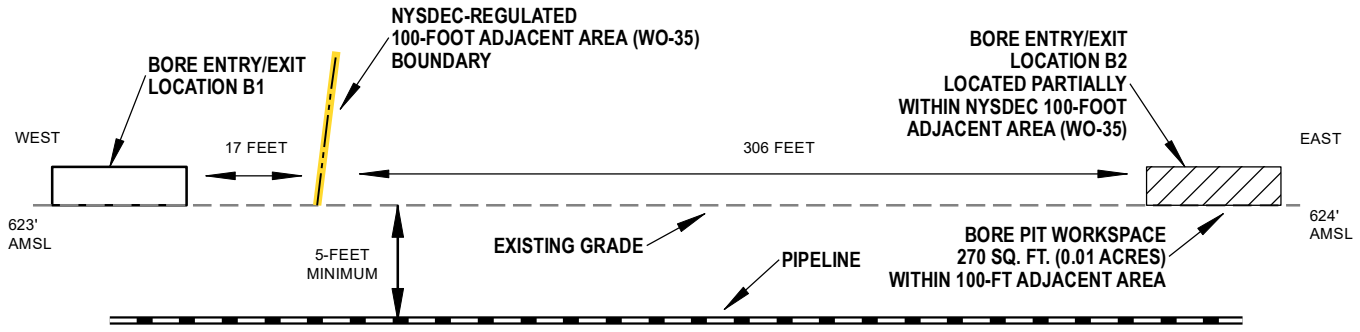
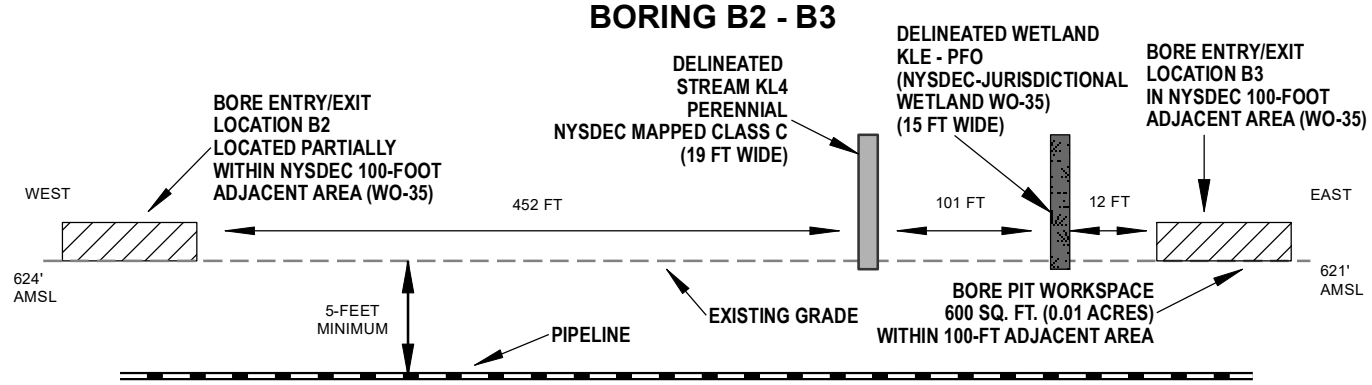
PROPOSED PIPELINE PROFILE
BORING B1 - B2



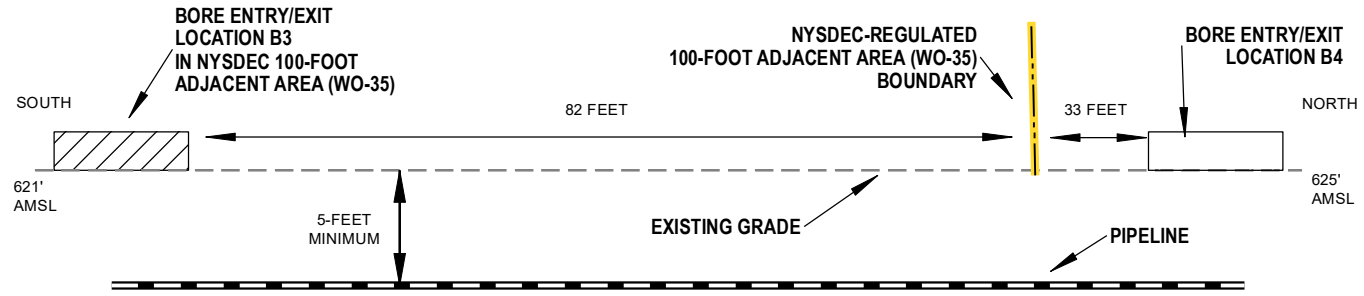
ACCESS TO BORE ENTRIES/EXITS
WILL BE FROM ROADWAY

PROPOSED PIPELINE PROFILE
BORING B2 - B3



ACCESS TO BORE ENTRIES/EXITS
WILL BE FROM ROADWAY

PROPOSED PIPELINE PROFILE
BORING B3 - B4



ACCESS TO BORE ENTRIES/EXITS
WILL BE FROM ROADWAY

LEGEND

- EXISTING GRADE
- PROPOSED HORIZONTAL BORING PIPELINE INSTALLATION

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. PLANS AND PROFILE NOT TO SCALE.
3. ELEVATIONS SHOWN ARE DERIVED FROM USGS 7.5' QUAD AND ARE REPRESENTED AS FEET ABOVE MEAN SEA LEVEL (AMSL).

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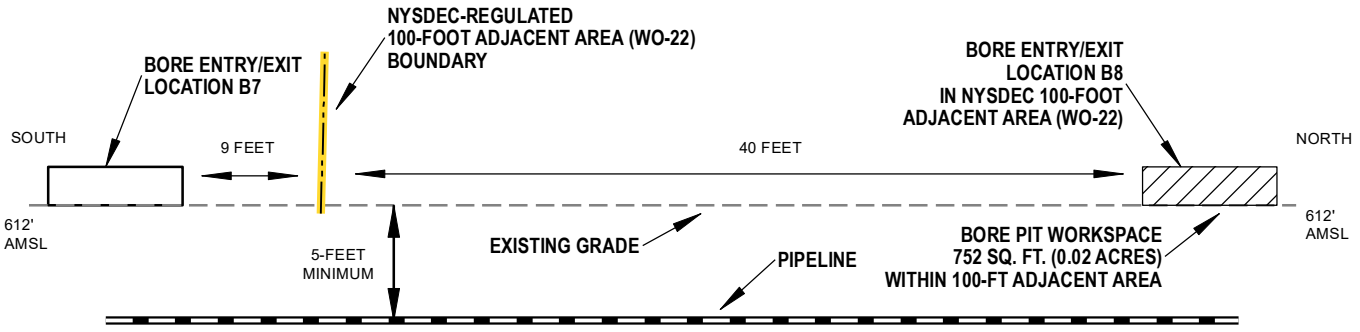
GREENBUSH FY2020 PIPELINE INSTALLATION PROJECT
TOWN OF NEWSTEAD
ERIE COUNTY, NEW YORK

PROPOSED PIPELINE
BORING PROFILES

PROFILE DRAWINGS NOT TO SCALE
APRIL 2020

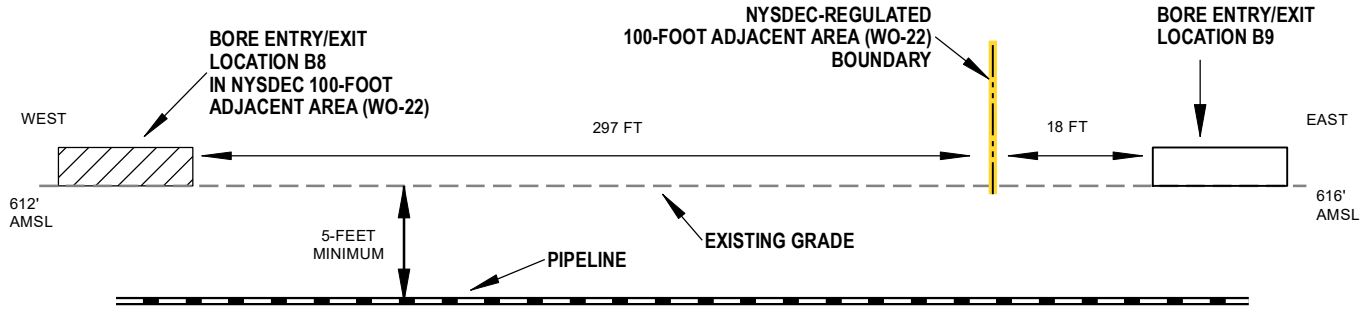
FIGURE 4
SHEET 1 OF 2

PROPOSED PIPELINE PROFILE
BORING B7 - B8



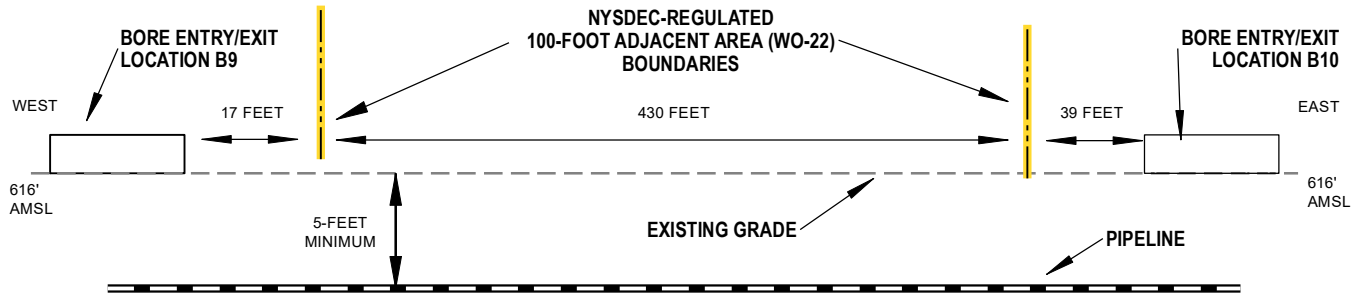
ACCESS TO BORE ENTRIES/EXITS
WILL BE FROM ROADWAY

PROPOSED PIPELINE PROFILE
BORING B8 - B9



ACCESS TO BORE ENTRIES/EXITS
WILL BE FROM ROADWAY

PROPOSED PIPELINE PROFILE
BORING B9 - B10



ACCESS TO BORE ENTRIES/EXITS
WILL BE FROM ROADWAY

LEGEND

- EXISTING GRADE
- PROPOSED HORIZONTAL BORING PIPELINE INSTALLATION

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. PLANS AND PROFILE NOT TO SCALE.
3. ELEVATIONS SHOWN ARE DERIVED FROM USGS 7.5' QUAD AND ARE REPRESENTED AS FEET ABOVE MEAN SEA LEVEL (AMSL).

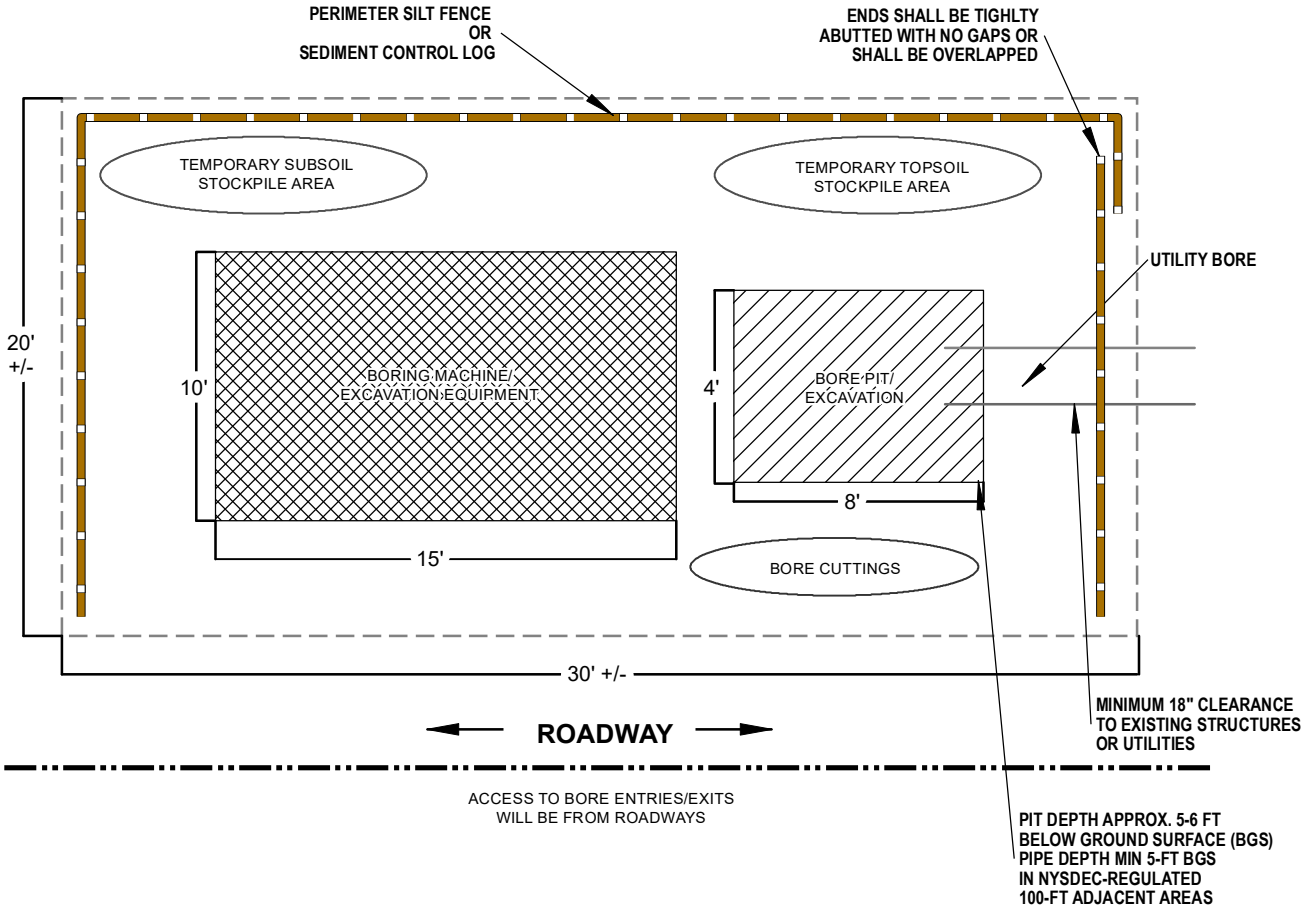
HALEY ALDRICH

NATIONAL FUEL GAS DISTRIBUTION CORPORATION
GREENBUSH FY2020 PIPELINE INSTALLATION PROJECT
TOWN OF NEWSTEAD
ERIE COUNTY, NEW YORK

NYSDEC-JURSIDICTIONAL
CROSSING PROFILES

PROFILE DRAWINGS NOT TO SCALE
APRIL 2020

FIGURE 4
SHEET 2 OF 2



NOTES:

1) DIMENSIONS SHOWN AND ARRANGEMENT OF SITE ARE APPROXIMATE AND MAY BE VARIED BASED ON WORK REQUIREMENTS AND/OR SITE CHARACTERISITICS.

2) PERIMETER CONTROL BMP'S (AS REQUIRED IN DETAILS) MUST BE INSTALLED AND FUNCTIONAL BEFORE ANY EARTH DISTURBANCE ACTIVITIES BEGIN. BMPS SHALL BE PLACED ALONG THE DOWN SLOPE SIDE OF THE SITE AND SHALL BE TIGHLTY ABUTTED WITH NO GAPS OR SHALL BE OVERLAPPED. BMPS SHALL REMAIN IN PLACE UNTIL FULL RESTORATION OF THE LANDSCAPE OR ACCEPTABLE VEGETATION LEVELS HAVE BEEN REACHED.

3) SEDIMENT CONTROL LOGS SHALL NOT BE USED IN PAVED OR IMPERVIOUS AREAS.

4) MATERIAL GENERATED FROM PIT EXCAVATIONS OR TRENCHING SHALL BE HAULED AWAY IMMEDIATELY OR STOCKPILED ON THE UPHILL SIDE OF EXCAVATIONS OR TRENCHES. PERIMETER CONTROL REQUIREMENTS PERTAIN TO ALL STOCKPILES NOT ABLE TO BE BACKFILLED BY THE END OF THE DAY OR PRIOR TO STORM EVENTS. EXCAVATED MATERIAL NOT TO BE STOCKPILED AGAINST THE CURB, GUTTER, OR WITHIN FLOWLINES.

5) FINAL SITE STABILIZATION SHALL BE BASED ON PREVIOUS CONDITIONS: SEED/MULCH IN NATIVE AREAS, SOD IN LANDSCAPED AREAS, CONCRETE, GRAVEL, OR ASHPALT IN IMPROVED AREAS, ETC. FINAL SITE CONDITION SHALL EQUAL OR EXCEED THE CONDITION OF SITE PRIOR TO WORK.

6) ADDITIONAL BMPS SHALL BE INSTALLED AS NECESSARY OR AS REQUIRED BY THE ENVIRONMENTAL INSPECTOR AND/OR NATIONAL FUEL CONSTRUCTION MANAGER.

7) ALL BORE MACHINES, EXCAVATION AND TRENCHING EQUIPMENT, AND SUPPORT EQUIPMENT INCLUDING BUT NOT LIMITED TO POTHOLING MACHINES, VAC TRUCKS, WATER TRUCKS, OR STORAGE TRUCKS, SHALL BE IN GOOD WORKING ORDER.

8) PAVED AREAS INCLUDING STREETS ARE TO BE KEPT CLEAN THROUGHOUT CONSTRUCTION AND SHALL BE CLEANED AS NECESSARY IF ACCIDENTAL TRACKING INTO PAVED AREAS OCCURS.

811
Know what's below.
811 before you dig.

HALEY ALDRICH

NATIONAL FUEL GAS DISTRIBUTION CORPORATION
GREENBUSH FY2020 PIPELINE INSTALLATION PROJECT
TOWN OF NEWSTEAD
ERIE COUNTY, NEW YORK

TYPICAL BORING WORKSPACE PLAN

PROFILE DRAWINGS NOT TO SCALE
APRIL 2020

FIGURE 5

APPENDIX B

WETLAND AND STREAM DELINEATION REPORT

HALEY ALDRICH

www.haleyaldrich.com

EXCERPTS OF

WETLAND AND STREAM DELINEATION REPORT

NFGDC FY2020 PILOT PROJECTS
ERIE COUNTY, NEW YORK

Prepared for:
National Fuel Gas Distribution Corporation
6363 Main Street
Williamsville, NY 14221

Prepared by:
Haley & Aldrich of New York
Rochester, New York

File No. 134374-002
April 2020

HALEY & ALDRICH OF NEW YORK
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ROCHESTER, NY 14623
585.359.9000

3 April 2020

SIGNATURE PAGE FOR

WETLAND AND STREAM DELINEATION REPORT
NFGDC FY2020 PILOT PROJECTS
TOWNS OF CLARENCE AND NEWSTEAD, NEW YORK

PREPARED FOR
NATIONAL FUEL GAS DISTRIBUTION CORPORATION
WILLIAMSVILLE, NY

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Senior Project Manager | Associate
Haley & Aldrich of New York

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1. Introduction

This Wetland and Stream Delineation Report summarizes the results of field work performed by Haley & Aldrich of New York (Haley & Aldrich) to locate and identify wetlands and streams in support of National Fuel Gas Distribution Corporation's (National Fuel) proposed NFGDC FY2020 Pilot Projects (Projects).

National Fuel is proposing to conduct five separate pilot installation projects, cumulatively referred to as the "FY2020 Pilot Projects" in the Towns of Clarence and Newstead, Erie County, New York (see Figure 1)." National Fuel plans on installing approximately 3,600-feet of 2-inch plastic pipeline along Dorsch Road; 4,250-feet of 4-inch line and 1,600-feet of 2-inch line along Salt Road; 8,550-feet of 4-inch line along Swift Mills Road and Greenbush Road; 15,400-feet of 2-inch line along Meahl Road, Draper Road, and Hunts-Corners Road; and along Swift Mills Road and Cedar Street installing 6,960-feet of 4-inch line. The "Study Area" includes an approximately 150-feet-wide area (75-feet off the edge of roadways, on both sides of roadways), and encompasses a total of approximately 159.1 acres.

2. Regulatory Authorities

2.1 WATERS OF THE UNITED STATES

As defined by the U.S. Army Corps of Engineers (USACE), Waters of the United States include lakes, ponds, streams, (intermittent and perennial), and wetlands which are regulated under Sections 401 and 404 of the Clean Water Act. Federally jurisdictional wetlands are defined as "those that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

The USACE also regulates navigable waters under Section 10 of the Rivers and Harbor Act (33 U.S.C. 401 et seq.), which requires a permit from the USACE to construct any structure in or over any navigable water of the United States, as well as any proposed action that would alter or disturb (such as excavation/dredging or deposition of materials) these waters. If the proposed structure or activity affects the course, location, condition, or capacity of the navigable water, even if the proposed activity is outside the boundaries of the water body, a permit from the USACE is required.

2.2 NEW YORK STATE FRESHWATER WETLANDS AND PROTECTED STREAMS

The Freshwater Wetlands Act (Article 24 and Title 23 of Article 71 of the Environmental Conservation Law) gives the New York State Department of Environmental Conservation (NYSDEC) jurisdiction over state-protected wetlands and adjacent areas (100-foot upland buffer). The Freshwater Wetlands Act requires the NYSDEC to map all state-protected wetlands to allow landowners and other interested parties a means of determining where state jurisdictional wetlands exist. To implement the policy established by this Act, regulations were promulgated by the state under 6 NYCRR Parts 663 and 664. Part 664 of the regulations designates wetlands into four class ratings, with Class I being the highest or best quality wetland and Class IV being the lowest. In general, wetlands regulated by the state are those 12.4 acres in size or larger. Smaller wetlands can also be regulated if they are considered of unusual local importance. A 100-foot adjacent area around the delineated boundary of any state-regulated wetland is also under NYSDEC jurisdiction. An Article 24 permit is required from the NYSDEC for any disturbance to a state-protected wetland or an adjacent area, including removing vegetation.

Under Article 15 of the Environmental Conservation Law (Protection of Waters), the NYSDEC has regulatory jurisdiction over any activity that disturbs the bed or banks of protected streams. In addition, small lakes and ponds with a surface area of 10 acres or less, located within the course of a protected stream, are considered to be part of a stream and are subject to regulation under the stream protection category of Article 15. Protected stream means any stream, or particular portion of a stream, that has been assigned by the NYSDEC any of the following classifications or standards: AA, A, B, or C(t) or C(ts) (6 NYCRR Part 701). A classification of AA or A indicates that the best use of the stream is as a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The best usages of Class B waters are primary and secondary contact recreation and fishing. The best usage of Class C waters is fishing. Streams designated (t) indicate that they support trout, while those designated (ts) support trout spawning. State water quality classifications of unprotected watercourses include Class C and Class D streams. Waters with a classification of D are suitable for fishing and non-contact recreation. An Article 15 permit is required from the NYSDEC for any disturbance to a stream classified C(t) or higher.

3. Methodology

Prior to initiating field investigations, Haley & Aldrich conducted a desktop review of publicly available data to evaluate the presence of mapped wetlands and streams within the Study Area. Data consulted includes, United States Geological Survey (USGS) topographic quadrangle maps, National Wetland Inventory (NWI) maps, Natural Resources Conservation Service (NRCS) County Soil survey, Federal Emergency Management Agency (FEMA) Flood Insurance maps, the National Hydrography Dataset (NHD), NYSDEC Freshwater Wetland Maps, and NYSDEC mapped streams. Information gathered from the desktop review are described in Site Setting section above.

The wetland and stream delineation field survey was performed in accordance with criteria set forth in the *Corps of Engineers Wetland Delineation Manual* (1987) and the *2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual:* [*Northcentral and Northeast Region*] (Version 2.0). Data was collected from one or more sample plots in each delineated wetland (depending on the size of the delineated area) and were recorded on USACE Routine Wetland Determination forms. The boundaries of wetlands were demarcated with blue survey ribbon (flagging) and located with a Trimble Geo 7X GPS unit with reported sub-meter accuracy.

Hydrology was evaluated based on indicators that are divided into two categories, primary and secondary. The 1987 manual and 2012 supplement define hydrology as present when at least one primary indicator or two secondary indicators are identified. One primary indicator is sufficient to evaluate if hydrology is present; however, if primary indicators are absent then two or more of the secondary indicators are required to evaluate hydrology. If other probable hydrology evidence was found, then this was subsequently documented on the Routine Wetland Determination Form.

Hydrophytic vegetation was assessed by identifying plant species and their assigned wetland indicator rating of obligate, facultative wet, facultative, facultative upland, and upland according to the *2016 National Wetland Plant List*. Vegetation in both upland and wetland communities was characterized using areal dominance method, with a radius of 30-feet around the soil sample location for trees, 15-foot radius for saplings/shrubs, and five feet for herbaceous plants.

Hydric soil indicators were evaluated using soil characteristics as defined in *Field Indicators of Hydric Soils in the United States (Version 8.0, 2016)*. Evidence of hydric soil indicators were recorded based on the presence of color matrix, hue, and redoximorphic features such as saturation, gleyed matrix, mottling, hydrogen sulfide odor, and organic/peat layers. Soil test pits were dug using a shovel to a depth of approximately 18-inches or refusal due the presence of hard pan layer, rock, or hard fill materials. Soil color was described using the Munsell Color book, texture using USDA hand-texture methods, and the presence/absence of redoximorphic features, including depletions and concentrations.

Additional surface waters, including stream channels and drainage ways, found during field work were investigated, flagged, located with GPS and characterized on the Stream Inventory Data Form. To the extent practicable, these surface waters were investigated to evaluate drainage patterns and potential connections to other Waters of the United States.

4. Project Setting

4.1 RESOURCES

Several resources were used in supporting this report including:

- United States Geological Survey (USGS) topographic mapping (Akron, Clarence, Corfu, and Wolcottsville 7.5-minute quadrangles);
- United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping;
- NYSDEC freshwater wetland and stream mapping;
- United States Department of Agriculture (USDA) Soil Conservation Service (SCS) (currently the Natural Resources Conservation Service [NRCS]) Erie County Soils;
- NRCS List of Hydric Soils of the State of New York;
- Federal Emergency Management Agency (FEMA) Flood Insurance maps;
- National Hydrography dataset; and
- Recent aerial photography.

4.2 PHYSIOGRAPHY AND GEOLOGY, AND SOILS

The Study Area is located in the Eastern Lake physiographic section of the larger Central Lowland province. This portion of the Eastern Lake section is level or nearly level and lies within the footprint of glacial Lake Warren. Elevations throughout the Study Area range from approximately 600 feet above mean sea level (ft. amsl) at the northern portions of the Study Area to approximately 825 ft amsl near the southern extent of the Study Area (Dorsch Road). A topographic map of the Study Area and surrounding region is provided as Figure 2.

Soil series units mapped by the NRCS web soil survey are listed in Table 1 and provided as Figure 2. Approximate acreage within the Study Area, drainage class, and whether the soil unit is classified as hydric are also summarized in Table 1. Soils mapped within the Study Area ranged primarily between somewhat poorly drained and moderately well drained silt loams. Five of the twenty-five mapped soil series units are classified as hydric.

Table 1. Study Area Soils

Soil Map Unit Symbol	Soil Map Unit Name	Approximate Acres within Study Area	Drainage Class	Hydric Conditions[1]
ApA	Appleton silt loam, 0 to 3 percent slopes	4.0	Somewhat poorly drained	Not Hydric
ArB	Arkport very fine sandy loam, 3 to 8 percent slopes	1.6	Well drained	Not Hydric
Cc	Canandaigua silt loam	6.6	Poorly drained	Hydric
CfB	Cayuga silt loam, 3 to 8 percent slopes	3.5	Moderately well drained	Not Hydric
CgB	Cazenovia silt loam, 3 to 8 percent slopes	1.4	Well drained	Not Hydric
Ch	Cheektowaga fine sandy loam	0.8	Very poorly drained	Hydric

Soil Map Unit Symbol	Soil Map Unit Name	Approximate Acres within Study Area	Drainage Class	Hydric Conditions[1]
CoA	Churchville silt loam, 0 to 3 percent slopes	27.4	Somewhat poorly drained	Not Hydric
CrB	Claverack loamy fine sand, 3 to 8 percent slopes	1.2	Moderately well drained	Not Hydric
CsA	Collamer silt loam, 0 to 3 percent slopes	2.1	Moderately well drained	Not Hydric
CtB	Collamer silt loam, till substratum, 3 to 8 percent slopes	2.8	Moderately well drained	Not Hydric
Cv	Cosad loamy fine sand	7.8	Somewhat poorly drained	Not Hydric
ElB	Elnora loamy fine sand, 3 to 8 percent slopes	0.3	Moderately well drained	Not Hydric
GbB	Galen fine sandy loam, till substratum, 3 to 8 percent slopes	1.8	Moderately well drained	Not Hydric
HoB	Honeoye loam, 3 to 8 percent slopes	8.6	Well drained	Not Hydric
La	Lakemont silt loam, 0 to 3 percent slopes	0.1	Poorly drained	Hydric
LmA	Lima loam, 0 to 3 percent slopes	10.3	Moderately well drained	Not Hydric
LmB	Lima loam, 0 to 3 percent slopes	5.5	Moderately well drained	Not Hydric
Ly	Lyons soils, 0 to 3 percent slopes	2.1	Poorly drained	Hydric
Mg	Middlebury silt loam	0.3	Somewhat poorly drained	Not Hydric
NfA	Niagara silt loam, 0 to 3 percent slopes	8.6	Somewhat poorly drained	Not Hydric
Nh	Niagara silt loam, till substratum	22.8	Somewhat poorly drained	Not Hydric
Od	Odessa silt loam, 0 to 3 percent slopes	7.9	Somewhat poorly drained	Not Hydric
OvA	Ovid silt loam, 0 to 3 percent slopes	0.6	Somewhat poorly drained	Not Hydric
Uc	Udorthents, smoothed	0.3	Moderately well drained	Not Hydric
Wd	Wayland soils complex, 0 to 3 percent slopes, frequently flooded	4.4	Poorly drained	Hydric

Note:

[1] Soils mapping source: USDA, Natural Resource Conservation Service (NRCS) web soil survey.

4.2.1 Soils Descriptions

A description of the primary soil series found within the Study Area is located below. See Figure 2 for mapping of all soil series located within the Study Area.

Ap - Appleton Series: This very deep, somewhat poorly drained soil formed in calcareous loamy till. These soils occur on low ground moraines and on foot slopes of glaciated hills.

Ar – Arkport Series: This very deep, well-drained soil formed in glacio-fluvial deposits having a high content of fine and very fine sand. These soils have loamy material in the subsoil occurring in thin horizontal bands.

Cc – Canandaigua Series: This very deep, poorly and very poorly drained soil formed in silty glacio-lacustrine sediments. These soils occur on lowland lake plains in depressional areas on glaciated uplands.

Cf – Cayuga Series: This series consists of very deep, moderately well drained soils formed in clayey lacustrine deposits overlying glacial till. These soils occur on hilly and undulating till plains where lake deposition thinly overlays the till.

Cg – Cazenovia Series: This very deep and deep, moderately well drained soils formed in loamy till. They occur on till plains ranging nearly level to very steep. The till contains limestone and an admixture of reddish lake-laid clays or reddish clay shale.

Ch – Cheektowaga Series: This series consists of very deep, poorly drained and very poorly drained soils formed in sandy deposits overlying lacustrine clayey sediments. These soils occur nearly level on lake plains. Due to high permeability and occurrence locations, potential for surface runoff is negligible to very low.

Co – Churchville Series: This series consist of very deep, somewhat poorly drained soils that formed in clayey lacustrine sediments overlying loamy till. These soils are nearly level to sloping areas of till plains and therefore generally remains wetter.

Cr – Claverack Series: This very deep, moderately well drained soil formed in sandy deposits that overlay clayey lacustrine sediments. They occur on nearly level to slightly sloping shallow deltas on lake plains. The sand, which overlies finer textured sediments, is dominated by quartz and has been derived from non-calcareous sandstone or granite.

Cs/Ct – Collamer Series: This series consists of very deep, moderately well drained soils formed in silty glacio-lacustrine sediments. These soils occur on lake and till plains that have a thick layer of lake sediments, though the slope may range from nearly level to very steep.

Cv – Cosad Series: This series consists of very deep, somewhat poorly drained soils formed in sandy deposits that overlay clayey lacustrine sediments. They occur nearly level on sandy lake or deltaic sediments and therefore the potential for surface runoff is relatively low.

El – Elnora Series: This series consists of very deep, moderately well drained soils formed in sandy glacial lake, eolian, and deltaic sediments. These soils occur primarily on beach rides and longshore bars on lake plains. Due to their formation in water sorted or windblown deposits, the soil is dominated by fine and very find sand.

Gb – Galen Series: This series consists of very deep, moderately well drained soils formed in sandy deltaic deposits. They occur nearly level or gently sloping in lake plains. The soils developed in materials dominated by fine and very fine sand of quartz, felspars, and ferromagnesian minerals.

Ho – Honeoye Series: This series consists of very deep, well drained soils formed in loamy till. They occur nearly level to very steep (slopes ranging from 0 to 65 percent) on till plains, hills, convex ridges, and drumlins. These soils are derived from limestone, dolomite, and calcareous shale, from lesser amounts of sandstone and siltstone.

La – Lakemont Series: This series consists of deep, poorly drained, and very poorly drained soils of lake plains. These soils occur nearly level and formed in very slowly permeable reddish clayey lacustrine sediments. Permeability is moderately slow in the surface and can lead to ponding.

Lm – Lima Series: This soil is gently sloping, deep and moderately well drained. Although this soil is gently sloping, it is slowly permeable and therefore is wet for short periods of time in the spring. Because of wetness in spring, the use of heavy equipment is limited for short periods and untiled low spots may remain troublesome for a somewhat longer time.

Ly – Lyons Series: This very deep, poorly and very poorly drained soil occurs on upland till plains in depressions and low areas. They occur nearly level occasionally in areas of seeps on gently sloping landscapes. These soils formed in calcareous till derived from limestone, calcareous shale, and sandstone.

Mg – Middlebury Series: This series consists of very deep, moderately well drained nearly level soils formed in post-glacial alluvium predominantly from areas of shale and sandstone with some lime bearing material.

Nf/Nh – Niagara Series: This very deep, somewhat poorly drained soil formed in silty glacio-lacustrine deposits. These soils are in level to slightly concave areas on lake plains and in valleys.

Od – Odessa Series: This series consists of very deep, somewhat poorly drained soils formed in red, clayey lacustrine deposits. These soils occur in moderately low areas, such as on the footslopes of lake plains and valley terraces.

Ud – Udorthents Series: This unit consists of moderately well drained to excessively drained soils. The permeability and stability of this soil unit are variable; these areas are frequently flooded.

Wd – Wayland Series: This series consists of very deep, poorly drained and very poorly drained nearly level soils formed in post-glacial alluvium. These soils occur in low or depressed areas on flood plains, with slopes ranging from 0 to 3 percent.

4.3 HYDROLOGY

The Study Area is located within the Niagara Watershed (HUC 04120104), a sub-basin of the larger Niagara River/Lake Erie Watershed. Within this watershed major rivers and streams include Tonawanda Creek, Cattaraugus Creek, and the Buffalo River. This watershed drains an area approximately 2,280 square miles.

The majority of surface hydrology within the Study Area is generated by precipitation and surface water sheet flow from adjacent areas at higher elevations with a total average annual precipitation of 37.08 inches, (Source: http://usclimatedata.com as measured in nearby Lockport).

According to the NWI, sixteen (16) wetlands are mapped within the Study Area (see Figure 3). These mapped wetlands are classified as palustrine freshwater forested/shrub/emergent (PFO1B, PFO1A, PSS1/EM1E) and palustrine riverine (R4SBC, R2UBH). NYSDEC mapping indicates four (4) state-mapped wetlands (WO-19, WO-22, WO-28, WO-35).

Based on available NYSDEC stream classification mapping, there are seven (7) mapped streams within the Study Area. Six (6) of these streams are Class C unnamed tributaries to Murder Creek and Tonawanda Creek. Class C streams are unprotected per Article 15 of the ECL (Protection of Waters). There is one Class C(t) protected unnamed tributary to Ellicott Creek. Additionally, portions of the site are located in Regulatory Floodways (Zone AE) due to proximity to Murder Creek and Black Creek. State mapped wetlands and streams within the Study Area are included in Table 2 and are depicted on Figure 3.

Table 2. State Mapped Wetlands and Streams within Study Area

Name	Classification[1]	Status[2]
Unnamed Tributary to Murder Creek (5 crossings)	C	Unprotected
Unnamed Tributary to Tonawanda Creek	C	Unprotected
Unnamed Tributary to Ellicott Creek	C(t)	Protected
Wetland WO-19	III	Protected
Wetland WO-22	II	Protected
Wetland WO-28	II	Protected
Wetland WO-35 (2 crossings)	III	Protected

GREENBUSH ROAD

Notes:

1. NYSDEC classifies streams as AA, A, B, C, or D. Streams can have a standard designation of (t) or (ts) for trout and trout spawning, respectively. NYSDEC classifies State freshwater wetlands as Class I, II, III, or IV.
2. NYSDEC protects streams classified as C(t) or above. NYSDEC also protects wetlands which are 12.4 acres or larger or are considered of unusual local importance and a 100 foot 'adjacent area' to the protected wetland.

5. Results

Field investigations to delineate wetlands and streams within and adjacent to the Study Area were completed by two Haley & Aldrich wetland scientists in November 2019. A total of twenty (20) wetlands, twenty-four (24) streams, and two (2) ponds were identified. These features are summarized in Table 3 below and are depicted on Figure 4.

5.1 DELINEATED WETLANDS

Table 3 below contains the complete inventory of wetlands delineated in the Study Area. Representative photos of each wetland and stream and associated upland areas are included as Appendix A, a brief description of each delineated wetland is included in Appendix B, and completed routine wetland determination forms are provided in Appendix C. Wetland community type was classified according to the Cowardin classification (Cowardin, et al., 1979).

Table 3. Delineated Wetlands within Study Area

Wetland ID	Wetland Community[1]	Area[2] (acres)	Jurisdiction[3]
KLA	PFO	0.09	USACE
KLB	PSS	0.16	USACE
KLC	PEM	0.26	USACE
KLD	PFO	0.50	USACE
KLE	PFO	0.30	USACE/NYSDEC
KLF	PFO	0.27	USACE/NYSDEC
	PSS	0.37	
KLG	PEM	0.07	USACE
KLH	PFO	0.45	USACE/NYSDEC
KLI	PFO	0.32	USACE/NYSDEC
KLJ	PEM	0.05	USACE
KLK	PEM	0.85	USACE
	PSS	0.31	
KLL	PEM	0.04	USACE
	PFO	0.98	
KLM	PSS	0.26	USACE
KLN	PFO	0.74	USACE/NYSDEC
	PSS	0.23	
SGA	PEM	0.09	USACE
	PSS	1.30	
SGB	PSS	0.33	USACE
SGC	PFO	1.78	USACE
SGD	PFO	1.66	USACE/NYSDEC
SGE	PFO	1.03	USACE/NYSDEC
SGF	PEM	0.15	USACE
POND-A	PUB	0.18	USACE
POND-B	PUB	0.08	USACE

GREENBUSH ROAD

Notes:

1 Wetland classifications are based on the Cowardin classification system whereby: (P = Palustrine; EM = Emergent; SS = Shrub Scrub; FO = Forested).
2 Area is expressed in acres. Area of wetlands presented is area mapped (shown on Figure 4) during field delineation and may vary from area within Study Area limits.
3 Based on field observations of hydrologic connections. Final jurisdiction will be confirmed through consultation with USACE and NYSDEC staff.

5.2 DELINEATED STREAMS

The streams observed within and immediately adjacent to the Study Area appear to be typical of streams found in this portion of western New York with the stream beds comprising silt, gravel, cobble, and fractured bedrock substrate and gentle to moderate gradients. See Appendix A for photos of all the streams delineated within the Study Area and Appendix B for more detailed and specific stream descriptions.

Table 4 below contains a summary of streams delineated in the Study Area. Completed stream inventory forms are also provided in Appendix C.

Table 4. Delineated Streams within Study Area

Stream ID	Stream Type[1]	Length within Study Area (feet)	Jurisdiction[2]	State Classification
KL1	Intermittent	111.8	USACE	N/A
KL2	Perennial	279.9	USACE	C
KL3	Ephemeral	90.1	USACE	N/A
KL4	Perennial	290.7	USACE	C
KL5	Perennial	210.1	USACE	N/A
KL6	Perennial	159.0	USACE	C
KL7	Intermittent	84.9	USACE	N/A
KL8	Perennial	183.8	USACE	C
KL9	Intermittent	300.6	USACE	N/A
KL10	Ephemeral	93.6	USACE	N/A
KL11	Ephemeral	95.6	USACE	N/A
KL12	Perennial	534.6	USACE	C
KL13	Intermittent	1,449.0	USACE	N/A
KL14	Perennial	202.9	USACE	C
SG1	Perennial	1,357.9	USACE/NYSDEC	C(T)
SG2	Intermittent	86.2	USACE	N/A
SG3	Ephemeral	70.0	USACE	N/A
SG4	Ephemeral	84.5	USACE	N/A
SG5	Ephemeral	131.3	USACE	N/A
SG6	Intermittent	135.7	USACE	N/A
SG7	Intermittent	206.2	USACE	N/A
SG8	Ephemeral	76.9	USACE	N/A
SG9	Intermittent	84.7	USACE	N/A
SG10	Ephemeral	92.6	USACE	N/A

GREENBUSH ROAD

Notes:
1 Stream type includes perennial, intermittent and ephemeral. A perennial stream has flowing water year-round during a typical year. Perennial streams are identified as solid blue lines on the USGS Topographic maps. An intermittent stream has flowing water during certain times of the year when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Intermittent streams are identified as dashed blue lines on the USGS Topographic maps. An ephemeral drain has flowing

water only during and for a short duration after, precipitation events in a typical year. Ephemeral drains are not identified on the USGS Topographic map.
2 Based on field observations of hydrologic connections. Final jurisdiction will be confirmed through consultation with USACE and NYSDEC staff.

6. Conclusions

A total of twenty (20) wetlands, twenty-four (24) streams, and two (2) ponds were delineated during November 2019 as part of an on-site wetland and stream delineation. Haley & Aldrich's analysis suggests that all wetlands and streams identified and delineated are likely to be considered jurisdictional by the USACE because they have connections to other Waters of the United States. Additionally, wetlands KLE, KLF, KLH, KLI, KLN, SGD, and SGE are likely to be considered jurisdictional by the NYSDEC because of their proximity to state-mapped protected wetlands. If these wetlands are deemed jurisdictional by NYSDEC then there will then be an additional 100-feet adjacent area assigned. Stream SG1 is considered jurisdictional by the NYSDEC because it is a state-protected Class C(t) stream. It is recommended that final determination of jurisdictional status be made through consultation with the USACE and NYSDEC.

References

1. U.S. Army Corps of Engineers. 1987. *Corps of Engineers Wetland Delineation Manual*. Environmental Laboratory, Vicksburg, MS, 92 pp.

2. U.S. Army Corps of Engineers. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)*. U.S. Army Engineer Research and Development Center, Vicksburg, MS, 162 pp.

3. *Classification of wetlands and deepwater habitats of the United States*. U.S. Department of the Interior, Fish and Wildlife Service, Washington D.C. 131 pp.

4. Edinger, G.J., et al. 2002. *Ecological Communities of New York State, Second Edition*. New York Heritage Program, NYS Department of Environmental Conservation, Albany, NY, 134 pp.

5. Reschke, Carol. 1990. *Ecological Communities of New York State*. New York Heritage Program, NYS Department of Environmental Conservation, Latham, NY 96 pp. and maps.

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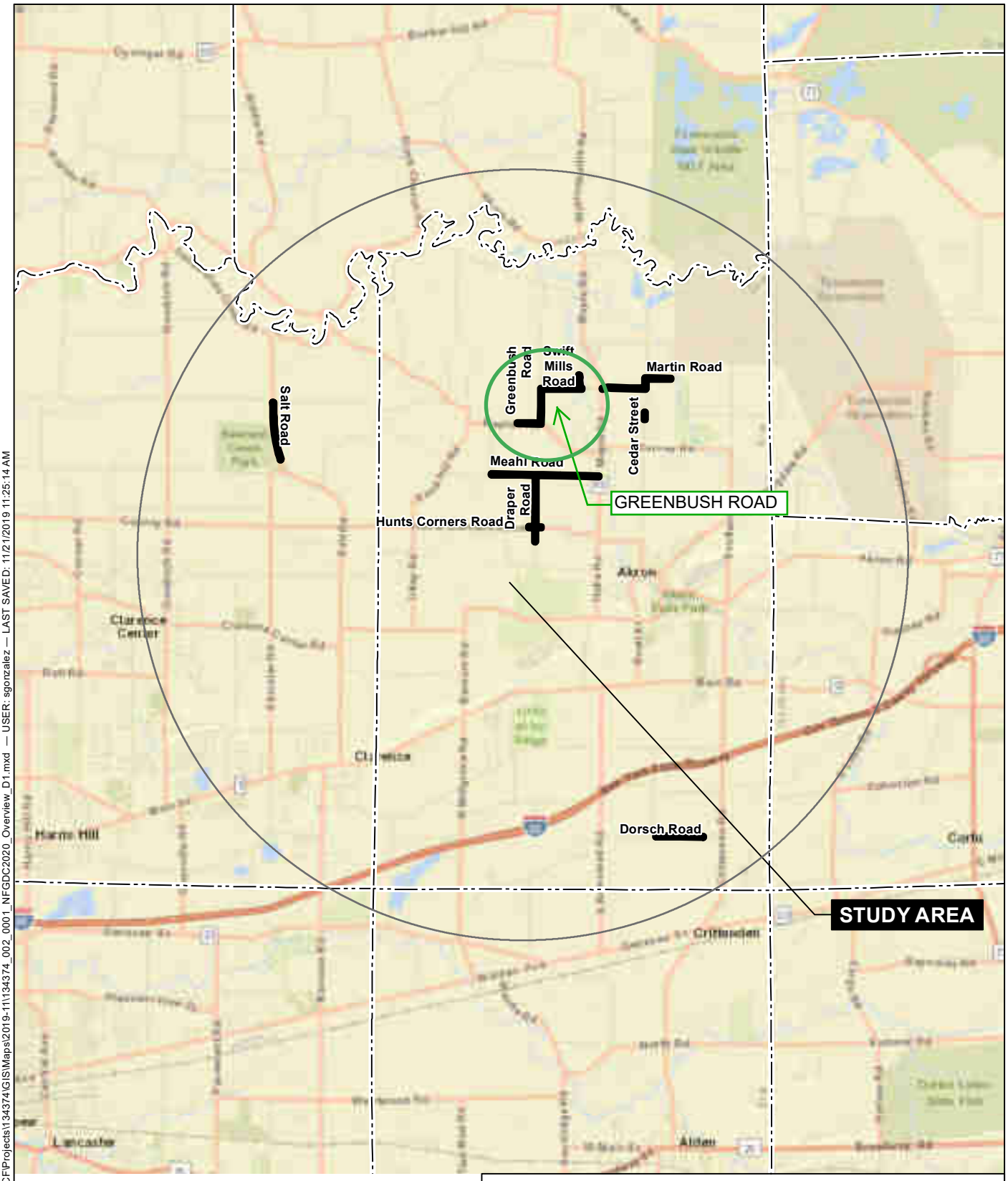
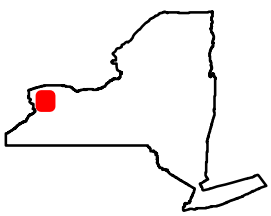
FIGURES





MAP SOURCE: ESRI
SITE COORDINATES: 43°2'19.155"N 78°31'52.772"W

HALEY ALDRICH

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ERIE COUNTY, NEW YORK

STUDY AREA OVERVIEW

APPROXIMATE SCALE: 1 IN = 2 MI
DECEMBER 2019

FIGURE 1

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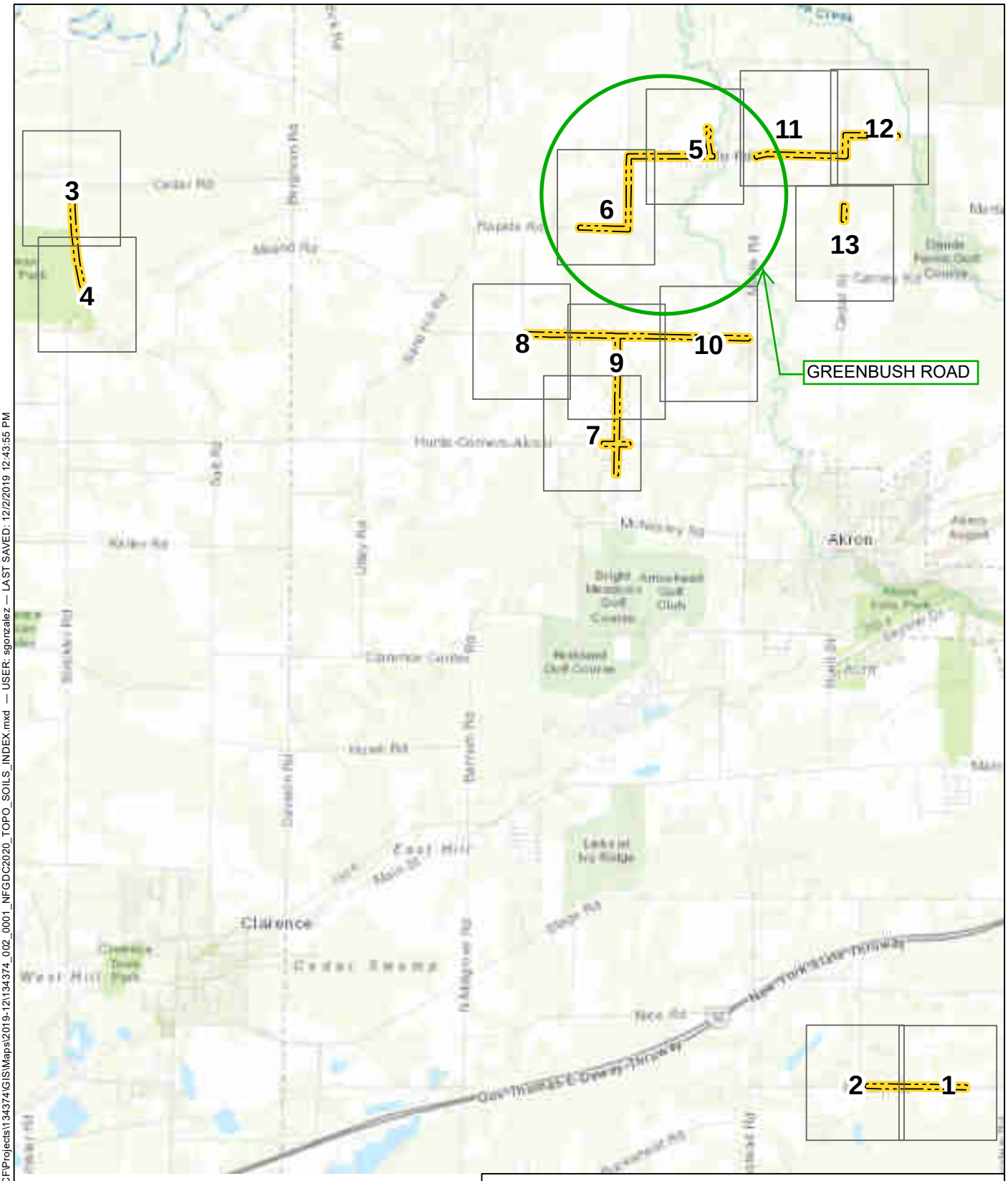

LEGEND

STUDY AREA

INDEX SHEETS

N

0 2,500 5,000

FEET

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE
2. MAP SOURCE: ESRI TOPOGRAPHIC

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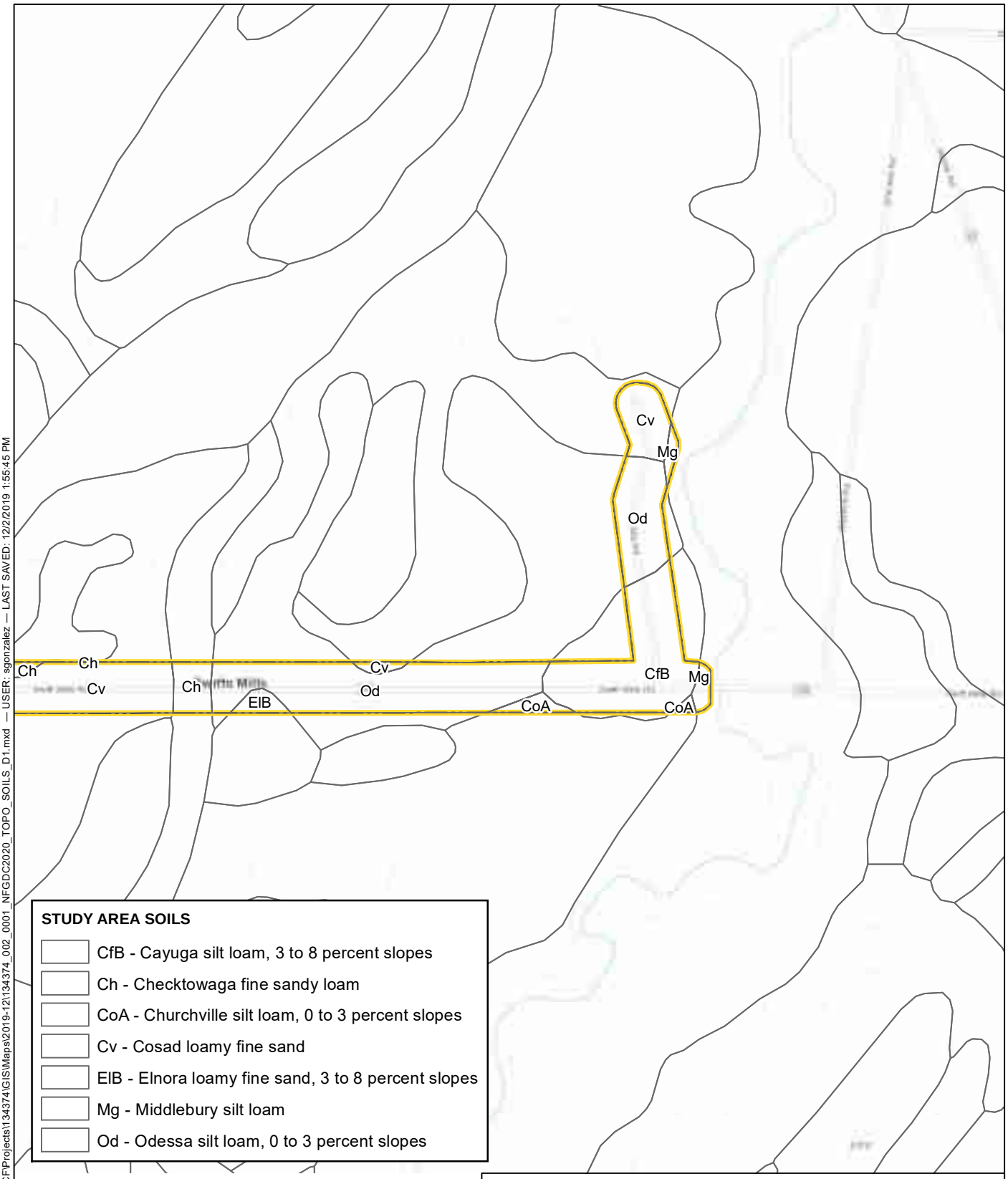
ERIE COUNTY, NEW YORK

STUDY AREA TOPOGRAPHY AND SOILS

DECEMBER 2019

FIGURE 2
INDEX SHEET

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\134374\GISMaps\2019-12\134374_002_0001_NFGDC2020_TOPO_SOILS_INDEX.mxd — USER: sgonzalez — LAST SAVED: 12/2/2019 12:43:55 PM



STUDY AREA SOILS

- CfB - Cayuga silt loam, 3 to 8 percent slopes
- Ch - Checktowaga fine sandy loam
- CoA - Churchville silt loam, 0 to 3 percent slopes
- Cv - Cosad loamy fine sand
- ElB - Elnora loamy fine sand, 3 to 8 percent slopes
- Mg - Middlebury silt loam
- Od - Odessa silt loam, 0 to 3 percent slopes

LEGEND

- STUDY AREA
- SOILS

N

0 250 500

FEET

MAP SOURCE: ESRI

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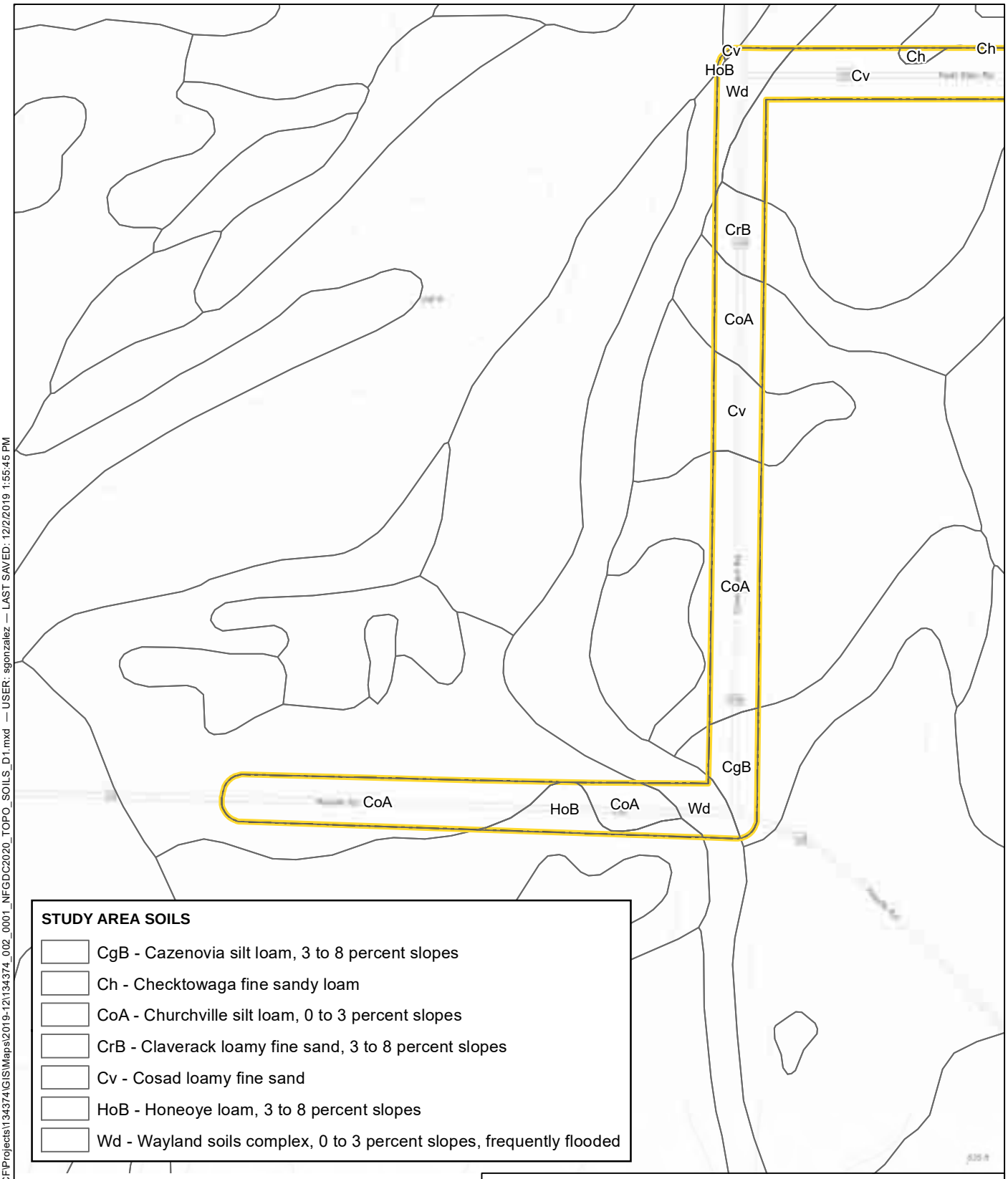
TOWNS OF CLARENCE AND NEWSTEAD
ERIE COUNTY, NEW YORK

STUDY AREA TOPOGRAPHY AND SOILS

DECEMBER 2019

FIGURE 2
SHEET 5 OF 13

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\134374\GISMaps\2019-12\134374_002_0001_NFGDC2020_TOPO_SOILS_D1.mxd — USER: sgonzalez — LAST SAVED: 12/2/2019 1:55:45 PM



STUDY AREA SOILS

- CgB - Cazenovia silt loam, 3 to 8 percent slopes
- Ch - Checktowaga fine sandy loam
- CoA - Churchville silt loam, 0 to 3 percent slopes
- CrB - Claverack loamy fine sand, 3 to 8 percent slopes
- Cv - Cosad loamy fine sand
- HoB - Honeoye loam, 3 to 8 percent slopes
- Wd - Wayland soils complex, 0 to 3 percent slopes, frequently flooded

LEGEND

- STUDY AREA
- SOILS

N

0 250 500

FEET

MAP SOURCE: ESRI

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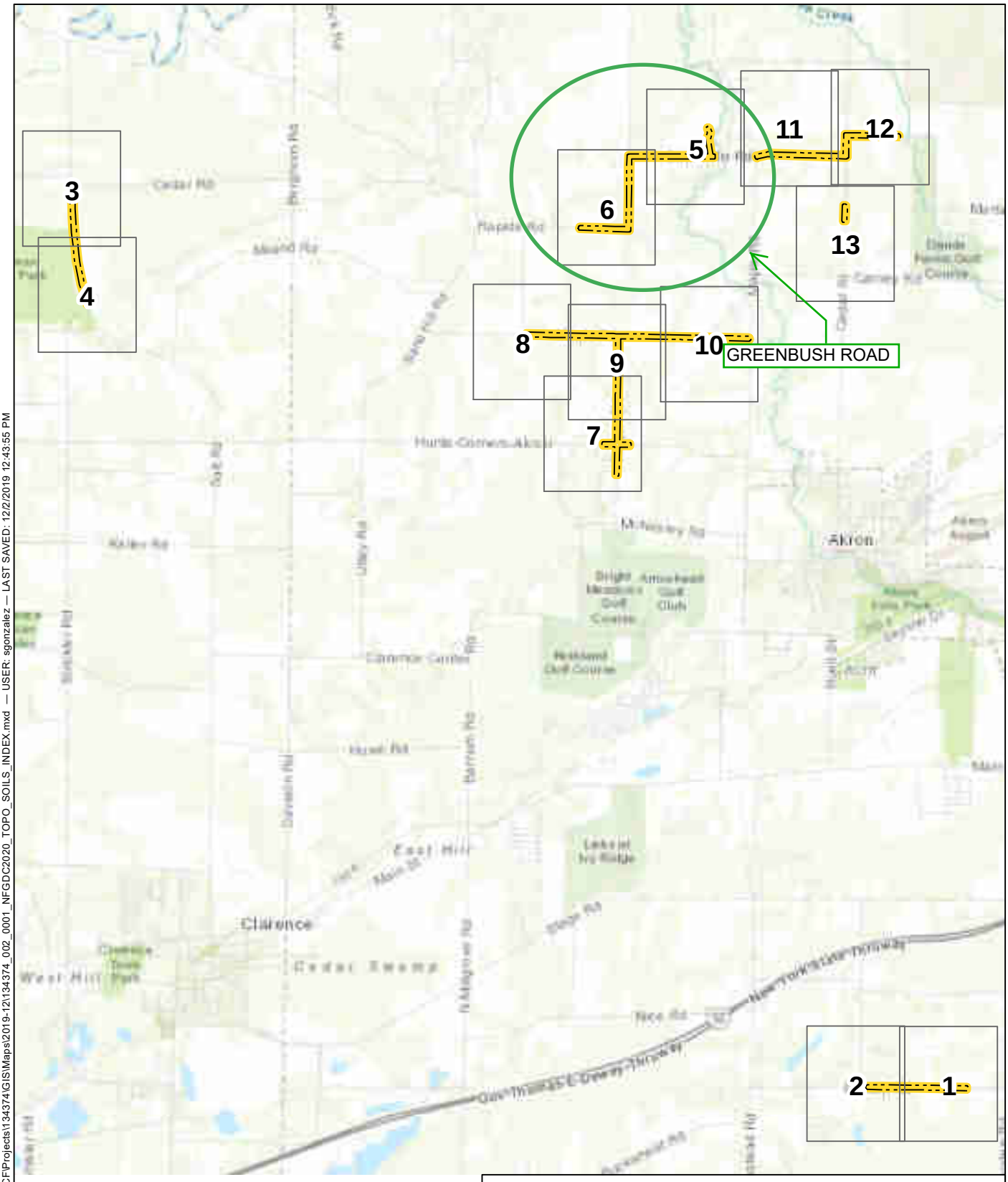
TOWNS OF CLARENCE AND NEWSTEAD
ERIE COUNTY, NEW YORK

STUDY AREA TOPOGRAPHY AND SOILS

DECEMBER 2019

FIGURE 2
SHEET 6 OF 13

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\134374\GIS\Maps\2019-12\134374_002_0001_NFGDC2020_TOPO_SOILS_D1.mxd — USER: sgonzalez — LAST SAVED: 12/2/2019 1:55:45 PM



LEGEND

STUDY AREA

INDEX SHEETS

N

0 2,500 5,000

FEET

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE
2. MAP SOURCE: ESRI TOPOGRAPHIC

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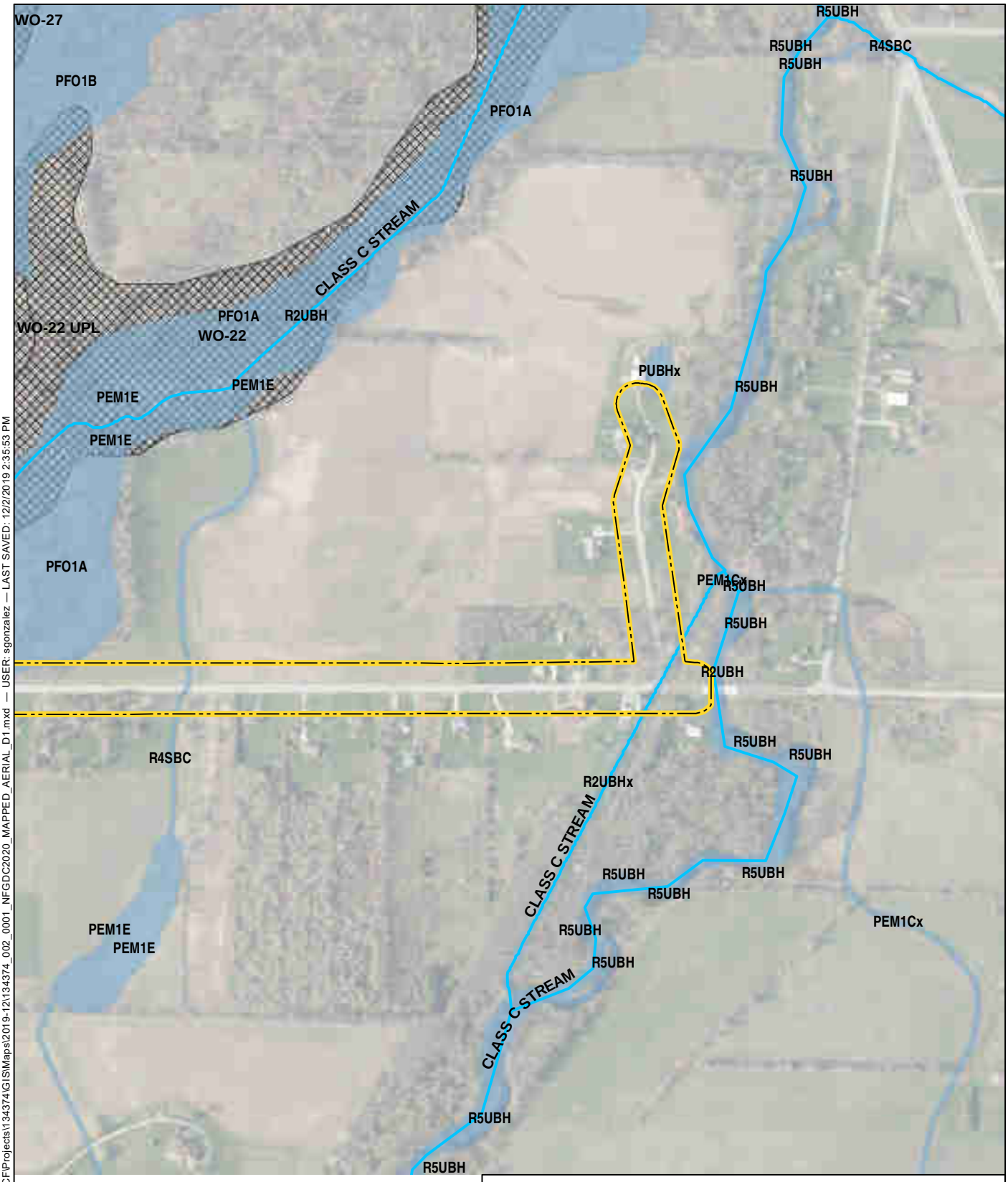
TOWNS OF CLARENCE AND NEWSTEAD
ERIE COUNTY, NEW YORK

FEDERAL AND STATE MAPPED AQUATIC RESOURCES

DECEMBER 2019

FIGURE 3
INDEX SHEET

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\134374\GISMaps\2019-12\134374_002_0001_NFGDC2020_TOPO_SOILS_INDEX.mxd — USER: sgonzalez — LAST SAVED: 12/2/2019 12:43:55 PM



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LEGEND

- STUDY AREA
- NYSDEC MAPPED STREAMS
- NYSDEC MAPPED WETLAND
- NWI MAPPED WETLAND

N

0 250 500
FEET

MAP SOURCE: ESRI

HALEY ALDRICH

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TOWNS OF CLARENCE AND NEWSTEAD
ERIE COUNTY, NEW YORK

FEDERAL AND STATE MAPPED AQUATIC RESOURCES

DECEMBER 2019

FIGURE 3
SHEET 5 OF 13

LEGEND

- STUDY AREA
- NYSDEC MAPPED STREAMS
- NYSDEC MAPPED WETLAND
- NWI MAPPED WETLAND

N

0 250 500

FEET

MAP SOURCE: ESRI

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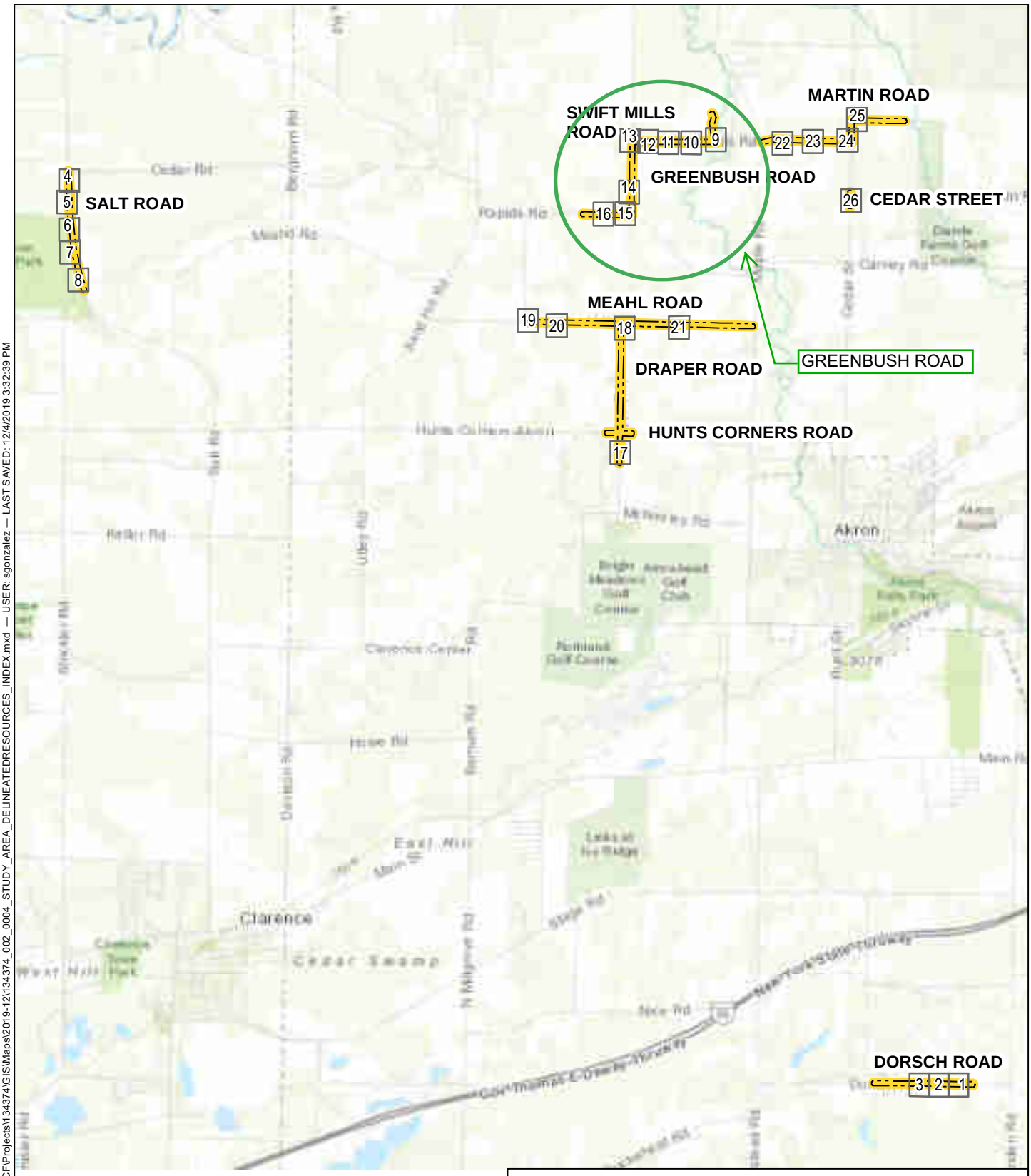
FEDERAL AND STATE MAPPED AQUATIC RESOURCES

DECEMBER 2019

FIGURE 3
SHEET 6 OF 13

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\134374\GIS\Maps\2019-12\134374_002_0001_NFGDC2020_MAPPED_AERIAL_D1.mxd — USER: sgonzalez — LAST SAVED: 12/2/2019 2:35:53 PM



LEGEND

STUDY AREA

INDEX SHEETS

0 2,500 5,000

MAP SCALE IN FEET

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. DELINEATED WETLAND TYPES ARE BASED ON COWARDIN CLASSIFICATION.

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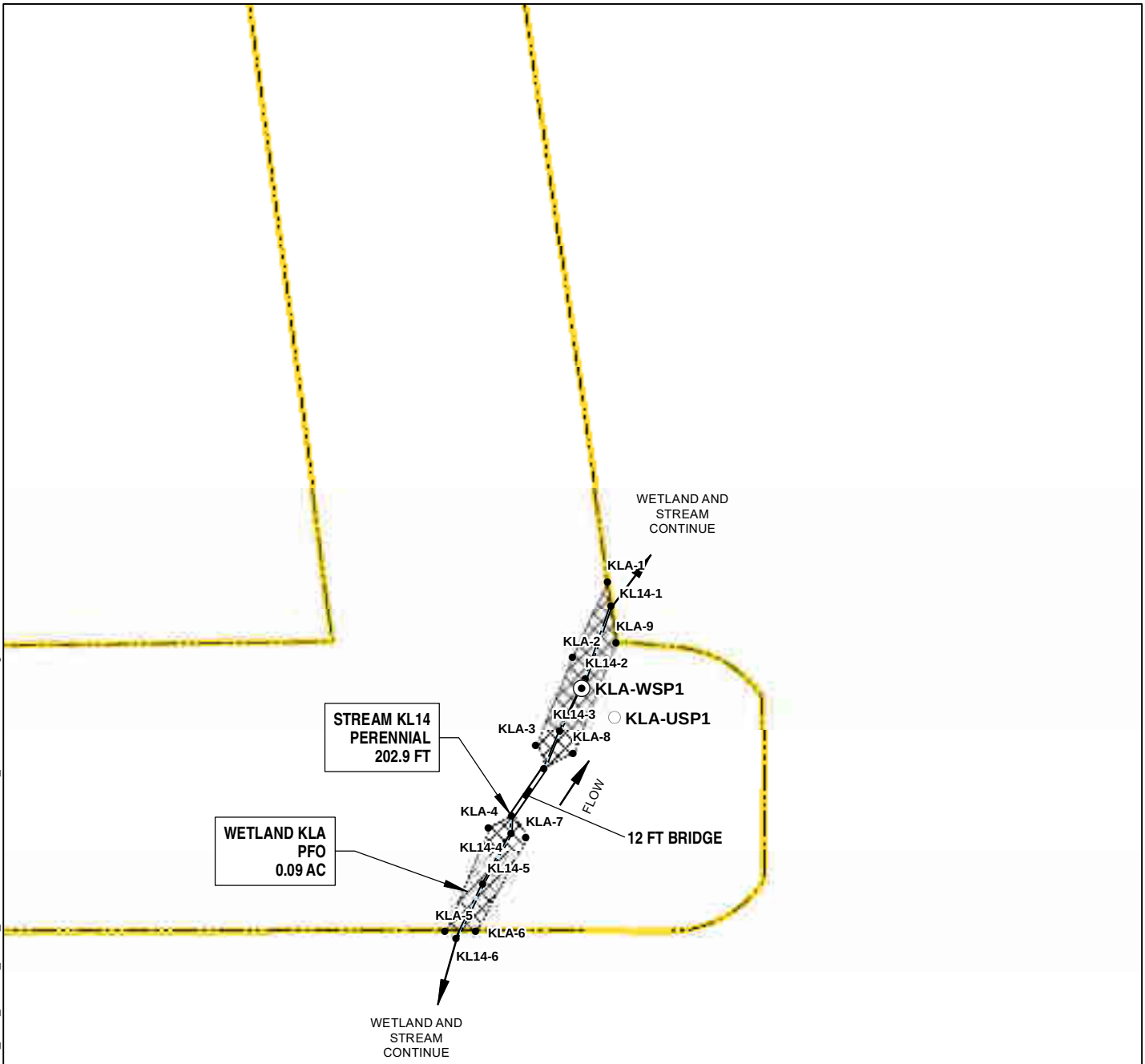
ERIE COUNTY, NEW YORK

DELINEATED WETLANDS AND STREAMS

DECEMBER 2019

FIGURE 4
INDEX SHEET



N

0 50 100

MAP SCALE IN FEET

LEGEND

- DELINEATION FLAG
- DELINEATED STREAM

SAMPLE POINTS

- UPLAND SAMPLE POINT
- WETLAND SAMPLE POINT
- FEATURE CONTINUES
- DELINEATED CULVERT

DELINEATED WETLAND TYPES

- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)
- PALUSTRINE SCRUB SHRUB (PSS)
- PALUSTRINE UNCONSOLIDATED BOTTOM (PUB)

NOTES

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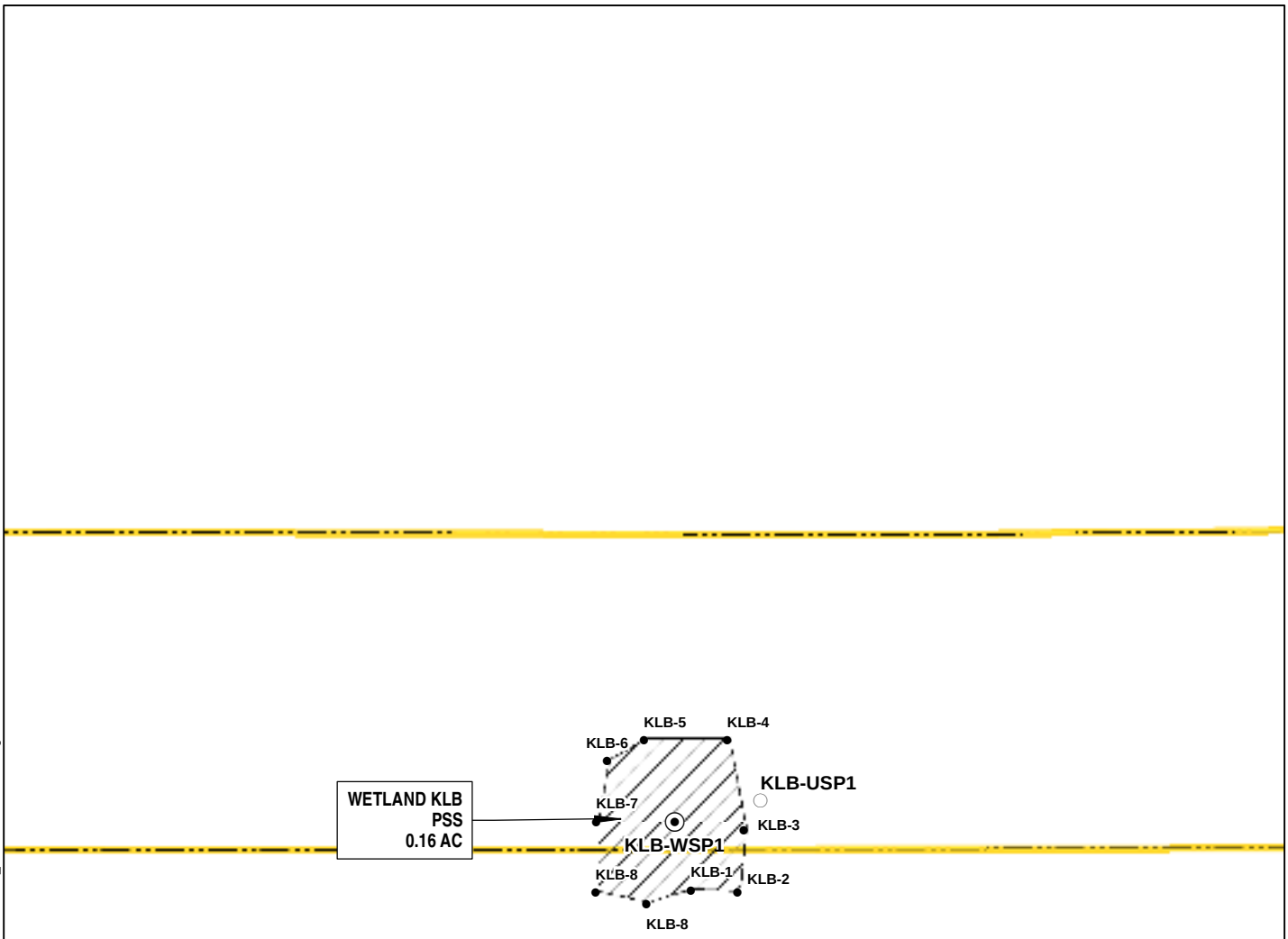
ERIE COUNTY, NEW YORK

DELINEATED WETLANDS AND STREAMS

DECEMBER 2019

FIGURE 4
SHEET 9 OF 26



0 50 100
MAP SCALE IN FEET

LEGEND

- DELINEATION FLAG
- DELINEATED STREAM

SAMPLE POINTS

- UPLAND SAMPLE POINT
- WETLAND SAMPLE POINT
- FEATURE CONTINUES
- DELINEATED CULVERT

DELINEATED WETLAND TYPES

- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)
- PALUSTRINE SCRUB SHRUB (PSS)
- PALUSTRINE UNCONSOLIDATED BOTTOM (PUB)

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ERIE COUNTY, NEW YORK

DELINEATED WETLANDS AND STREAMS

DECEMBER 2019

FIGURE 4
SHEET 10 OF 26

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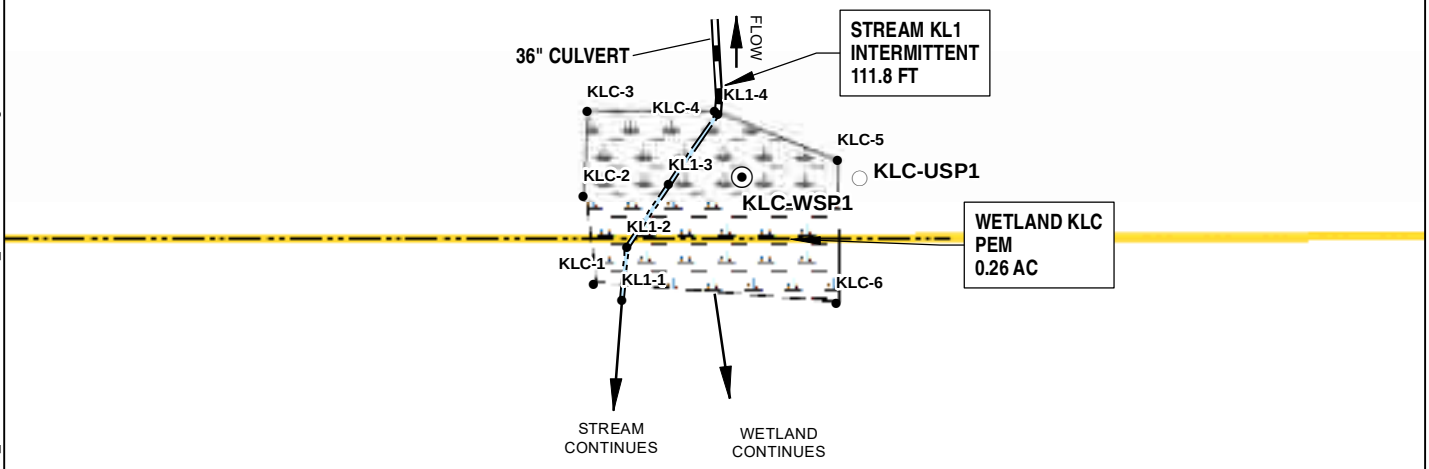

N

0 50 100

MAP SCALE IN FEET

LEGEND

- DELINEATION FLAG
- DELINEATED STREAM

SAMPLE POINTS

- UPLAND SAMPLE POINT
- WETLAND SAMPLE POINT
- FEATURE CONTINUES
- DELINEATED CULVERT

DELINEATED WETLAND TYPES

- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)
- PALUSTRINE SCRUB SHRUB (PSS)
- PALUSTRINE UNCONSOLIDATED BOTTOM (PUB)

NOTES

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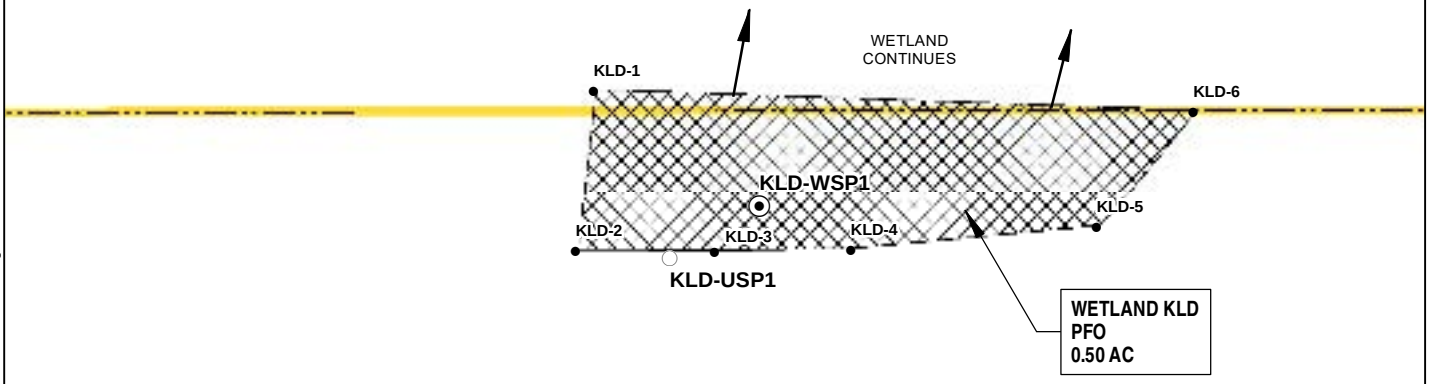
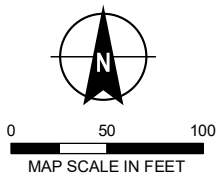
TOWNS OF CLARENCE AND NEWSTEAD
ERIE COUNTY, NEW YORK

DELINEATED WETLANDS AND STREAMS

DECEMBER 2019

FIGURE 4
SHEET 11 OF 26





LEGEND

- DELINEATION FLAG
- DELINEATED STREAM

SAMPLE POINTS

- UPLAND SAMPLE POINT
- WETLAND SAMPLE POINT
- FEATURE CONTINUES
- DELINEATED CULVERT

DELINEATED WETLAND TYPES

- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)
- PALUSTRINE SCRUB SHRUB (PSS)
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NOTES

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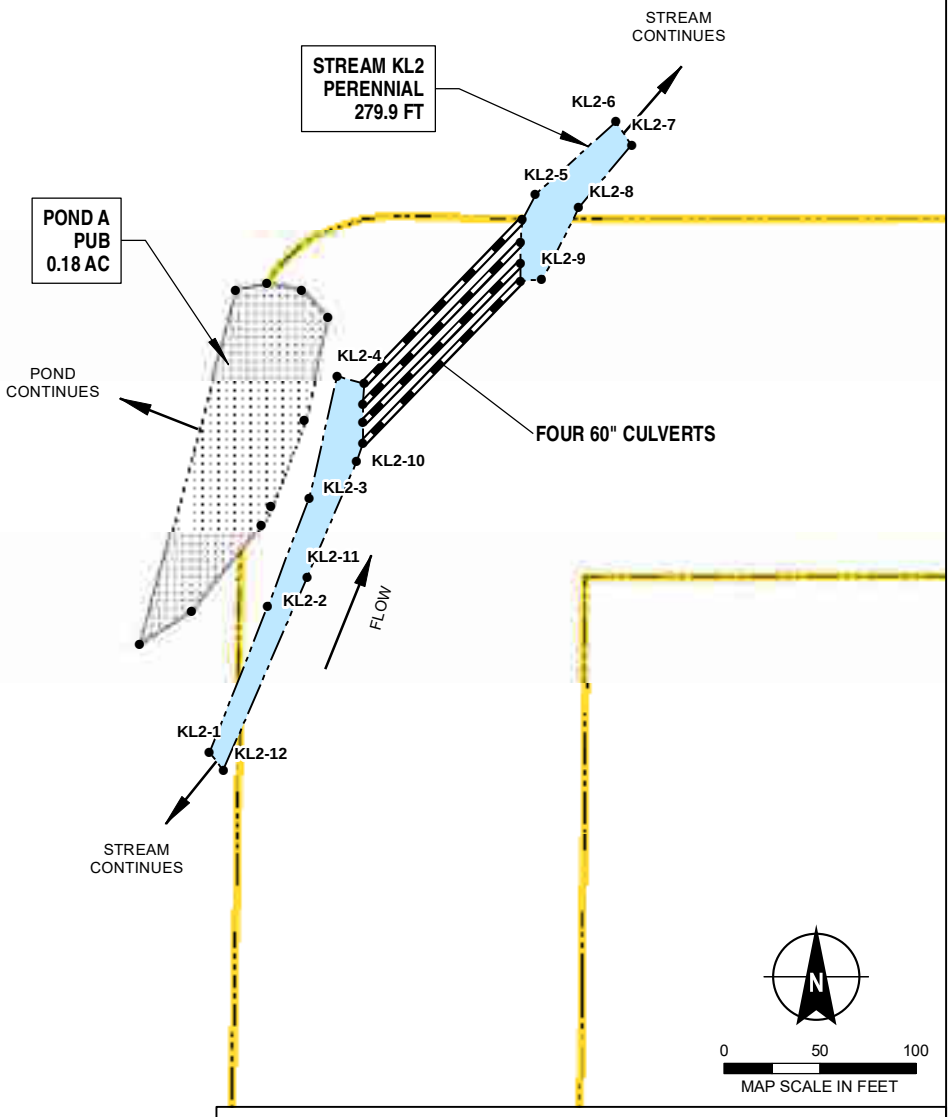
TOWNS OF CLARENCE AND NEWSTEAD
ERIE COUNTY, NEW YORK

DELINEATED WETLANDS AND STREAMS

DECEMBER 2019

FIGURE 4
SHEET 12 OF 26



LEGEND

- DELINEATION FLAG
- DELINEATED STREAM

SAMPLE POINTS

- UPLAND SAMPLE POINT
- WETLAND SAMPLE POINT
- FEATURE CONTINUES
- DELINEATED CULVERT

DELINEATED WETLAND TYPES

- PALUSTRINE EMERGENT (PEM)
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- PALUSTRINE SCRUB SHRUB (PSS)
- PALUSTRINE UNCONSOLIDATED BOTTOM (PUB)

NOTES

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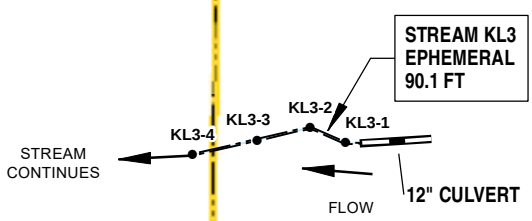
TOWNS OF CLARENCE AND NEWSTEAD
ERIE COUNTY, NEW YORK

DELINEATED WETLANDS AND STREAMS

DECEMBER 2019

FIGURE 4
SHEET 13 OF 26



N

0 50 100

MAP SCALE IN FEET

LEGEND

- DELINEATION FLAG
- DELINEATED STREAM

SAMPLE POINTS

- UPLAND SAMPLE POINT
- WETLAND SAMPLE POINT
- FEATURE CONTINUES
- DELINEATED CULVERT

DELINEATED WETLAND TYPES

- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)
- PALUSTRINE SCRUB SHRUB (PSS)
- PALUSTRINE UNCONSOLIDATED BOTTOM (PUB)

NOTES

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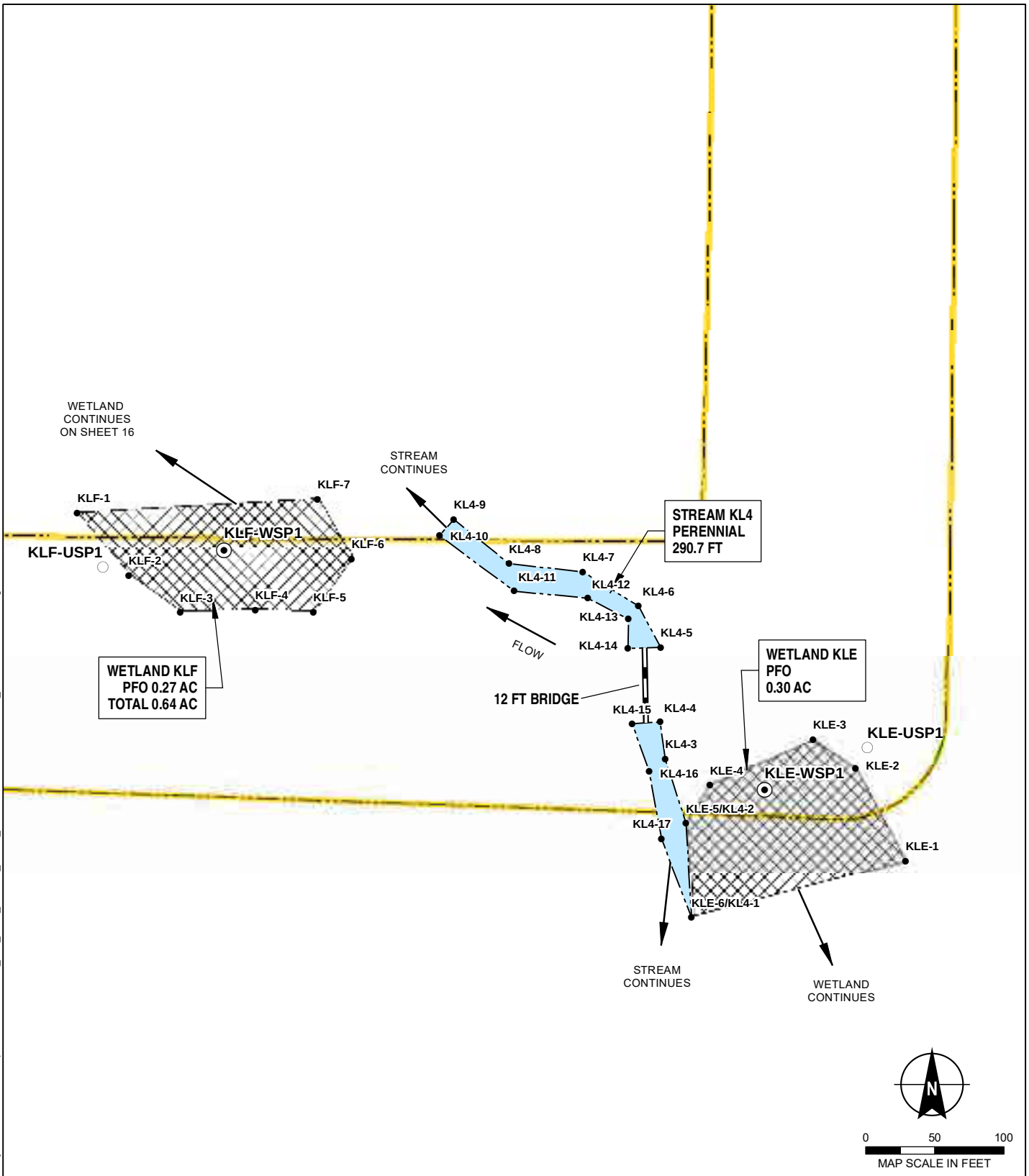
ERIE COUNTY, NEW YORK

DELINEATED WETLANDS AND STREAMS

DECEMBER 2019

FIGURE 4
SHEET 14 OF 26

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\134374\GIS\Maps\2019-12\134374_002_0004_STUDY_AREA_DELINEATEDRESOURCES_D2.mxd — USER: sgonzalez — LAST SAVED: 12/6/2019 3:42:54 PM



LEGEND

- DELINEATION FLAG
- DELINEATED STREAM

SAMPLE POINTS

- UPLAND SAMPLE POINT
- WETLAND SAMPLE POINT
- FEATURE CONTINUES
- DELINEATED CULVERT

DELINEATED WETLAND TYPES

- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)
- PALUSTRINE SCRUB SHRUB (PSS)
- PALUSTRINE UNCONSOLIDATED BOTTOM (PUB)

NOTES

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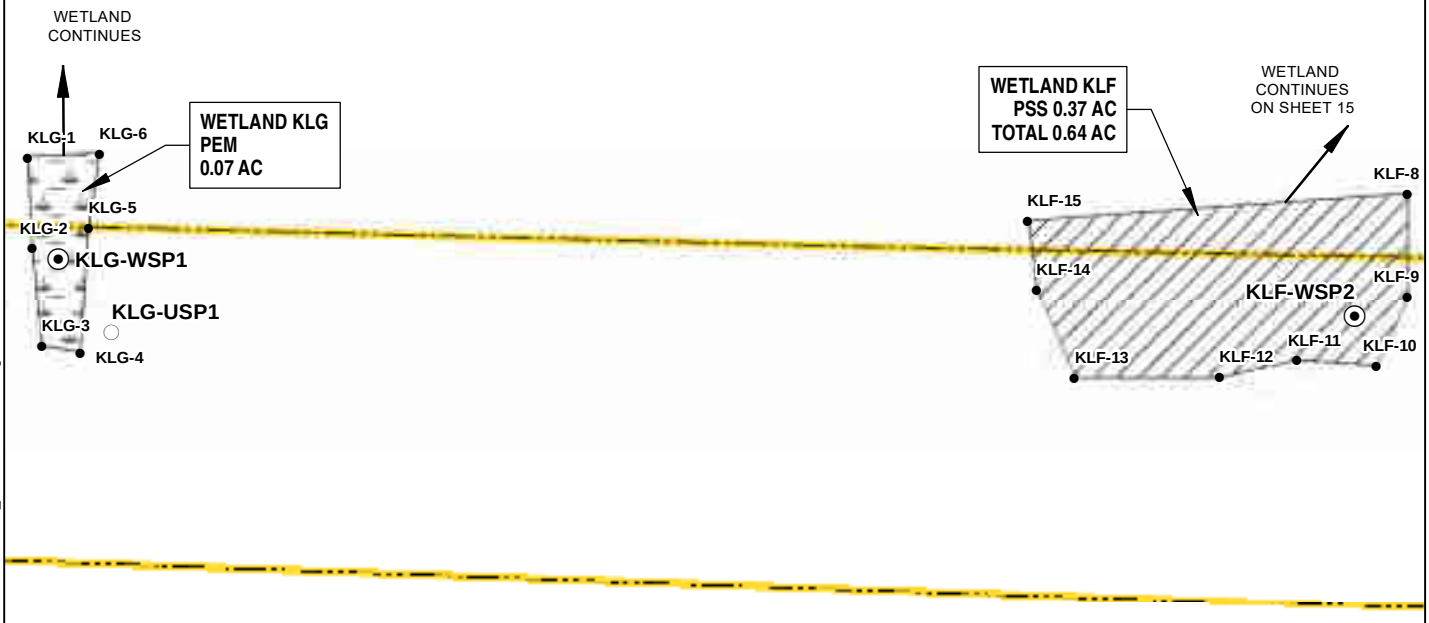
TOWNS OF CLARENCE AND NEWSTEAD
ERIE COUNTY, NEW YORK

DELINEATED WETLANDS AND STREAMS

DECEMBER 2019

FIGURE 4
SHEET 15 OF 26



N

0 50 100

MAP SCALE IN FEET

LEGEND

- DELINEATION FLAG
- DELINEATED STREAM

SAMPLE POINTS

- UPLAND SAMPLE POINT
- WETLAND SAMPLE POINT
- FEATURE CONTINUES
- DELINEATED CULVERT

DELINEATED WETLAND TYPES

- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE FORESTED (PFO)
- PALUSTRINE SCRUB SHRUB (PSS)
- PALUSTRINE UNCONSOLIDATED BOTTOM (PUB)

NOTES

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TOWNS OF CLARENCE AND NEWSTEAD
ERIE COUNTY, NEW YORK

DELINEATED WETLANDS AND STREAMS

DECEMBER 2019

FIGURE 4
SHEET 16 OF 26

APPENDIX A

Photo Log

Photo 8: Forested (PFO) Wetland KLA. View looking northeast.

Photo 9: Scrub Shrub (PSS) Wetland KLB. View looking south.

Photo 10: Emergent (PEM) Wetland KLC (foreground). View looking south. {Apparent PFO wetland areas further south and outside of Study Area}

Photo 11: Forested (PFO) Wetland KLD. View looking north.

Photo 12: Forested (PFO) Wetland KLE. View looking south.

Photo 13: Forested (PFO) Wetland KLF. View looking north.

Photo 14: Scrub Shrub (PSS) Wetland KLF. View looking north.

Photo 15: Emergent (PEM) Wetland KLG. View looking north.

Photo 36: Intermittent Stream KL1 looking south.

Photo 37: Perennial Stream KL2. View looking southwest.

Photo 38: Ephemeral Stream KL3. View looking west.

Photo 39: Perennial Stream KL4 looking northwest.

Photo 49: Perennial Stream KL14 looking southwest.

APPENDIX B

Description of Delineated Wetlands and Streams

HALEY ALDRICH

WETLAND DESCRIPTIONS

Wetland KLA: This is a 0.09-acre PFO wetland located in the northern portion of the Study Area, crossing Swift Mills Road. The observed wetland hydrology indicators included surface water, high water table, and saturation. Dominant vegetation included willow species (*Salix spp*.), black hawthorn (*Crataegus douglasii*), silky dogwood (*Cornus amomum*), narrowleaf cattail (*Typha angustifolia*), sensitive fern (*Onoclea sensibilis*), and goldenrod species (*Solidago spp*.). The observed hydric soil indicator was Redox Dark Surface (F6). Wetland KLA is associated with Stream KL14.

Wetland KLB: This is a 0.16-acre PSS wetland located in the northern portion of the Study Area, south of Swift Mills Road. The observed wetland hydrology indicators included surface water, high water table, saturation, and water-stained leaves. Dominant vegetation included willow species, red maple (*Acer rubra*), red osier dogwood (*Cornus sericea*), soft rush (*Juncus effusus*), and purple loosestrife (*Lythrum salicaria*). The observed hydric soil indicator was Depleted Dark Surface (F7).

Wetland KLC: This is a 0.26-acre PEM wetland located in the northern portion of the Study Area, south of Swift Mills Road. The observed wetland hydrology indicator was saturation. Dominant vegetation included Eastern cottonwood (*Populus deltoides*), willow species, red osier dogwood, reed canary grass (*Phalaris arundinicea*), and calico aster (*Symphyotrichum lateriflorum*). A portion of the wetland next to the road appears to be regularly mowed. The observed hydric soil indicator was Redox Dark Surface (F6). Wetland KLC is associated with Stream KL1.

Wetland KLD: This is a 0.50-acre PFO wetland located in the northern portion of the Study Area, north of Swift Mills Road. The observed wetland hydrology indicators included surface water, high water table, saturation, water marks, water-stained leaves, and hydrogen sulfide odor. Dominant vegetation included Eastern cottonwood, American beech (*Fagus grandifolia*), European buckthorn (*Rhamnus cathartica*), soft rush, and reed canary grass. The observed hydric soil indicator was Redox Dark Surface (F6).

Wetland KLE: This is a 0.29-acre PFO wetland located in the central portion of the Study Area, south of the intersection of Greenbush Road and Rapids Road. The observed wetland hydrology indicators included surface water, high water table, saturation, and water-stained leaves. Dominant vegetation included swamp white oak (*Quercus bicolor*), red osier dogwood, European buckthorn, and reed canary grass. The observed hydric soil indicator was Histosol (A1). This wetland is associated with Stream KL4 and NYSDEC mapped wetland WO-35.

Wetland KLF: This is a 0.64-acre PSS/PFO wetland located in the central portion of the Study Area, north of Rapids Road. The observed wetland hydrology indicators included high water table, saturation, and oxidized rhizospheres. Dominant vegetation included green ash (*Fraxinus pennsylvanica*), red maple, red osier dogwood, gray dogwood (*Cornus racemosa*), sensitive fern, and purple loosestrife. The observed hydric soil indicator was Redox Dark Surface (F6). Wetland KLF has a drainage channel excavated through the middle of the PFO portion, which is draining into Stream KL4 to the north.

Wetland KLG: This is a 0.07-acre PEM wetland located in the central portion of the Study Area, north of Rapids Road. The observed wetland hydrology indicators included surface water, high water table, and saturation. Dominant vegetation included willow species, Eastern cottonwood, silky dogwood, narrowleaf cattail, and reed canary grass. The observed hydric soil indicator was Redox Dark Surface (F6).

Pond A: This is a 0.18-acre PUB deepwater habitat pond located in the northern portion of the Study Area, west of the corner of Greenbush Road and Swift Mills Road, and west of Stream KL2. The dominant vegetation surrounding the pond was narrowleaf cattail and goldenrod species.

STREAM DESCRIPTIONS

KL1 is an unmapped intermittent stream located in the northern portion of the Study Area. The stream originates off-site, flows north through Wetland KLC, and crosses Swift Mills Road through a 36-inch culvert. Stream KL1 is approximately 3-feet wide and 4 to 6-inches deep, with a silt loam channel substrate.

KL2 is a mapped perennial stream located in the northern portion of the Study Area. The stream originates off-site and flows northeast to cross the intersection of Greenbush Road and Swift Mills Road through four (4) 60-inch culverts, continuing off-site. The stream is approximately 8-feet wide and 12 to 18-inches deep, with a silt and gravel channel substrate. Stream KL2 is a NYSDEC Class C mapped stream and is an unnamed tributary to Murder Creek.

KL3 is an unmapped ephemeral stream located in the northern portion of the Study Area. The stream originates from a 12-inch culvert crossing Greenbush Road and flowing west off-site. Stream KL3 is approximately 1-foot wide and 1 to 2-inches deep, with a silt loam channel substrate.

KL4 is a mapped perennial stream located in the northern portion of the Study Area. The stream originates off-site, flows along the western side of Wetland KLE, crosses Rapids Road through a 12-foot bridge, and continues flowing northwest. The stream is approximately 8-feet wide and 12 to 18-inches deep, with a silt loam channel substrate. Stream KL4 is a NYDEC Class C mapped stream and is an unnamed tributary to Murder Creek.

KL14 is a mapped perennial stream located in the northern portion of the Study Area. The stream flows northeast through Wetland KLA, crossing Swift Mills Road underneath a 12-feet bridge, and continuing off-site. The stream is approximately 8-feet wide and 8 to 10-inches deep, with a silt loam channel substrate. Stream KL14 is a NYDEC Class C mapped stream and is an unnamed tributary to Murder Creek.

APPENDIX C

Routine Wetland Determination and Stream Inventory Forms

HALEY ALDRICH

Stream Inventory Data Form

Project Information

Project Name:	NFGA Phase Pilot	Observer Name:	KL/TR
Project Number:	134374-002	Date:	11/18/19
Map Sheet Number:		State: NY County: Erie	
GPS Point No(s).	43.059198, -78.524888	Weather:	Overcast 30's F
Associated Data Sheet No(s).		Stream Location: (Address, nearest road, structure etc.)	SWIFT HILLS RD

Stream Information

Stream Name:	KL1	Stream Width:	3 ft.
Perceptible Flow:	Yes (X) No ( )	Water Width:	3 ft.
Direction of Flow:	North	Bank to Bank:	3 ft.
Flow Type:	Perennial ( ) Intermittent (X) Ephemeral ( )	Bankfull Width:	3 ft.
		Channel Substrate:	silt loam
Probed Stream Depth:	4-6 inches	Observed Water Quality:	murky/clear

Aquatic Habitat

- [ ] Sand Bar
- [ ] Sand/Gravel Beach Bar
- [ ] Mud Bar
- [ ] Overhanging
- [ ] Trees/Shrubs
- [ ] Cobble Riffles
- [ ] Deep Ponds/Holes
- [X] Aquatic Vegetation
- [ ] Other

Wildlife Observed (Species)

- [ ] Waterfowl
- [ ] Fish
- [ ] Turtles
- [ ] Frogs
- [ ] Invertebrates
- [ ] Salamanders
- [ ] Other:

Observed Use:

- [ ] Drinking
- [ ] Irrigation
- [ ] Swimming
- [ ] Fishing
- [X] Drainage
- [ ] Boating
- [ ] Other:

Left Bank Height:	3 inches	Right Bank Height:	3 inches
Left Bank Slope:	0-5 %	Right Bank Slope:	0-5 %
Bank Substrate:	silt loam	Erosion Potential:	very low

Stream Inventory Data Form

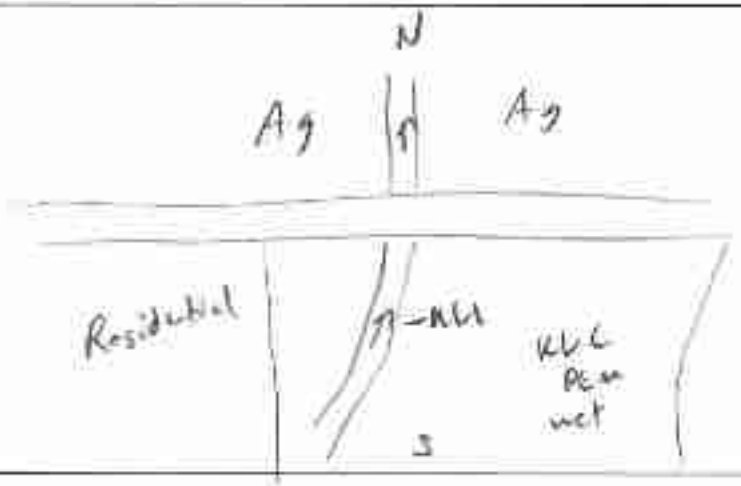
Stream Information (continued) Data Sheet No. KL1

Meander:	Low	Dominant Vegetative Species Type:	Reed canary / herbaceous
Gradient:	Very low	Trees:	willow sp. on fringe
Adjacent Community Type:	PEM wetland	Shrubs:	Silky dogwood on fringe
Est. % of Canopy Closure Over Stream Channel:	0-5%	Herbaceous:	Reed canary 95% narrowleaf cattail 5%
Threatened or Endangered Species Presence:	None observed		
Species Names If Present:	N/A		
Regulatory Status:	USACE		

Notes

flow channel at center of PEM wetland KLC
flows north across Mills Rd through 3811
culvert

Sketch



Stream Inventory Data Form

Project Information			
Project Name:	NFGDC FY2020 Pilots	Observer Name:	TR / KL
Project Number:	134374-002	Date:	11/18/19
Map Sheet Number:		State: NY County:	Erie
GPS Point No(s).	43.059962, -78.629802	Weather:	Overcast 30's F
Associated Data Sheet No(s).		Stream Location: (Address, nearest road, structure etc.)	Intersection of greenbush / swift mills

Stream Information			
Stream Name:	KL 2	Stream Width:	10 ft.
Perceptible Flow:	Yes (X) No ( )	Water Width:	8 ft.
Direction of Flow:	Northeast	Bank to Bank:	10 ft.
Flow Type:	Perennial (X) Intermittent ( ) Ephemeral ( )	Bankfull Width:	10 ft.
		Channel Substrate:	silt / gravel
Probed Stream Depth:	12-18 inches	Observed Water Quality:	Low / medium

Aquatic Habitat	Wildlife Observed (Species)	Observed Use:
☐ Sand Bar	☐ Waterfowl	☐ Drinking
☐ Sand/Gravel Beach Bar	☐ Fish	☐ Irrigation
☐ Mud Bar	☐ Turtles	☐ Swimming
☐ Overhanging	☐ Frogs	☐ Fishing
☒ Trees/Shrubs	☐ Invertebrates	☒ Drainage \ Road
☐ Cobble Riffles	☐ Salamanders	☐ Boating
☐ Deep Ponds/Holes	☐ Other:	☐ Other:
☒ Aquatic Vegetation		
☐ Other		

Left Bank Height:	1-2 ft	Right Bank Height:	2-3 feet
Left Bank Slope:	10-15 %	Right Bank Slope:	20-30 %
Bank Substrate:	silt / gravel	Erosion Potential:	low / medium

Stream Inventory Data Form

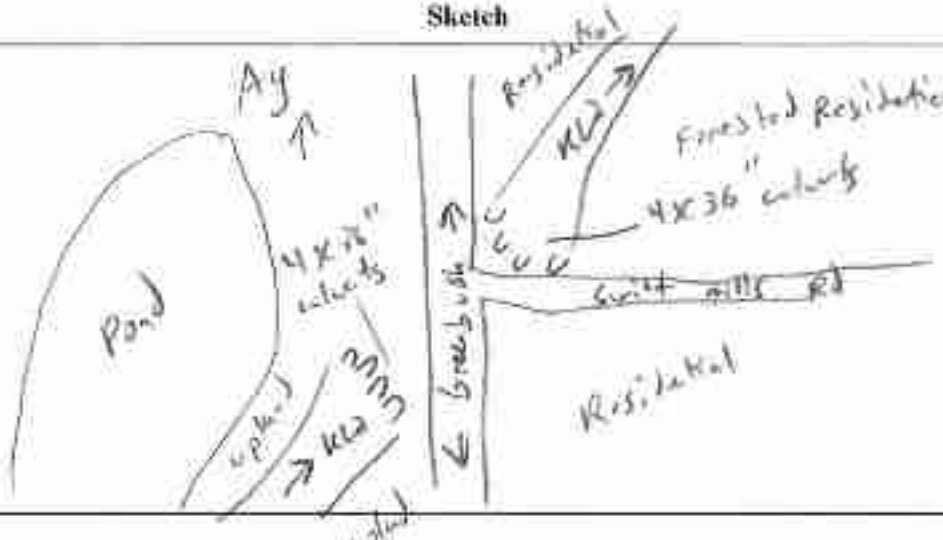
Stream Information (continued) Data Sheet No. KL2

Meander:	Low	Dominant Vegetative Species Type:	Herbaceous
Gradient:	Low / mod		
Adjacent Community Type:	open Fall / Pond / Residential	Trees:	coniferous spruce
Est. % of Canopy Closure Over Stream Channel:	5-10 %	Shrubs:	Spruce / coniferous saplings
Threatened or Endangered Species Presence:	None observed	Herbaceous:	grasses, clover, goldenrod, sp. Dandelion
Species Names If Present:	N/A		
Regulatory Status:			

Notes

KL2 crosses gravel road through 4 36" culverts spaced approx 3-4 feet apart each flows northeast

Sketch



Stream Inventory Data Form

Project Information			
Project Name:	NPGOL FY2020 Pilots	Observer Name:	TR KL
Project Number:	134374-002	Date:	11/18/19
Map Sheet Number:		State: NY County: Erie	
GPS Point No(s).	43.055042, -78529868	Weather:	overcast 20's F
Associated Data Sheet No(s).		Stream Location: (Address, nearest road, structure etc.)	west side of greenbush rd

Stream Information			
Stream Name:	KB	Stream Width:	1 ft.
Perceptible Flow:	Yes (X) No ( )	Water Width:	1 ft.
Direction of Flow:	west	Bank to Bank:	1 ft.
Flow Type:	Perennial ( ) Intermittent ( ) Ephemeral (X)	Bankfull Width:	1 ft.
		Channel Substrate:	silt loam
Probed Stream Depth:	1-2 inches	Observed Water Quality:	low loading

Aquatic Habitat

- [ ] Sand Bar
- [ ] Sand/Gravel Beach Bar
- [ ] Mud Bar
- [ ] Overhanging
- [x] Trees/Shrubs
- [ ] Cobble Riffles
- [ ] Deep Ponds/Holes
- [x] Aquatic Vegetation
- [ ] Other

Wildlife Observed (Species)

- [ ] Waterfowl
- [ ] Fish
- [ ] Turtles
- [ ] Frogs
- [ ] Invertebrates
- [ ] Salamanders
- [ ] Other:

Observed Use:

- [ ] Drinking
- [ ] Irrigation
- [ ] Swimming
- [ ] Fishing
- [x] Drainage roadside
- [ ] Boating
- [ ] Other:

Left Bank Height:	0-1 ft	Right Bank Height:	0-1 ft
Left Bank Slope:	15 %	Right Bank Slope:	15 %
Bank Substrate:	silt loam	Erosion Potential:	low

Stream Inventory Data Form

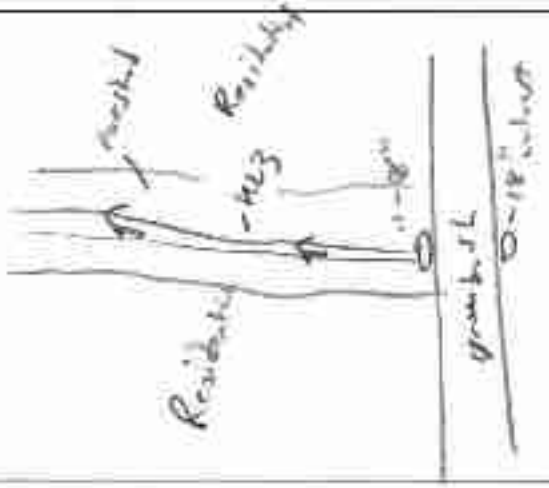
Stream Information (continued) Data Sheet No. WL-3

Meander:	None	Dominant Vegetative Species Type:	Trees
Gradient:	very low		
Adjacent Community Type:	Forest fringe / residential	Trees:	Green ash, elm sp. cottonwood, spruce red maple
Est. % of Canopy Closure Over Stream Channel:	80-90%	Shrubs:	willow saplings red osier / honeysuckle
Threatened or Endangered Species Presence:	None observed	Herbaceous:	goldenrod rush sp.
Species Names If Present:	N/A		
Regulatory Status:	USACE		

Notes

stream flow originates at roadside drainage on east side of road, flow channelized/starts at 18" culvert on west side of road

Sketch



Stream Inventory Data Form

Project Information

Project Name:	NFGDL FY2021 P.I.T.S	Observer Name:	KL / TR
Project Number:	134374-002	Date:	11/18/19
Map Sheet Number:		State: NY County:	Erie
GPS Point No(s):	43.052776, -78.530305	Weather:	overcast 30's
Associated Data Sheet No(s):		Stream Location: (Address, nearest road, structure etc.)	crossed rapids #1

Stream Information

Stream Name:	KL 4	Stream Width:	8-10 ft.
Perceptible Flow:	Yes ⊗ No ○	Water Width:	8 ft.
Direction of Flow:	Northeast	Bank to Bank:	10 ft.
Flow Type:	Perennial ⊗ Intermittent ○ Ephemeral ○	Bankfull Width:	10 ft.
		Channel Substrate:	silt / sand
		Observed Water Quality:	medium
Probed Stream Depth:	12-18 inches		

Aquatic Habitat

- ☐ Sand Bar
- ☐ Sand/Gravel Beach Bar
- ☐ Mud Bar
- ☐ Overhanging
- ☒ Trees/Shrubs
- ☐ Cobble Riffles
- ☐ Deep Ponds/Holes
- ☐ Aquatic Vegetation
- ☐ Other

Wildlife Observed (Species)

- ☐ Waterfowl
- ☐ Fish
- ☐ Turtles
- ☐ Frogs
- ☐ Invertebrates
- ☐ Salamanders
- ☐ Other:

Observed Use:

- ☐ Drinking
- ☐ Irrigation
- ☐ Swimming
- ☐ Fishing
- ☒ Drainage
- ☐ Boating
- ☐ Other:

Left Bank Height:	8-12	Right Bank Height:	2-3
Left Bank Slope:	60-70°	Right Bank Slope:	30-40°
Bank Substrate:	silt, gravel, cobbles	Erosion Potential:	low / medium

Stream Inventory Data Form

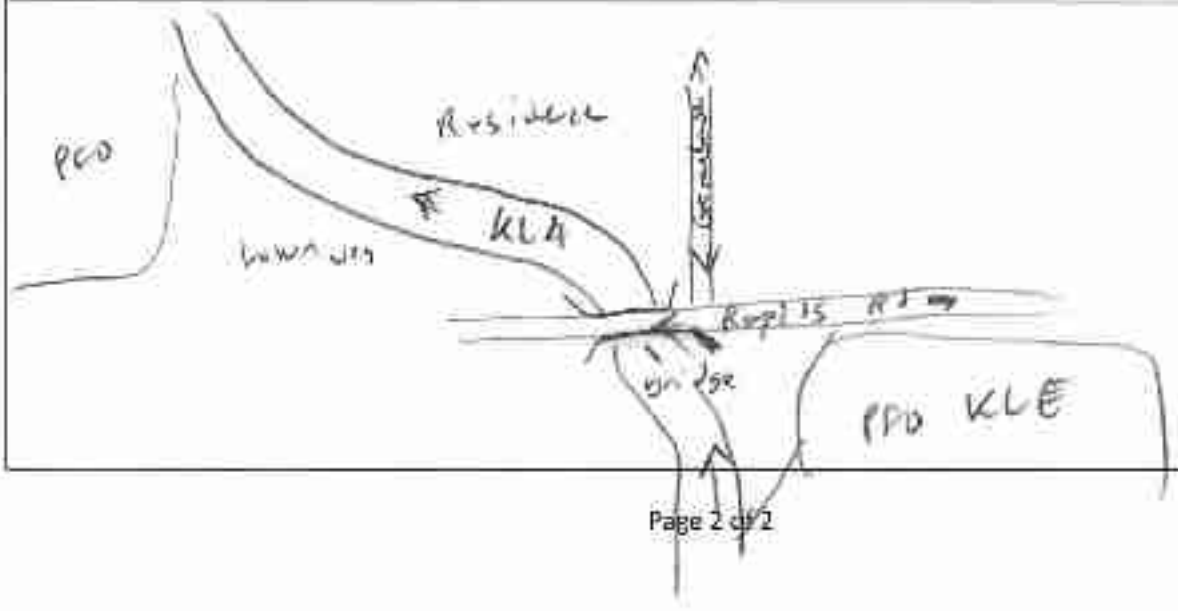
Stream Information (continued) Data Sheet No. KL 4

Meander:	mild	Dominant Vegetative Species Type:	Hardwoods
Gradient:	moderate	Trees:	cottonwood, ash, maple
Adjacent Community Type:	residential land PFO		
Est. % of Canopy Closure Over Stream Channel:	20-30%	Shrubs:	N/A - plus willow sp.
Threatened or Endangered Species Presence:	None known	Herbaceous:	lawn veg (grass) in yard, dandelion
Species Names If Present:	N/A		
Regulatory Status:			

Notes

Area flows north across rapids and PFO on south side of road (east of stream)

Sketch



Stream Inventory Data Form

Project Information

Project Name:	NFBE Floods Pilot	Observer Name:	TR
Project Number:	134374-002	Date:	11/18/19
Map Sheet Number:		State: NY	County: Erie
GPS Point No(s).	43.060256, -78.618239	Weather:	Overcast 30's F
Associated Data Sheet No(s).		Stream Location: (Address, nearest road, structure etc.)	Crosses Swift Mills Rd

Stream Information

Stream Name:	KL14	Stream Width:	1-2 ft.
Perceptible Flow:	Yes ○ No ⊗	Water Width:	2 ft.
Direction of Flow:	North ?	Bank to Bank:	8-10 ft.
Flow Type:	Perennial ⊗ Intermittent ○ Ephemeral ○	Bankfull Width:	8-10 ft.
		Channel Substrate:	silt loam
Probed Stream Depth:	8-10 inches	Observed Water Quality:	Low/medium

Aquatic Habitat

- ☐ Sand Bar
- ☐ Sand/Gravel Beach Bar
- ☐ Mud Bar
- ☐ Overhanging
- ☐ Trees/Shrubs
- ☐ Cobble Riffles
- ☐ Deep Ponds/Holes
- ☒ Aquatic Vegetation
- ☐ Other

Wildlife Observed (Species)

- ☐ Waterfowl
- ☐ Fish
- ☐ Turtles
- ☐ Frogs
- ☐ Invertebrates
- ☐ Salamanders
- ☐ Other:

Observed Use:

- ☐ Drinking
- ☐ Irrigation
- ☐ Swimming
- ☐ Fishing
- ☒ Drainage
- ☐ Boating
- ☐ Other:

Left Bank Height:	1-2 ft	Right Bank Height:	1-2 ft
Left Bank Slope:	40°±	Right Bank Slope:	40°±
Bank Substrate:	silt loam	Erosion Potential:	very low

Stream Inventory Data Form

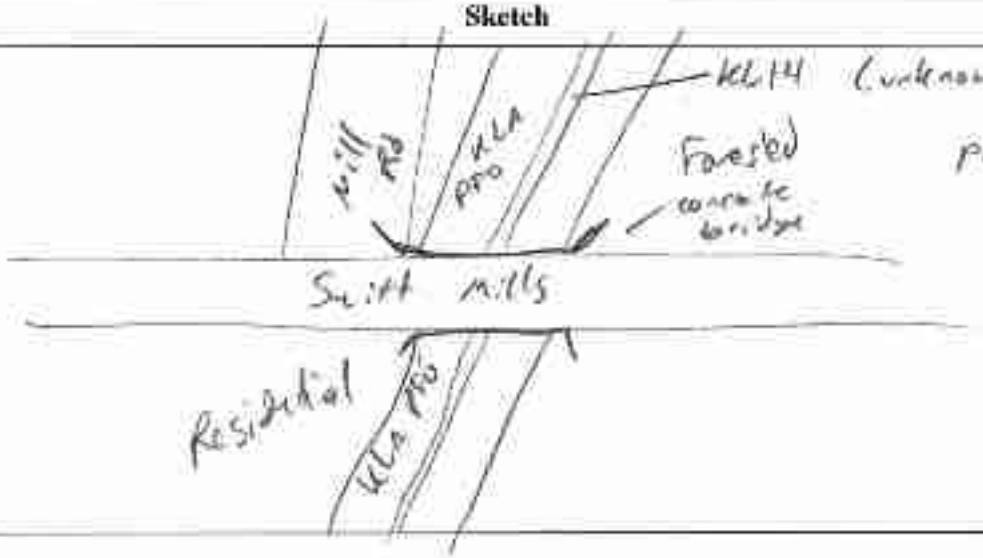
Stream Information (continued) Data Sheet No. KL14

Meander:	none / low	Dominant Vegetative Species Type:	Trees / Herbaceous
Gradient:	very low / none?		
Adjacent Community Type:	PFO wetland	Trees:	willow sp. Hawthorne
Est. % of Canopy Closure Over Stream Channel:	90-100 %	Shrubs:	silky dogwood blackberry
Threatened or Endangered Species Presence:	Not observed	Herbaceous:	Narrowleaf cattail purple loosestrife creeping jenny
Species Names If Present:	N/A		
Regulatory Status:			

Notes

This stream is a mapped class C stream, however channel is very small and although entire wetland (KL4) has water, no or very low flow in stream

Sketch



WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NFGDC FY2020 Pilot City/County: ERIE Sampling Date: 11/18

Applicant/Owner: NFGDC State: NY Sampling Point: KLA-WET

Investigator(s): KL + TR Section, Township, Range: SWIFTS MILLS

Landform (hillside, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 5

Subregion (LRR or MLRA): LRR R Lat: 43.060209 Long: -78.518258 Datum: WGS 84

Soil Map Unit Name: CAB: CAYUGA SILT LOAM, 3-8% SLOPES NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?**	Yes X	No ____
Hydric Soil Present?	Yes X	No ____			
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID: KLA		

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 1	
Water Table Present?	Yes ✓	No ____	Depth (inches): 3	
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): surface	**Wetland Hydrology Present?** Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: KLA-WSP1

Tree Stratum (Plot size: 30 FT)	Absolute % Cover	Dominant Species?	Indicator Status
1. Willow spp. SALIX SPP	30	Y	FACW
2. hawthorn CRATAEGUS DOUGLASII	20	Y	FAC
3.			
4.			
5.			
6.			
7.			
	50	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 FT)			
1. Silky dogwood, CORNUS SERICEA	15	Y	FACW
2. bush honeysuckle, LONICERA TARTARICA	5	Y	FACU
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	

Herb Stratum (Plot size: 5 FT)			
1. narrowleaf cattail, TYPHA ANGUSTIFOLIA	10	Y	OBL
2. sensitive fern, ONOCLEA SENSIBILIS	20	Y	FACW
3. purple loosestrife, LYTHRUM SALICARIA	5	N	OBL
4. Schuyler spp.	10	Y	FAC
5. lily spp. NYMPHAEA ODORATA	2	N	OBL
6. creeping jenny, LYSIMACHIA NUMMULARIA	5	N	FACW
7.			
8.			
9.			
10.			
11.			
12.			
	52	= Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 86 (A/B)

Prevalence Index worksheet:

Total % Cover of	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: KLA-WSP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/2	95	7.5YR 3/6	5	C	M	Silt loam	organics
5-16+	10YR 4/2	80	7.5YR 5/6	20	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ___ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ___ High Chroma Sands (S11) (LRR K, L)
- ___ Loamy Mucky Mineral (F1) (LRR K, L)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (LRR K, L)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ___ Coast Prairie Redox (A16) (LRR K, L, R)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ___ Polyvalue Below Surface (S8) (LRR K, L)
- ___ Thin Dark Surface (S9) (LRR K, L)
- ___ Iron-Manganese Masses (F12) (LRR K, L, R)
- ___ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ___ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NFGDC FY2020 PILOT City/County: ERIE Sampling Date: 11/18

Applicant/Owner: NFGDC State: NY Sampling Point: KLP-USP

Investigator(s): TR + KL Section, Township, Range: SWIFTS MILLS

Landform (hillside, terrace, etc.): FLAT Local relief (concave, convex, none): NONE Slope (%): 0

Subregion (LRR or MLRA): LRR R Lat: 43.060156 Long: -78.518178 Datum: WGS 84

Soil Map Unit Name: CfB: CANGA SILT LOAM, 3-8 % SLOPES NWI classification: UPLAND

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____
Wetland Hydrology Present?	Yes ____	No X	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants

Sampling Point: FLA-USP1

Tree Stratum (Plot size: 30FT)	Absolute % Cover	Dominant Species?	Indicator Status
1. Hawthorn, CRATAEGUS DOUGLASII	30	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	30	=Total Cover	

Sapling/Shrub Stratum (Plot size: 15FT)			
1. bush honeysuckle, LONICERA MACKII	30	Y	FACU
2. Staghorn Sumac, RHUS TYPHINA	20	Y	UPL
3.			
4.			
5.			
6.			
7.			
	50	=Total Cover	

Herb Stratum (Plot size: —)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		=Total Cover	

Woody Vine Stratum (Plot size: 30FT)			
1. grape vine, VITIS AESTIVALIS	10	Y	FACU
2.			
3.			
4.			
	10	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index worksheet:

Total % Cover of	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WLR-USP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2	100					sandy silt loam	
8							RESTRICTION	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ High Chroma Sands (S11) **(LRR K, L)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR K, L)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR R, L, R)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: gravel

Depth (inches): 8

Hydric Soil Present? Yes ___ No X

Remarks:

frozen soil

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NFGDC FY2020 P.Lots City/County: Erie Sampling Date: 11/18/19

Applicant/Owner: NFGDC State: NY Sampling Point: WLB-W SP

Investigator(s): KV / TR Section, Township, Range: SNIFTS MILLS

Landform (hillside, terrace, etc.): Flat Local relief (concave, convex, none): NONE Slope (%): 0

Subregion (LRR or MLRA): LRR R Lat: 43.05982 Long: -78.521602 Datum: WGS 84

Soil Map Unit Name: OH: ODESSA SILT LOAM, 0-3% SLOPES NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	If yes, optional Wetland Site ID: PSS-WSP-WLB
Wetland Hydrology Present?	Yes X	No ____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): +1
Water Table Present?	Yes X	No ____	Depth (inches): Surface
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 1

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: ULB-WSP1

Tree Stratum (Plot size: 30 FT)	Absolute % Cover	Dominant Species?	Indicator Status
1. willow sp., SALIX SPP	5	Y	FACW
2. Red maple, ACER RUBRUM	5	Y	FAC
3.			
4.			
5.			
6.			
7.			
	10	=Total Cover	

Sapling/Shrub Stratum (Plot size: 15 FT)	Absolute % Cover	Dominant Species?	Indicator Status
1. Red osier dogwood, CORNUS SERICEA	25	Y	FACW
2. willow sp., SALIX SPP	45	Y	FACW
3.			
4.			
5.			
6.			
7.			
	70	=Total Cover	

Herb Stratum (Plot size: 5 FT)	Absolute % Cover	Dominant Species?	Indicator Status
1. Juncus effusus	15	Y	OBL
2. purple loosestrife, LYTHRUM SALICARIA	20	Y	OBL
3. [illegible]	5	N	OBL
4. Calico aster, SYMPHYOTRICHUM LATERIFLORUM	10	N	FAC
5. Reed canary grass, PHALARIS ARUNDINACEA	10	N	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	60	=Total Cover	

Woody Vine Stratum (Plot size: —)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: KLB-WSP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6+	10YR 3/1	90	2.5Y 5/2	10	D	M	SiL loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ High Chroma Sands (S11) **(LRR K, L)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- X Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Mad (F10) **(LRR K, L)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NFGDC Fydingo Pilot City/County: Erie Sampling Date: 11/18/19

Applicant/Owner: NFGDC State: NY Sampling Point: KLO-US

Investigator(s): KL / TR Section, Township, Range: SWIFTS MILLS

Landform (hillside, terrace, etc.): flat Local relief (concave, convex, none): NONE Slope (%): 0-2

Subregion (LRR or MLRA): LRR R Lat: 43.059853 Long: -78.521417 Datum: WGS 84

Soil Map Unit Name: Od: ODESSA SILT LOAM, 0-3% SLOPES NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No X	Is the Sampled Area within a Wetland?	Yes ___ No X
Hydric Soil Present?	Yes ___ No X	If yes, optional Wetland Site ID:	
Wetland Hydrology Present?	Yes ___ No X		

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___ No X	Depth (inches): ___	
Water Table Present?	Yes ___ No X	Depth (inches): ___	**Wetland Hydrology Present?** Yes ___ No X
Saturation Present? (includes capillary fringe)	Yes ___ No X	Depth (inches): ___	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: ULB-ASP1

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5FT)			
1. Blue grass POA ANNUA	50	Y	FACU
2. Ground ivy GLECHOMA HEDERACEA	20	Y	FACU
3. white clover TRIFOLIUM REPENS	5	N	FACU
4. bedstraw sp. GALIUM SP	5	N	FACU
5. dandelion TARAXACUM OFFICINALE	5	N	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85 = Total Cover		

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)
Prevalence Index = B/A =		

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: KLB-USP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16+	10YR 3/3	100					silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ___ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ___ High Chroma Sands (S11) (LRR K, L)
- ___ Loamy Mucky Mineral (F1) (LRR K, L)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Mari (F10) (LRR K, L)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ___ Coast Prairie Redox (A16) (LRR K, L, R)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ___ Polyvalue Below Surface (S8) (LRR K, L)
- ___ Thin Dark Surface (S9) (LRR K, L)
- ___ Iron-Manganese Masses (F12) (LRR K, L, R)
- ___ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ___ Mesic Spodic (TA5) (MLRA 144A, 145, 149B)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NFGDC FY2020 Pilot City/County: ERIE Sampling Date: 11/18

Applicant/Owner: NFGDC State: NY Sampling Point: KLC-WS1

Investigator(s): KL+TR Section, Township, Range: SWIFTS MILLS

Landform (hillside, terrace, etc.): Flat Local relief (concave, convex, none): NONE Slope (%): 0

Subregion (LRR or MLRA): LRR R Lat: 43.059861 Long: -78.5247 Datum: WGS 84

Soil Map Unit Name: Ch: CHEEKTOWAGA FINE SANDY LOAM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID: KLC

Remarks: (Explain alternative procedures here or in a separate report.)

PORTION OF WETLAND APPEARS TO BE MOWED

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): SURFACE

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: KLC - WSP1

Tree Stratum (Plot size: 30 FT)	Absolute % Cover	Dominant Species?	Indicator Status
1. Eastern cottonwood, Populus deltoides	10	Y	FAC
2. Willow, Salix spp	5	Y	FACW
3.			
4.			
5.			
6.			
7.			
	15 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15 FT)	Absolute % Cover	Dominant Species?	Indicator Status
1. red osier dogwood,	15	Y	FACW
2. Cornus sericea			
3.			
4.			
5.			
6.			
7.			
	15 = Total Cover		

Herb Stratum (Plot size: 5 FT)	Absolute % Cover	Dominant Species?	Indicator Status
1. joe pye weed, Eupatorium maculatum	15	N	OBL
2. Narrowleaf cattail, Typha angustifolia	5	N	OBL
3. calico aster, Symphyotrichum lateriflorum	20	Y	FAC
4. Reed canary, Phalaris	30	Y	FACW
5. arundinacea			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80 = Total Cover		

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: YLC - WSP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16+	10YR 2/1	85	7.5YR 5/6	15	C	M	Mucky Silt	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Mari (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NFGDC FY2020 Pilot City/County: ERIE Sampling Date: 11/18

Applicant/Owner: NFGDC State: NY Sampling Point: KLC-WS

Investigator(s): KL & TR Section, Township, Range: SWIFTS MILLS

Landform (hillside, terrace, etc.): Flat Local relief (concave, convex, none): NONE Slope (%): 0

Subregion (LRR or MLRA): LRR R Lat: 43.059859 Long: -78.52447 Datum: WGS 84

Soil Map Unit Name: OdA: ODESSA SILT LOAM, 0-3% SLOPES NWI classification: UPLAND

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	Is the Sampled Area		
Hydric Soil Present?	Yes ____	No X	within a Wetland?	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: KLC-UKP1

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 5FT)			
1. Festuca spp	30	Y	FACU
2. White clover, TRIFOLIUM REPENS	20	Y	FACU
3. bed straw, GALIUM SPP	15	N	FACU
4. ground ivy, GLECHOMA HEDERACEA	5	N	FACU
5. dandelion, TARAXACUM OFFICINALE	20	Y	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: KLE-WSP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18*	10YR 4/2	90	7.5YR 6/4	10	C	PL+M	silty-clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ High Chroma Sands (S11) **(LRR K, L)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR K, L)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NFGDC FY2020 Pilot City/County: ERIE Sampling Date: 11/19

Applicant/Owner: NFGDC State: NY Sampling Point: ELD-WSP

Investigator(s): EL + TR Section, Township, Range: SWIFTS MILLS

Landform (hillside, terrace, etc.): FLAT Local relief (concave, convex, none): NONE Slope (%): 0

Subregion (LRR or MLRA): LRR R Lat: 43.060145 Long: -78.527474 Datum: WGS 84

Soil Map Unit Name: CH. CHEEKTOWAGA FINE SANDY LOAM NWI classification: PEO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No ____	If yes, optional Wetland Site ID: ELD
Wetland Hydrology Present?	Yes X	No ____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- X Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): 19
Water Table Present?	Yes X	No ____	Depth (inches): Surface
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): Surface

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: KLD-WSP1

Tree Stratum (Plot size: 30 FT)	Absolute % Cover	Dominant Species?	Indicator Status
1. Eastern cottonwood, POPULUS DELTOIDES	30	Y	FAC
2. Green ash, FRAXINUS PENNSYLVANICA	10	N	FACW
3. American beech, FAGUS GRANDIFOLIA	20	Y	FACU
4. Red maple, ACER RUBRUM	5	N	FAC
5.			
6.			
7.			
	65	=Total Cover	

Sapling/Shrub Stratum (Plot size: 15 FT)			
1. Bush honeysuckle, LONICERA TATARICA	5	Y	FACU
2. Buckthorn, RHAMNUS CATHARTICA	5	Y	FAC
3.			
4.			
5.			
6.			
7.			
	10	=Total Cover	

Herb Stratum (Plot size: 5 FT)			
1. Calico aster, SYMPHYOTRICHUM LATERIFLORUM	10	N	FAC
2. Soft rush, JUNCUS EFFUSUS	15	Y	OBL
3. Narrowleaf cattail, TYPHA ANGUSTIFOLIA	10	N	OBL
4. goldenrod, SOLIDAGO SPP	5	N	FAC
5. reed canary, PHALARIS ARUNDINACEA	20	Y	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	60	=Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: KLD-WS1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16+	10YR 2/1	95	7.5YR 5/6	5	C	PL	MUCKY SILT LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NFGDC FY2020 Pilot City/County: ERIE Sampling Date: 11/15

Applicant/Owner: NFGDC State: NY Sampling Point: UPLD-USF

Investigator(s): TR + KL Section, Township, Range: SNIFTS MILLS

Landform (hillside, terrace, etc.): ROADSHOULDER Local relief (concave, convex, none): CONVEX Slope (%): 3-5

Subregion (LRR or MLRA): LRR R Lat: 43.060071 Long: -78.527648 Datum: WGS 84

Soil Map Unit Name: Cv: COSAD LOAMY FINE SAND NWI classification: UPLAND

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	Is the Sampled Area		
Hydric Soil Present?	Yes ____	No X	within a Wetland?	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____	
Water Table Present?	Yes ____	No X	Depth (inches): ____	
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____	Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: KLD-USP1

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 5FT)			
1. Festuca, FESTUCA SPP	55	Y	FACU
2. white clover, TRIFOLIUM REPENS	10	N	FACU
3. dandelion, TARAXACUM OFFICINALE	15	N	FACU
4. Blue grass, POA ANNUA	20	Y	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 – Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (Include photo numbers here or on a separate sheet.)

road shoulder

SOIL

Sampling Point: KLD-USP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8+	2.5Y 3/3	100					gravel + silt	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ High Chroma Sands (S11) **(LRR K, L)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR K, L)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ___ No X

Remarks:

Frozen

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: JPGDC Fuels Pilot City/County: Erie Sampling Date: 11/18/19

Applicant/Owner: JPGDC State: NY Sampling Point: WLE-US-

Investigator(s): KL TMK Section, Township, Range: SWIFTS MILLS

Landform (hillside, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0-2

Subregion (LRR or MLRA): LRR R Lat: 43.062461 Long: -78.529971 Datum: WGS 84

Soil Map Unit Name: WJ: WAYLAND SOILS COMPLEX, 0-3 % SLOPES NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?**	Yes X No ____
Hydric Soil Present?	Yes X	No ____	If yes, optional Wetland Site ID:	WLE - PFO
Wetland Hydrology Present?	Yes X	No ____		

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1) 2-3"
- X High Water Table (A2) 8-10"
- X Saturation (A3) 2"
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): +3"
Water Table Present?	Yes X	No ____	Depth (inches): ↓
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): ↓

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WS9

VEGETATION – Use scientific names of plants. Sampling Point: KLE-PF0

Tree Stratum (Plot size: 30 FT)	Absolute % Cover	Dominant Species?	Indicator Status
1. SWAMP WHITE OAK, QUERCUS BICOLOR	55%	Y	FACW
2. SLIPPERY ELM, ULMUS RUBRA	10%	N	FAC
3.			
4.			
5.			
6.			
7.			
	65	=Total Cover	

Sapling/Shrub Stratum (Plot size: 15 FT)			
1. RED OSIER DOGWOOD, CORNUS SERICEA	10	Y	FACW
2. BUCKTHORN, RHAMNUS CATHARTICA	5	Y	FAC
3.			
4.			
5.			
6.			
7.			
	15	=Total Cover	

Herb Stratum (Plot size: 5FT)			
1. Aster Sp. SYMPHYOTRICHUM SP	10	Y	FAC
2. Red canary grass	10	Y	FACW
3. PHALARIS ARUNDINACEA			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	=Total Cover	

Woody Vine Stratum (Plot size: —)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: KLE-WSP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16+	10yr 2/1	100					MUCKY SILT LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- [X] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] High Chroma Sands (S11) (LRR K, L)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Mari (F10) (LRR K, L)

Indicators for Problematic Hydric Soils[3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (F21)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes [X] No [ ]

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NFGDL FY2021 P1.2 City/County: Erie Sampling Date: 11/18/19

Applicant/Owner: NFGDL FY2021 P1.2 State: NY Sampling Point: KLE - US1

Investigator(s): KL MR Section, Township, Range: SWIFTS MILLS

Landform (hillside, terrace, etc.): FLAT Local relief (concave, convex, none): NONE Slope (%): 2-4

Subregion (LRR or MLRA): LRR R Lat: 43.052536 Long: -78.529694 Datum: WGS 84

Soil Map Unit Name: CgB: CAZENOVIA SILT LOAM, 3-8 % SLOPES NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	Is the Sampled Area within a Wetland? Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: KLE-U1P1

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 FT)	Absolute % Cover	Dominant Species?	Indicator Status
1. Ground ivy, GLECHOMA HEDERACEA	10	N	FACU
2. Woodland strawberry, FRAGARIA VESCA	20	Y	FACU
3. White clover, TRIFOLIUM REPENS	10	N	FACU
4. MUGWORT, AMBROSIA	20	Y	FACU
5. ARTEMISIIFOLIA			
6. Festuca sp.	25	Y	FACU
7.			
8.			
9.			
10.			
11.			
12.			
	85	= Total Cover	

Woody Vine Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WLF-US#1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12+	2.5Y 5/4	70	2.5YR 4/6	30	C	M/PL	sandy clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ High Chroma Sands (S11) **(LRR K, L)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR K, L)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NFGC FY2020 P.L.S. City/County: Erie Sampling Date: 11/19/19

Applicant/Owner: NFGC State: NY Sampling Point: KLF-6 UP

Investigator(s): KL / TR Section, Township, Range: SWIFTS MILLS

Landform (hillside, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0-2

Subregion (LRR or MLRA): LRR K Lat: 43.052929 Long: -78.531435 Datum: WGS 84

Soil Map Unit Name: CoA: CHURCHVILLE SILT LOAM, 0-3% SLOPES NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID: KLF (PFO)

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 6
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 5

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

wetland has a distinct channel excavated through middle of it, which is draining wetland to KL4 stream to north

VEGETATION – Use scientific names of plants.

Sampling Point: WLF-USP1

Tree Stratum (Plot size: 30 FT)	Absolute % Cover	Dominant Species?	Indicator Status
1. Green ash, FRAXINUS PENNSYLVANICA	25	Y	FACW
2. Swamp white oak, QUERCUS BICOLOR	10	N	FACW
3. Red maple, ACER RUBRUM	15	Y	FAC
4. American elm, ULMUS AMERICANA	5	N	FAC
5. Slippery elm, ULMUS RUBRA	5	N	FAC
6.			
7.			
	55	=Total Cover	

Sapling/Shrub Stratum (Plot size: 15 FT)			
1. Red osier dogwood, CORNUS SERICEA	25	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	25	=Total Cover	

Herb Stratum (Plot size: 5FT)			
1. Sensitive fern, ONOCLEA SENSIBILIS	15	Y	FACW
2. Aster sp., SYMPHYOTRICHUM SPP	15	Y	FAC
3. Willow herb, EPILOBIUM COLORATUM	5	N	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	35	=Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: MLF-WSP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	100					Silt loam	
3-16+	10YR 3/2	80	5YR 5/6	25	C	M	Silt	
			7.5YR 6/2	15	D	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ___ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ___ High Chroma Sands (S11) (LRR K, L)
- ___ Loamy Mucky Mineral (F1) (LRR K, L)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Mart (F10) (LRR K, L)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ___ Coast Prairie Redox (A16) (LRR K, L, R)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ___ Polyvalue Below Surface (S8) (LRR K, L)
- ___ Thin Dark Surface (S9) (LRR K, L)
- ___ Iron-Manganese Masses (F12) (LRR K, L, R)
- ___ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ___ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NFGDL FY20 24 Pilot City/County: Erie Sampling Date: 11/18/19

Applicant/Owner: NFGDL State: NY Sampling Point: WL P-USP

Investigator(s): TB TKL Section, Township, Range: SWIFTS MILLS

Landform (hillside, terrace, etc.): slight hillside Local relief (concave, convex, none): CONVEX Slope (%): 4-6

Subregion (LRR or MLRA): LRR R Lat: 43.052896 Long: -78.531763 Datum: WGS 84

Soil Map Unit Name: CoA: CHURCHVILLE SILT LOAM, 0-3% SLOPES NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	Is the Sampled Area within a Wetland? Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants

Sampling Point: KLF-UP1

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 5FT)			
1. Dactylis TRIFOLIUM REPENS	15	Y	FACU
2. ground ivy GLECHOMA HEDERACEA	20	Y	FACU
3. white clover TRIFOLIUM REPENS	20	Y	FACU
4. Festuca sp.	20	Y	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: KLF USP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/3	100					Silt loam	(sandy)

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ___ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ___ High Chroma Sands (S11) (LRR K, L)
- ___ Loamy Mucky Mineral (F1) (LRR K, L)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (LRR K, L)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ___ Coast Prairie Redox (A16) (LRR K, L, R)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ___ Polyvalue Below Surface (S8) (LRR K, L)
- ___ Thin Dark Surface (S9) (LRR K, L)
- ___ Iron-Manganese Masses (F12) (LRR K, L, R)
- ___ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ___ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ___ No X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NFLOC Expan RLF City/County: Erie Sampling Date: 11/19/19

Applicant/Owner: NFLOC State: NY Sampling Point: RLF-usp1

Investigator(s): KL ITR Section, Township, Range: SWIFTS MILLS

Landform (hillside, terrace, etc.): FLAT Local relief (concave, convex, none): NONE Slope (%): 0

Subregion (LRR or MLRA): LRR R Lat: 43.052878 Long: -78.532399 Datum: WGS 84

Soil Map Unit Name: CoA: CHURCHVILLE SILT LOAM, 0-3% SLOPES NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	Is the Sampled Area within a Wetland?	Yes X	No ____
Hydric Soil Present?	Yes ____	No ____			
Wetland Hydrology Present?	Yes ____	No ____	If yes, optional Wetland Site ID:	RLF - wp2 - PSS	

Remarks: (Explain alternative procedures here or in a separate report.)

same upland as RLF-usp1

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 6

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: KLF-WS/2-

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Sapling/Shrub Stratum (Plot size: 15 FT)			
1. Gray dogwood CORNUS RACEMOSA	50	Y	FAC
2. green ash FRAXINUS PENNSYLVANICA	10	N	FACW
3.			
4.			
5.			
6.			
7.			
	60	=Total Cover	
Herb Stratum (Plot size: ______)			
1. Purple loosestrife LYTHRUM SALICARIA	30	Y	OBL
2. goldenrod sp. SOLIDAGO	10	Y	FAC
3. Aster sp. SYMPHYOTRICHUM spp	10	Y	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	50	=Total Cover	
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ______	x 1 = ______
FACW species ______	x 2 = ______
FAC species ______	x 3 = ______
FACU species ______	x 4 = ______
UPL species ______	x 5 = ______
Column Totals: ______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF-WET-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 2/1	97	7.5YR 4/6	3	C	PL	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ___ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ___ High Chroma Sands (S11) (LRR K, L)
- ___ Loamy Mucky Mineral (F1) (LRR K, L)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (LRR K, L)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ___ Coast Prairie Redox (A16) (LRR K, L, R)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ___ Polyvalue Below Surface (S8) (LRR K, L)
- ___ Thin Dark Surface (S9) (LRR K, L)
- ___ Iron-Manganese Masses (F12) (LRR K, L, R)
- ___ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ___ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: NFWA Fyoon Mills City/County: Gen Sampling Date: 11/14/11
Applicant/Owner: NFGDC State: NY Sampling Point: KLG-W5
Investigator(s): TR KL Section, Township, Range: SWIFTS MILLS
Landform (hillside, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 0-2
Subregion (LRR or MLRA): LRR R Lat: 43.052961 Long: -78.534924 Datum: WGS 84
Soil Map Unit Name: CoA: CHURCHVILLE SILT LOAM, 0-3% SLOPES NWI classification: PEM
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___		Is the Sampled Area within a Wetland? Yes X No ___
Hydric Soil Present? Yes X No ___		If yes, optional Wetland Site ID: KLG - PEA
Wetland Hydrology Present? Yes X No ___		

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches):	1
Water Table Present?	Yes X	No ___	Depth (inches):	0-2
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches):	Surface

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: KUS-WEP1

Tree Stratum (Plot size: 30 FT)	Absolute % Cover	Dominant Species?	Indicator Status
1. Willow, SALIX SPP	10	Y	FACW
2. Eastern cottonwood, POPULUS DELTOIDES	15	Y	FAC
3.			
4.			
5.			
6.			
7.			
	25	=Total Cover	

Sapling/Shrub Stratum (Plot size: 15 FT)			
1. Silky dogwood, CORNUS AMOMUM	10	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	10	=Total Cover	

Herb Stratum (Plot size: 5 FT)			
1. narrowleaf cattail, TYPHA ANGUSTIFOLIA	20	Y	OBL
2. purple loosestrife, LYTHRUM SALICARIA	15	N	OBL
3. reed canary, PHALARIS ARUNDINACEA	30	Y	FACW
4. sedge aster, SYMPHYOTRICHUM LATERIFLORUM	10	N	FAC
5. goldenrod, SOLIDAGO SPP	10	N	FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85	=Total Cover	

Woody Vine Stratum (Plot size: —)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: kug - WS pt

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16+	10YR 2/1	80	7.5YR 4/6	20	C	M	clay silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ___ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ___ High Chroma Sands (S11) (LRR K, L)
- ___ Loamy Mucky Mineral (F1) (LRR K, L)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Mar (F10) (LRR K, L)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ___ Coast Prairie Redox (A16) (LRR K, L, R)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ___ Polyvalue Below Surface (S8) (LRR R, L)
- ___ Thin Dark Surface (S9) (LRR K, L)
- ___ Iron-Manganese Masses (F12) (LRR K, L, R)
- ___ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ___ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: [illegible] City/County: [illegible] Sampling Date: [illegible]

Applicant/Owner: [illegible] State: NY Sampling Point: [illegible]

Investigator(s): [illegible] Section, Township, Range: SWIFTS MILLS

Landform (hillside, terrace, etc.): [illegible] Local relief (concave, convex, none): CONVEX Slope (%): 1-3

Subregion (LRR or MLRA): LRR R Lat: 43.052855 Long: -78.534821 Datum: WGS 84

Soil Map Unit Name: CoA: CHURHVILLE SILT LOAM, 0-3% SLOPES NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	**Is the Sampled Area within a Wetland?**	**Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No X	If yes, optional Wetland Site ID: ___	
Wetland Hydrology Present?	Yes ___	No X		

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: KLG-USP1

Tree Stratum (Plot size: 30 FT)	Absolute % Cover	Dominant Species?	Indicator Status
1. BLUE SPRUCE, PICEA PUNGENS	5	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	5	= Total Cover	

Sapling/Shrub Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 FT)	Absolute % Cover	Dominant Species?	Indicator Status
1. white clover, TRIFOLIUM REPENS	10	N	FACU
2. Dandelion, TARAXACUM OFFICINALE	15	N	FACU
3. BLUE GRASS, POA ANNUA	30	Y	FACU
4. Fescue grass, FESTUCA SPP	20	Y	FACU
5. Queen anne's lace,	15	N	UPL
6. DAUCUS CAROTA			
7.			
8.			
9.			
10.			
11.			
12.			
	90	= Total Cover	

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	0	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	0	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:		(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

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Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: NLB-USP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/3	100					Silty Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ___ No ✓

Remarks:

APPENDIX C

EROSION AND SEDIMENT CONTROL AND AGRICULTURAL MITIGATION PLAN

NATIONAL FUEL GAS CORPORATION

Erosion and Sediment Control

&

Agricultural Mitigation Plan

(ESCAMP)

18 November 2013

Revised: 30 May 2018

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1 INTRODUCTION

1.1 Plan Objectives

The primary objective of this Erosion and Sedimentation Control & Agricultural Mitigation Plan (ESCAMP or "Plan") is to reduce potential impacts from construction and maintenance of the project and outline mitigation, monitoring and maintenance procedures.

This Plan describes basic environmental construction and agricultural mitigation techniques that National (or its contractors) will use to construct and maintain pipelines. Best Management Practices (BMPs) will be implemented throughout construction to protect the environment and to minimize potential effects to the pipeline project. This document references BMPs that may be National Fuel Gas's (National) BMPs, Pennsylvania Department of Environmental Protection's (PADEP) BMPs, New York State Department of Environmental Conservation (NYSDEC) BMPs or varying combinations of listed references.

This ESCAMP has been modified and may be subject to further revision, as needed prior to construction, to include any additional requirements recommended by Federal, State, or Local agencies during the process of issuing permits. This document will be included as part of the Contractor's construction specifications.

1.2 Format

The content of this Plan is derived from the Federal Energy Regulatory Commission's (FERC) Wetland and Waterbody Construction and Mitigation Procedure; Upland Erosion Control, Revegetation, and Maintenance Plan; and Agricultural Mitigation Through the Stages of Pipeline Planning, Construction/Restoration and Follow Up Monitoring. Additional project specific input has been integrated from consultation with the United State Army Corps of Engineering, the Pennsylvania Department of Environmental Protection, the New York State Department of Environmental Conservation, the United States Fish & Wildlife Service, the United States Department of Agriculture, New York State Department of Agriculture & Markets, and the County Soil & Water Conservation Districts.

This ESCAMP provides information regarding the project construction and restoration, including the following:

- Agricultural Mitigation, as described herein and provided in the attached Soil Protection and Subsoil Decompaction Plan (Attachment 1);
- Wetland/Waterbody Construction, Erosion and Sedimentation Controls as described herein and as detailed in attached Best Management Practices (BMP) drawings (Attachment 2);
- Stormwater Pollution Prevention project information; and
- Revegetation and Maintenance details.
- Reference information used to develop this Plan is identified in the Section 11. Supplemental information is provided in the project Spill Prevention and Response Procedures (SPRP) document, Hydrostatic Test Plan, and Site Specific Residential Mitigation Plans (not included in this document).

2 SUPERVISION AND INSPECTION

2.1 Environmental Inspection

- At least one Environmental Inspector having knowledge of the wetland and waterbody conditions in the project area is required for each construction spread during construction and restoration. The number and experience of Environmental Inspectors assigned to each construction spread should be appropriate for the length of the construction spread and the number/significance of resources affected.
- Environmental Inspectors shall have peer status with all other activity inspectors.
- Environmental Inspectors shall have the authority to stop activities that violate the environmental conditions of the FERC's Orders, stipulations of other environmental permits or approvals, or landowner easement agreements; and to order appropriate corrective action. Corrective actions (and their status) will be documented in daily forms and, at a minimum, maintained in project files for the duration of construction activities.

The Project's Environmental Manager will be the primary liaison between the Project and agency representatives. Environmental Inspectors may be directed by the Environmental Manager to coordinate with agency field staff during project inspection activities. Agencies will be notified of project activities in accordance with permit and FERC's Orders requirements or as required by law (e.g., spill of hazardous material to a water source). Additional notifications will be made on a case-by-case situation (e.g., requests for agency guidance or existing requirement variances).

2.2 Responsibilities of Environmental Inspectors

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

- Inspecting construction activities for compliance with the requirements of this Plan, FERC Procedures, the environmental conditions of the FERC's orders, the mitigation measures proposed by the project sponsor (as approved and/or modified by the order), other environmental permits and approvals, and environmental requirements in landowner easement agreements.
- Identifying, documenting, and overseeing corrective actions, as necessary to bring an activity back into compliance.
- Verifying that the limits of authorized construction work areas and locations of access roads are visibly marked before clearing, and maintained throughout construction.
- Verifying the location of signs and highly visible flagging marking the boundaries of sensitive resource areas, waterbodies, wetlands, or areas with special requirements along the construction work area.
- Identifying erosion/sediment control and soil stabilization needs in all areas.
- Coordinate activities with agricultural inspectors and drainage specialists in farmland areas (see Section 2.4 – Responsibilities/Qualifications of Agriculture Inspectors).

- Ensuring that the design of slope breakers will not cause erosion or direct water into sensitive environmental resource areas including known cultural resources sites, wetlands, waterbodies and sensitive species habitats.
- Verifying that dewatering activities are properly monitored and do not result in the deposition of sand, silt, and/or sediment into sensitive environmental resource areas, including wetlands, waterbodies, cultural resource sites, and sensitive species habitats; stopping dewatering activities if such deposition is occurring and ensuring the design of the discharge shall be changed to prevent reoccurrence; and verifying that dewatering structures are removed after completion of dewatering activities. (See Trench Dewatering section of this Plan).
- Ensuring that subsoil and topsoil are tested in residential areas to measure compaction and determine the need for corrective action.
- Advising the Chief Inspector when environmental conditions (such as wet weather or frozen soils) make it advisable to restrict or delay construction activities to avoid topsoil mixing or excessive compaction. .
- Ensuring restoration of contours and topsoil.
- Verifying that the soils imported for agricultural or residential use have been certified (if available) as free of noxious weeds and soil pests, unless otherwise approved by the landowner.
- Ensuring that erosion control devices are properly installed, to prevent sediment flow into sensitive environmental resource areas (e.g., wetlands, waterbodies, cultural resource sites, and sensitive species habitats) beyond approved workspace limits and onto roads, and determining the need for additional erosion control devices.
- When working in New York State (NY), ensuring compliance with New York State Department of Environmental Conservation (DEC) State Pollution Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from construction activities where applicable (NY DEC SPDES permit required for NY Projects resulting in 1 acre disturbance or greater). See Stormwater Pollution Prevention section of this plan.
- When working in Pennsylvania (PA), ensuring compliance with either the PA Department of Environmental Protection's (DEP's) Erosion and Sediment Control General Permit (ESCGP-2) or their National Pollution Discharge Elimination System (NPDES) Permit for Stormwater Discharges Associated with Construction Activities where applicable (PA DEP ESCGP-2 permit required for PA Oil & Gas Related (non-distribution) Projects resulting in 5 acres disturbance or greater; PA DEP NPDES permit required for PA Distribution Projects resulting in 1 acre disturbance or greater). See Stormwater Pollution Prevention section of this plan.
- Inspecting and ensuring the maintenance of temporary erosion control measures at least:
    - On a daily basis in areas of active construction or equipment operation.
    - On a weekly basis in areas with no construction or equipment operation.
    - Within 24 hours of 0.5 inch of rainfall.
- Ensuring the repair of all ineffective temporary erosion control measures within 24 hours of identification, or as soon as conditions allow if compliance with this time frame would result in greater environmental impacts.

- Keeping records of compliance with the environmental conditions of the FERC's orders, and the mitigation measures proposed by the project sponsor in the application submitted to the FERC, and other Federal or state environmental permits during active construction and restoration.
- Identifying areas that should be given special attention to ensure stabilization and restoration after the construction phase.
- Verifying that locations for any disposal of excess construction materials for beneficial reuse comply with all applicable local, state, and federal regulations/permits and do not result in adverse environmental impacts or violate applicable landowner/land management agency agreements. These locations must also comply with Section 3.3.

2.3 Agricultural Inspection

The Agricultural Inspection for the project will include a combination of agricultural and drainage specialists to ensure aspects of the project that affect farmland meet or exceed: the project-specific conditions or orders of certification, relevant to agricultural resources, which are incorporated by the lead/certifying agency.

National's level of agriculture-related staffing will be dependent on the workload requirements including but not limited to: technical, pre-construction planning; construction/restoration inspection and; monitoring and follow-up remediation including drainage mitigation activities (e.g.: less staff during the pre-construction planning phase and the monitoring and the follow-up remediation phase), but will include the project's commitment to agricultural inspectors and agricultural drainage specialists on a full-time basis through pipeline construction/restoration, which make up the peak work load phase of pipeline right-of-way activity.

Based on the project's anticipated number of construction work spreads, there may be one agricultural drainage specialist and two agricultural inspectors assigned full-time, per spread. However, a practical degree of flexibility will be available: should agricultural construction/restoration activity within one work spread be temporarily light enough for the agricultural inspector to fully and effectively supervise, at a time when the activities are heavy in the other work spread, then the agricultural inspector in the former spread may temporarily assist the staff in the latter spread. For periods of peak construction/restoration activities in agricultural lands that exceed the effective capability of the full-time staff, the project will provide additional temporary agricultural inspectors.

During phases of less intensive project activity (e.g., pre-construction planning, or dormant right-of-way winterization without construction, follow-up crop monitoring, etc.), fewer staff may be employed, as appropriate, relative to the level of activity. Regardless, the project sponsor will provide an adequate number of qualified personnel (per the responsibilities/qualifications herein) to meet the level of effort required by this plan or conditions of FERC's Orders.

To the extent practicably feasible, the project will strive to utilize the same agricultural and drainage specialist staff during the planning, construction restoration and monitoring phases of work to allow for maximum technical continuity.

2.4 Responsibilities/Qualifications of Agriculture Inspectors

Agricultural Inspector

The work of a qualified Agricultural Inspector, with the ability and the authority required to perform independently, assumes the pipeline right-of-way project aspects listed below:

- Training and education of other project sponsor staff (e.g.: land agents, craft inspectors, assistant agricultural compliance inspectors, environmental inspectors, etc.), and construction personnel, in the proper use and application of the agricultural right-of-way standards and case-specific orders of certification.
- Technical field supervision over all aspects of the project that affects agricultural resources, through each stage of on-site work: right-of-way clearing, construction stages (including compliance with trench dewatering procedures), clean-up stage and initial restoration stages.
- Technical field supervision (after the satisfactory completion of initial restoration), over the on-site monitoring of, and the follow-up restoration in, agricultural lands.
- Communication in conjunction with other project staff with affected farmland owners and operators over the project's duration: planning through construction/initial restoration, to completion of monitoring and follow-up restoration.

The key mission of each Agricultural Inspector is ensuring the project's full compliance in meeting (or exceeding) standards and case-specific conditions or orders pertaining to the affected agricultural resources.

The following are recommended qualifications for Agricultural Inspectors:

- Earned a bachelor degree or associate in applied science diploma in: agronomy or environmental sciences, with concentration in: agriculture, soils, horticulture, forestry, or closely allied science, and been employed in the respective field, regionally, not less than five years (i.e.: not directly out of college); or-
- Advanced steadily in a career through on-the-job training and performance, regionally, for a minimum of ten years as a soil and water conservation field technician with a practical working knowledge of soil conservation, farming, surveying, land excavation and drainage, or similar types of work: from the land review, field planning and design/layout phase through construction inspection and site completion; or-
- Advanced steadily in a career through on-the-job training and field performance for a minimum of five years in pipeline construction/restoration right-of-way work, with at least two full years serving as an assistant to either a qualified agricultural or environmental compliance inspector, and have earned, and currently hold certification as, either a Professional in Erosion and Sediment Control (CPESC) or Professional in Storm Water Quality (CPSWQ); or-
- Combination of the above qualifications.

Drainage Specialist (where appropriate)

The Agricultural Drainage Specialist is responsible for the detailed, on-site data consolidation of all surface and subsurface drainage characteristics and facilities for affected farmlands; and planning and technically supervising all drainage-related mitigation, through the planning and construction, initial restoration, post-construction

monitoring and follow up restoration stages. The drainage specialist provides the specialized technical direction that enables the project to fully restore all disturbed land and all facility components of surface and subsurface drainage on affected farmland; including the effective mitigation of new or exacerbated conditions of water boils or field saturation

The drainage specialist serves as a specialized arm of the Agricultural Inspectors working in close technical coordination with them over a project's full duration, as required. The drainage specialist will provide primary technical direction of on-site drainage mitigation and follow up for all affected agricultural lands. In addition the drainage specialist may provide both technical field direction and oversight of the subcontractors specializing in agricultural drainage.

The work of a qualified drainage specialist, with the ability and technical authority to work both jointly and independently, assumes the pipeline right-of-way project aspects listed below:

- On-site inventory of all surface and subsurface drainage-related characteristics of affected farmlands, in the pre-construction planning phase. This includes location referencing for drainage such as:
    - existing features of surface runoff such as small but defined swales, up to large and broad swales;
    - existing farm features of water control such as diversion terraces, field ditches, main outlet ditches;
    - existing buried water lines (farmstead consumptive use);
    - existing water source (developed springs, etc.) or unnamed water flow areas;
    - subsurface drain line systems ranging from clay tile to modern perforated polyethylene tubing; or, approximated locations of earlier stone drain systems; key drainage features which are outside of the directly affected farm field[s], but may serve to receive the respective surface or subsurface drainage, e.g.: ditches and culverts of active or abandoned railroads, road ditches, etc.
- Estimating portions of farms, based on soil, terrain, and drainage/water table characteristics, where new or exacerbated conditions of water boils or field saturation should be anticipated for follow up mitigation.
- In farm lands, assisting other Agricultural and Environmental Inspectors in the advance selection of acceptable trench de- watering measures and respective locations of water discharge to avoid agricultural impacts and estimating the pumping/associated hose length requirements necessary to ensure such avoidance of impacts.
- Ensuring the project's prompt marking/staking of all disturbed drainage facilities. Assisting the Agricultural Inspectors, as needed, in ensuring compliance with trench de-watering standards and dry backfilling (as defined in Section 4.10) of the trenches in affected farmland.
- Planning and laying out interceptor drain line systems including their safe, gravity-flow discharge to predetermined outlet locations.
- Providing on-site design, general material estimates and technical field supervision over:

- Drain line repairs and system replacements;
- The effective engineering re-construction of un-avoided surface drainage facilities such as diversion terraces or farm waterways;
- The installation and outlet of interceptor drain line systems.

3 PRECONSTRUCTION PLANNING

This Section presents the pre-construction planning efforts, further details regarding the construction activities are presented in Section 4 – Construction Activities and general sequencing of planning, installation, cleanup and restoration is presented in Section 10 – General Pipeline Construction Sequencing.

3.1 Construction Work Areas

Construction activities shall be confined to the approved work areas.

- Identify all construction work areas (e.g., construction right-of-way, extra work space areas, pipe storage and contractor yards, borrow and disposal areas, access roads, etc.) that would be needed for safe construction. The project sponsor must ensure that appropriate cultural resources and biological surveys are conducted, as determined necessary by the appropriate federal and state agencies.
- Project sponsors are encouraged to consider expanding any cultural resources and endangered species surveys in anticipation of the need for activities outside of authorized work areas.
- Plan construction sequencing to limit the amount and duration of open trench sections, as necessary, to prevent excessive erosion or sediment flow into sensitive environmental resource areas.

3.1.1 ROW & Staging Areas

Before construction begins, the right-of-way (ROW) will be surveyed and staked. Other utility lines will be located and marked to prevent accidental damage during pipeline construction.

Staging areas will be set up when the contractor starts work. Proper BMP controls will be erected prior to any sustained heavy traffic. If vehicles enter or exit the staging area onto a paved road, an entrance pad will be installed as per *BMP Drawing No. 1.*

3.1.2 Access Roads

The project will make use of the ROW for access along the pipeline. Where additional access is necessary for pick-up trucks and other vehicles, existing access roads may be used upon agreement with the landowner. Appropriate BMP controls will be installed and maintained on these roads, and they will be reclaimed to a condition at least equal to their pre-construction condition.

In agricultural lands topsoil will be stripped and segregated for expansion (widening or lengthening) or installation access roads (if necessary). National will work with landowners, and if requested by the landowner, access roads will remain in place for landowner use following construction. Alternatively, if access roads are restored to original use (e.g., tillable land) they will be fully restored using the same scope of agricultural mitigation and restoration measures that apply to pipeline construction right-of-way.

3.1.3 Pipe yards

During project planning efforts have been made to site pipe yards in previously disturbed non-agricultural areas. If agricultural lands are utilized for yards, the Contractor shall strip and segregate topsoil in agricultural lands used as pipe yards. However, if any such area is used as a pipeyard it will be fully restored using the same scope of agricultural mitigation and restoration measures that apply to pipeline construction right-of-way.

3.1.4 Wetland/Waterbody Crossings

The pre-construction activities include survey of topographic surface elevations, in addition to the identification of wetlands and waterbodies. This survey will include elevations at the top and bottom of banks, location of the greatest stream depth, and edge water edge of the crossing for both pre- and post-construction. This topographic survey of conditions will be used, in conjunction with pre-construction photograph of the crossing locations from downstream and parallel to the pipeline centerline to document the pre-existing conditions of the crossing and to confirm that existing topography and profiles are re-established during restoration. All construction plans will be prepared in accordance with the FERC guidance, National standards, and the BMPs.

Stream crossings will be inspected daily during active construction and weekly during inactive construction. Following the restoration of the stream crossing, the crossings will be inspected after major rain events. This inspection program will continue through several high water events to ensure that the stream channel is stable.

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

- Site-specific justifications for extra workspace areas that would be closer than 50 feet from a waterbody or wetland
- Site-specific justifications for the use of a construction right-of-way greater than 75- feet-wide in wetlands.

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

- Spill Prevention and Response Procedures specified in section 3.5
- A schedule identifying when trenching or blasting will occur within each waterbody greater than 10 feet wide, within any designated coldwater fishery, and within any waterbody identified as habitat for federally-listed threatened or endangered species. The project sponsor will revise the schedule as necessary to provide FERC staff at least 14 days advanced notice. Changes within this last 14-day period must provide for at least 48 hours advanced notice.

- Plans for horizontal directional drilling (HDD) under wetlands or waterbodies
- A wetland delineation report if applicable
- The hydrostatic testing information

3.2 Agricultural Area Planning

3.2.1 Drain Tile and Irrigation Systems

Supplementing the details of pre-construction activities, in agricultural areas, as identified in the responsibilities of the Drainage Specialist (Section 2.4), planning will include the following:

- Attempt to locate existing drain tiles and irrigation systems.
- Contact landowners and County Conservation Districts to determine the locations of future drain tiles that are likely to be installed within 3 years of the authorized construction.
- If working in New York State, develop procedures (with NYS DA&M and/or the Soil and Water Conservation District) for constructing through drain tile areas, maintaining irrigation systems during construction, and repairing drain tiles and irrigation systems after construction.
- Engage qualified drain tile specialists, as needed to conduct or monitor repairs to drain tile systems affected by construction. Use drain tile specialists from the project area, if available.
- Assist in identification of the dewatering outlets and favorable locations, including off ROW, for the protected day lighting of gravity flow drain outlets for new interceptors or replaced drain lines.
- For new pipelines in areas where drain tiles exist or are planned, ensure that the depth of cover over the pipeline is sufficient to avoid interference with drain tile systems.

3.2.2 Grazing Deferment

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

3.3 Disposal Planning

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

3.4 Agency Coordination

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

- Obtain written recommendations from the local soil conservation authorities or land management agencies regarding permanent erosion control and revegetation specifications.
- National will consult with the appropriate technical and/or regulatory agencies regarding invasive species, noxious weeds and soil-borne pathogens. National agrees to consult with the appropriate agencies regarding agricultural bio security (noxious weeds and soil-borne pathogens). If necessary, based on this consultation, National will develop specific practical cost-effective procedures to mitigate significant agricultural bio security risks, if they are determined to exist in the project area.
- Develop specific procedures in coordination with the appropriate agencies to prevent the introduction or spread of invasive species, noxious weeds, and soil pests resulting from construction and restoration activities.
- Develop specific procedures in coordination with the appropriate agencies and landowners, as necessary, to allow for livestock and wildlife movement and protection during construction.
- Develop specific blasting procedures in coordination with the appropriate agencies that address pre- and post-blast inspections; advanced public notification; and mitigation measures for building foundations, groundwater wells, and springs. Use appropriate methods (e.g., blasting mats) to prevent damage to nearby structures and to prevent debris from entering sensitive environmental resource areas.

3.5 Spill Prevention and Response Procedures

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

3.6 Stormwater Pollution Prevention Plan

Make available on each construction spread in Pennsylvania, the Stormwater Pollution Prevention Plan prepared for compliance with the National Pollution Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Construction Activities or the Pennsylvania Department of Environmental Protection's Erosion & Sedimentation Control General Permit (ESCGP-2).

Make available on each construction spread in New York, the Stormwater Pollution Prevention Plan prepared for compliance with the New York State Department of Environmental Conservation, State Pollution Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activities (GP-0-15-002).

3.7 Residential Construction

For all properties with residences located within 50 feet of construction work areas, project sponsors shall; avoid removal of mature trees and landscaping within the construction work area unless necessary for safe operation of construction equipment, or as specified on landowner agreements; fence the edge of the construction work

area for a distance of 100 feet on either side of the residence; and restore all lawn areas and landscaping immediately following clean-up operations, or as specified in landowner agreements. If season or weather conditions prevent compliance with these time frames, maintain and monitor temporary erosion controls (sediment barriers and mulch) until conditions allow completion of restoration.

3.8 Winter Construction Plans

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

The plan shall address:

- Winter construction procedures (e.g., snow handling and removal, access road construction and maintenance, soil handling under saturated or frozen conditions, topsoil stripping).
- Stabilization and monitoring procedures if ground conditions will delay restoration until the following spring (e.g., mulching and erosion controls, inspecting and reporting, stormwater control during spring thaw conditions); and
- Final restoration procedures (e.g., subsidence and compaction repair, topsoil replacement, seeding).

4 CONSTRUCTION ACTIVITIES

This Section presents the details regarding specific construction activities while additional general sequencing of planning; installation, cleanup and restoration are presented in Section 10 – General Pipeline Construction Sequencing.

4.1 Approved Areas of Disturbance

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

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

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

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

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

4.2 Residential Area Construction

The care exercised by construction crews and the qualities of cleanup following construction are paramount concerns of homeowners. National will make every effort to ensure that all construction activities minimize adverse impacts to residences and that cleanup is quick and thorough.
Throughout construction, traffic lanes and access to homes will be maintained except for the brief periods essential for laying the new pipeline. The Contractor will erect temporary safety fences in the vicinity of streets and homes to keep the public away from the construction zone. National may use techniques such as stovepipe and drag section construction in order to minimize the impacts of construction in residential areas on a site-specific basis. Site-specific residential mitigation plans will be utilized in areas with residences within 25 feet from the edge of construction right-of-way.

Homeowners will be notified in advance of any scheduled disruption of household utilities and the duration of the interruption will be kept as brief as possible. Representatives of the local utility companies will be on-site during construction when necessary. In addition, National will strive to accommodate any special concerns regarding ornamental shrubs, trees, or structures by avoiding them as long as such avoidance will not unduly interfere with construction and operation of the pipeline.

National will take measures to ensure that construction activities will not prevent access to residential areas by fire and emergency vehicles. At least one lane of traffic will be kept open for emergency vehicles when constructing on or across residential streets. During the brief period of road closure, steel plates will be available on site to cover the open area to permit travel by emergency vehicles.

In residential areas, topsoil replacement (i.e., importation of topsoil) is an acceptable alternative to topsoil segregation. Where topsoil segregation is conducted, maintain separation of salvaged topsoil and subsoil throughout all construction activities. Segregated topsoil may not be used for padding the pipe or filling sandbags.

Immediately after backfilling, residential areas will be cleaned up, and all construction debris will be removed. Lawns will be raked, topsoil added as necessary, and lawns restored per agreements with landowners. Ornamental shrubs will be replaced where possible. Contractors will restore fences, mailboxes, and other structures removed during construction. Sidewalks, driveways, and roads will be restored as soon as practical.

4.3 Agricultural Area Construction

In predominantly agricultural areas, National will have Agricultural Inspectors/Specialists on site during construction in accordance with the Agricultural Inspection section of this Plan. In addition, prior to construction, National's Drainage Specialists (in coordination with National land agents) will contact farm landowners and operators and the local agencies for planning purposes described in previous section.

4.3.1 Topsoil Segregation

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

- Cultivated or rotated croplands, and managed pastures;
- Residential areas;
- Hayfields; and
- Other areas at the landowner's or land managing agency's request.

In residential areas, importation of topsoil is an acceptable alternative to topsoil segregation.
Where topsoil segregation is required, the project sponsor must:

- Segregate at least 12 inches of topsoil in deep soils (more than 12 inches of topsoil); and
- Make every effort to segregate the entire topsoil layer in soils with less than 12 inches of topsoil. Remove subsoil to a depth of 12 inches or to the top of the bedrock, whichever is shallower
- For specialty soils, topsoil removal up to 16 inches will be required.

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

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

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

4.3.2 Drain Tiles

All drainage tiles encountered shall be marked, maintained during construction, and restored to as good or better condition upon completion of construction. *BMP Drawing Nos. 30, 30A and 42* provide typical information for drain tiles where encountered. Specific details on drain tile monitoring activities are provided in Section 7.6.1.

- Mark locations of drain tiles damaged during construction. Encountered drain tiles shall be referenced and flagged with stakes located adjacent to the ditch, and the right-of-way edge (outer perimeters).
- When it is necessary to maintain flow in the drainage system during construction, a temporary pipe bridge shall be installed across the trench. Smaller feeder drains shall be capped so that flows are diverted to the primary drain on which the Pipe Bridge has been installed.
- Open ends of tile shall be covered to prevent ingress of dirt, rock, or wildlife.
- All drainage systems shall be probed to determine if damage has occurred. All tiles damaged during construction shall be flagged by the trenching inspector.
- Repair or replace all damaged drain tiles to their original or better condition under the supervision of the Drainage Specialist. Do not use filter-covered drain tiles unless the local soil conservation authorities or land management agencies and landowner agree. Use Qualified Drainage specialists for testing and repairs to ensure proper repairs and adequate probing/testing of the repaired or replaced drainage systems.
- For new pipelines in areas where drain tiles exist or are planned, ensure that the depth of cover over the pipeline is sufficient to avoid interference with drain tile systems. For adjacent pipeline loops in agricultural areas, install the new pipeline with at least the same depth of cover as the existing pipeline(s).
- Other drainage-related impacts such as water boils and right-of-way saturation that are created or exacerbated by the pipeline project will be mitigated during monitoring and follow-up remediation (see Section 9.1 - Monitoring and Maintenance).
- Detailed records of drainage system repairs shall be maintained and upon request given to the landowner and the local soil conservation authority or land management agency offices for future reference.

4.3.3 Irrigation

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

4.4 Equipment Crossings

Construction of equipment crossings will occur during the clearing or grading process. Protective measures will include the use of timber mats laid adjacent to and across streambeds if banks are high enough, flume pipe covered by fill material (clean gravel or crushed stone) or portable bridges approved by the Environmental Inspector. The size and number of flume pipes will be sufficient for maximum anticipated flows. Typical crossing method information is presented on *BMP Drawing Nos. 2, 9, 12, 13 and 21.*

Flume pipes will conform to waterbody crossing dimensions and alignments. Stream channels will not be permanently straightened or realigned to conform with flume pipe dimensions or for any other reasons, unless a permit has been acquired to do so.

4.5 Road Crossings and Access Points

An entrance pad *(BMP Drawing No. 1)* is a temporary entrance/exit located where construction traffic enters or leaves the right-of-way onto or from a roadway or other paved surface. This access pad is typically constructed of stone or gravel. Strip topsoil and segregate for access areas and roads in agricultural and residential lands.

A stabilized entrance pad is intended to reduce off-site sedimentation by eliminating the tracking of excess soil onto paved public roadways. The entrance pad serves as the designated point at which all construction traffic can access and exit the right-of-way. If crushed stone access pads are used in residential or active agricultural areas, place the stone on durable synthetic fabric to facilitate removal.

The Grading Crew will install rock entrances at public roads. If the job kicks off at a point where an entrance pad is required, the entrance pad will be installed as soon as the immediate area required for the pad is stumped and rock can be brought in. This shall be within forty-eight (48) hours from the time the Grading Crew move onto the location.

For other locations along the pipeline where entrance pads are required, the pads will be installed as the Grading Crew progresses to these locations, but no later than forty-eight (48) hours from the time they reach these locations. Also;

- Maintain safe and accessible conditions at all road crossings and access points during construction.
- If crushed stone access pads are used in residential or agricultural areas, place the stone on synthetic fabric to facilitate removal.
- Minimize the use of tracked equipment on public roadways. Remove any soil or gravel spilled or tracked onto roadways daily or more frequent as necessary to maintain safe road conditions. Repair any damages to roadway surfaces, shoulders, and bar ditches.

4.6 Interim Stabilization

Where activity ceases for 20 or more days or jobs not cleaned up by October 15 will be final graded and seeded with Aroostook (if available) winter rye at a rate of 170 pounds per acre. One hundred percent (100%) mulch will be spread on non-stabilized slopes of 10% or steeper. Only weed-free straw mulch, not hay mulch, will be used where mulch is needed on agricultural land. Before permanent seeding is planted in spring, the right-of-way will be inspected and any grade or water control structures that have been damaged over the winter will be repaired.

4.7 Slope Breakers

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

- Slope breakers (waterbars) are intended to reduce runoff velocity and divert water off the construction ROW. Slope breakers may be constructed of materials such as soil, silt fence; staked hay or straw bales (straw only in agricultural lands), sand bags, or filter socks.

- Install slope breakers on all disturbed areas, as necessary to avoid excessive erosion. Slope breakers must be installed on slopes greater than 5 percent where the base of the slope is less than 50 feet from waterbody, wetland, road crossings and the following spacing (closer spacing if necessary): (See *BMP Drawing No.* 8A)

Table 1: Slope Breaker Installation: Slope and Distance

PENNSYLVANIA Installation		NEW YORK Installation	
Slope	**Distance**	**Slope**	**Distance**
<5%	250 Feet	<5%	125 Feet
5 - 15%	150 Feet	5 - 10%	100 Feet
>15 - 30%	100 Feet	>10 – 20%	75 Feet
>30%	50 Feet	>20 – 35%	50 Feet
		>35%	25 Feet

- Direct the outfall of each slope breaker to a stable, well-vegetated area or construct an energy-dissipating device at the end of the slope breaker and off the construction ROW (*See BMP Drawing No. 31*).
- Position the outfall of each slope breaker to prevent sediment discharge into wetlands, waterbodies, or other sensitive environmental resource areas.
- Inspect and maintain slope breakers throughout the construction project.

4.8 Sediment Barriers

Sediment barriers are intended to stop the flow of sediments and prevent the deposition of sediments beyond approved workspaces or into sensitive resources. They may be constructed of materials such as silt fence, staked hay or straw bales (straw only in agricultural lands), compacted earth (e.g., drivable berms across travel ways), sand bags, filter socks, or other appropriate materials. Typical sediment barrier information is presented on *BMP Drawing Nos. 5 and 22*.

- At a minimum, install and maintain temporary sediment barriers across the entire construction right-of-way at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody, wetland, or road crossing until revegetation is successful as defined in this Plan. Leave adequate room between the base of the slope and the sediment barrier to accommodate ponding of water and sediment deposition.
- Where wetlands or waterbodies are adjacent to and down slope of construction work areas, install sediment barriers along the edge of these areas, as necessary to prevent sediment flow into the wetland or waterbody.
- Install temporary sediment barriers at the base of slopes adjacent to road crossings until disturbed vegetation has been reestablished.
- Inspect and maintain all temporary sediment barriers throughout the construction project and after .5- inches of rainfall within a 24-hour period.
- Maintain all temporary sediment barriers in place until permanent revegetation measures are successful or the upland areas adjacent to wetlands, waterbodies, or roads are stabilized.
- Contractor shall incorporate appropriate erosion/sediment control measures in pipe yards.

- Remove temporary sediment barriers from areas that are successfully revegetated. In agricultural lands, if access to restored farmlands is required to remove sediment barriers, access will be limited to light-weight wide tired vehicles.

4.9 Mulch

- Apply mulch on all slopes (except in cultivated cropland) concurrent with or immediately after seeding, where necessary to stabilize the soil surface and to reduce wind and water erosion. Spread mulch uniformly over the area to cover at least 75 percent of the ground surface at a rate of 2 tons/acre of straw unless the local soil conservation authorities, landowner, or land managing agency approves otherwise in writing. In agricultural lands, straw mulch application will be conducted at the discretion of the Agricultural inspector.
- Mulch can consist of weed-free straw, hay, wood fiber hydro-mulch, erosion control fabric, or some functional equivalent. Hay will not be utilized in agricultural lands.
- If mulching before seeding: increase mulch application on all slopes within 100 feet of waterbodies and wetlands to a rate of 3 tons/acre of straw or equivalent.
- Mulch all disturbed upland areas (except cultivated croplands) before seeding if: Final cleanup, including final grading and installation of permanent erosion control measures, is not completed in an area within 20 days after the trench in that area is backfilled (10 days in residential areas); or, Construction or restoration activity is interrupted for extended periods, such as when seeding cannot be completed due to seeding period restrictions.
- If mulching before seeding, increase mulch application on all slopes within 100 feet of waterbodies and wetlands to a rate of 3 tons/acre of straw or equivalent.
- If wood chips are used as mulch, do not use more than 1 ton/acre and add the equivalent of 11 lbs/acre available nitrogen (at least 50 percent of which is slow release).
- On all dry, sandy sites and slopes greater than 8%, spread mulch uniformly over the area to cover at least 75% of the ground surface at a rate of 3 tons/acre of straw or hay or its equivalent, unless the local soil conservation authority or land management agency makes other recommendations in writing. Hay will not be utilized in agricultural lands.
- If a mulch blower is used, the strands of the mulching material shall be at least 8 inches long to allow anchoring.
- Ensure that mulch is adequately anchored to minimize loss due to wind and water.
- When anchoring by mechanical means, use a mulch-anchoring tool to properly crimp the mulch to a depth of 2 to 3 inches. When anchoring with liquid mulch binders, use rates recommended by the manufacturer. Do not use liquid mulch binders within 100 feet of wetlands or waterbodies, except where the product is certified environmentally non-toxic by the appropriate state or federal agency or independent standards-setting organization.
- Do not use synthetic monofilament mesh/ netted erosion control materials in areas designated as sensitive wildlife habitat, unless the product is specifically designed to minimize harm to wildlife. Anchor the erosion control fabric with staples or other appropriate devices.

4.10 Trench Dewatering

Trench dewatering is the removal of excess runoff and groundwater (that has accumulated and is occupying the ditch line) to allow for the installation of the pipe or the completion of a pipeline tie-in, and the dry backfilling (as defined below) of the ditch. The removal of any excess water within the ditch line prior to backfilling is critical in agricultural lands; and permits ditch inspection and allows for a drier ditch to backfill the spoil material. This enables the right-of-way to be effectively restored sooner, by the relatively faster return of workable conditions, as opposed to extended waiting until spoil material backfilled in a wet ditchline dries enough to be able to have the heavy equipment work over. Typically, the trench is dewatered, and is maintained in a dewatered state not higher in water level than six inches above the top of the trench bottom sand bagpipe supports, during the backfilling activity ("dry backfilling").

Trench dewatering management will be accomplished by using a combination of efforts or BMPs (See *BMP Drawing Nos. 5, 22, 28, 31, 35 and 39*) dependent upon the specific site conditions and may include the following:

- Sediment filtering bags *(BMP Drawing No. 28)* and/or other equivalent sediment control structures for pumped water should be used whenever water is pumped from the pipeline trench. Sediment filter bags (use only Non-woven Geotextile filter bags), when implemented and maintained properly, prevent the discharge of heavily silt-laden water - effectively trapping particles larger than approximately 150 microns. Filter bags shall be used in well-vegetated areas, providing additional filtration upon discharge. Discharge to agricultural lands will not be conducted in active crop areas unless dry conditions are present and with landowner permission. The pumping rate should not exceed the maximum recommended by the Manufacturer (for example: Pumping rate through the filter bags shall be no greater than 750 gpm or ½ the maximum specified by the manufacturer, whichever is less). The filter bags will be changed when they become half full. Their silt contents will not be deposited on agricultural lands.
- Discharge into approved upland vegetated (grassy) areas onto stable erosion resistant areas, located such that it does not allow the water to return to the right-of-way ditch line.
- Based on previous experience, filter bags have provided successful means in controlling the discharge of turbid waters If the water being discharged from the filter bag appears "milky" or excessively cloudy, then sediment corrals can be utilized to augment filter bag use, positioned at least 25 feet from any waterbody and closely monitored to ensure proper function to prevent turbid water from entering a waterbody.
- Trench dewatering using floating pump or supporting pump intakes to reduce sediments suspended in water.
- Use a splashboard or dissipation device at the point of discharge to prevent scouring of the ground.
- Filtration bags, a straw bale basin, filter cloth basins or a combination of these devices are acceptable methods of filtration for discharge of water in an insufficiently vegetated or wetland area.
- Pumping water to temporary holding areas (e.g., other sections of pipeline trench, nearby or crossed ditches, external portable tanks).

- Planning dewatering into construction sequencing to minimize amount of dewatering required. For example, during the lowering-in phase, dewatering should be accomplished before requisite construction activity occurs (such as in the morning) and backfill activity should be initiated as soon as possible following pipe installation to prevent the ditch from refilling with water when a high ground water table is present. In agricultural lands, dewatering level will be maintained, throughout backfilling operations, to no more than six inches above the top of the trench-bottom pipe support sand bags to ensure dry backfilling.
- In agricultural lands trench-dewatering activities will be coordinated with the Environmental Inspector by the Agricultural Inspector/Drainage Specialists.

4.11 Temporary Trench Breakers

- Trench breakers are intended to slow the flow of subsurface water along the trench. Trench breakers may be constructed of materials such as bentonite, clay, sand bags or polyurethane foam, subsoil earth filled bags or equivalent (refer to permit or permitting agency for acceptable materials). Topsoil shall not be used for filling trench breaker bags. In agricultural fields and residential areas where slope breakers are not typically required, install trench breakers at the spacing in the following table. (See BMP Drawing Nos. 6Aand 8A).
- At a minimum, install a trench breaker at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody or wetland and where needed to avoid draining a waterbody or wetland. Install trench breakers at wetland boundaries, as specified (See BMP Drawing No. 6A).
- Trench breakers will be installed at intervals according to the table below and at additional locations, if necessary, in agricultural lands as recommended by the Agricultural Inspector. The base level of each breaker is established on the trench floor, prior to pipe laying, to ensure the completed breaker's control against significant water-piping and internal erosion. The bulk remainder of each trench breaker will be installed after the pipe is laid in the ditch and prior to backfill. *(See BMP Drawing No. 6A*)
- An Engineer or similarly qualified professional shall determine the need for and spacing of trench breakers. Otherwise, trench breakers shall be installed at intervals as per the following table and upslope of slope breakers and/or the site specific SWPPP or E&S Plan (See BMP Drawing Nos. 6A and 8A).

Table 2: Temporary Trench Breakers: Hard / Soft Plug Spacing

Slope	Hard Plug Spacing	or	Soft Plug Spacing
<5%	N/A		1000 Feet
5 - 15%	900 Feet		600 Feet
>15 - 30%	600 Feet		400 Feet
>30%	300 Feet		200 Feet

In agricultural lands, at the direction of the Environmental/Agricultural Inspector trench breaker heights may be adjusted to full, one-half, two-thirds, or alternating heights based on field conditions.

4.13 Maintenance of Erosion Control Devices

Inspecting and ensuring the maintenance of temporary erosion control measures will be conducted at least:

- On a daily basis in areas of active construction or equipment operation.
- On a weekly basis in areas with no construction or equipment operation.
- Within 24 hours of 0.5 inch of rainfall.

Slope breakers will be checked and repaired at the end of each day where construction traffic has disturbed them.

5 WATERBODY CROSSINGS

A summary of the waterbody crossings and locations are included in the waterbody tables.

5.1 Construction Restrictions

No construction may take place in or affecting banks of any streams:

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

Coldwater fisheries - June 1 through September 30

Coolwater and warmwater fisheries - June 1 through November 30.

5.2 Stream Buffer Area

Stream buffer areas must be maintained at all times. The buffer area is that area 50 feet from the top of banks on both sides of stream. Activities such as stacking cut logs, burning cleared brush, discharging water from trenches, welding pipe sections, refueling and maintaining equipment should be done outside of buffer areas. These areas should also be seeded and mulched immediately after pipeline installation. Stream crossings will be treated as a special construction crossing in order to minimize the amount of time required to complete construction. Construction equipment will not be parked or stored in the buffer area. No fuel storage, fuel transfer, oil change or hydraulic fluid additions shall occur within 100 feet of any waterway. Please see Table 3 below with guidelines.

Table 3: Stream & Wetland Crossing Guidelines

PA Stream	**A, B, C, D, E, J, K**
PA Stream (HQ/EV)	**A, B, C, D, E, J, L, M, N**
PA Wetland	**A, B, C, F, G, H, I**
NY Stream	**A, B, C, D, E, O**
NY Wetland	**A, B, C, F, G, H, I, P**

Note: Table above assumes ALL scenarios involve FERC jurisdiction

A. No hydrocarbon refueling, hazardous material storage, overnight equipment parking, or concrete coating activities within 100' of streams/wetlands (FERC).

B. Pumps & fuel vessels operating within 100' of streams/wetlands require secondary containment (FERC).

C. Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50' away from wetland/stream (FERC, PADEP).

D. All spoil must be placed in the ROW at least 10 feet from the water's edge (FERC).

E. Maintain 15' Undisturbed Riparian area when pipeline parallels a stream (FERC).

F. Limit ROW width to no more than 75' through wetland areas (FERC).

G. Cut vegetation just above ground level and leave root systems in wetlands (FERC).

H. Limit pulling of stumps and grading activities in wetlands to directly over the trenchline unless these activities are required on the ROW for safety purposes (FERC).

I. Segregate the top 1' of topsoil from the area disturbed by trenching in wetlands unless standing water is present or soils are saturated (FERC).

J. No Grubbing within 50' of top of bank of stream until all materials required to complete the crossing are on site and pipe is ready for installation (PADEP).

K. Immediately stabilize area 50' from top of stream bank with erosion control blanket (PADEP).

L. Immediately stabilize area 100' from top of HQ/EV stream bank with erosion control blanket (PADEP).

M. Preserve 150' riparian area of HQ/EV stream wherever possible (PADEP).

N. No hydrocarbon refueling, hazardous material storage, overnight equipment parking, or concrete coating activities within 150' of HQ/EV stream (PADEP).

O. Minimize disturbance to 50' riparian area. Use 100' for cold water lakes (NYSDEC).

P. Pay close attention to DEC 100' wetland buffer requirements in NY permits (NYSDEC).

Note: The above is not an exhaustive list of requirements but a guideline. All project specific permits and plans must be reviewed prior to construction activities through stream and wetland areas. Any contradictions or inconsistencies between this table and relevant permit documents or regulatory guidance should be addressed by deferring to the most stringent procedures, unless directed by National Fuel or Empire Pipeline.

5.3 Maintenance of Stream Crossing Control Devices

Construction erosion control devices will be installed prior to earth disturbance of the area. They will be maintained at all times. Inspecting and ensuring the maintenance of temporary erosion control measures will be conducted at least:

- On a daily basis in areas of active construction or equipment operation.
- On a weekly basis in areas with no construction or equipment operation.
- Within 24 hours of 0.5 inch of rainfall.

5.4 Additional Work Space Areas

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

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

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

5.5 Spoil Pile Placement/Control

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

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

5.6 Waterbody Crossing Procedures

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

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

Leave at least 25 feet of ground on either side of the waterbody (top of bank) as a natural, vegetative strip (except for the trench and equipment crossing). All woody species will be cut flush to grade and only the stumps in the trench line will be removed. When necessary, stumps at the bridge crossing area may be removed to accommodate the safe installation of the construction bridge.
Where pipelines parallel a waterbody, maintain at least 15 feet of undisturbed vegetation between the waterbody (and any adjacent wetland) and the construction right of way, except where maintaining this offset will result in greater environmental impact.

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

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

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

Crossing of waterbodies when they are dry or frozen and not flowing may proceed using standard upland construction techniques in accordance with the Plan, provided that the Environmental Inspector verifies that water is unlikely to flow between initial disturbance and final stabilization of the feature. In the event of perceptible flow, the project sponsor must comply with all applicable Procedure requirements for "waterbodies", as defined in 5.11 Waterbody Size Classification.

5.7 Pipeline Construction at Streams

- Install filter fence across the right-of-way prior to construction. (See *BMP Drawing No.* 5 for proper fence installation) Make any repairs to fence as necessary after each working day. Replace filter fence across the travel area with straw bales during construction. (See *BMP Drawing No.* 22 for proper installation of straw bales)
- The stream is not to be diverted or the flow restricted. No filter fence or straw bales are to be placed directly into stream flow.
- The pipe is to be readied outside the stream buffer area prior to trenching and then installed immediately.
- Install trench breakers at the edge of stream during construction as per *BMP Drawing No.* 6. Ditching is to be performed from stream banks where possible.

5.8 Equipment Bridges

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

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

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

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

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

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

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

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

5.9 Dry-Ditch Crossing Methods

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

5.9.1 Dam and Pump

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

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

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

5.9.2 Flume Crossing

The flume crossing method requires implementation of the following steps:

- install flume pipe after blasting (if necessary), but before any trenching
- use sand bag or sand bag and plastic sheeting diversion structure or equivalent to develop an effective seal and to divert stream flow through the flume pipe (some modifications to the stream bottom may be required to achieve an effective seal

- properly align flume pipe(s) to prevent bank erosion and streambed scour
- do not remove flume pipe during trenching, pipelaying, or backfilling activities, or initial streambed restoration efforts
- remove all flume pipes and dams that are not also part of the equipment bridge as soon as final cleanup of the stream bed and bank is complete.

5.9.3 Horizontal Directional Drill

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

- site-specific construction diagrams that show the location of mud pits, pipe assembly areas, and all areas to be disturbed or cleared for construction
- justification that disturbed areas are limited to the minimum needed to construct the crossing;
- identification of any aboveground disturbance or clearing between the HDD entry and exit workspaces during construction
- a description of how an inadvertent release of drilling mud would be contained and cleaned up
- a contingency plan for crossing the waterbody or wetland in the event the HDD is unsuccessful and how the abandoned drill hole would be sealed, if necessary.

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

5.10 HDD - Inadvertent Release Contingencies

In the absence of a site-specific plan the following is a contingency plan to prepare for and address the unlikely event of release (or "frac-out") of drilling fluids (non-toxic bentonite –a clay-based fluid slurry) to the surface waters at these crossings.

Planning & Monitoring:

- Prior to starting drilling operations, the drilling contractor will ensure appropriate containment equipment (such as earth moving equipment, portable pumps, hay bales, silt fencing, etc) will be readily available and stored at the drilling site throughout the process.
- Inspection and drilling personnel will review these monitoring and response procedures prior to initiating the drilling activities;
- The environmental inspector will complete visual surface monitoring along the HDD path during drilling operations. An increased inspection frequency will be undertaken when the drill path passes below the stream elevation.
- Monitor the use and return of the drilling fluids during the drilling processes.

- If a frac-out or release of drilling fluid to a stream or waterbody occurs, the environmental inspector will follow the project's established chain of command and permit requirements for reporting to the project team, regulatory agencies and landowners.

Response Measures:

- If there is a frac-out, the following contingency measures (individually, or in combination as needed) will be implemented by the Contractor to stop or minimize the release and to clean it up (recover and properly dispose of) released drilling fluids:
    - Decrease the drilling fluid circulation pressures;
    - Size the drill hole to remove blockages (i.e. cleaning the drill hole to remove potential blockages, thereby allowing the fluid to flow within the drill hole and not into the geologic formation);
    - Thicken the drilling fluid properties by increasing bentonite content; and/or
    - If necessary, make adjustments to the drilling alignment.
    - If the release location is in an upland area, barriers (i.e. hay bales, sand bags, silt fences, etc.) will be staged or berms will be constructed immediately around the release point as containment to keep any material from migrating to surface waters or wetlands. If the amount of an upland release does not allow practical collection, the affected area will be diluted with fresh water and allowed to dry.
    - In the event that a frac out does occur that impacts the stream bed, the first response by the contractor will be to halt the pumping of the drilling fluid and communicate with the environmental inspector and standby staff who will install a silt curtain downstream to minimize the area of the stream potentially impacted.
    - Collected or contained drilling fluid will be removed by pump or vacuum truck.

- If necessary, the Environmental Inspector will require that the drilling operations be temporarily reduced or suspended so that the extent of the release can be assessed and corrective actions, if any are required, can be implemented.

The drill cuttings generated from the drilling operations will be stockpiled at upland locations in a manner that prevents their release into any surface waters or wetlands. Excess drilling fluid and cuttings will be transported to an approved upland disposal site in accordance with the project permit conditions.

5.11 Waterbody Size Classification

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

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

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

5.12 Crossing of Minor Waterbodies

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

- Except for blasting and other rock breaking measures, complete instream construction activities (including trenching, pipe installation, backfill, and restoration of the streambed contours) within 24 hours. Streambanks and unconsolidated streambeds may require additional restoration after this period.
- Limit use of equipment operating in the waterbody to that needed to construct the crossing.
- Equipment bridges are not required at minor waterbodies that do not have a state-designated fishery classification or protected status (e.g., agricultural or intermittent drainage ditches). However, if an equipment bridge is used it must be constructed as described in section 5.8.

5.13 Crossing of Intermediate Waterbodies

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

- Complete instream construction activities (not including blasting and other rock breaking measures) within 48 hours, unless site-specific conditions make completion within 48 hours infeasible.
- Limit use of equipment in the waterbody to that needed to construct the crossing.
- All other construction equipment must cross on an equipment must cross on an equipment bridge as specified in section 5.8.

5.14 Crossing of Major Waterbodies

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

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

5.15 Temporary Erosion and Sediment Control

Install sediment barriers (as defined in section IV.F.3.a of the Plan) immediately after initial disturbance of the waterbody or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or

restoration of adjacent upland areas is complete. Temporary erosion and sediment control measures are addressed in more detail in the Plan; however, the following specific measures must be implemented at stream crossings:

- Install sediment barriers across the entire construction right-of-way at all waterbody crossings, where necessary to prevent the flow of sediments into the waterbody. Removable sediment barriers (or driveable berms) must be installed across the travel lane. These removable sediment barriers can be removed during the construction day, but must be re-installed after construction has stopped for the day and/or when heavy precipitation is imminent;
- Where waterbodies are adjacent to the construction right-of-way and the right-of-way slopes toward the waterbody, install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil within the construction right-of-way and prevent sediment flow into the waterbody; and
- Use temporary trench plugs at all waterbody crossings, as necessary, to prevent diversion of water into upland portions of the pipeline trench and to keep any accumulated trench water out of the waterbody.

5.16 Trench Dewatering

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

6. WETLAND CROSSINGS

A summary of the wetland crossings and locations are included in the wetland tables. Refer to Table 3 for wetland crossing guidelines.

6.1 General Guidelines

National will insure that all construction personnel are informed that impacts on all vegetation will be kept to a minimum. Wide tracked equipment will be used and standing water will be maintained at normal levels to insure that water level and flow are kept at pre-construction levels. Where water levels are temporarily high, as a result of a recent heavy rainfall, the Company Representative may direct that the construction be postponed until after the water levels subside.

Comply with COE, or it's delegated agency, permit terms and conditions.

Vehicular traffic in wetlands and wet areas will be restricted to a minimum and access avoided to the extent possible. Wetland crossings will be treated as a special construction crossing in order to minimize the amount of time required to complete construction. Construction equipment will not be parked or stored in the wetland. No fuel storage, fuel transfer, oil change or hydraulic fluid additions shall occur within 100 feet of any wetland. The project sponsor shall conduct a wetland delineation using the current federal methodology and file a wetland

delineation report with the Secretary before construction. The requirement to file a wetlands delineation report does not apply to projects constructed under the automatic authorization provisions in the FERC's regulations.

This report shall identify:

- By milepost all wetlands that would be affected
- The National Wetlands Inventory (NWI) classification for each wetland
- The cross length of each wetland in feet
- The area of permanent and temporary disturbance that would occur in each wetland by NWI classification type

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

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

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

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

Implement the measures of sections 5 and 6 in the event a waterbody crossing is located within or adjacent to a wetland crossing. If all measures of sections 5 and 6 cannot be met, the project sponsor must file with the Secretary a site-specific crossing plan for review and written approval by the Director before construction. This crossing plan shall address at a minimum:

- Spoil control
- Equipment bridges
- Restoration of waterbody banks and wetland hydrology
- Timing of the waterbody crossing
- Method of crossing
- Size and location of all extra work areas

Do not locate aboveground facilities in any wetland, except where the location of such facilities outside of wetlands would prohibit compliance with U.S. Department of Transportation regulations. The following describes the proposed wetland crossing techniques to reduce construction-related impacts. Typical wetland crossing information is shown in *BMP Drawing Nos. 4 and 4A*. Modification to this plan may be made as dictated by soil moisture conditions at the time of construction.

6.1.1 Construction in Dry Wetlands

Dry Wetland: No standing water or saturated soil at time of construction.

- Standard pipeline construction methods can be used in wetlands where soils are dry enough at the time of construction to support equipment.
- In dry wetlands topsoil segregation must be used (as long as there is sufficient topsoil present to allow for mechanical separation by equipment).
- Install filter fence across ROW at edge of wetland.
- If spoil and silt cannot be contained within the ROW (i.e., approved working limits), install filter fence at the edge of the construction ROW; remove during cleanup.
- Minimize vegetation clearing and stump removal within the wetland, only remove cut vegetation and stumps in trench line.
- Segregate topsoil over trench-line.
- Install trench breakers at each wetland boundary (on upland side).
- Restore topsoil and seed with Annual Ryegrass (see Revegetation section of this Plan).

6.1.2 Construction in Saturated Wetlands

Saturated Wetland: Standing water or highly saturated soil at time of construction.

- Wetlands topsoil segregation is not required.
- Minimize vegetation clearing and stump removal, only remove cut vegetation and stumps in trench line.
- Permanent slope breakers will be installed at the base of all slopes adjacent to wetlands.
- Clean rock with Geo-textile or timber mats can be used for the temporary road.
- Timber mats can only be two (2) layers deep.
- Remove any timber mats used during construction in wetlands.
- Weld pipe outside the wetlands and carry in or use the push pull method.
- Install trench breaker at each wetland boundary (on upland side).
- Do not use brush mats.
- Do not use upland soils for temporary roads.

6.2 Standard Pipeline Construction

Standard pipeline construction can be used in wetlands where soils are dry enough at the time of construction to support equipment. This crossing method requires the segregation of topsoil from subsoil (as long as there is sufficient topsoil present to allow for mechanical separation by equipment).

The construction procedures that will be used to cross small wetlands will be similar to those used on dry land areas. However, if the trench contains water, trench breakers will be left in the trench prior to entering the wetland. This procedure will minimize silt discharges into the wetland. If construction activities breach a permeable layer, the bottom of the trench will be sealed.

In addition, the point at which the trench enters and exits a wetland will be sealed with impervious trench breakers (clay or bentonite) to insure the wetlands hydrologic integrity. Concrete bags/sakrete shall not be used as impervious trench breakers at wetland limits. Backfill will be well compacted, especially at the edges of the wetland. Original topographic conditions will be restored after the completion of construction.

Construction in larger wetland areas may use the "push technique". Board mats will be used to provide a working surface for the movement of equipment, personnel, and materials. The trench may be excavated using a dragline or clamshell dredge. The excavated material will be stored adjacent to the trench.

The pipe will be stored and joined at staging areas located outside the wetland. As necessary, the pipe will be weighted to provide negative buoyancy and temporary floats may be attached to the pipe to provide short-term positive buoyancy. After floating the pipe into place, these floats will be cut and the pipe will settle to the bottom of the trench. This operation will be repeated, with pipe sections fabricated, pushed into place, and subsequent sections welded together until the wetland crossing is complete. The excavated material will then be placed over the pipe to backfill the trench. To maintain flow patterns within the wetland, excess soil will be removed or redistributed within the right-of-way in such a manner that the flow patterns are not impacted.

Vegetation of most wetland areas disturbed during construction should reoccur naturally and is generally favored. Emergent and shrub wetland vegetation will be allowed to become re-established; however, tree size vegetation will be controlled within the permanently maintained right-of-way.

Wetland revegetation shall be considered successful if the cover of herbaceous and/or woody species is at least 80 percent of the type, density, and distribution of the vegetation in adjacent wetland areas that were not disturbed by construction. If revegetation is not successful at the end of 3 years, develop and implement (in consultation with a professional wetland ecologist) a remedial revegetation plan to actively re-vegetate the wetland. Continue revegetation efforts until wetland revegetation is successful.

Do not conduct vegetation maintenance over the full width of the permanent right-of-way in wetlands. However, to facilitate periodic pipeline corrosion/leak surveys, a corridor centered on the pipeline and up to 10 feet wide may be maintained in an herbaceous state. In addition, trees within 15 feet of the pipeline that is greater than 15 feet in height may be selectively cut and removed from the permanent right-of-way.

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

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

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

6.3 Extra Work Areas and Access Roads

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

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

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

In wetlands that cannot be appropriately stabilized, all construction equipment other than that needed to install the wetland crossing shall use access roads located in upland areas. Where access roads in upland areas do not provide reasonable access, limit all other construction equipment to one pass through the wetland using the construction right-of-way.

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

6.4 Equipment Pads / Timber Mats

In wetlands with standing water the National representatives may direct that equipment pads be used to prevent unnecessary damage to the soil structure. Generally several equipment pads will be laid side by side in the construction travel area.

6.5 Clearing

- Limit construction equipment operating in wetland areas to that needed to clear the construction right-of-way, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the construction right-of-way.
- Rubber tired equipment will be allowed to work in wetlands unless the equipment will not damage existing root systems and is approved by the Chief Environmental Inspector (CEI). Bulldozers will not be used to

remove timber, trees, or brush. Trees and brush will be cut at ground level by tree shears, grinders, or chain saws.

- Tree stumps will be left in place, except within the trench line or unless their removal is necessary to ensure the safety of workers. Tree stumps may only be removed from outside the trench line if specifically authorized by the Chief Inspector. Leaving stumps in place will facilitate rapid vegetation of the wetland by indigenous tree species following construction. Stumps may be ground to a suitable height for safety reasons.
- All timber, brush, and grindings will be removed from the wetland.
- Debris and stumps will not be buried within wetlands but may be buried in the ROW outside of wetlands (in non-agricultural lands), where permitted.
- Trees located outside of the ROW will not be cut.
- The Environmental Inspector will photo document areas before and after clearing for use in later revegetation/restoration.
- The project sponsor can burn woody debris in wetlands, if approved by the COE and in accordance with state and local regulations, ensuring that all remaining woody debris is removed for disposal.

6.6 Grading

Extensive grading will normally be unnecessary because the topography of most wetlands is level. Grading will be limited to the areas directly over the trench line, except where topography, such as side slopes, requires additional grading for safety reasons. Where grading is required, topsoil will be segregated and returned as an even layer to all graded areas.

6.7 Trenching

- The topsoil in wetlands will be stripped from the ditch line and segregated if: it is not saturated and of sufficient depth to allow mechanical separation. Topsoil stripping (in non-saturated conditions) will be performed up to a depth of 12 inches. The segregated topsoil will be stockpiled separately from subsoil for later restoration of the ROW. Immediately after backfilling is complete, restore the segregated topsoil to it's original location.
- Spoil will be contained with straw bales, filter socks, or silt fences to prevent the spoil from flowing off of the ROW or into waterbodies.
- Minimize the length of time that topsoil is segregated and the trench is open. Do not trench the wetland until the pipeline is assembled and ready for lowering in.

6.8 Temporary Sediment Control

Install sediment barriers immediately after initial disturbance of the wetland or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench). Except as noted below, maintain sediment barriers until replaced by permanent erosion controls or

restoration of adjacent upland areas is complete. Temporary erosion and sediment control measures are addressed in more detail in the Plan.

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

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

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

6.9 Trench Dewatering

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

6.10 Backfilling

- The trench will be backfilled with subsoil first. After the subsoil has been rough graded, topsoil will be replaced in an even layer. The topsoil contains seeds, rhizomes, and other plant propagules, which will aid rapid re-colonization by indigenous wetland species.
- Where rock (boulders, etc.) was part of the surface features prior to construction of the pipeline, rock will be placed back in the wetland in approximately the same configuration, as had been the pre-construction situation. Photos will be taken of the ROW in these situations, both before and after, in order to document the nature of the situation.

7 RESTORATION

7.1 Cleanup

- Commence cleanup operations immediately following backfill operations. Complete final grading, topsoil replacement, and installation of permanent erosion control structures within 20 days after backfilling the trench (10 days in residential areas). In agricultural lands, deep ripping of the exposed right-of-way, rock cleanup, and disposal prior to topsoil replacement and deep sub-soiling are part of the restoration process prior to grading (for details on agricultural land decompaction refer to Attachment 1). If seasonal or other weather conditions prevent compliance with these time frames, maintain temporary erosion controls (temporary slope breakers, sediment barriers, and mulch) until conditions allow completion of cleanup. If construction or restoration unexpectedly continues into the winter season when conditions could delay

successful decompaction, topsoil replacement, or permanent seeding until the following spring, file with the Secretary for the review and written approval of the Director, a winter construction plan (as specified in section 3.7). this filing requirement does not apply to projects constructed under the automatic authorization provisions of the FERC's regulations.

- A travel lane may be left open temporarily to allow access by construction traffic if the temporary erosion control structures are installed and inspected and maintained. When access is no longer required the travel lane must be removed and the right-of-way restored.
- Rock excavated from the trench may be used to backfill the trench only to the top of the existing bedrock profile. Generally, in agricultural lands, rock will not be returned to the trench any higher than 24 inches below the exposed (topsoil-stripped) construction surface. However, if extensive areas of shallow bedrock (within 24 to 30 inches from native surface) are encountered, National will limit backfill of rock to a depth of not less than 30" below pre-existing grade. Rock that is not returned to the trench should be considered construction debris, unless approved for use as cover/surface stabilization or for some other use on the construction work areas by the landowner or land managing agency.
- Remove excess rock from at least the top 12 inches of soil in all cultivated or rotated cropland, managed pastures, hayfields, and residential areas, as well as other areas at the landowner's request. The size, density, and distribution of rock on the construction work area should be similar to adjacent areas not disturbed by construction. The landowner or land management agency may approve other provisions in writing.
- Grade the construction right-of-way to restore pre-construction contours and leave the soil in the proper condition for planting.
- Remove construction debris from all construction work areas unless the landowner or land management agency approves leaving materials onsite for beneficial reuse, stabilization, or habitat restoration.
- Remove temporary sediment barriers when replaced by permanent erosion control measures or when revegetation is successful.
- Contractor shall restore and re-vegetate all disturbed pipe yard areas, including lime, fertilizer, seed and mulch or restore equivalent to pre-construction conditions.

PERMANENT EROSION CONTROL DEVICES

7.2 Permanent Trench Breakers

- An Engineer or similarly qualified professional shall determine the need for and spacing of trench breakers, including agricultural fields. Otherwise, trench breakers shall be installed at intervals as per the following table and upslope of slope breakers and/or the site specific SWPPP or E&S Plan (See BMP Drawing Nos. 6A and 8A).
- Trench breakers are intended to slow the flow of subsurface water along the trench. Trench breakers may be constructed of materials such as bentonite, clay, sand bags or polyurethane foam (refer to permit or permitting agency for acceptable materials). Do not use topsoil in trench breakers.

- At a minimum, install a trench breaker at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody or wetland and where needed to avoid draining a waterbody or wetland. Install trench breakers at wetland boundaries, as specified in the procedures.

Table 4: Permanent Trench Breaker Spacing

Slope	Spacing
<5%	1000 Feet
5 - 15%	500 Feet
>15 - 25%	300 Feet
>25-35%	200 Feet
>35-100%	100 Feet
>100%	50 Feet

7.3 Permanent Slope Breakers

- Permanent slope breakers are intended to reduce runoff velocity, divert water off the construction ROW, and prevent sediment deposition into sensitive resources. Permanent slope breakers may be constructed of materials such as soil, stone, or some functional equivalent.
- Construct and maintain permanent slope breakers in all areas, except cultivated areas and lawns, unless requested by the landowner, using the spacing recommendations obtained from the local soil conservation authority or land managing agency.
- In the absence of written recommendations, use the following spacing unless closer spacing is necessary to avoid excessive erosion on the construction right-of-way: (See *BMP Drawing No.* 8A)
- Construct slope breakers to divert surface flow to a stable area without causing water to pool or erode behind the breaker. In the absence of a stable area, construct appropriate energy-dissipating devices at the end of the breaker.
- Slope breakers may extend slightly (about 4 feet) beyond the edge of the construction right-of-way to effectively drain water off the disturbed area. Where slope breakers extend beyond the edge of the construction right-of-way, they are subject to compliance with all applicable survey requirements.
- Please see Table 1 for correct slope breaker installation methods using percent slope and distance.

7.4 Soil Compaction Mitigation

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

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

7.5 Permanent Restoration Measures

Permanent restoration and revegetation measures serve to control erosion and sedimentation by establishing a vegetative cover, which protects the soil, and by using structures which can divert or slow runoff and trap sediment. The Contractor shall restore all disturbed portions of the construction ROW and supplemental work areas, as approved by Company.

- Final grading shall be completed within 10 days after the ditch is backfilled, weather and soil moisture permitting.
- All construction debris shall be removed from the ROW and the ROW shall be graded so that the soil is left in the proper condition for planting.
- Where trench compaction has not been done, the ROW shall be graded to pre-construction contours, as practical, with a small crown of soil left over the ditch to compensate for settling, but not to interfere with natural drainage. Openings shall be left in the trench-line crown to allow for lateral surface drainage, as approved by National inspectors.
- Where topsoil has been segregated, the topsoil shall be spread back along the ROW in an even layer (as further described in Attachment 1 - Soil Protection and Subsoil Decompaction Plan).
- The Environmental Inspector may direct construction of permanent slope breakers to replace temporary erosion control barriers at road, waterbody and wetland crossings, as specified/approved. In addition, in agricultural lands, construction of permanent slope breakers at these areas will be reviewed and coordinated with the Agricultural Inspector.

Wetland and Waterbody Crossing Restoration

7.6.1 Wetlands Crossings

- All project related material used to support equipment on the right-of-way, including, but not limited to: work mats, timber temporary riprap, and other construction debris shall be removed during the final grading of the right-of-way.
- Where the pipeline trench may drain a wetland, construct trench breakers at the wetland boundaries and/or seal the trench bottom as necessary to maintain the original wetland hydrology.
- Once backfilling is complete, affected areas original contours and flow regimes will be restored to maintain original wetland hydrology.
- For each wetland crossed, install a trench breaker at the base of slopes near the boundary between the wetland and adjacent upland areas. Install a permanent slope breaker across the construction right-of-way at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from the wetland,

or as needed to prevent sediment transport into the wetland. In addition, install sediment barriers as outlined in the Plan. In some areas, with the approval of the Environmental Inspector, an earthen berm may be suitable as a sediment barrier adjacent to the wetland.

- Ensure that all disturbed areas successfully revegetate with wetland herbaceous and/or woody plant species.
- During final grading, wetlands (including areas within the 100-foot buffer) will be restored to original contours and the buffer areas seeded and mulched as soon after backfilling as practicable (preferably within 48 hours but not longer than one week) with the exception of the travel portion of the ROW, which will also be restored using these procedures after the travel way is no longer need.
- If necessary or required; to reduce the potential for risk for invasion or spreading of invasive species (such as purple loosestrife, phragmites, or Japanese knotweed), an elevated wash rack station will be used for equipment – see *BMP Drawing No. 44*. This wash rack equipment will be used in cases where:
    - the construction equipment exits a wetland having predominant invasive species vegetation, and
    - it enters another wetland without the invasive species within the next 1000 feet along the alignment
- The ROW will be seeded with annual rye grass or native perennial seed mix (see Revegetation section of this Plan) at a rate of 40 pounds/acre (unless standing water is present) to stabilize the area until indigenous wetland species can re-establish themselves. If the affected wetland is within an active agricultural parcel, reseeding will be performed according to landowner agreements.
- If bad weather limits the effectiveness of reseeding efforts, at the discretion of the Environmental Inspector and as allowed by all applicable permits, the ROW should be mulched (with straw only) to minimize erosion until conditions are suitable for reseeding. This temporary mulch cover should be monitored and maintained until conditions are suitable for completing restoration.
- No fertilizer, mulch, or lime shall be used in wetlands unless required in writing by the appropriate federal or state agency.
- Remove temporary sediment barriers located at the boundary between wetland and adjacent upland areas after revegetation and stabilization of adjacent upland areas are judged to be successful.
- Consult with the appropriate federal or state agencies to develop a project-specific wetland restoration plan. The restoration plan shall include measures for re-establishing herbaceous and/or woody species, controlling the invasion and spread of invasive species and noxious weeds (e.g., purple loosestrife and phragmites), and monitoring the success of the revegetation and weed control efforts. Provide this plan to the FERC staff upon request.
- During forested wetland restoration, the following measures will be undertaken to maximize or monitor success of revegetation:
    - Minimizing removal of stumps – to the extent practicable (while still allowing for safe working conditions) stumps will be left in place within the construction ROW to re-sprout following construction and restoration;
    - As indicated in the Clearing section of the plan, tree stumps may only be removed from the trench line unless specifically authorized by the Chief Inspector (stumps may be removed or ground to a suitable height for safety reasons);

- If practicable, any stumps or root wads removed from the trench line, may be maintained within the ROW (e.g., staged and mulched during construction) to improve viability and replaced during restoration;
- As necessary, or to supplement revegetation of forested wetlands (if stumps have been too damaged to survive), locally native tree species will be planted during the restoration or monitoring phases;
- Locally native tree species stock or cuttings will be planted in a random pattern to promote natural distribution, although minimum species-appropriate average planting densities will be observed;
- Following construction, ROW maintenance in wetlands will be limited to clearing of 10 feet, centered on the pipeline. In addition, trees within 15 feet of the pipeline that is greater than 15 feet in height may be selectively cut and removed from the permanent right-of-way.

7.6.2 Waterbody Crossings

- Return all waterbody banks to preconstruction contours or to a stable angle of repose as approved by the Environmental Inspector. Native rock from the construction right-of-way will be used to stabilize the banks where available. Do not use stream material for stabilization.
- Use clean gravel or native cobbles for the upper 1 foot of trench backfill in all waterbodies that contain coldwater fisheries.
- For open cut crossings, stabilize waterbody banks and install temporary sediment barriers within 24 hours of completing instream construction activities. For dry-ditch crossings, complete streambed and bank stabilization before returning flow to the waterbody channel.
- Install erosion control fabric or a functional equivalent on waterbody banks at the time of final bank re-contouring. Do not use synthetic monofilament mesh/netted erosion control materials in areas designated as sensitive wildlife habitat unless the product is specifically designed to minimize harm to wildlife. Anchor erosion control fabric with staples or other appropriate devices.
- Application of riprap for bank stabilization must comply with COE, or its delegated agency, permit terms and conditions.
- Unless otherwise specified by state permit, limit the use of riprap to areas where flow conditions preclude effective vegetation stabilization techniques such as seeding and erosion control fabric.
- Install permanent slope breakers across the construction right-of-way at the base of slopes greater than 5 percent that are less than 50 feet from the waterbody, or as needed to prevent sediment transport into the waterbody, install sediment barriers as outlined in the Plan as per *BMP Drawing No.* 8 prior to seeding and mulching (as described above in Section 7.3). in some areas, with the approval of the Environmental Inspector, an earthen berm may be suitable as a sediment barrier adjacent to the waterbody.
- Seed and mulch the area immediately after pipeline installation. Revegetate disturbed riparian areas with native species of conservation grasses, legumes, and woody species, similar in density to adjacent undisturbed lands. At locations with existing (pre-construction) wooded conditions along stream banks and

riparian areas, the following measures will be followed to minimize the potential for erosion and to provide for overhanging vegetation:

- During clearing, existing stream bank vegetation will be maintained, except within the trench line– a setback of 50 feet from the stream bank will be utilized for additional temporary work space.
- To the extent practicable (while still allowing for safe working conditions) stumps may be left in place along these riparian areas to re-sprout following construction and restoration.
- If practicable, any stumps or root wads removed from the trench line, may be maintained within the ROW (e.g., staged and mulched during construction) to improve viability and replaced during restoration

7.6 Residential Areas Restoration

Cleanup and restoration measures in residential areas will commence upon completion of the pipeline lowering in and backfilling. The restoration and mitigation efforts in residential areas will be completed in accordance with FERC requirements and include site-specific residential mitigation plans for residences located within 25 feet from the edge of construction right-of-way.

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

7.7 Agricultural Mitigation

The subsoil shall be de-compacted prior to replacement of the segregated topsoil. Decompaction activities shall be conducted only during periods of relatively low soil moisture to ensure the desired mitigation and prevent additional subsurface compaction. Specific additional details are included in Attachment 1 to this Plan - Soil Protection and Subsoil Decompaction Plan.

The project sponsor will file with the Secretary for the review and written approval of the Director, a winterization plan if construction will continue into the late autumn or winter season, or if restoration will not have been completed on agricultural lands by October when moisture or temperature conditions could delay successful restoration until the following year in agricultural lands – including subsoil decompaction, topsoil replacement, or permanent seeding.

7.8.1 Subsurface Drainage Systems

Subsurface drainage systems may include a collection of subsurface pipes, such as perforated tubing or tile, that intercepts, collects and transports excess groundwater, within the soil, from a section of land. Systems may also include older emplacements of “stone drains” installed in the late 1800s and early 1900s. Subsurface drainage systems have a number of functions depending on the location and the conditions under which the tile has been installed. Drain tile can have the following impacts:

- Improvement of the seasonal soil condition in an area by regulating the seasonal water table and ground water flow serving to maintain the parcel or area for farming or similar use;
- Providing the ability to control the amount of surface water and groundwater in an existing wet area that is used for agriculture production;
- Intercepting and removing surface runoff through the ground as opposed to allowing the flow across the surface (which would increase the potential for erosion and loss of valuable topsoil):
- Serves as an outlet for an existing system or an area that may have an increase in ground saturation related to pipeline excavation activity;
- Collects groundwater for other uses such as: spring fed, shallow wells for domestic supply; irrigation; watering ponds for livestock or similar activity.

During the pre-construction planning (see Pre-Construction Planning section of this Plan) verification should be obtained from the land department files, the landowner and/or the County Conservation or USDA-NRCS office, as to the existing or future tile system that will be crossed. A detailed drainage line repair procedure for the repair of clay tile and plastic drain line will be developed by the Ag Specialist in consultation with the local Soil and Water Conservation District (where appropriate). It is important to verify that all tiles have been distinctly marked on both sides of the excavated area and right-of-way edges (outer perimeter), for later reference. If necessary, make provisions to be able to maintain the system in working order, so as to limit impacts to existing crops from the excess groundwater for the duration of the construction activities.

During construction, drain tiles shall be identified, marked and information recorded by the drainage specialist (see Agricultural Inspection section of this Plan). If damaged during construction, a qualified drain tile repair specialist will conduct repair or replacement to equivalent or better condition. Typical repairs are shown on *BMP Drawing Nos. 30, 30A, and 42*, and generally include the following:

- Tile repairs should be designed with substantial support placed beneath the replaced section of tile to prevent the sagging of the tile line when the backfill material placed back in the trench settles, as shown on the attached repair detail.
- It is important to adequately size the repairs to match the existing tile system. Inadequately sized tile can negatively affect the entire system and render it non-functional.
- Should additional tile be necessary due to evident soil saturation, verify that the existing tile system can accommodate the additional amount of flow prior to connecting into that system. If necessary, a new system should be installed to facilitate the new lines or the existing system should be increased in size to accommodate the increase in flow amounts.
- At the time a tile is cut, the exposed ends of the drainpipe should be plugged or covered to prevent the tile from becoming clogged with dirt or rocks.
- The trenching crew or inspector shall carefully and immediately mark the location of cut or damaged tile in a prominent manner with lath, staking or flagging securely placed in the backfill or at the edge of the right-of-way.

- General tile replacement or repairs shall be performed in accordance with the requirements identified in this document including the material engineering details noted in BMP Drawing No. 30, and/or local ordinances or standards which may be higher, but not lower, in their level of requirements.
- The Drainage Specialist must approve any tile that may be proposed for reuse.
- The original gradient of the tile line shall be re-established with the replacement tile. As an alternative, the tile line can be re-routed and/or replaced, but must function as well as the original line.

8 REVEGETATION

8.1 General

- The project sponsor is responsible for ensuring successful revegetation of soils disturbed by project-related activities, except as noted as follows:
- Restore all turf, ornamental shrubs, and specialized landscaping in accordance with the landowners request, or compensate the landowner. Restoration work must be performed by personnel familiar with local horticultural and turf establishment practices.
- Restore agricultural lands based on site-specific soil data.

8.2 Revegetation Operations

In general, rough grading will occur 0-3 days after backfilling. The right-of-way will then be limed and fertilized (no fertilizer or lime shall be used in wetlands). The lime and fertilizer will then be disked or blended into the worked soil. If necessary, a rock rake will then be run or stones will be hand-picked by laborers. The right-of-way will then be finished with a final grade. Then seed and mulch will be applied at specified rates.

In agricultural areas, additional procedures for restoration and revegetation will be performed in accordance with those outlined in the Soil Protection and Subsoil Decompaction Plan (Attachment 1)

8.3 Soil Additives

The respective project representative within the appropriate time frame will interview each affected farmland operator, during planning prior to construction, for data on the most recent preconstruction application of soil additives per field. If necessary within the appropriate time frame, site-referenced soil testing of all affected agricultural land along the project at appropriate intervals to determine the respective soil's pH, percent of organic material, cation exchange capacity, and NPK (nitrogen, phosphorus, potassium) will be implemented. This information will be used to help establish the specific rate of lime and nutrients to be applied per field for: temporary seed cover applications; permanent seed mixtures; and (depending on time of restoration and other seasonal factors), row crop production the same season as restoration. Additional written data concerning soil modifiers will be obtained from the County Conservation District, or land management agencies. Based on the results of the site testing and other information, the site-specific fertilizer and soil pH modifiers will be incorporated into the top two inches of soil during or as soon as practicable after application.

8.4 Seeding Requirements

- Prepare a seedbed in disturbed areas to a depth of 3 to 4 inches using appropriate equipment to provide a firm seedbed. When hydro seeding, scarify the seedbed to facilitate lodging and germination of seed.
- Seed disturbed areas in accordance with written recommendations for seed mixes, rates, and dates obtained from the local soil conservation authority or the request of the landowner or land management agency. Seeding is not required in cultivated croplands unless requested by the landowner
- Perform seeding of permanent vegetation within the recommended seeding dates. If seeding cannot be done within those dates, use appropriate temporary erosion control measures and perform seeding of permanent vegetation at the appropriate time within the next recommended seeding season based on ROW soil workability (further described in Attachment 4 – Seeding, Fertilizing, and Lime Recommendation for Gas Pipeline Right-of-Way Restoration in Farmlands).Dormant seeding or temporary seeding of annual species may also be used, if necessary, to establish cover, as approved by the Environmental Inspector. Lawns may be seeded on a schedule established with the landowner.
- In the absence of written recommendations from the local soil conservation authorities, seed all disturbed soils within 4 working days of final grading in Pennsylvania and 7 days in New York, weather and soil conditions permitting, subject to specifications in the first three (3) bullets of this section (8.4 Seeding Requirements).
- Base seeding rates on Pure Live Seed. Use seed within 12 months of seed testing.
- Treat legume seed with an inoculant specific to the species using the manufacturer's recommended rate of inoculant appropriate for the seeding method (broadcast, drill, or hydro).
- In the absence of written recommendations from the local soil conservation authorities, landowner, or land managing agency to the contrary, a seed drill equipped with a cultipacker is preferred for seed application.
- Broadcast or hydro seeding can be used in lieu of drilling at double the recommended seeding rates. Where seed is broadcast, firm the seedbed with a cultipacker or roller after seeding. In rocky soils or where site conditions may limit the effectiveness of this equipment, other alternatives may be appropriate (e.g., use of a chain drag) to lightly cover seed after application, as approved by the Environmental Inspector.
- Seed slopes steeper than 33% immediately after final grading, weather permitting.
- For two-year project timelines, the topsoil berm will be seeded when the soil in the pile is loose and fresh. The top of the berm will be flattened to allow for lightweight broadcast seeding over the entire berm.

8.5 Temporary Mixtures - October 15 through March 31

General site preparation, lime and fertilizer application rates and temporary seed mixtures are detailed in Attachment 4 – Seeding, Fertilizing, and Lime Recommendation for Gas Pipeline Right-of-Way Restoration in Farmlands.

8.6 Permanent Mixtures - April 1 through October 14

General site preparation, lime and fertilizer application rates and permanent seed mixtures are detailed in Attachment 4 – Seeding, Fertilizing, and Lime Recommendation for Gas Pipeline Right-of-Way Restoration in Farmlands.

In agricultural lands soils will be tested prior to construction by the Agricultural Inspector to determine appropriate site-specific lime and fertilizer application rates (modifying the general rates in Attachment 4 up or down accordingly).

9 POST CONSTRUCTION ACTIVITIES AND REPORTING

9.1 Monitoring and Maintenance

- Conduct follow-up inspections of all disturbed areas, as necessary, to determine the success of revegetation and address landowners concerns. At a minimum, conduct inspections after the first and second growing seasons.
- Revegetation in non-agricultural areas shall be considered successful if upon visual survey the density and cover of non-nuisance vegetation (or crops in cultivated cropland) is similar in density and cover to adjacent undisturbed lands.
- In agricultural areas, revegetation shall be considered successful when upon visual survey, crop growth and vigor are similar to adjacent undisturbed portions of the same field, unless the easement agreement specifies otherwise. Monitoring will be performed by the Agricultural Inspector as necessary during the growing season for a period of no less than two years immediately following full-length activation of pipeline or completion of successful yield, whichever occurs first. The monitoring shall include an assessment of plant populations, general appearance, and yields appropriate to the crops being monitored – as outlined in the Special Crop Productivity Monitoring Procedures Paper (February 1993), included as Attachment 3 to this document.
- In wetland areas, revegetation and restoration progress will be recorded annually for three years post construction or until restoration is deemed successful.
- Continue revegetation efforts until revegetation is successful.
- Monitor and correct problems with drainage and irrigation systems resulting from pipeline construction in agricultural areas until restoration is successful.
- Restoration shall be considered successful if the ROW surface condition, including the topsoil and the horizon of the upper subsoil is similar to adjacent undisturbed lands, construction debris is removed (unless otherwise approved by the landowner or land managing agency), revegetation is successful, and proper drainage for agriculture, including the mitigation of right-of-way water boils and saturation, has been restored.
- Routine vegetation mowing or clearing over the full width of the permanent right-of-way in uplands shall not be done more frequently than every 3 years. However, to facilitate periodic corrosion and leak surveys, a corridor not exceeding 10 feet in width centered on the pipeline may be cleared at a frequency necessary to maintain the 10-foot corridor in a herbaceous state. In no case shall routine vegetation mowing or clearing occur during the migratory bird nesting season between April 15th and August 1st of any year unless

specifically approved in writing by the responsible land management agency or the U.S. Fish and Wildlife Service.

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

9.1.1 Waterbody Post-Construction Maintenance

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

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

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

9.1.2 Wetland Post-Construction Maintenance

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

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

Time of the year restrictions specified in the Plan (April 15 – August 1 of any year) apply to routine mowing and clearing of wetland areas.
Monitor and record the success of wetland revegetation annually until wetland revegetation is successful.

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

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

- Vegetation is at least 80 percent of either the cover documented for the wetland prior to construction, or at least 80 percent of the cover in adjacent wetland areas that were not disturbed by construction.
- If natural rather than active revegetation was used, the plant species composition is consistent with early successional wetland plant communities in the affected ecoregion.
- Invasive species and noxious weeds are absent, unless they are abundant in adjacent areas that were not disturbed by construction.

9.2 Reporting

The project sponsor shall maintain records that identify by milepost:

- Method of application, application rate, and type of fertilizer, pH modifying agent, seed, and mulch used.
- Acreage treated
- Dates of backfilling and seeding
- Names of landowners requesting special seeding treatment and a description of the follow-up actions
- The location of any subsurface drainage repairs or improvements made during restoration; and
- Any problem areas and how they were addressed

The project sponsor shall file with the Secretary quarterly activity reports documenting the results of follow-up inspections required by section 9.1; any problem areas, including those identified by the landowner; and corrective actions taken for at least 2 years following construction.

The requirement to file quarterly activity reports with the Secretary does not apply to projects constructed under the automatic authorization, prior notice, or advanced notice provisions in the FERC's regulations.

9.2.1 Wetland Reporting

Within 3 years after construction, file a report with the Secretary identifying the status of the wetland revegetation efforts and documenting success as defined in 9.1.2 above. The requirements to file wetland restoration reports with the Secretary does not apply to projects constructed under the automatic authorization, prior notice, or advanced notice provisions in the FERC's regulations.

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

9.3 Off Road Vehicle Control

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

- Signs
- Fences with locking gates
- Slash and timber barriers, pipe barriers, or a line of boulders across the ROW
- Conifers or other appropriate trees or shrubs across the ROW

10 GENERAL PIPELINE CONSTRUCTION SEQUENCING

10.1 Pre-Construction

Prior to mobilization, the Drainage Specialist/Agricultural Inspector will review drain tile systems, potential dewatering outlets, and potential outlets for interceptor systems to mitigate subsequent ROW water boils and saturation (see Pre-Construction Planning section of this Plan). In conjunction with the Environmental Inspector and the Project's construction management, the Drainage Specialist/Agricultural Inspector will review nearby or crossed ditches (see Section 4.10), for their adequacy as temporary holding areas for trench dewatering, at a minimum covering those segments of the Project's ROW through agricultural lands that are identified with high water table (HWT) soil. The staff will review the construction ROW plan, concerning agricultural lands for: a) the topsoil stockpiling locations being consistent with the upslope side of the ROW; b) the "extra work space areas" for their sufficiency of size to accommodate effective soil segregation and protection, for various special construction related activities (e.g., bore set ups and corresponding spoil areas; staging sites for waterway or road crossings, etc.); and c) location of all natural drainage swales on affected farms, where adequate surface drainage gaps (through soil berms) are to be left as openings during topsoil stripping and spoil excavation management.

Before construction begins, the R.O.W. will be surveyed and staked. Other utility lines will be located and marked to prevent accidental damage during pipeline construction. Additionally, mark stream buffers and wetland boundaries. Post environmental signs as it relates to No Fueling areas, Access Roads, Not an Access Road, Streams and Wetlands.

10.2 Staging Area; Typical BMP's 1, 5, 17, 23A, 45ABC

Staging areas will be set up when the contractor moves in to begin work. Install proper BMPs as required. Examples of BMP's are rock construction entrances, silt fence or sock, rock channel filters, topsoil segregation. Proper access BMPs will be implemented prior to any sustained heavy traffic. If vehicles enter or exit the staging area onto a paved road, an entrance pad will be installed as per *BMP Drawing No.1.* Strip topsoil and segregate for staging areas (if any) residential or agricultural lands.

10.3 Handling of Hazardous Materials

All fuels, oils, chemicals, or other hazardous materials will be maintained in tightly sealed containers during transportation and storage. Fuels will be stored in equipment staging areas in stationary tanks. The tanks will be diked at the time of their placement in the staging area. Refueling will be performed in accordance with Section IV.A.1 of the FERC's Wetland and Waterbody Construction and Mitigation Procedures (Procedures); this

includes storage of hazardous materials and the application of concrete coating. The FERC procedure is to store fuels and perform refueling at distances no less than 100 feet from a stream or wetland. In addition to the FERC's procedures, the project will not allow the maintenance of equipment within 100 feet of streams and wetlands unless not doing so may create a greater hazard if not corrected before moving equipment (e.g., patching an oil leak from a stranded backhoe). This is also shown on *BMP Drawing Nos. 4 and 4A*, note 2.

In the event of a spill or leakage, the contents will be transferred to another tank. The empty tank will be removed as well as all standing liquids caught by the dike. All obviously contaminated soils will be removed and photo-ionization meters will be used to identify any further contaminated soils. The excavated area will be backfilled with clean soil.

10.4 Access Roads

The project will make use of the existing ROW for access along the pipeline. Where additional access is necessary, existing access roads may be used upon agreement with the landowner. Expansion of existing access roads or creation of new access roads is subject to routine construction requirements (e.g., topsoil stripping in residential or agricultural areas). BMPs will be installed and maintained on these roads, and they will be reclaimed to a condition at least equal to their pre-construction condition unless otherwise agreed to with a landowner.

10.5 Rock Entrances; BMP 1

The Grading Crew will install rock entrances at public roads in accordance with BMP Drawing No. 1, Entrance Pad. If the job kicks off at a point where an entrance pad is required, the entrance pad will be installed as soon as the immediate area required for the pad is stumped and rock can be brought in. This shall be within forty-eight (48) hours from the time the Grading Crew move onto the location.

For other locations along the pipeline where entrance pads are required, the pads will be installed as the Grading Crew progresses to these locations, but no later than forty-eight (48) hours from the time they reach these locations.

Rock construction entrances should be installed wherever it is anticipated that construction traffic will exit the project site onto any roadway, public or private. Access to the site should be limited to the stabilized construction entrance(s). Rock construction entrances should be maintained to the specified dimensions and the capacity to remove sediment from tires by adding rock when necessary. A stockpile of rock material should be maintained on site. Sediment deposited on public roadways should be removed and returned to the construction site immediately. Note: Washing roadway or sweeping the deposits into roadway ditches, sewers, culverts, or other drainage courses is not acceptable.

10.6 Clearing; Typical BMP's 1, 5, 37, 45ABC

Clear and grub vegetation as needed within the clearing limits as shown on the plans. Minimize vegetation clearing at stream crossings to maintain existing riparian buffers. Temporary stream and wetland crossings must be provided by the Clearing Crew wherever equipment crosses an existing stream channel and/or wetland. Mats

are to be placed within designated travel area. Wherever such crossings are installed, an appropriate permit must be obtained from DEP, DEC, and/or Army Corps of Engineers.

This consists of the removal of trees and other obstructions from the ROW Clearing will be restricted to only that portion of the ROW necessary for actual construction. Trees, brush, and other obstructions will be cleared to permit safe and efficient use of machinery and other construction equipment. Permission will be obtained from landowners for use of access roads across their property to the ROW, for cutting trees and erecting temporary gates where necessary.

Various clearing methods will be employed, depending on tree size, contours of the land, and the ability of the ground to support clearing equipment. Marketable timber will be cut to specified lengths and stacked. All brush may be disposed of in one of several ways, depending on local restrictions and the terms of applicable permits and/or easement agreements: piled on the edge of the R.O.W. to provide cover for wildlife, burned, or chipped. Chipped wood may be removed from or scattered along the edge of the ROW. After the removal of ROW vegetation temporary ECDs will be installed as necessary to prevent erosion.

10.7 Grading; Typical BMP's 1, 4A, 5, 8A, 9, 17, 19, 22, 23A, 37, 45ABC, 51

Rock outcrops, ridges, boulders, and tree stumps will be removed from the working area, and sharp topographical irregularities will be graded to ensure rapid and safe passage of the work crews. Backhoes and bulldozers will be employed for removal of tree stumps, rocks, and boulders. Burying them or setting them outside the construction area will serve to dispose of tree stumps in an approved manner, typically. No tree stumps will be buried or placed in agricultural lands. In agricultural lands as identified in Section 4.3.1 Topsoil Segregation, topsoil will be carefully stripped from the full work area (spoil stockpiling zone, trench area, pipe stringing/welding, and traffic areas) segregated from the subsoil, and preserved for later restoration of the ROW. Leveling the ROW may entail rock blasting in certain areas. Qualified, experienced personnel will conduct blasting operations. Licensed blasting experts will be employed, and blasting permits will be obtained when required by government authorities. Disposal of excess rock will be in accordance with the terms of any applicable permit and/or easement agreements.

Install waterbars at each location specified on the plans. Strip topsoil within designated areas (Ag land, pasture, etc.) as needed and stockpile within the LOD. Apply seed (rye grass) and mulch to topsoil stockpile. Install compost filter sock or filter fence at all locations specified in the plans. In areas with concentrated flow, install limestone rock filters (do not use silt sock) as indicated on the plans. Grading Crew will typically make improvements to clearing crew's temporary stream and wetland crossings.

10.8 Temporary Diversions; Typical BMP's 11, 14, 17, 25

Diversion ditches will be installed by the Grading Crew each time the crew progresses to a location where an additional diversion ditch is required according to this Plan. Example information on diversion ditches and controls are included on *BMP Drawing Nos. 11, 14, 17 and 25*. The Rough Grading Crew (at the leading edge of the grading process) will install rough diversions each day for that section of the ROW, which has been rough graded. The Finish Grade Crew (at the trailing edge of the grading process) will finalize the construction of the temporary diversion ditches. After that, each succeeding crew will be responsible for maintaining the diversion ditches on a daily basis.

10.9 Ditching; Typical BMP's 4, 6A, 10A, 12, 13, 18, 21, 28, 30, 38, 47

Begin pipeline construction. Minimize earth disturbance to the maximum extent possible to install pipeline and windrow spoil within the LOD. Apply seed (rye grass) and mulch to all areas of the spoil pile (4 day for PA and 7 day in NY requirement). The proposed steel pipeline with welded joints will require a relatively long time frame for open trench. Wherever water is pumped from the trench, it must be treated for sediment removal prior to discharging. Sediment bags should be distributed at low lying areas along the pipeline corridor. The excavated trench will remain open for the minimum time necessary to efficiently excavate the trench, install pipeline, backfill the trench, install trench plugs at locations indicated on the plan and begin stabilization of the disturbed areas. For most installations, this time period should not exceed 30 calendar days. Re-establishment of water bars, silt fence or sock must be completed by the end of each day.

The ditch centerline will be staked following completion of grading. The ditch will be excavated by mechanical backhoe to a depth that provides at least three (3) feet of cover on top of the pipe, except in bedrock areas, where a minimum cover of two (2) feet will be provided. In areas where the depth of soil over bedrock is less than (4) feet, the pipe should be buried below the top of the bedrock at the depth required for the land use, whichever is less. In agricultural lands a minimum of (4) feet of cover will be maintained, except where the new pipeline is located parallel and adjacent to an older existing pipeline that was buried with less than 40 inches of cover. In this situation, a minimum depth of 40 inches is required. In areas where temporary filling has been utilized, the depth will be measured from the original ground surface. During construction, excavated material is typically stored along one side of the trench while the other side is used as a work area.

The method of excavation used will depend on the specific soil conditions encountered, however, it is expected that track excavators will be required. Ditch-line breakers, usually composed of sandbags or staked straw bales, will be installed on steep slopes. Where bedrock is encountered, attempt to rip the ditch with a backhoe. Only if this technique proves unsuccessful will blasting be used.

Landowners will be contacted sufficiently in advance of construction, regarding access ways across the trench. The owner, as well as the operator (if different from the owner), of affected agricultural land will be met with by one of the respective project representative to designate farming related access ways across the trench. Where requested by either by landowners or farmland operators, access ways across the trench will be spaced at convenient intervals to allow landowners and land operators, all sizes of farming equipment requiring access, domestic livestock, and wildlife to cross the construction area.

Drainage Specialists in coordination with National land agents will contact landowners to locate drainage systems installed along the pipeline. If drainage tile is present, excavation of the trench will be to a depth sufficient to meet drainage tile clearance requirements. Damaged drain tiles will be promptly repaired or replaced (see Restoration section of this Plan).

10.10 Lowering In

Prior to lowering in, the ditch will be cleaned of all debris; the bottom smoothed and sand bags placed at a spacing of 15 feet or less, along the ditch bottom. The pipe string will be lifted from the skid supports and lowered directly into the ditch by using a sufficient number of side-boom tractors equipped with rubber-tired cradles and/or slings and belts to prevent damage to the pipe and pipe coating.

In areas where the ditch bottom is irregularly shaped due to consolidated rock and/or where the excavated spoil materials are unacceptable for backfilling around the pipe, padding materials may be required. Sand or screened subsoil material from the ditch excavation, or a combination of each, will be used for padding. This padding material will be placed on the bottom of the ditch, at a depth of six (6) inches, just prior to lowering in the pipe.

10.11 Backfilling; Typical BMP's 4, 6A, 10A, 12, 13, 18, 21, 28, 30, 38, 47

Before backfilling begins, a final inspection will be made to assure that all debris has been removed from the ditch and that the pipe and pipe coating are undamaged.

Where rock, gravel, or other materials are encountered of a size and shape that could cause damage to the pipe or pipe coating, select padding material will be placed around the pipe to a thickness of six (6) inches, or rock shield will be applied.

While the ditch is open the Drainage Specialist will supervise the repair or replacement of drain lines. During backfilling, the Drainage Specialist or Agricultural Inspector (in conjunction with backfill inspector) will supervise the application of the necessary measures to ensure protection from damage and permanent drain line support for gravity flow. Prior to backfilling the trench, any drain tiles across the working side of the ROW will be inspected to ensure its integrity. Tiles crushed or otherwise damaged by construction activity will be repaired or replaced to pre-construction or better condition.

In the event dewatering is required for pipe installation and backfilling additional efforts described in Section 4.10 will be employed.

On steep slopes, trench breakers consisting of sandbags, gravel, cement, or cement-filled sacks will be installed in the trench over and around the pipe to provide full protection against wash-away in areas that are vulnerable. Compacted earth or other suitable low-permeability material will be used on gentler slopes and wet areas to minimize channeling of groundwater along the ditch line.

The ditch will be backfilled using either subsoil excavated from the pipeline ditch or fill from a remote source. Multiple passes of heavy equipment will be used to compact the fill material.

Restoration and cleanup activities will occur following the pipe installation and backfill as described in Section 7.

10.12 Stream Crossing; Typical BMP's 2, 5, 6A, 13, 21, 24, 28, 31, 37, 45ABC, 47, 51

As pipeline construction progresses to stream crossings, install temporary dam and pump bypass system or flumed crossing as shown on the plans and dewater excavations as needed. Once crossing is complete, remove pump and bypass system and restore normal stream flow. Place erosion control blankets on banks. Replace all temporary sediment controls (silt fence or sock). Apply soil additives, seed and mulch all disturbed areas within 50-feet of stream on both sides of stream (within 24-hrs of completion). Temporary equipment crossings will be removed when no longer needed.

10.13 Hydrostatic Testing

Before any segment of new pipeline is placed in-service, it will be hydrostatically tested to ensure it conforms to ESP SC and D.O.T. specifications. Test water will be withdrawn from nearby hydrants, ponds, streams, or trucked in from an off-site location. This water will be pumped into the pipeline behind a fill pig. A high-pressure pump will be used to pressurize the pipeline to designed test pressure. The test pressure will be maintained for eight (8) hours. After test, the pipe section is depressurized and test water is discharged to an approved location where it is released back into the environment (in accordance with the project Hydrostatic Test Plan). (Reference *BMP Drawing No. 3*.)

10.13.1 Notification Procedures and Permits

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

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

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

10.13.2 General

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

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

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

10.13.3 Intake source and Rate

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

Do not use state-designated exceptional value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate federal, state, and/or local permitting agencies grant written permission.
Maintain adequate flow rates to protect aquatic life, provide for all waterbody uses, and provide for downstream withdrawals of water by existing users

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

10.13.4 Discharge Location, Method, and Rate

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

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

10.14 Restoration and Re-vegetation; Typical BMP's 5, 8A, 24, 45ABC

As pipeline construction is completed, re-grade the site to pre-project contours. Apply soil additives according to plan requirements. Seed and mulch disturbed areas immediately upon final grading operations. Place erosion control blankets within 100-feet from any stream, drainage, wetland, or other body of water in Special Protected Watersheds and non-agricultural areas. Place hydraulically applied blanket or erosion control blanket on all slopes equal to or greater than 3:1.

Final grading, topsoil replacement, and installation of permanent erosion control structures will be completed within 20 days after backfilling the trench (10 days in residential areas). If soil moisture, seasonal or other weather conditions prevent compliance with these time frames, temporary erosion controls (temporary slope breakers and sediment barriers) will be maintained until conditions allow completion of cleanup.

The pipeline ROW will be carefully cleaned up and restored following construction. When the backfilling is completed, excess rock and similar materials will be removed from the ROW along with accumulated construction debris, and the ROW will be re-graded.

Topsoil will be re-spread over the ROW in areas where it had been segregated prior to ditching. Drainage ditches, terraces, roads, and fences will be restored to their former condition. Permanent slope breakers will be installed to divert runoff away from disturbed areas. Agricultural lands will be restored to equal or better condition (see the Restoration section and attached Soil Protection and Subsoil De-compaction Plan).

Construction equipment, surplus materials, and debris will be removed from the ROW. Pipeline markers and warning signs will be erected at roads and interspersed at points along the ROW. The ROW will be re-seeded, fertilized, and mulched unless the landowner stipulates otherwise. Re-vegetation will be monitored periodically. If excessive erosion occurs, these areas will be stabilized and re-vegetated.

10.15 Maintenance /Reporting

All BMPs must remain in place and FUNCTIONAL until all areas within the limit of disturbance are completed and permanently stabilized. Maintenance must include inspection of all erosion and sediment controls after each runoff event and also on a weekly basis.

10.16 ECD Removal and Close Out

Upon achieving permanent stabilization (a minimum uniform, perennial 70% vegetative cover) remove compost filter sock/filter fence and any other temporary erosion and sediment pollution control BMP. Seed, mulch, and permanently stabilize any disturbed areas caused by the removal of the temporary BMPs.

REFERENCES

- Federal Energy Regulatory Commission. Upland Erosion Control, Revegetation, and Maintenance Plan, May 2013.
- Federal Energy Regulatory Commission. Wetland and Waterbody Construction and Mitigation Procedures, May 2013.
- New York State Department of Agriculture & Markets. Pipeline Construction Projects- Agricultural Mitigation through Stages of Project Planning, Construction/Restoration and Follow-Up Monitoring, November 1997.
- New York State Department of Agriculture & Markets – Special Crop Productivity Monitoring Procedures, February 1993.
- New York State Department of Agriculture & Markets – New York State Farmlands Seeding, Fertilizer, and Lime Recommendations for Gas Pipeline Right-of-Way Restoration in Farmlands, undated.
- Pennsylvania Department of Environmental Protection. ESCGP-2 permit for Stormwater Discharges from Construction Activity.
- Pennsylvania Department of Environmental Protection. Erosion and Sediment Pollution Control Manual. Technical Guidance Number 363-2134-008; March 2012
- New York State Department of Environmental Conservation SPDES General Permit for Stormwater Discharges from Construction Activities (GP-0-15-002).

Attachment 1

Soil Protection and Subsoil Decompaction Plan

SOIL PROTECTION
and
SUBSOIL DECOMPACTION MITIGATION PLAN

May 2006
Revised March 2017

OVERVIEW OF PROCEDURES

Successful soil protection and subsoil decompaction includes procedures generally associated with the following steps, with the detailed technical process outlined in the following Detailed Procedures Section:

Agency Coordination

During project planning, construction, restoration and monitoring, agency coordination will be conducted at levels appropriate to meet the objectives in this Plan, including:

1. Coordinate with the appropriate agencies regarding:
   - Drain Tile and Irrigation Systems
   - Grazing Deferment
   - Soils
   - Agricultural Biological Security
2. Obtain written recommendations from the County Conservation District regarding erosion control and revegetation specifications, both temporary and permanent. Have available all written recommendations from these or other agencies for erosion control and revegetation specifications at the project location.
3. The project sponsor agrees to consult with the appropriate agencies regarding agricultural bio-security (noxious weeds and soil-borne pathogens). If necessary, based on this consultation, Empire will develop specific practical cost-effective procedures to mitigate significant agricultural bio-security risks, if they are determined to exist in the project area.

Topsoil Segregation

1. Use topsoil segregation (or topsoil replacement) methods in residential areas, and topsoil segregation when the construction right-of-way is wider than 30 feet in agricultural lands (as defined by the Detailed Procedures in the following section):
   - Annually cultivated or rotated agricultural lands or developed improved pasture lands
   - Hayfields
   - Land enrolled in USDA Conservation Reserve Program and maintained for return to tillable use, and other areas at the landowners request
2. Prevent the mixing of topsoil with subsoil in agricultural lands by stripping all topsoil from the full work area.
3. In deep agricultural soils strip topsoil in accordance with detailed procedures outlined in the following section.
4. At stream crossings, segregate topsoil from pipe trench on stream banks to facilitate re-stabilization.

Drain Tiles

All drainage tiles encountered shall be marked, maintained during construction, and restored or replaced to as good or better condition upon completion of construction. Tiles shall be referenced and flagged with stakes located adjacent to the ditch and the temporary construction right-of-way edges (outer perimeter).

Additional details regarding drain tile maintenance, repair and/or replacement are provided in Section 4.3.2 and along with the associated BMP drawings.

Soil Compaction Mitigation

Subsoil compaction of all agricultural lands shall be relieved in two phases. First the subsoil shall be deep ripped (at times of appropriately low soil moisture) with uplifted stone removal (using standard rock-picking equipment) occurring prior or replacement of the segregated topsoil. Following topsoil replacement a second phase of decompaction will occur, that includes Paratill® deep sub-soiling, and supplemental excess stone removal, of the right-of-way (including the topsoil storage area). Subsoil and topsoil replacement activities shall not be performed after October 1st, unless this act is approved by a qualified environmental inspector and/or a certifying agency along with Ag and Markets.

DETAILED PROCEDURES

Topsoil Segregation

1.0 Use topsoil segregation methods in all the following areas:
- Annually cultivated or rotated agricultural lands.
- Hayfields, improved pastures[1], and rotation hay land/pastures.
- Other areas at the landowners' request

2.0 Prevent the mixing of topsoil with subsoil by stripping topsoil from the full work area and limit all excavating, spoil stockpiling, and traffic/equipment to the area cleared of topsoil.
- Note: Less than full available width of construction right-of-way may be used, provided that the topsoil and subsoil are segregated and all traffic/equipment and subsoil storage are limited to the area cleared of topsoil.

3.0 Stockpile both the spoil and topsoil in a manner that prevents pooling of water behind the soil piles (prevents excessive saturation of the soil), e.g.: cut a surface drainage gap through the segregated soil piles (lineal berms), and across the right-of-way, at swale crossings, and protect outlet points.

4.0 In deep agricultural soils (more than 12 inches of topsoil), segregate the topsoil to a minimum depth of at least 12-incheIn shallow soils, the entire topsoil will be stripped. The subsoil will be segregated to a depth of 12 inches or to the top of bedrock, whichever is shallower In soils with less than 12 inches of topsoil the entire topsoil layer and 1-2 inches of friable subsoil (as approved by the Agricultural Inspector) will be segregated. Topsoil removal up to a depth of 16 inches will be required in specially designated soils.

[1] Improved pastures: land of generally tillable quality, used predominantly for grazing but largely open (free of trees, brush, and boulders).

5.0 At stream crossings, only segregate topsoil from pipe trench on stream banks to facilitate re-stabilization. Don't disturb the remainder of the actual bank. Agricultural topsoil stripping shall proceed out to the field's fringe, near, but not beyond the edge of the stream's riparian strip.

Soil Compaction Mitigation: Two Phases

1.0 First phase, deep-ripping the exposed subsoil. In all agricultural sections of the right-of-way where topsoil is stripped, the Contractor shall deep rip the exposed, construction surface subsoil with deep tillage devices such as a heavy duty ripping chisel or ripping chisel-plow, e.g.: V-frame or straight-frame ripper; or a heavy duty Paratill®.

The subsoil shall be thoroughly deep-ripped and rock picked prior to the replacement of segregated topsoil. The subsoil shall be deep-ripped to a depth of 18 to 22 inches as determined by the Agricultural Inspector. At least 40 hp of pull should be available per leg of implement, e.g.: 4 legs / 160 hp tractor.

Note: Due to the spacing between ripping legs (about 24 to 30 inches) a series of staggered, overlapping, "parallel rips" is employed to help ensure thorough breakup of the compacted mass of subsoil material. "Kittering" or a broad "S" series of cross rips will immediately follow for sites where the former "parallel" technique is inadequate for breakup of larger chunks into smaller clods.

1.1. All stones greater than 4 inches in dimension, which are brought to the surface during the de-compaction process, shall be removed, during alternating passes of the deep ripper, rock rake, wind rower, and mechanical rock picker.

1.2. Upon approval by the Agricultural Inspector of the subsoil deep ripping and the stone removal, the topsoil that has been temporarily removed for the period of construction shall then be uniformly replaced, preferably using a light to moderate weight, LGP (low ground pressure), wide-track bulldozer.

1.3. All of the first phase deep-ripping and rock picking activities, as well as topsoil replacement and second phase de-compaction activities shall be conducted only during periods of relatively low soil moisture (i.e., not in a state of plastic consistency), as verified by the Atterberg field test, to ensure the desired mitigation and prevent additional soil profile compaction. Further technical details are provided in the Soil Moisture (Workability) section below.

1.4. Once the deep-ripping phase begins, further use of the right-of-way for any traffic is prohibited.

2.0 Second phase: Following topsoil replacement - Paratill® the right-of-way preferably with a deep angled-leg sub-soiler so the soil profile will be loosened to a depth of 20 to 22 inches achieving the necessary shattering of the subsoil and remove any large size uplifted rocks.

2.1. Deep soil profile shattering (by Paratill® or other approved deep tillage implement) includes the entire width of the temporary construction right-of-way: all areas that where the topsoil was stripped and replaced plus the area where the topsoil berm had been stored.

2.2. Deep soil profile shattering tools with angled legs include the 3 to 5 leg Paratill ®.

2.3. Alternative deep sub-soiling tools include such implements as but not limited to the straight leg Unverferth Zone Builder ® with 5 legs and (for narrower right-of-ways or limited hp tractors) 3 leg parabolic shanks, heavy duty sub-soiler (either straight frame or V-frame). Manufacturers' such as but not limited to John Deere ® and Brillion ®.

2.4. As noted for deep ripping (above) at least 40 hp of pull should be available per leg of implement for full depth effectiveness in right-of-way conditions.

2.5. If subsequent construction and cleanup activities result in further compaction, conduct additional deep sub-soiling of the agricultural soil profile, as needed.

3.0 After the completion of deep, soil profile shattering the right-of-way is lightly to moderately disked and then limed, fertilized and seeded during friable (workable) soil moisture conditions to minimize re-compaction.

Trench Crowning and Mitigation of Trench Settling

Prior to trench crowning and during the trench backfilling, ripped or blasted bedrock or concentrated volumes of excavated stone or rock material (excavated from the trench) may be used to backfill the trench only to the top of the existing bedrock profile. Generally, in agricultural lands, rock will not be returned to the trench any higher than 24 inches below the exposed (topsoil-stripped) construction surface in mesic soils nor 30 inches in frigid soils from the exposed working construction surface right-of-way

All excess rock not utilized, as trench backfill, will be hauled away. The remaining backfill materials will consist of suitable subsoil over the rock fill material.

1.0 Rough trench crowning will occur during the backfill operation of the construction phase, using subsoil materials over the trench to allow, and compensate, for trench settling to the extent possible prior to restoration. Right-of-way crowning is the placement of a small berm or crown using two distinct layers of soil materials over the trench line in agricultural areas. Installing a berm or crown along the trench line compensates for the settling of backfilled soils following pipeline restoration. Typically, when backfilling, air pockets or voids will remain below grade. Eventually, the below grade soils will move into the voids and creates depressions at the surface. The crown material will compensate for this settling and can be used to fill in the area that would have otherwise been a depression. *BMP No. Drawing No. 38* shows typifies the procedure.

Note: If construction backfilling occurs between early autumn through winter Agricultural restoration will not be initiated until relatively drier soil conditions in late spring or early summer. Nearly all the trench settling will have occurred by mid-spring, giving the opportunity to compensate for trench settling using surplus, on site subsoil material immediately before restoration

Note: The stockpiled topsoil (with the proper low moisture content) will be uniformly spread over the stripped portion of the affected right-of-way, after the initial deep ripping of the exposed subsoil and the rock cleanup has been completed, in late spring or early summer.

2.0 In areas where trench settling occurs after topsoil spreading, imported topsoil will be used to fill each depression. Attempts will be made to identify sources of topsoil free of weeds, including soliciting input from landowners of potential sources.

3.0 Topsoil from the right-of-way or from adjacent agricultural land will not be used to backfill depressions.

Soil Moisture (Workability) during Restoration, Compaction Testing during Monitoring and Remedial Action

1.0 Soil Moisture – During restoration activities check the soils for not exceeding friable (workable) moisture content using the following procedures (Atterberg field test for plastic soil consistency):

1.1 Exposed construction surface subsoil

1.1.1 Take a sample with a soil auger at a depth of 16 inches.

1.1.2 Roll the soil in your hand (Worm Method), to the diameter of an earthworm (1/8" diameter), and if the soil remains intact, in increments beyond 3/8" long, the soil is too wet (or "plastic"). If it breaks (crumbles) apart into 3/8" or shorter sections, the moisture content is correct (workable for deep ripping).

1.2 Topsoil stockpile (berm)

1.2.1 Take samples from vicinity of the berms' lower outside and inside slopes, 9 inches deep, and from the berms' inner core (at least 24 inches inside of the berm).

1.2.2 Administer the same test for each individual sample of topsoil material, as above in 1.1.2 (worm method). If all samples test friable (workable) topsoil replacement may proceed as long as favorable soil conditions remain.

1.2.3 If the topsoil is too wet, break open the topsoil stockpile (berm) and rough spread the soil partially across the right-of-way, allow it to air dry, and then conduct re-tests, until friable (usually about 2 days minimum of clear, dry weather) and then complete the topsoil replacement.

2.0 Compaction Testing during the Post Restoration Monitoring and Maintenance - Once the moisture of the restored, full soil profile on the affected right-of-way is at or near equilibrium with the adjacent off right-of-way land, soil profile compaction testing will be conducted by the Agricultural Inspector using an appropriate soil penetrometer or other soil compaction-measuring device (in the early spring following the year of initial restoration).

2.1 Cone-type soil penetrometer, using the 3/4 inch diameter cone, or similar cone-type soil compaction measuring tool, capable of withstanding applications of at least 400 pounds-per-square-inch (psi). When the readings inside the right-of-way are less than, equal with, or no more than twenty percent greater than the subsoil density readings outside the right-of-way, the subsoil de-compaction/shattering restoration is satisfactory.

2.2 Test for soil compaction, obtaining readings at every 3-inch vertical interval from surface to 21 inches, or to the point of resistance (300 psi), through the topsoil and subsoil, across the project right-of-way in agricultural areas. These cross section tests shall be conducted at right-of-way inter-spacing (not to exceed 200 feet) sufficient to determine the need for remedial measures.

2.3 Tests shall be done on the same soil type under the similar moisture conditions and should include the following areas

2.3.1 Temporary stockpile areas

2.3.2 The trenched zone

2.3.3 Soil from undisturbed areas

2.3.4 The work area

2.3.5 Any traffic areas related to the project

2.4 It is standard to test each sampling site of a multi-site cross section at five to eight separate points of measurement of the soil profile's density, all taken in roughly the area of a thirty-inch diameter circle. The single highest and single lowest mechanical samples of the complete soil

profile, per test site, are “thrown out”. The remainder of the complete test samples recorded in 3-inch increments is used to calculate the soil profile’s average density per 3-inch increment.

2.5 The soil profile compaction test results within the right-of-way will be compared with those of the adjacent off right-of-way portion of the affected farm field/soil unit.

2.6 If the “higher-than-threshold” measurements occur (for instance) in one out of six representative cross-sections of one long field and no similar excesses are measured in its neighboring croplands along the right-of-way, this should be viewed as an “isolated anomaly” and the soil restoration work on the subject field is generally considered adequate.

3.0 Where representative subsoil density on the right-of-way, or a repetitive zone within the right-of-way, exceeds the representative subsoil density outside the right-of-way, follow-up shattering of the soil profile will be performed using a deep, angled-leg subsoil tool in the respective areas of the right-of-way.

4.0 Follow-up deep shattering will be applied during periods of relatively low soil moisture to ensure the desired mitigation and to prevent additional subsoil compaction. (Refer to Soil Moisture section 1.0, above)

5.0 Oversized stone/rock material, which is uplifted to the surface as a result of the deep shattering, will be removed.

General Monitoring and Remediation

1.0 General right-of-way conditions to be monitored include topsoil thickness, relative soil density (compaction), relative content of rock and large stones, trench settling, crop development, drainage and repair of severed fences, etc, for not less than two years following the full-length activation of the pipeline or completion of initial ROW restoration, whichever occurs last.

Topsoil deficiency and trench settling shall be mitigated with imported topsoil that is of "equal or greater quality" than topsoil on the affected site. Crop development/production problems maybe the result of right-of-way trench saturation or residual compaction, in which case appropriate interceptor drainage and/or de-compaction mitigation will be implemented. Results will be compared to portions of the same field located outside of the right-of-way.

Attachment 2

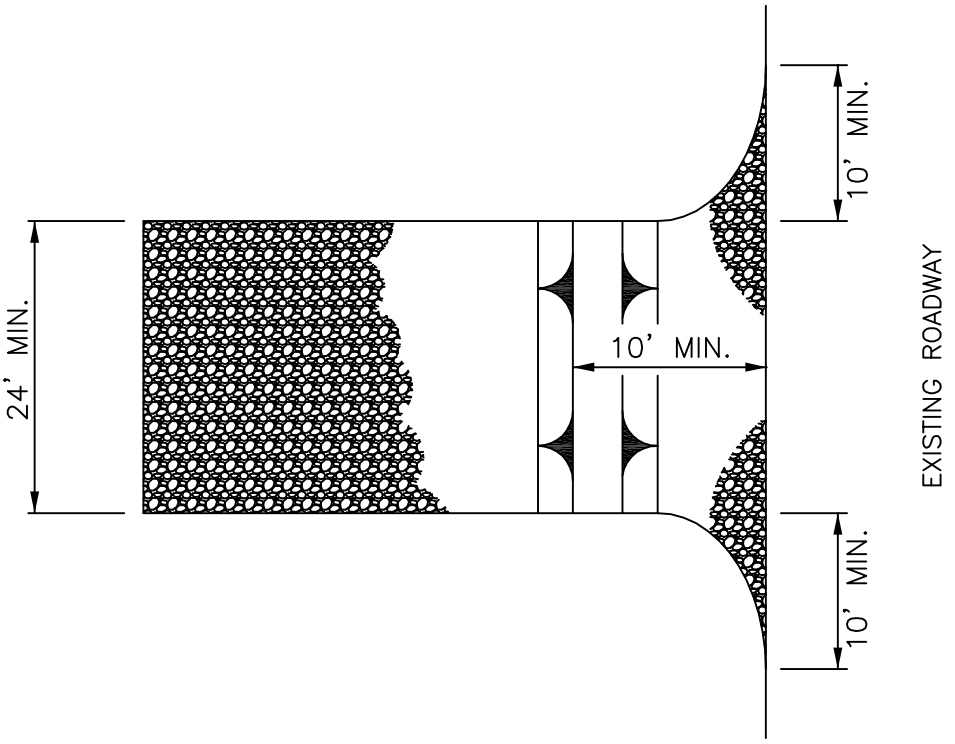
Best Management Practices (BMP) Drawings

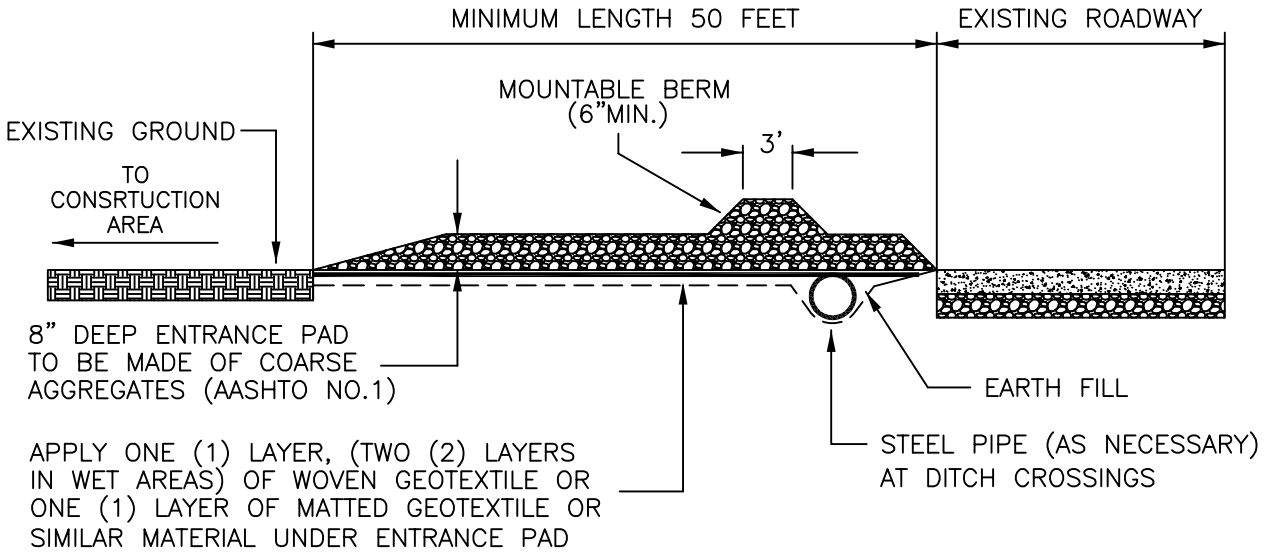
BMP Drawing Index

BMP Description	Drawing Number	Drawing Date
Entrance Pad	1	1/17/2014
Stream Crossing – Dam & Pump Energy Dissipater	2	5/16/2002
Pipe Test Energy Dissipater	3	12/9/2013
Wetland Crossing	4	1/17/2014
Wetland Travel Area	4A	1/17/2014
Filter Fence	5	6/2/2010
Trench Breaker	6A	1/17/2014
Stream Bank Stabilization	7	1/7/1997
Slope Breakers	8A	1/17/2014
Stream Mat	9	1/17/2014
Stream Mat at Undefined Channel	9A	1/17/2014
Temporary Equipment Timber Mat Stream Crossing	9B	8/24/2016
Road Crossing (Open Cut)	10	1/17/2014
Diversion Ditch	11	1/8/1997
Road Crossing (Bore)	12	1/17/2014
Flume (Dry Ditch) Stream	13	1/17/2014
Run Off Ditch	14	6/27/2007
Erosion Blankets Channel Installation	15	1/9/1997
Specifications Erosion Blankets Channel Installation	15A	1/9/1997
Block and Gravel Drop Inlet Sediment Barrier	16	3/27/2017
Rock Channel Filter	17	1/10/1997
Road Culvert Extension Across Pipeline Trench	18	9/9/2003
Temporary Culvert With Clean Rock Fill	19	1/17/2014
Temporary Culvert Across Open Trench	20	1/10/1997
Dam And Pump Stream Crossing	21	1/17/2014
Straw Bale Installation	22	3/10/2000
Topsoil Segregation	23	1/17/2014
Topsoil Segregation	23A	1/17/2014
Topsoil Segregation	23B	1/17/2014
Erosion Blankets Slope Installation	24	1/13/1997
Specifications Erosion Blankets Slope Installation	24A	1/13/1997
Catch Basin Sediment Sack	25	3/5/2008
Cathodic Protection Anode Installation	26	1/17/2014
Storm Water Channel	27	6/27/2007
Dewatering Filter Bag	28	1/17/2014
Road Culvert	29	9/14/2001
Typical Drain Tile Repair Across Trench	30	6/24/2005

BMP Drawing Index

BMP Description	Drawing Number	Drawing Date
Typical Drain Tile Repair Across Trench	30A	6/29/2005
Energy Dissipater	31	6/27/2007
Wooden Mat Bridge Pipeline Crossing	32	1/17/2014
Stone Bridge Pipeline Crossing (Without Mats)	32A	1/17/2014
Bell Hole Next To Waterbody	33	1/17/2014
Bell Hole Next To Wetland	34	1/17/2014
Bell Hole Agricultural Field	35	1/17/2014
Bell Hole Adjacent To Paved Road	36	1/17/2014
Extra Work Spaces	37	1/17/2014
Right-Of-Way Crowning	38	4/4/2005
Discharge Method For Trench Dewatering	39	1/17/2014
Parallel/New Submain Tile Installation	40	5/11/2006
Lateral Intercept Drain	41	4/8/2005
Typical Drain Tile Outlet	42	6/24/2005
Stone Pipeline Crossing with Timber Matting	43	1/17/2014
Elevated Washrack	44	5/3/2007
Compost Filter Sock	45A	12/9/2013
Compost Filter Sock	45B	3/11/2010
Compost Filter Sock	45C	3/11/2010
(No BMP Drawing)	46	-----
Trench Dewatering Sediment Corral	47	9/13/2010
Hydrotest Water Discharge Device	48	1/17/2014
Large Volume Hydrotest Water Discharge Device	48A	1/17/2014
Concrete Slab Pipe Protection Detail	49	1/17/2014
Diversion Terrace Protection and Mat	50	1/17/2014
Sediment Filter Sock (New York)	51	1/23/2014
30’-0” Portable Bridge	52	2/9/2017
35’-0” Portable Bridge	53	2/9/2017
40’-0” Portable Bridge	54	2/9/2017





MOUNTABLE BERMS SHOULD BE INSTALLED WHEREVER OPTIONAL CULVERT PIPE IS USED. PIPE TO BE SIZED APPROPRIATELY FOR SIZE OF DITCH BEING CROSSED.

MAINTENANCE:

ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON THE 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 DEPSOSITED ON ROADWAY, EXTEND LENGTH OF ROCK CONSTRUCTION BY 50 FEET INCREMENTS UNTIL CONDITION IS ALLEVIATED OR INSTALL WASH RACK. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWER, CULVERTS, OR OTHER DRAINSGEWAYS IS NOT ACCEPTABLE.

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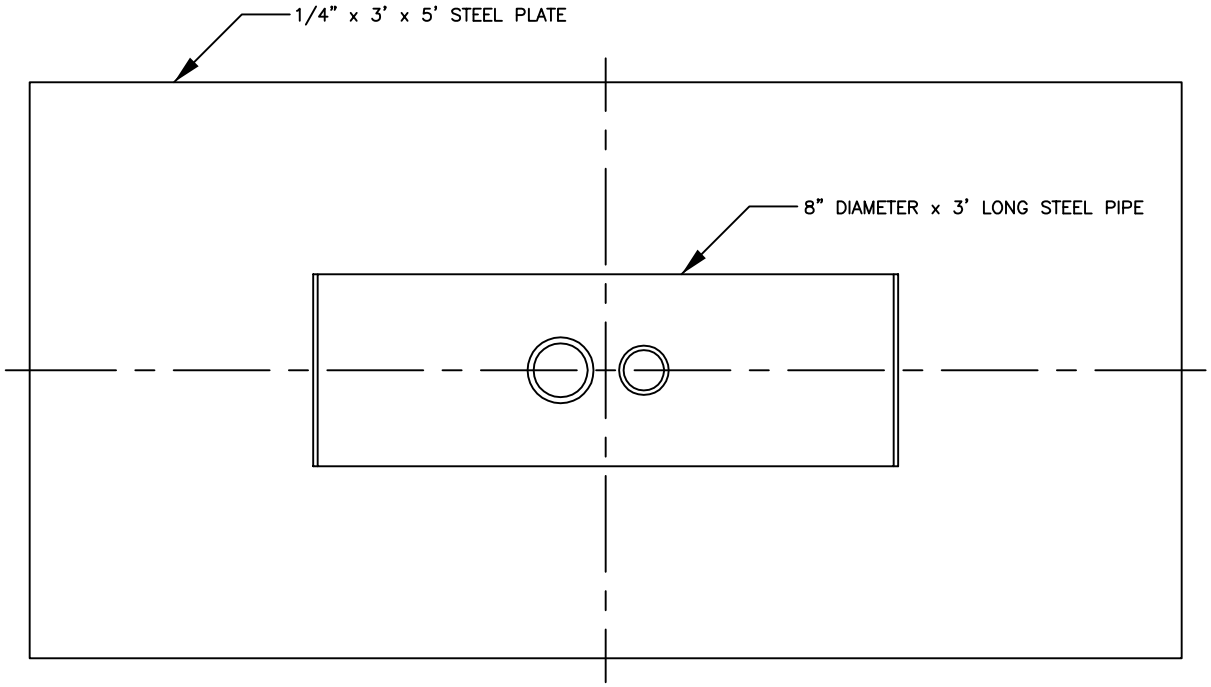

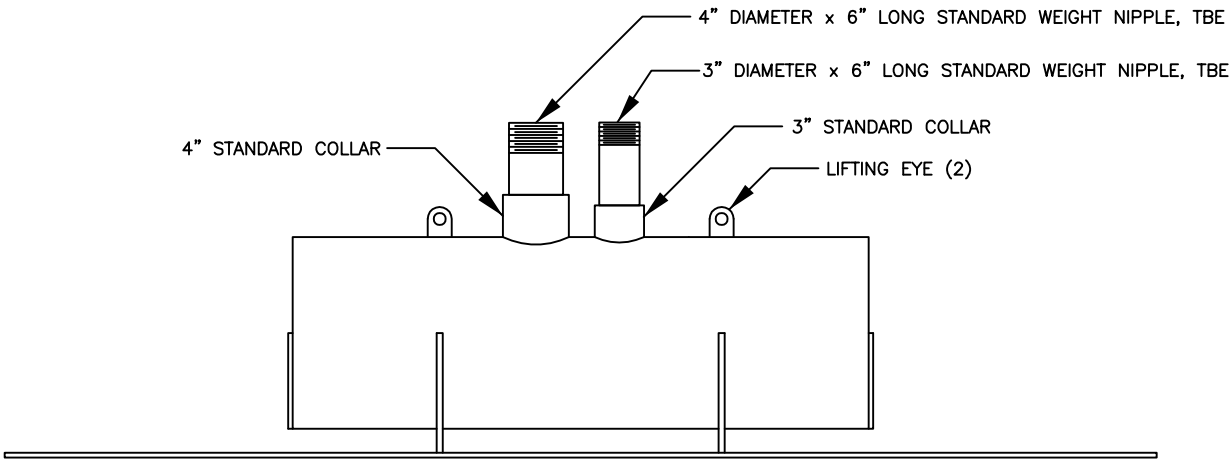

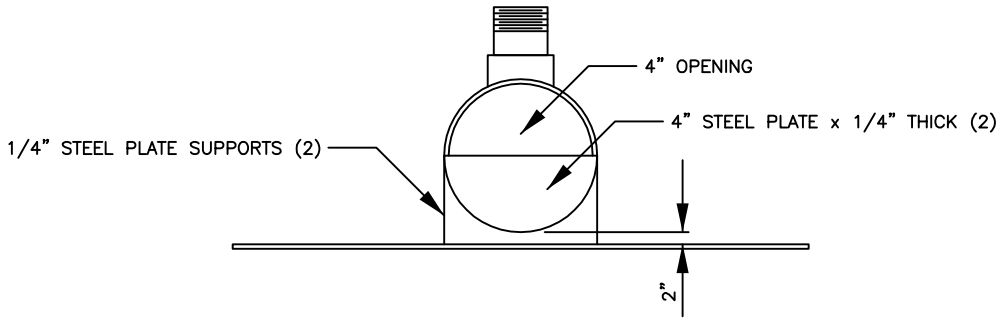

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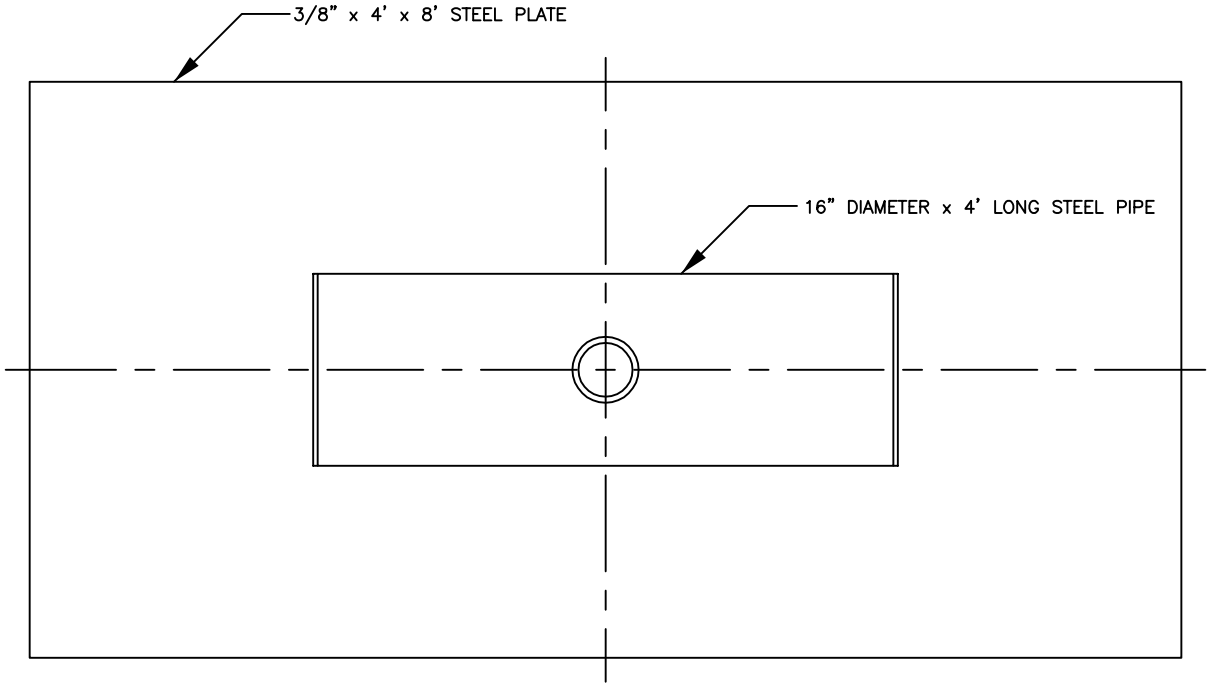

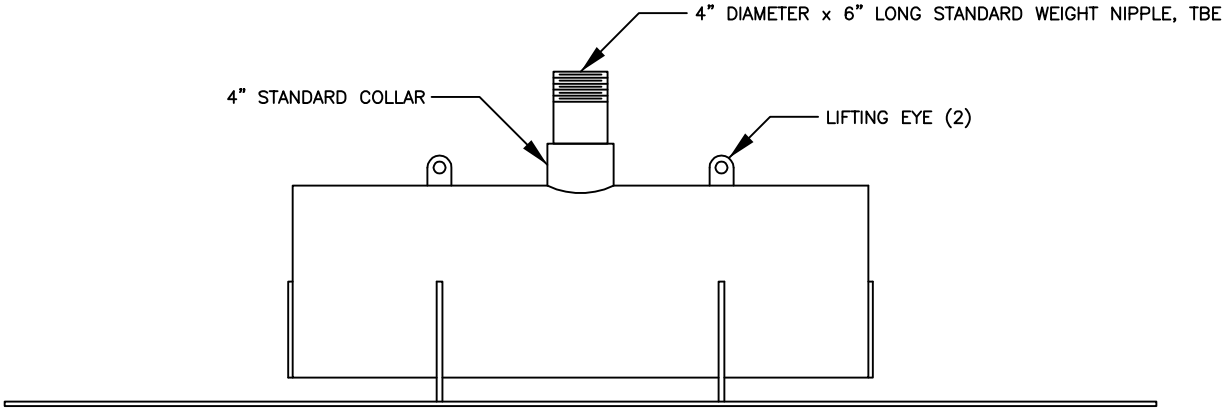

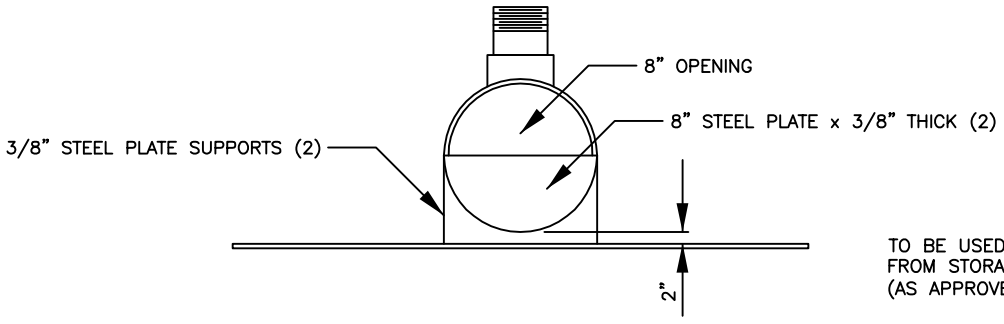

TO BE USED FOR DISCHARGING FROM STORAGE TANK TO STREAM (AS APPROVED BY PERMITTING)

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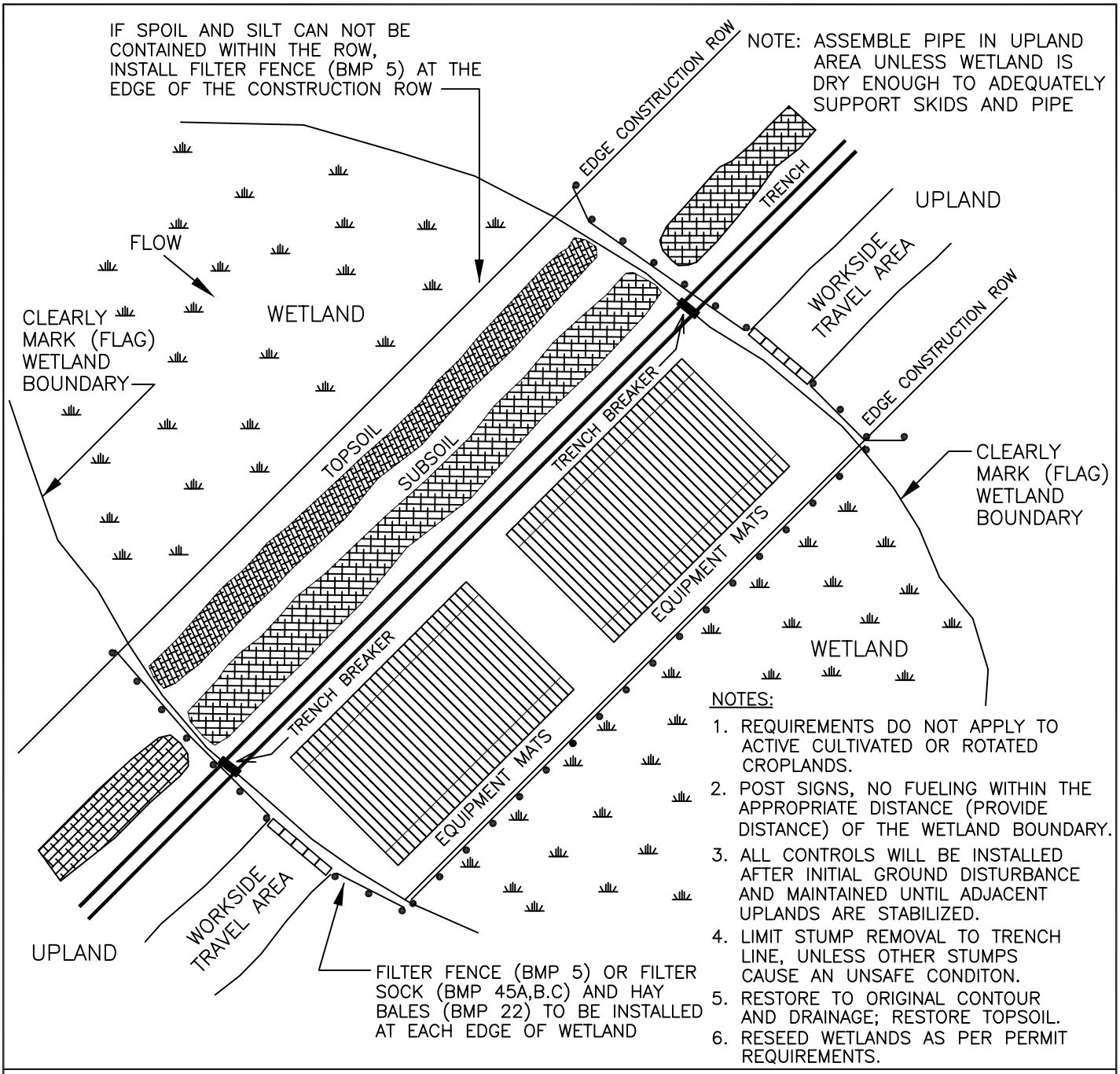
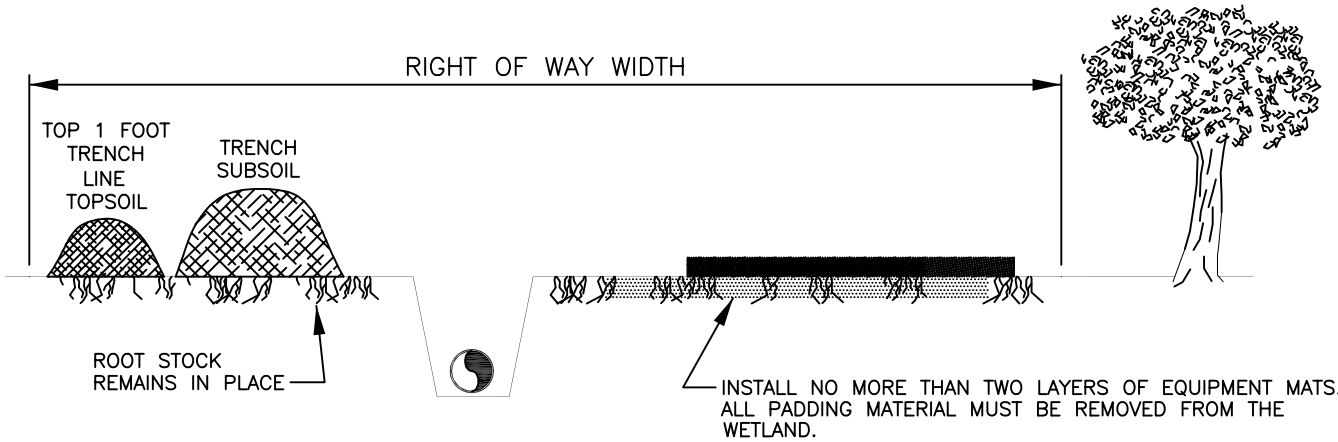


NOTES:

1. REQUIREMENTS DO NOT APPLY TO ACTIVE CULTIVATED OR ROTATED CROPLANDS.
2. POST SIGNS, NO FUELING WITHIN THE APPROPRIATE DISTANCE (PROVIDE DISTANCE) OF THE WETLAND BOUNDARY.
3. ALL CONTROLS WILL BE INSTALLED AFTER INITIAL GROUND DISTURBANCE AND MAINTAINED UNTIL ADJACENT UPLANDS ARE STABILIZED.
4. LIMIT STUMP REMOVAL TO TRENCH LINE, UNLESS OTHER STUMPS CAUSE AN UNSAFE CONDITON.
5. RESTORE TO ORIGINAL CONTOUR AND DRAINAGE; RESTORE TOPSOIL.
6. RESEED WETLANDS AS PER PERMIT REQUIREMENTS.



RESTORE TO ORIGINAL CONTOUR AND DRAINAGE; RESTORE TOPSOIL

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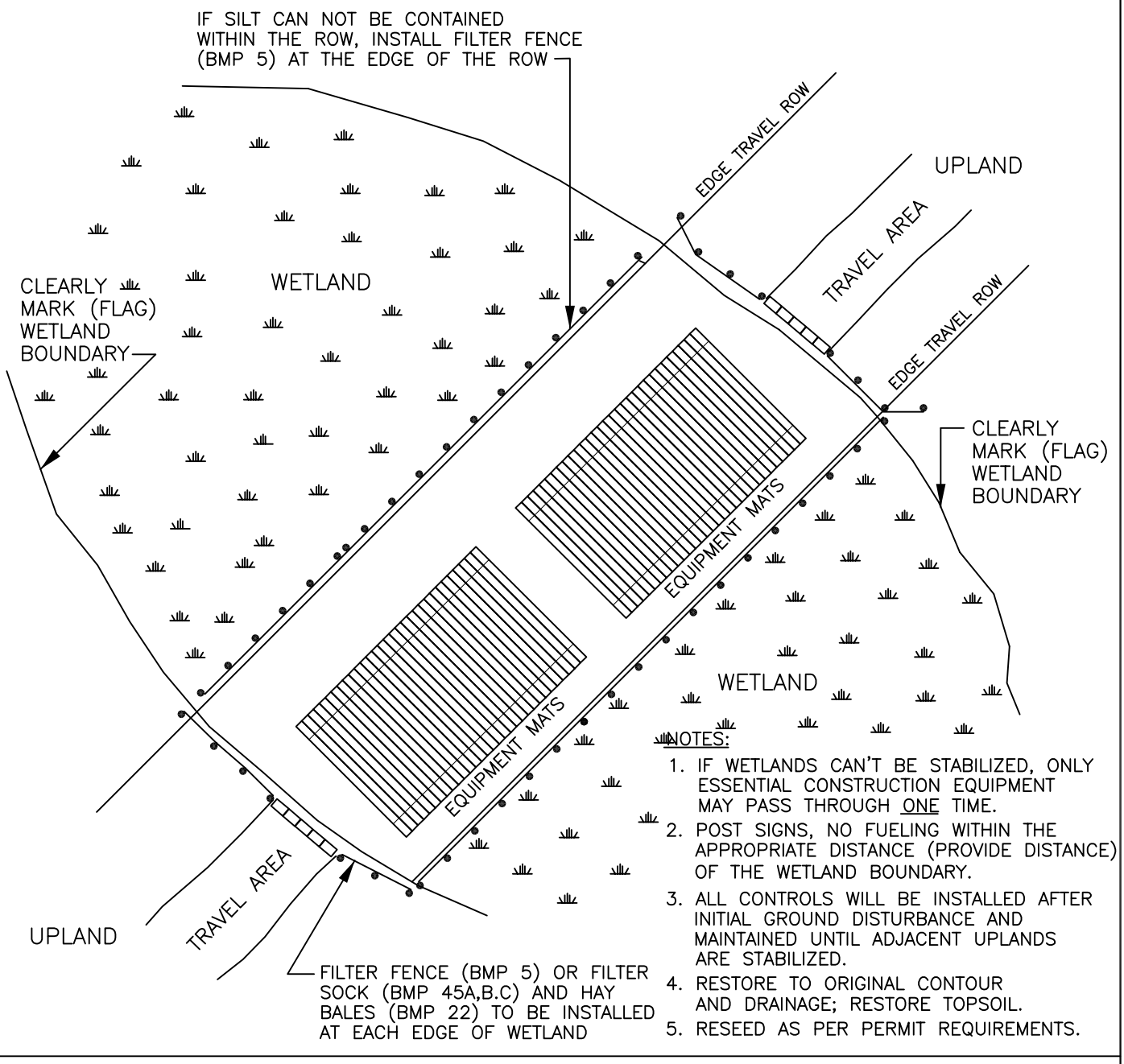
FILENAME: EPC\BMP04.dwg
LAST REVISION DATE: 01/17/2014

WETLAND CROSSING

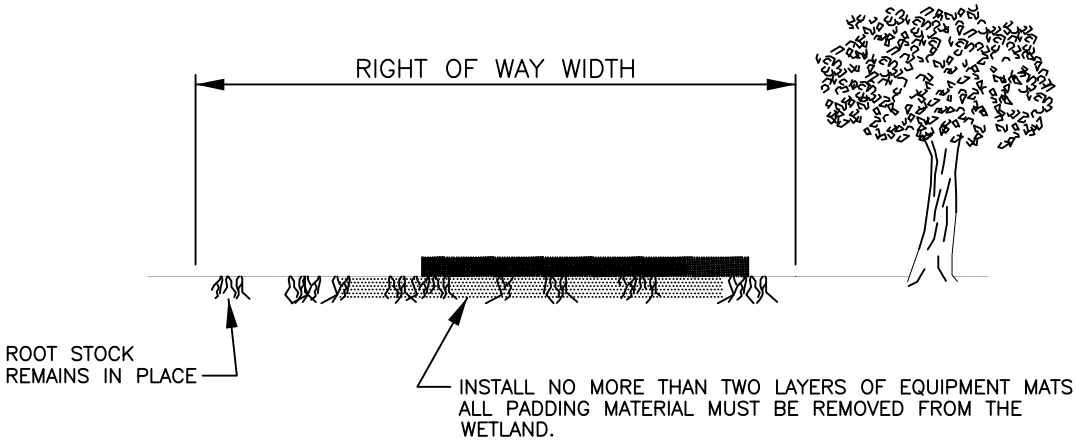
DRAWING NUMBER: 4

REVIEWED: 01/2014



NOTES:

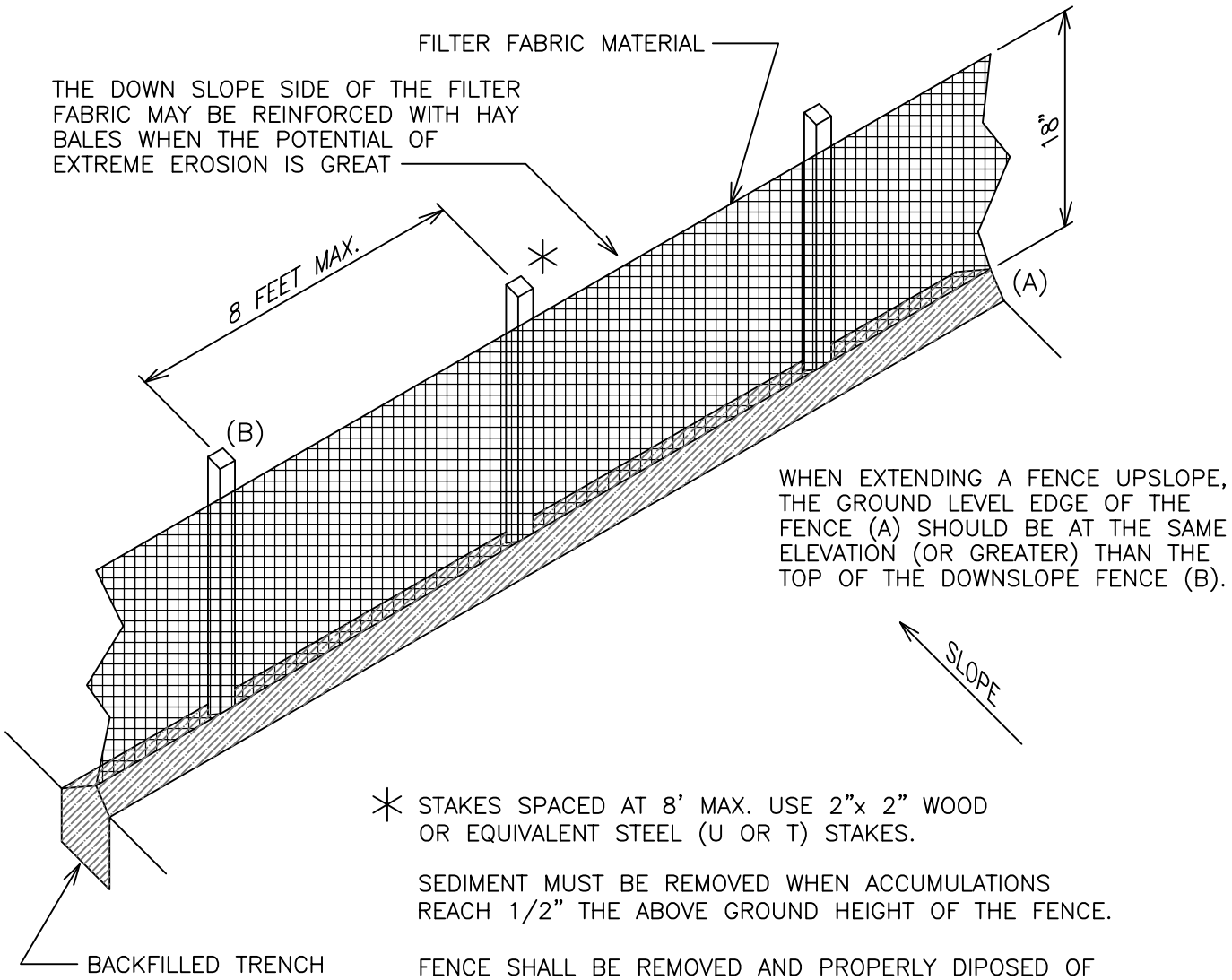
1. IF WETLANDS CAN'T BE STABILIZED, ONLY ESSENTIAL CONSTRUCTION EQUIPMENT MAY PASS THROUGH ONE TIME.
2. POST SIGNS, NO FUELING WITHIN THE APPROPRIATE DISTANCE (PROVIDE DISTANCE) OF THE WETLAND BOUNDARY.
3. ALL CONTROLS WILL BE INSTALLED AFTER INITIAL GROUND DISTURBANCE AND MAINTAINED UNTIL ADJACENT UPLANDS ARE STABILIZED.
4. RESTORE TO ORIGINAL CONTOUR AND DRAINAGE; RESTORE TOPSOIL.
5. RESEED AS PER PERMIT REQUIREMENTS.



RESTORE TO ORIGINAL CONTOUR AND DRAINAGE; RESTORE TOPSOIL

National Fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512 (814) 871-8676	DRAWN BY: DRISCOLL/PHILLIPS FILENAME: EPC\BMP04A.dwg LAST REVISION DATE: 01/17/2014	WETLAND TRAVEL AREA	DRAWING NUMBER: 4A

REVIEWED: 01/2014

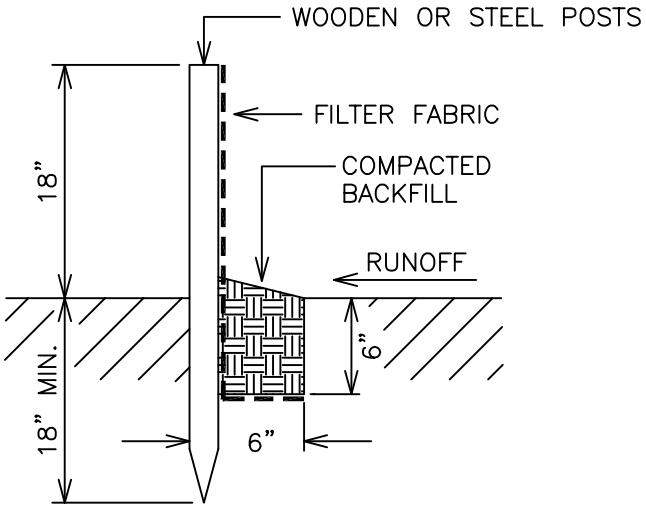


✳ STAKES SPACED AT 8' MAX. USE 2"x 2" WOOD OR EQUIVALENT STEEL (U OR T) STAKES.

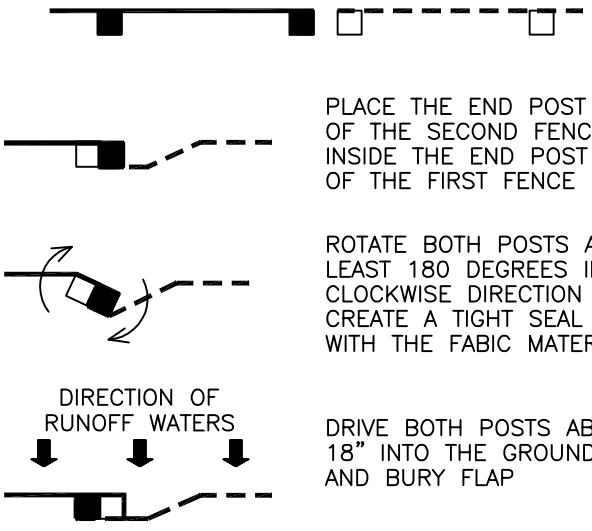
SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2" THE ABOVE GROUND HEIGHT OF THE FENCE.

FENCE SHALL BE REMOVED AND PROPERLY DIPOSED OF WHEN DISTURBED AREA IS PERMANENTLY STABILIZED.

FENCE DETAIL



ATTACHING TWO SILT FENCES



PLACE THE END POST OF THE SECOND FENCE INSIDE THE END POST OF THE FIRST FENCE

ROTATE BOTH POSTS AT LEAST 180 DEGREES IN A CLOCKWISE DIRECTION TO CREATE A TIGHT SEAL WITH THE FABIC MATERIAL

DRIVE BOTH POSTS ABOUT 18" INTO THE GROUND AND BURY FLAP

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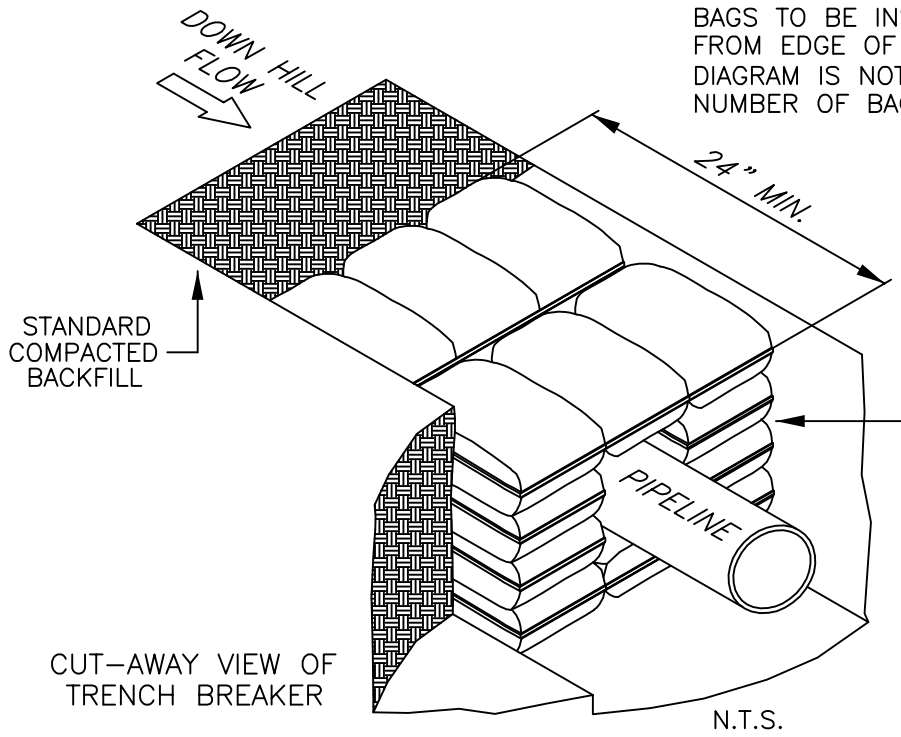
REVIEWED: 01/2014



BAGS TO BE INSTALLED TO FILL ENTIRE VOID FROM EDGE OF DITCH TO EDGE OF DITCH. THE DIAGRAM IS NOT A REPRESENTATION OF THE TOTAL NUMBER OF BAGS REQUIRED.

IMPERVIOUS TRENCH BREAKERS (CLAY OR BENTONITE) ARE REQUIRED FOR ALL STREAM, RIVER, WETLAND OR OTHER WATER BODY CROSSINGS.

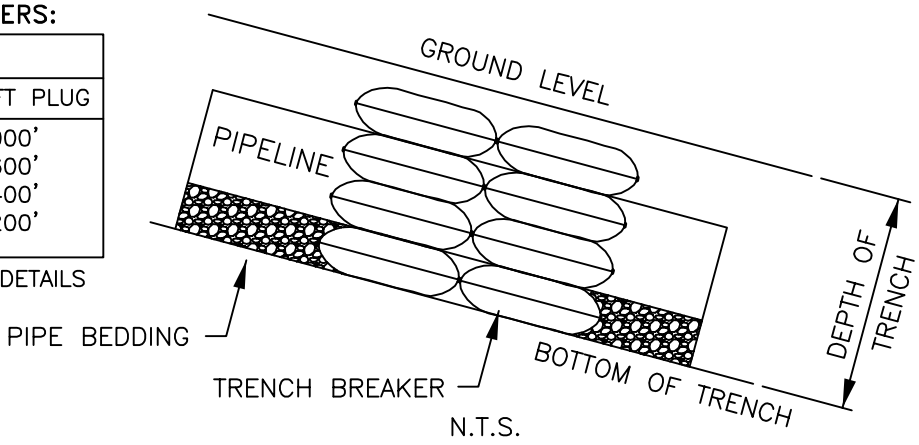
CUT–AWAY VIEW OF TRENCH BREAKER

N.T.S.

TEMPORARY TRENCH BREAKERS:

HARD/SOFT PLUG SPACING			
SLOPE	HARD PLUG	(OR)	SOFT PLUG
< 5%	N/A	(OR)	1000'
5–15%	900'		600'
15–30%	600'		400'
>30%	300'		200'

* SEE BMP #8A FOR ADDITIONAL DETAILS



N.T.S.

TRENCH BREAKER SLOPE SPACING

- AT THE SPACING LISTED IN THE CHART SHOWN BELOW ON THIS DRAWING.

ADDITIONAL LOCATIONS

AS A MINIMUM, INSTALL A TRENCH BREAKER AT THE BASE OF SLOPES GREATER THAN 5% WHERE THE BASE OF SLOPE IS LESS THAN 50' FROM A WATERBODY OR WETLAND AND WHERE NEEDED TO AVOID DRAINING A WATERBODY OR WETLAND.

PERMANENT TRENCH BREAKERS		
TRENCH SLOPE (%)	SPACING (FT)	PLUG MATERIAL
<5	1,000	* CLAY, BENTONITE, SOIL OR SAND FILLED SACKS
5–15	500	* CLAY, BENTONITE, SOIL OR SAND FILLED SACKS
15–25	300	* CLAY, BENTONITE, SOIL OR SAND FILLED SACKS
25–35	200	* CLAY, BENTONITE, SOIL OR SAND FILLED SACKS
35–100	100	* CLAY, BENTONITE, SOIL OR SAND FILLED SACKS
>100	50	CEMENT FILLED BAGS (WETTED) OF MORTARED STONE

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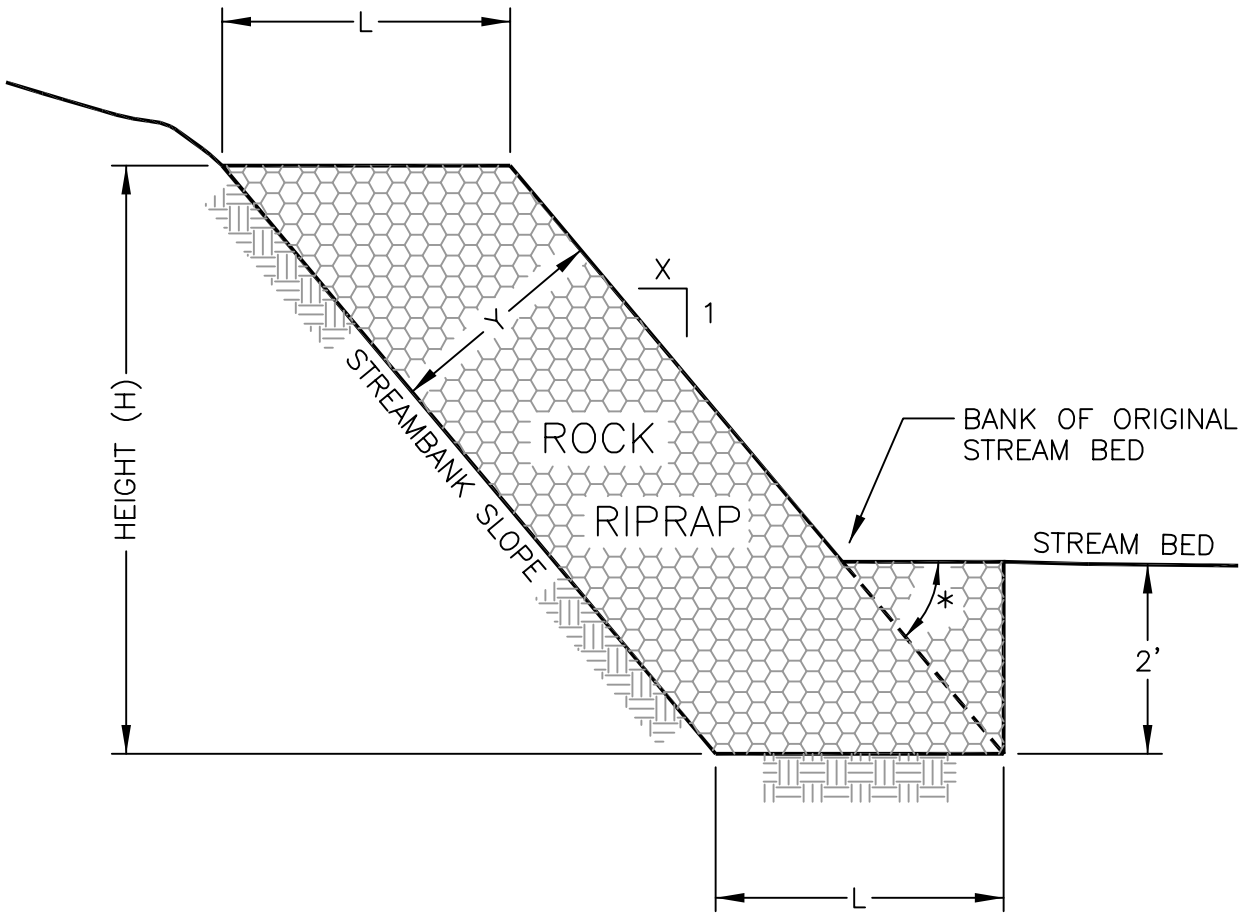
FILENAME: NFGSC\BMP06A.dwg
LAST REVISION DATE: 01/17/2014

TRENCH BREAKER

DRAWING NUMBER: 6A

REVIEWED: 01/2014



(Y) ROCK THICKNESS	TABLE OF L VALUES SIDE SLOPES			
	1.5:1	2:1	2.5:1	3:1
12"	1.8'	2.2'	2.7'	3.2'
18"	2.7'	3.4'	4.0'	4.7'
24"	3.6'	4.5'	5.4'	6.3'
30"	4.5'	5.6'	6.7'	7.9'
36"	5.4'	6.7'	8.1'	9.5'
42"	6.3'	7.8'	9.4'	11.1'
48"	7.2'	8.9'	10.8'	12.7'
*	33.69°	26.57°	21.80°	18.43°

FORMULAS TO CALCULATE LENGTH OF RIPRAP (L)

$$L = \frac{Y}{\sin *} \qquad \text{OR} \qquad L = Y\sqrt{X^2 + 1}$$

(ENTER "Y" IN FEET)

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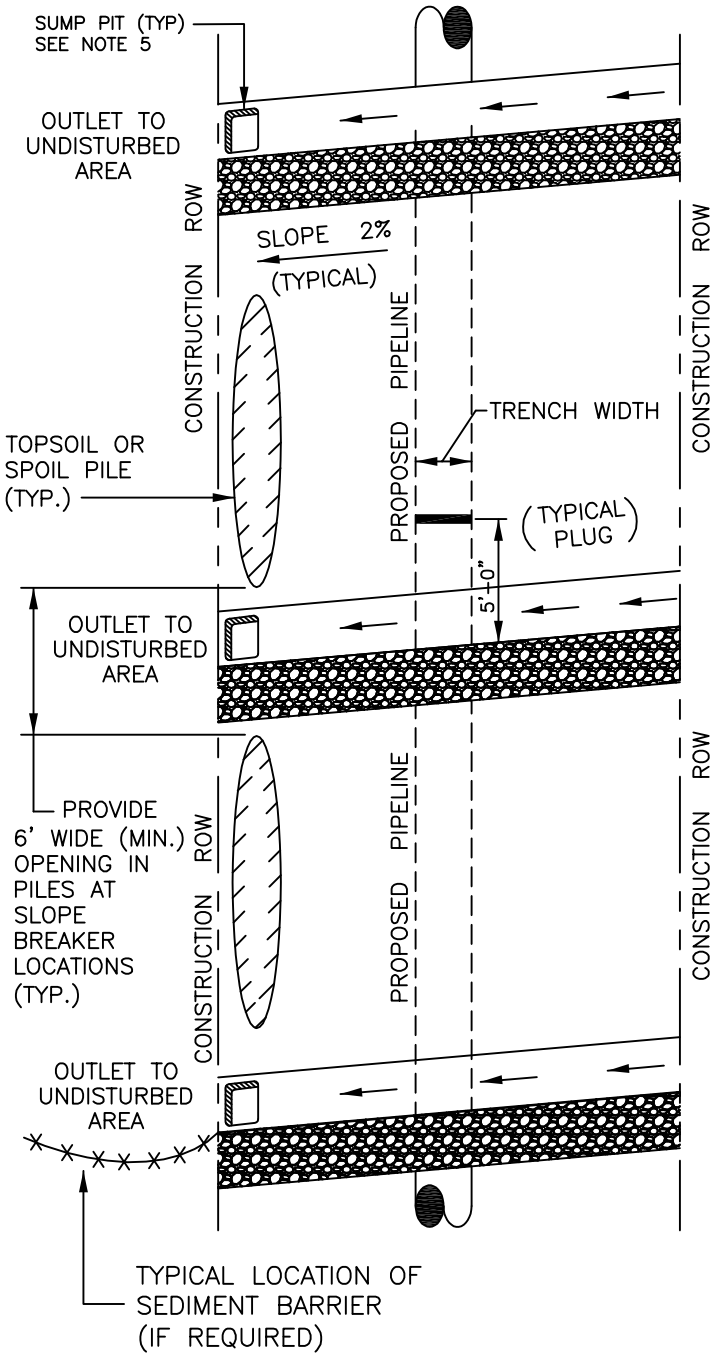
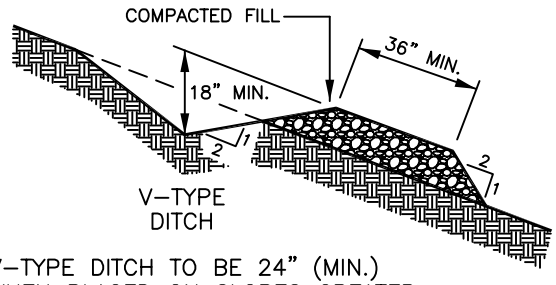
REVIEWED: 01/2014





V-TYPE DITCH TO BE 24" (MIN.) WHEN PLACED ON SLOPES GREATER THAN 33% (3H:1V).

TEMPORARY TRENCH BREAKER

HARD/SOFT PLUG SPACING			
SLOPE	HARD PLUG	(OR)	SOFT PLUG
< 5%	N/A		1000'
5–15%	900'	(OR)	600'
15–30%	600'		400'
>30%	300'		200'

NEW YORK PROJECTS SLOPE BREAKER SPACING	
SLOPE	DISTANCE
<5%	125 FEET
5–10%	100 FEET
10–20%	75 FEET
20–35%	50 FEET
>35%	25 FEET

PENNSYLVANIA PROJECTS SLOPE BREAKER SPACING	
SLOPE	DISTANCE
<5%	250 FEET
5–15%	150 FEET
15–30%	100 FEET
>30%	50 FEET

NOTES:

1. DO NOT INSTALL SLOPE BREAKERS TO OUTLET IN THE DIRECTION OF HOUSES OR BUILDINGS.
2. ANY BREAKERS THAT OUTLET ONTO A GRASS YARD WILL BE FILTERED BY A FILTER FENCE.
3. INSTALL AT THE BASE OF SLOPES ADJACENT TO WATERBODIES AND WETLANDS.
4. BREAKERS MAY EXTEND UP TO 4' BEYOND THE EDGE OF CONSTRUCTION IF THE AREA IS ENVIRONMENTALLY CLEARED.
5. OBSTRUCTIONS, (E.G. STRAW BALES, SILT FENCE, ROCK FILTERS, COMPOST SOCKS ETC.)SHOULD NOT BE PLACED IN ANY WATERBARS. WHERE NEEDED, THEY MAY BE LOCATED BELOW THE DISCHARGE END OF THE WATERBAR.
6. HARD PLUGS ARE UN-EXCAVATED PLUGS OF NATIVE SOIL LEFT IN THE PIPELINE TRENCH.
7. SOFT PLUGS ARE COMPACTED SOIL PLUGS THAT ARE PRE-EXCAVATED AND INSTALLED IN THE PIPELINE TRENCH.
8. COMPANY INSPECTOR SHALL DETERMINE THE TYPE OF PLUG TO BE USED.

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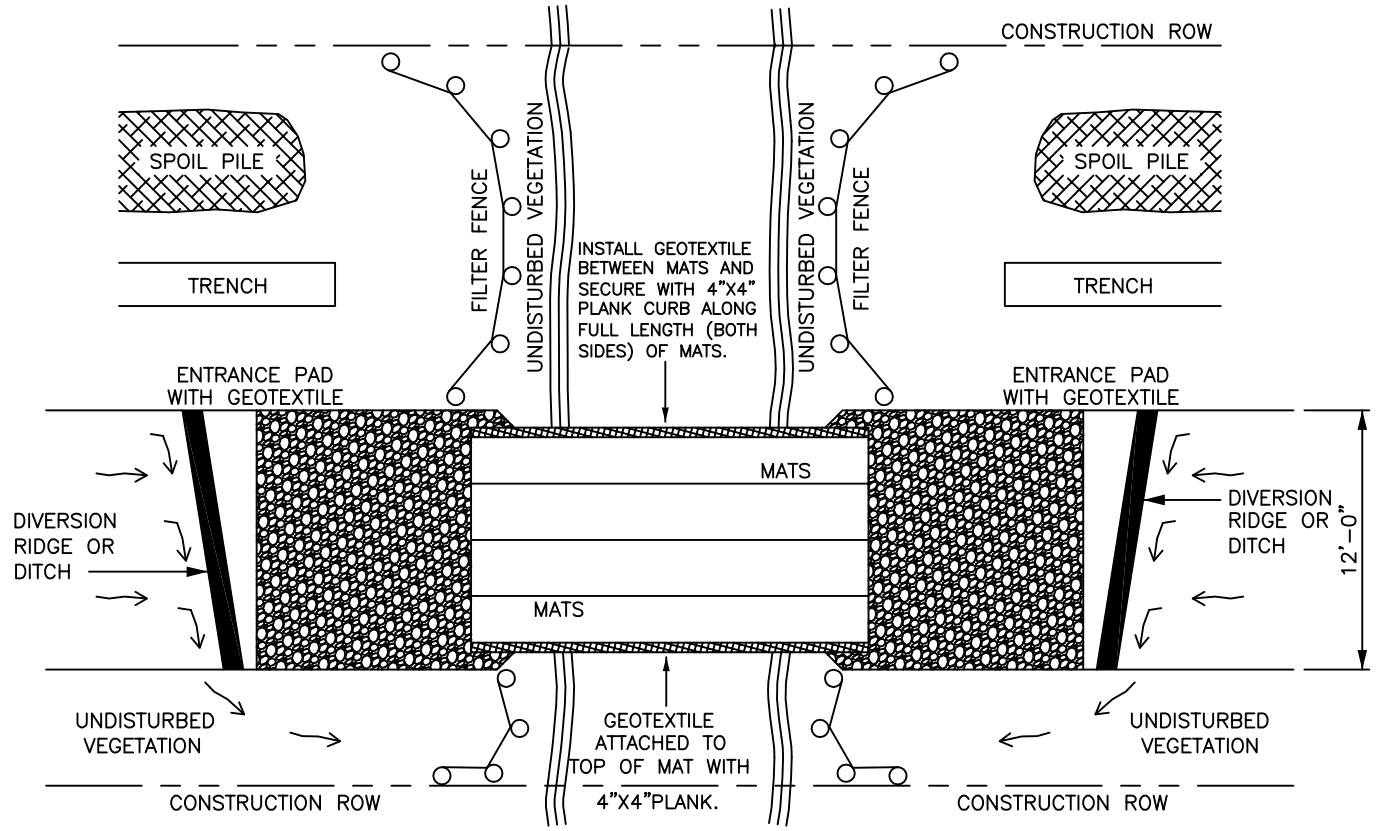
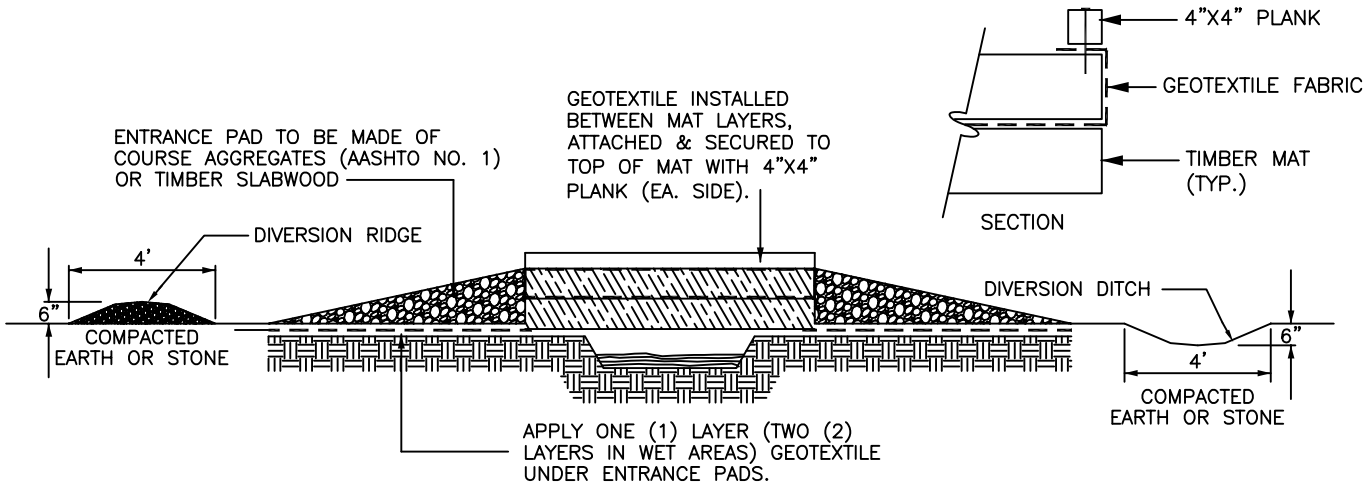
DRAWN BY: L. A. PHILLIPS
FILENAME: EPC\BMP08A.dwg
LAST REVISION DATE: 01/17/2014

SLOPE BREAKERS HARD PLUGS AND SOFT PLUGS

DRAWING NUMBER: 8A

REVIEWED: 01/2014

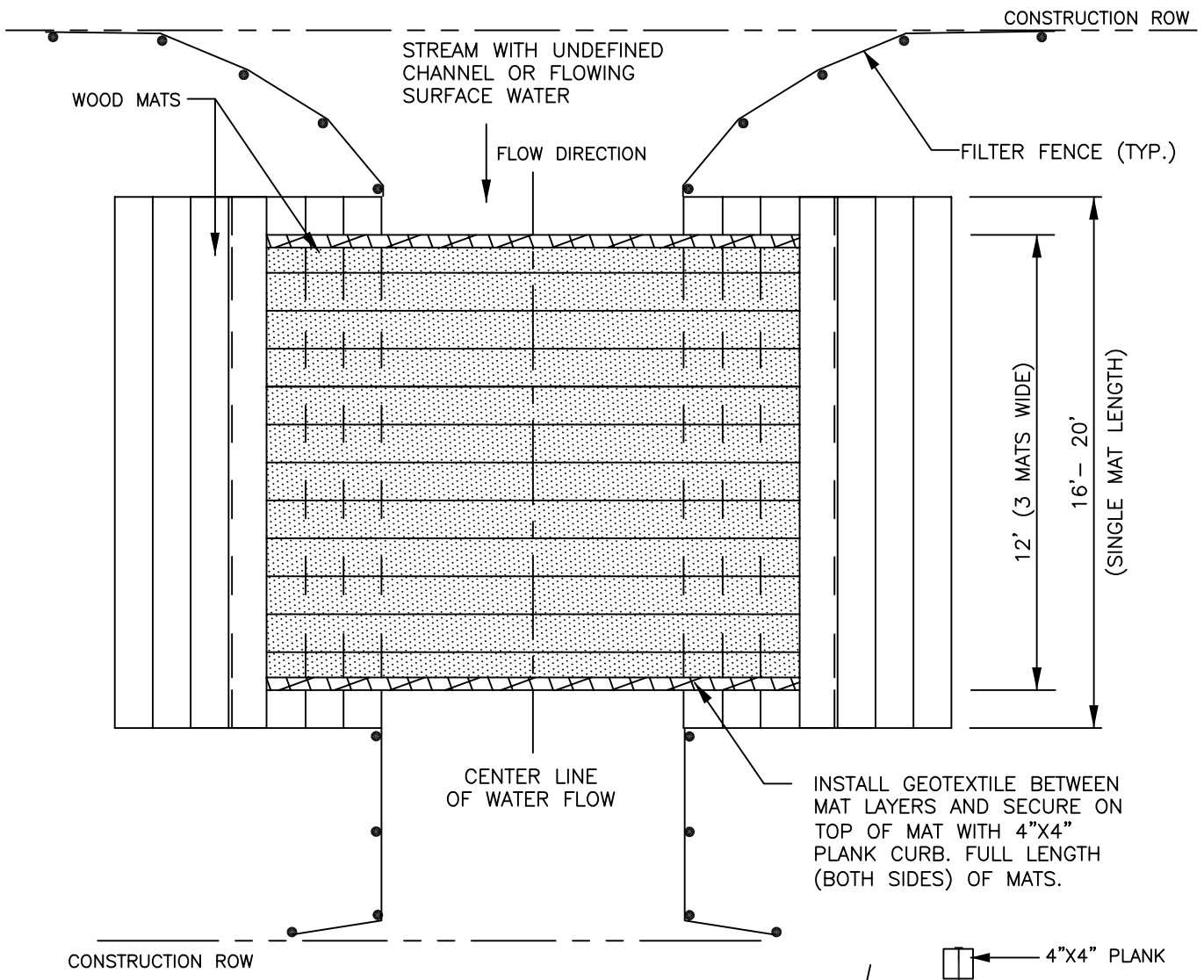




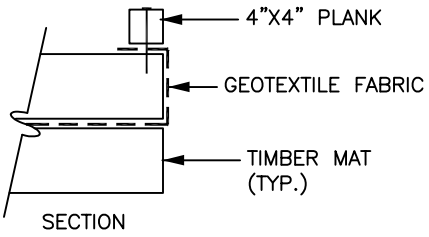
1. ONLY CLEARING EQUIPMENT AND EQUIPMENT NECESSARY FOR INSTALLATION OF EQUIPMENT BRIDGES MAY CROSS WATERBODIES PRIOR TO BRIDGE INSTALLATION. LIMIT THE CROSSING OF EACH WATERBODY TO ONE PER PIECE OF CLEARING EQUIPMENT.
2. INSTALL FILTER FENCE ACROSS THE DISTURBED AREA OF THE R.O.W.
3. APPLY GEOTEXTILE UNDER ENTRANCE PADS. INSTALL GEOTEXTILE BETWEEN MATS AND ATTACH TO TOP MAT.
4. EXCESS MUD IS TO BE REMOVED FROM THE ENTRANCE PADS AND MATS DURING CONSTRUCTION.
5. DURING FINAL CLEAN UP WHEN MATS, CULVERT, CLEAN ROCK FILL, ETC. ARE REMOVED, INSTALL FILTER FENCE ACROSS THE ENTIRE R.O.W. ON BOTH SIDES OF STREAM.
6. LOCATE ALL SPOIL A MINIMUM OF 10 FEET FROM THE WATERS EDGE.

National Fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512 (814) 871-8676	DRAWN BY: L. A. PHILLIPS FILENAME: NFGSC\BMP09.dwg LAST REVISION DATE: 01/17/2014	STREAM MAT	DRAWING NUMBER: 9

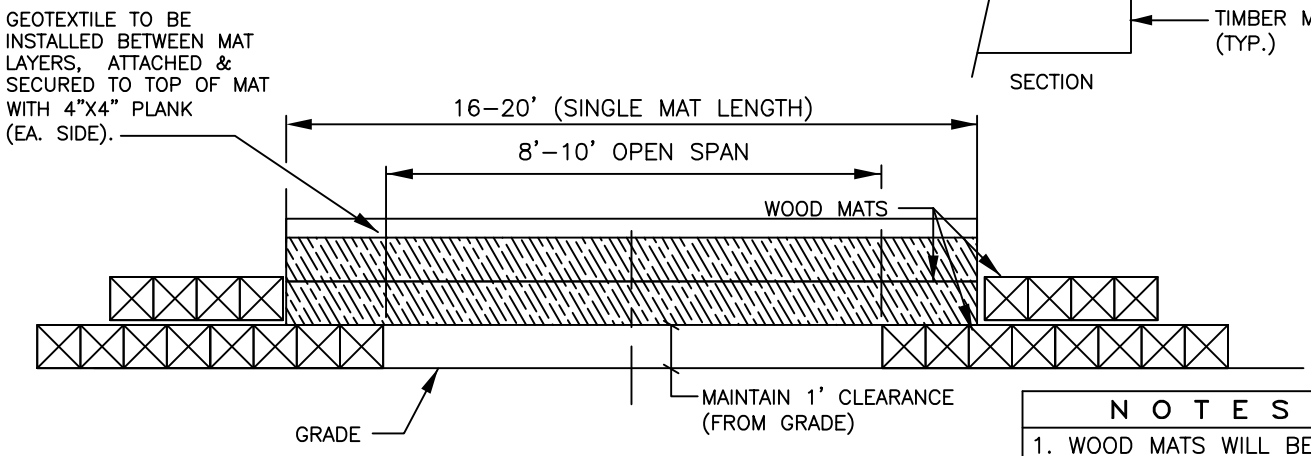
REVIEWED: 01/2014



PLAN VIEW



SECTION



SIDE VIEW

N O T E S

1. WOOD MATS WILL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.
2. ADDITIONAL MATS, IF NEEDED, WILL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.

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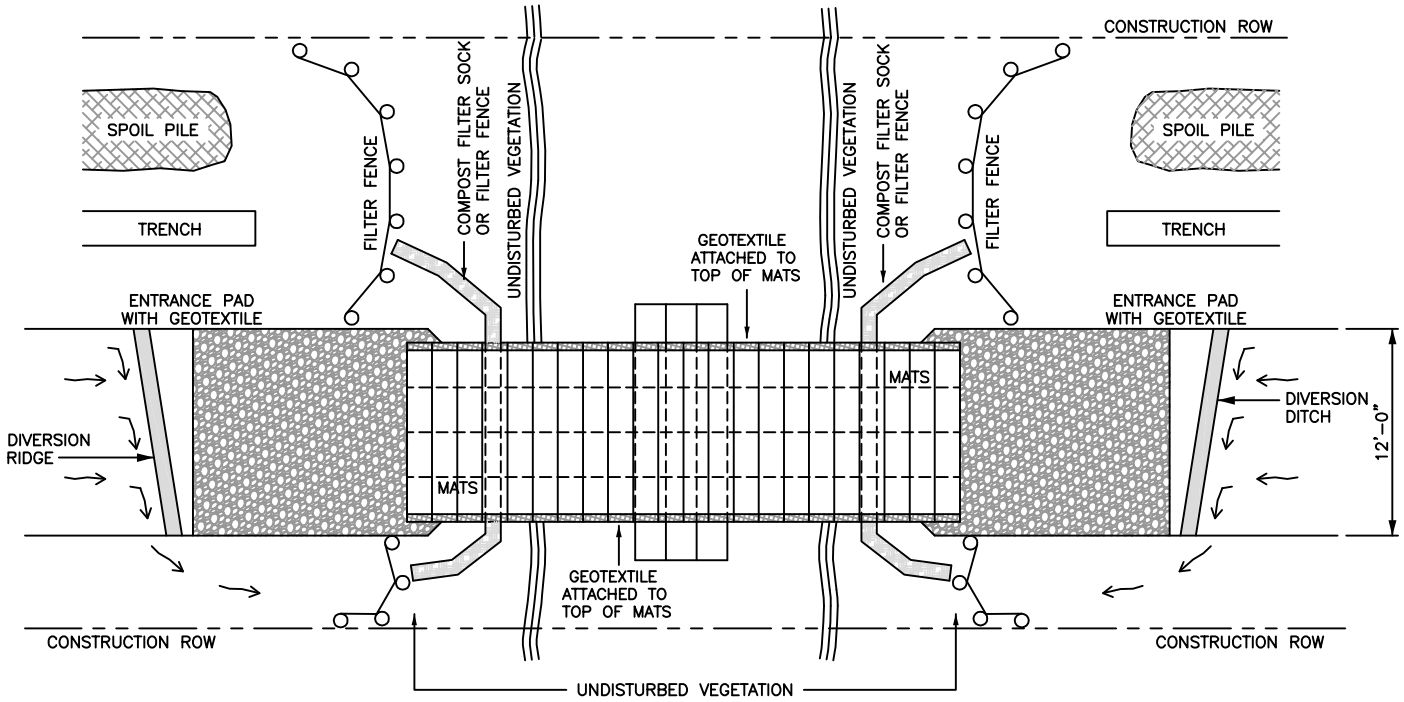
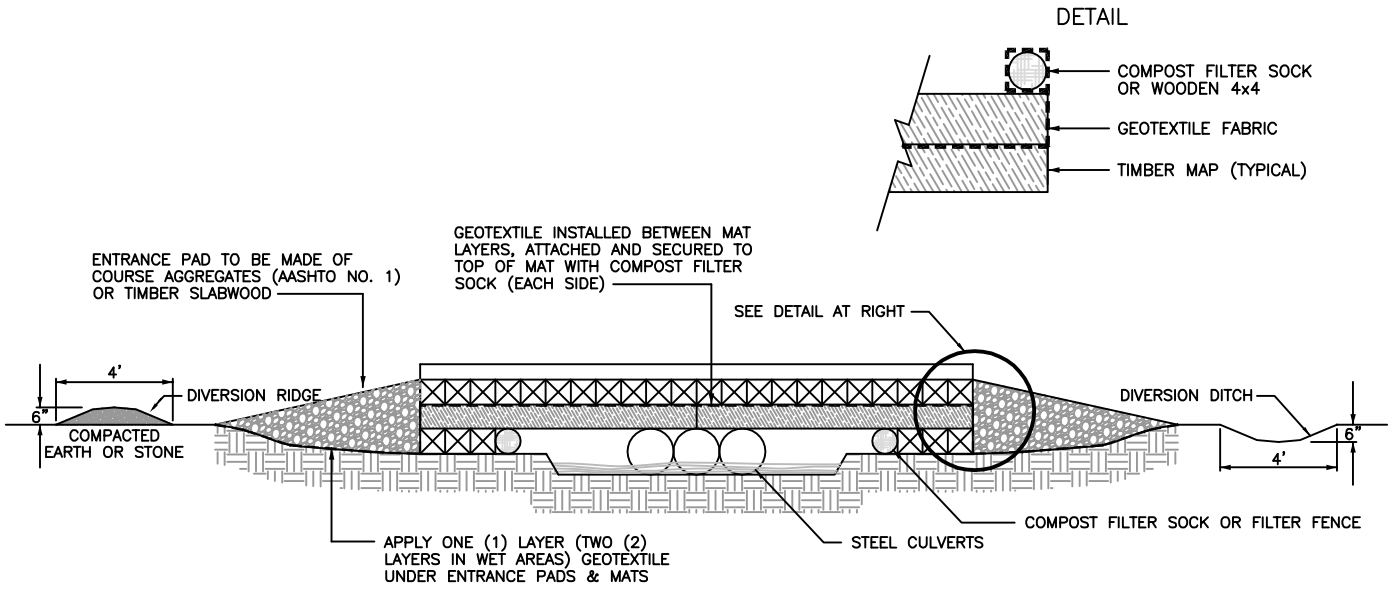
DRAWN BY: K. HURLEY
FILENAME: EPC\BMP9A.dwg
DATE: 01/17/2014

STREAM MAT @ UNDEFINED CHANNEL

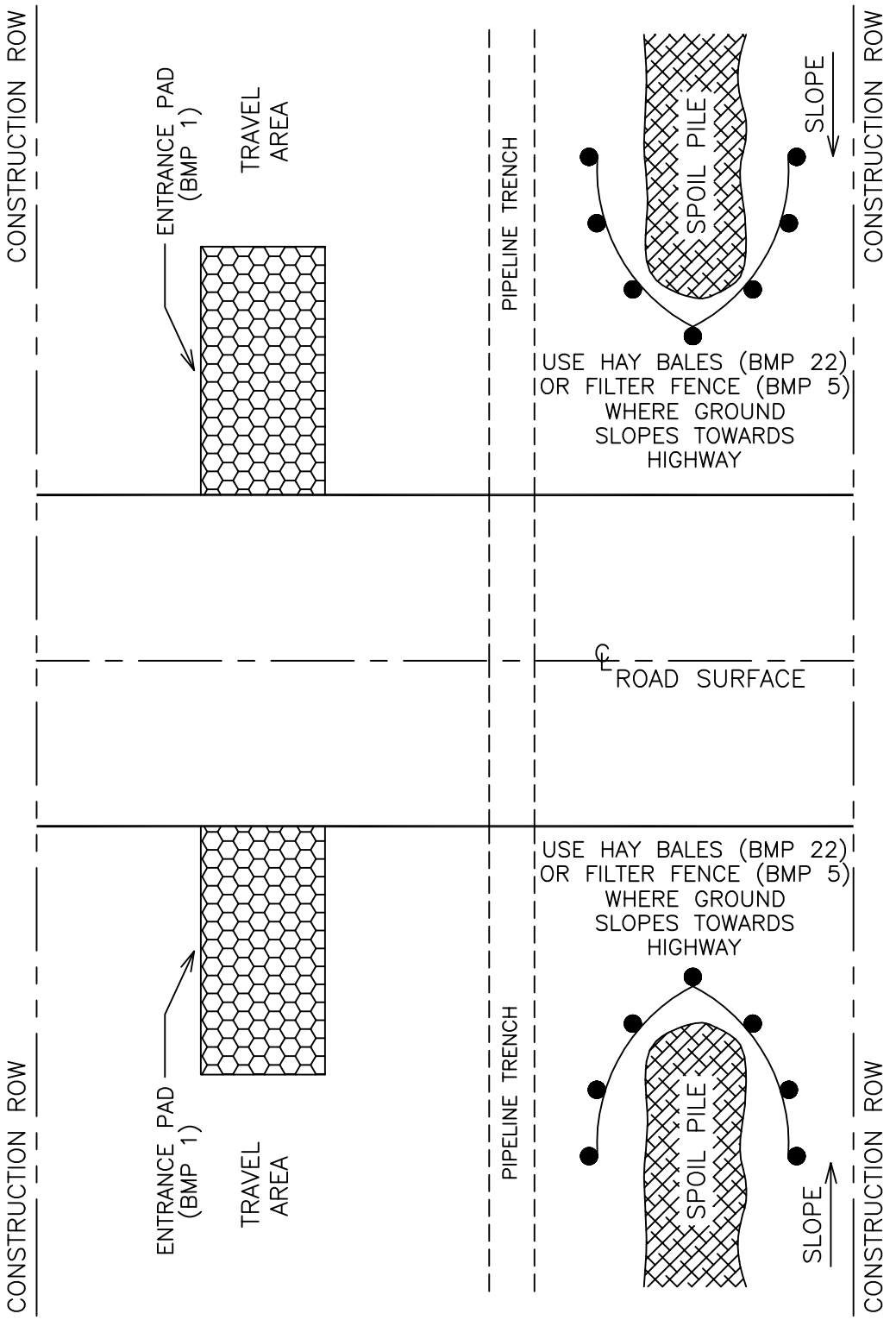
DRAWING NUMBER: 9A





1. ONLY CLEARING EQUIPMENT AND EQUIPMENT NECESSARY FOR INSTALLATION OF EQUIPMENT BRIDGES MAY CROSS WATERBODIES PRIOR TO BRIDGE INSTALLATION. LIMIT THE CROSSING OF EACH WATERBODY TO ONE PER PIECE OF CLEARING EQUIPMENT.
2. INSTALL FILTER FENCE ACROSS THE DISTURBED AREA OF THE R.O.W.
3. APPLY GEOTEXTILE UNDER ENTRANCE PADS AND MATS. ATTACH GEOTEXTILE TO MATS.
4. EXCESS MUD IS TO BE REMOVED FROM THE ENTRANCE PADS AND MATS DURING CONSTRUCTION.
5. DURING FINAL CLEAN UP WHEN MATS, CULVERT, CLEAN ROCK FILL, ETC. ARE REMOVED, INSTALL FILTER FENCE ACROSS THE ENTIRE R.O.W. ON BOTH SIDES OF STREAM.
6. LOCATE ALL SPOIL A MINIMUM OF 10 FEET FROM THE WATERS EDGE.
7. INSTALL TEMPORARY EROSION AND SEDIMENT CONTROLS PRIOR TO EARTH DISTURBANCE.
8. WOODEN SIDE BOARDS WILL BE USED TO KEEP SEDIMENT FROM FALLING INTO STREAM.
9. GEOTEXTILE FABRIC WILL BE PLACED ABOVE FIRST LAYER OF MATS TO PREVENT SEDIMENT FROM FALLING INTO THE STREAM.

national Fuel	DRAWN BY: L. A. PHILLIPS FILENAME: NFGSC\BMP09B.dwg DATE: 08/24/2016	TEMPORARY EQUIPMENT TIMBER MAT STREAM CROSSING	DRAWING NUMBER: 9B



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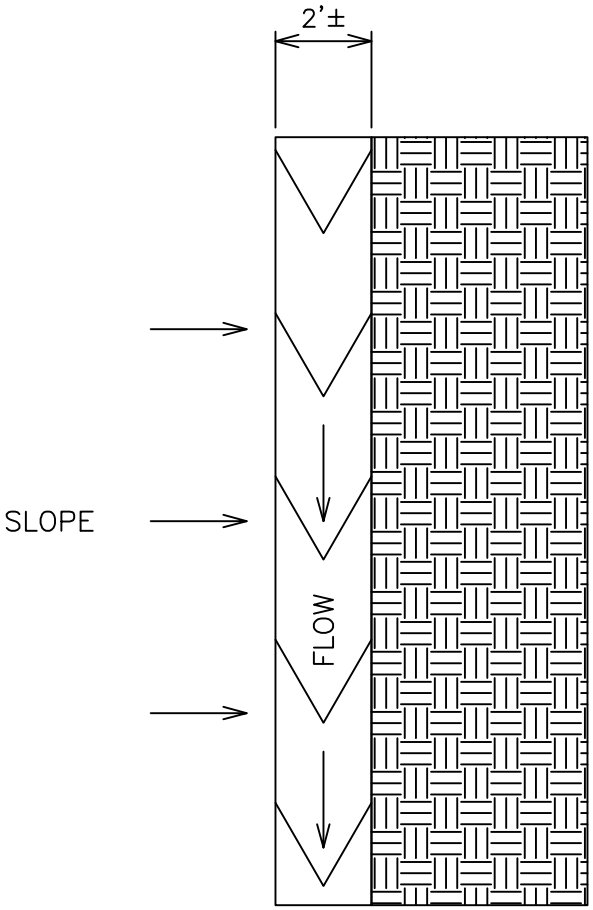
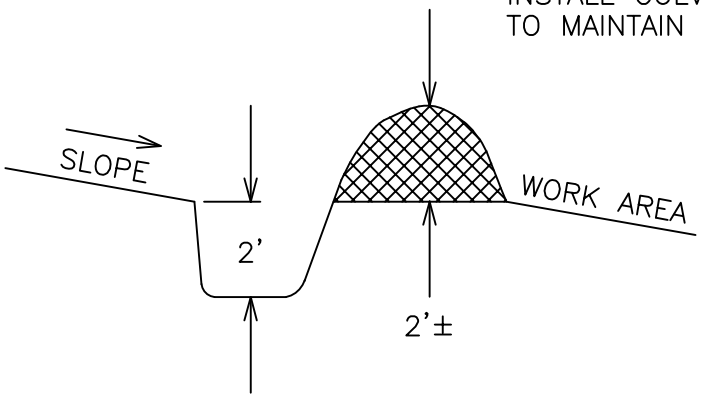
REVIEWED: 01/2014



DIVERSION DITCHES ARE INTENDED TO COLLECT AND CONVEY CLEAN SURFACE WATER, SPRINGS, ETC. AWAY FROM THE PROJECT AREA.

WORK AREA

OUTLET TO UNDISTURBED AREAS OR INSTALL CULVERT ACROSS THE R.O.W. TO MAINTAIN CLEAN WATER.



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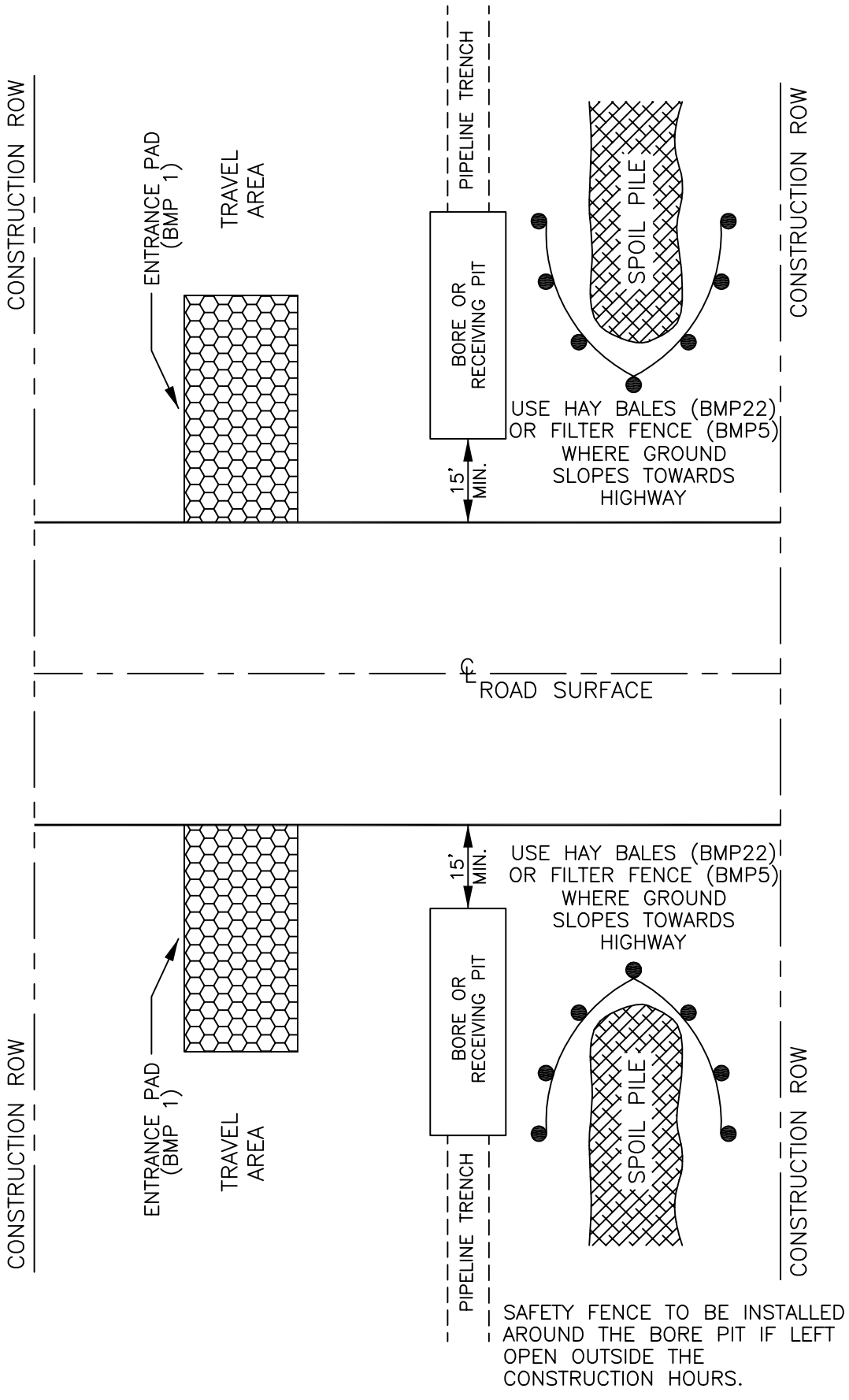
REVIEWED: 01/2014



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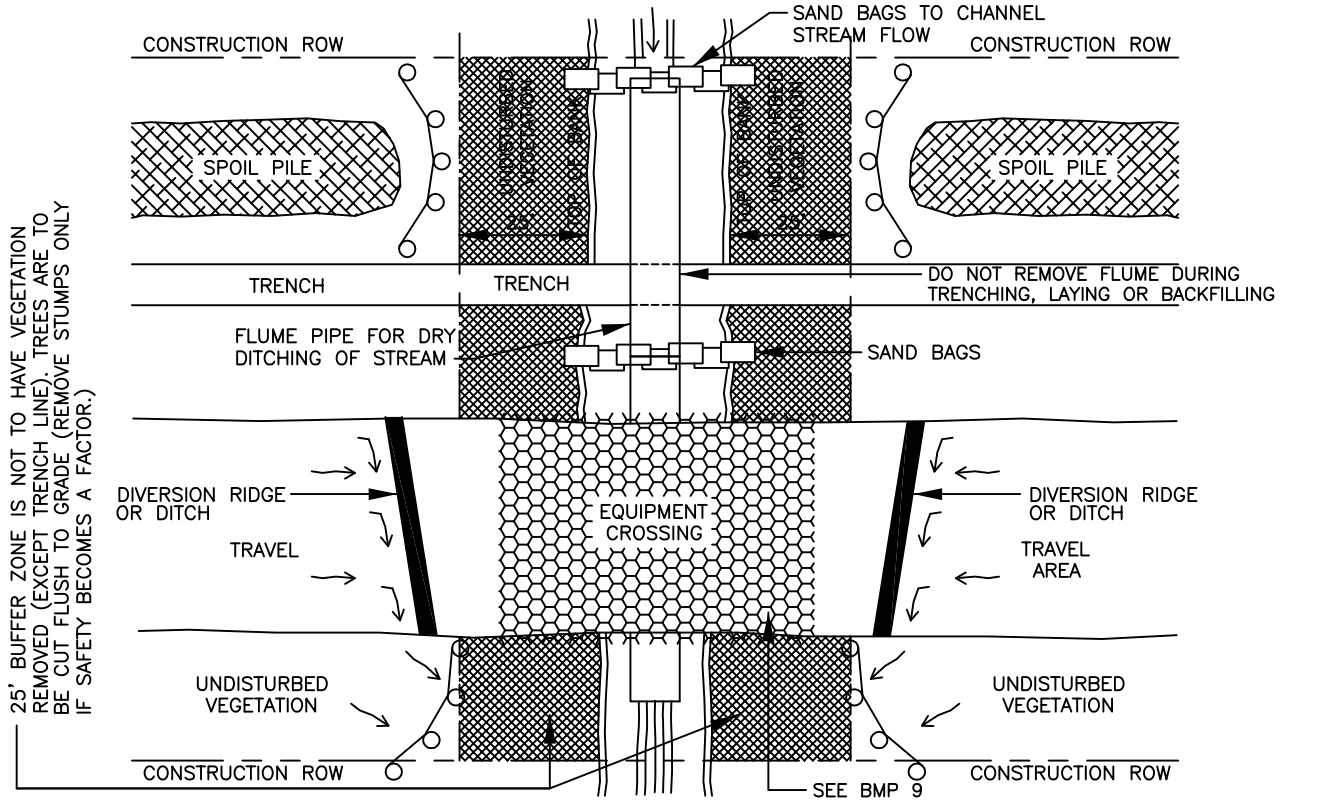
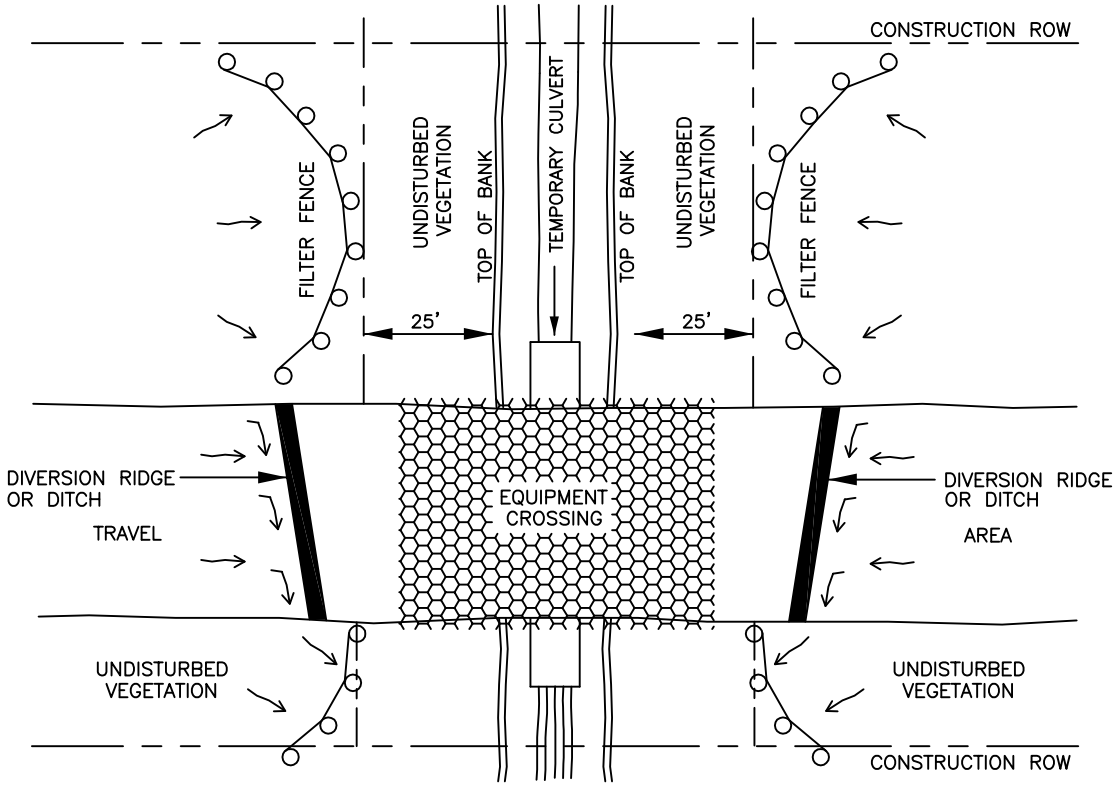
REVIEWED: 01/2014



SPOIL REMOVED DURING TRENCH CONSTRUCTION OF CROSSING MAY BE PLACED 10 FT BACK FROM ORDINARY HIGH WATER MARK PROVIDED E&S CONTROLS INSTALLED.

UNDISTURBED VEGETATION BUFFER SHALL BE 25 FT OR TO EDGE OF EXISTING NON-NATIVE VEGETATION WHERE THAT DISTANCE IS <25 FT.

DURING CONSTRUCTION



AFTER CONSTRUCTION

NOTE:
DRY-DITCH CROSSING METHODS CAN BE USED FOR WATERBODIES UP TO 30'.

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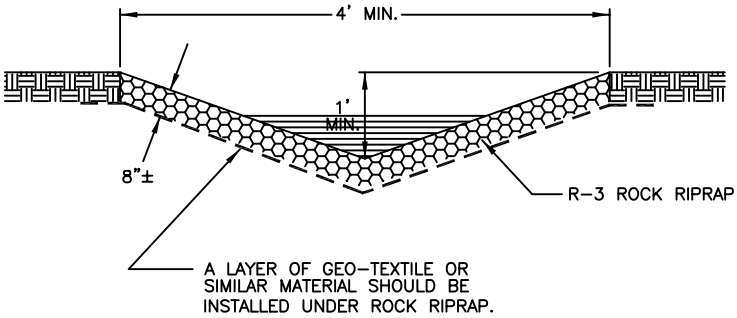
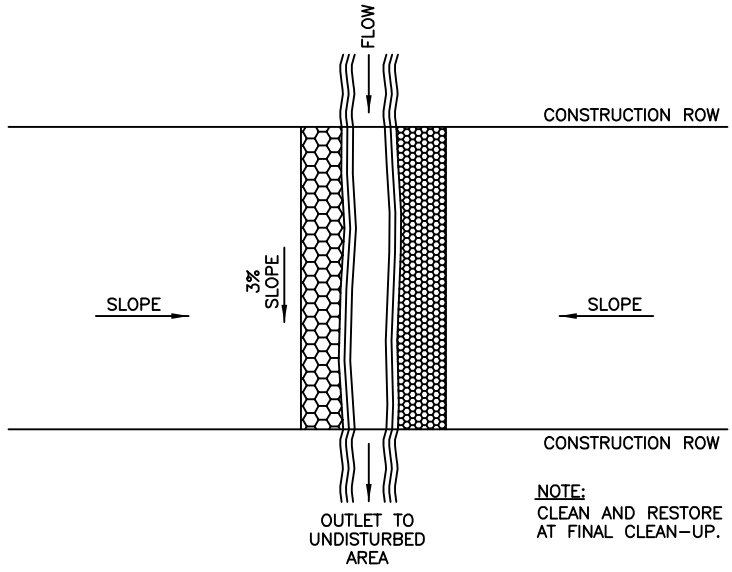
REVIEWED: 01/2014



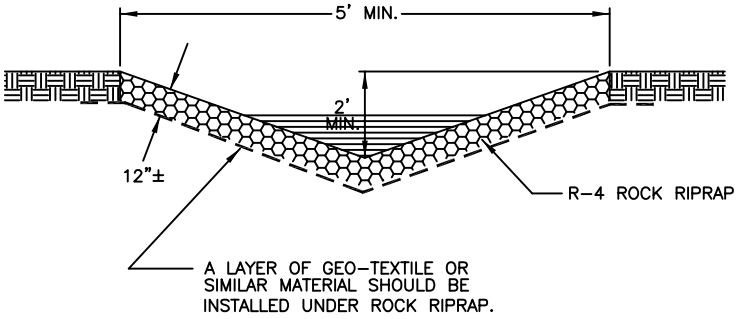
ROCK SIZE (INCHES)

MAX. 6"
AVG. 3"
MIN. 2"

VELOCITY = 6.5'/SEC.
Q = 13 CFS



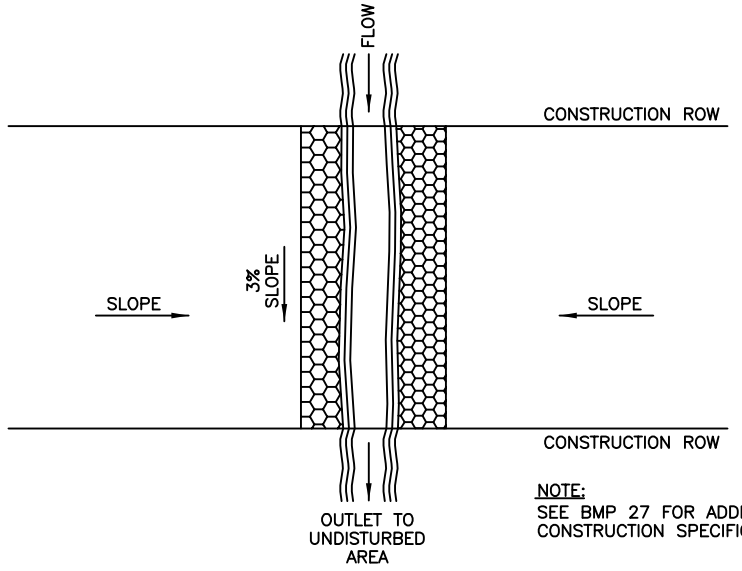
NOTE:
CLEAN AND RESTORE DITCH AT FINAL CLEAN-UP.



ROCK SIZE (INCHES)

MAX. 12"
AVG. 6"
MIN. 3"

VELOCITY = 8.7'/SEC.
Q = 43 CFS



NOTE:
SEE BMP 27 FOR ADDITIONAL DETAILS, CONSTRUCTION SPECIFICATIONS AND MAINTENANCE.

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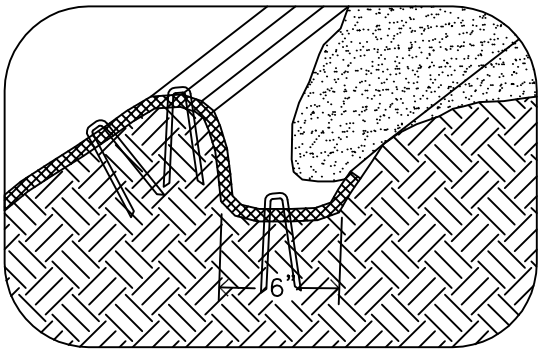
DRAWN BY: L. A. PHILLIPS
FILENAME: EPC\BMP14.dwg
LAST REVISION DATE: 06/27/2007

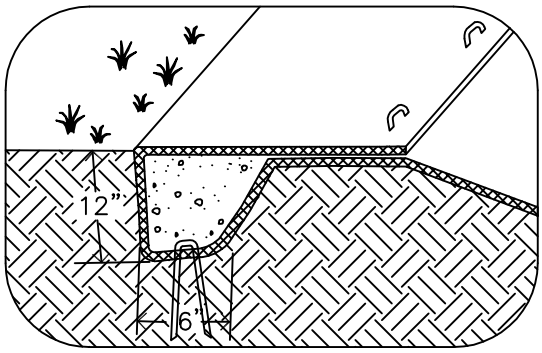
RUN OFF DITCH

DRAWING NUMBER: 14

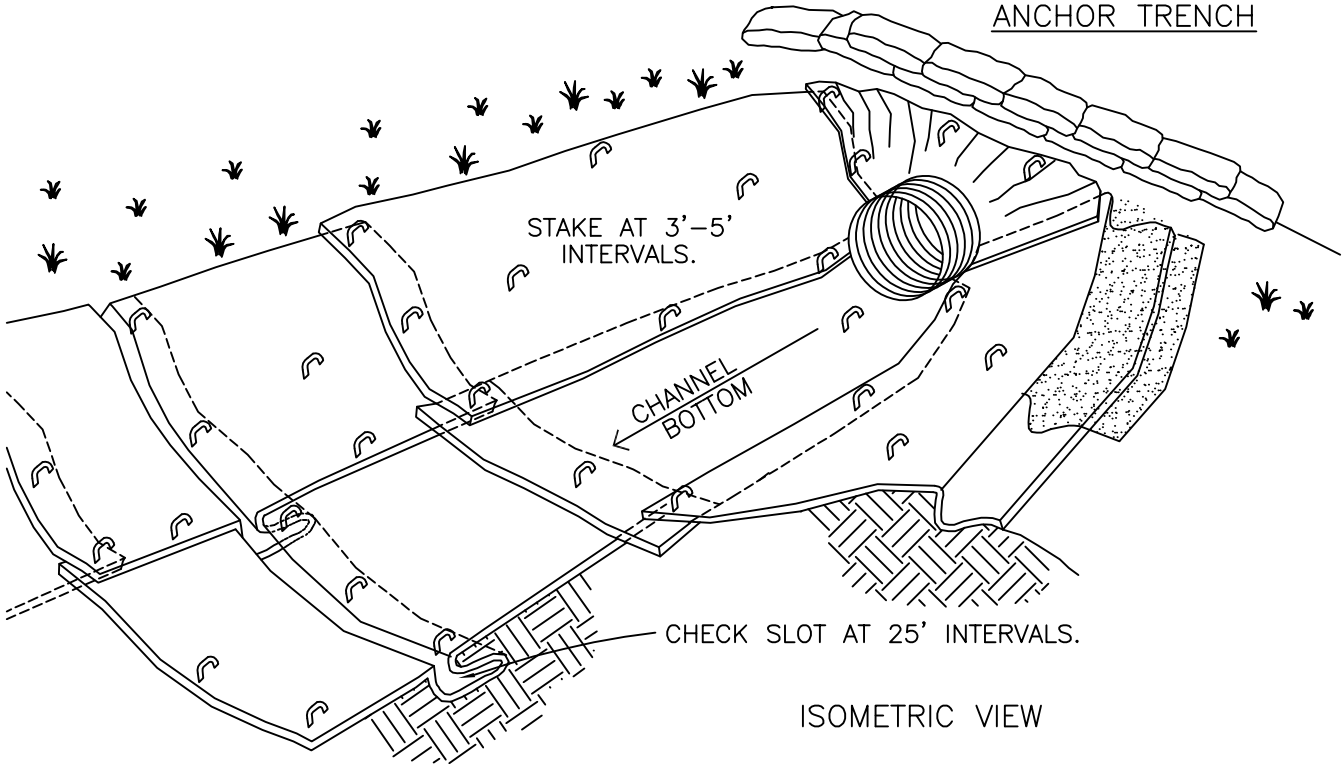
REVIEWED: 01/2014



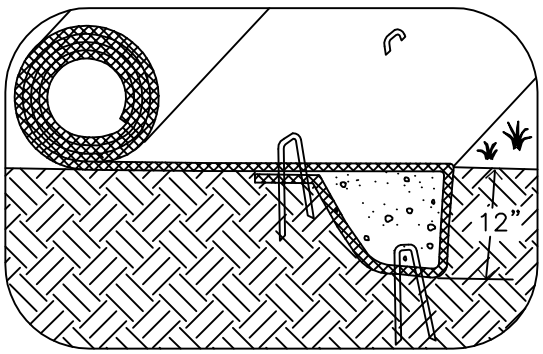
LONGITUDINAL ANCHOR TRENCH



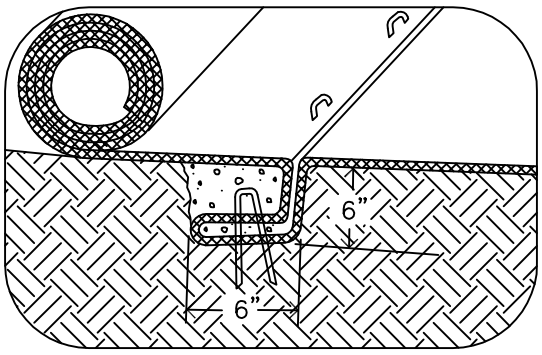
TERMINAL SLOPE AND CHANNEL ANCHOR TRENCH



ISOMETRIC VIEW



INITIAL CHANNEL ANCHOR TRENCH



INTERMITTENT CHECK SLOT

NOTES:

1. CHECK SLOTS TO BE CONSTRUCTED PER MANUFACTURERS SPECIFICATIONS.
2. STAKING OR STAPLING LAYOUT PER MANUFACTURERS SPECIFICATIONS.
3. SEE DRAWING NO. 15A FOR INSTALLATION SPECIFICATIONS.

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REVIEWED 01/2014

CONSTRUCTION SPECIFICATIONS:

SITE PREPARATION

1. PROPER SITE PREPARATION IS ESSENTIAL TO ENSURE COMPLETE CONTACT OF THE PROTECTION MATTING WITH THE SOIL.
2. GRADE AND SHAPE AREA OF INSTALLATION.
3. REMOVE ALL ROCKS, CLODS, VEGETATIVE OR OTHER OBSTRUCTIONS SO THAT THE INSTALLED BLANKETS, OR MATS WILL HAVE DIRECT CONTACT WITH THE SOIL.
4. PREPARE SEEDBED BY LOOSENING 2"–3" OF TOPSOIL ABOVE FINAL GRADE.
5. INCORPORATE AMENDMENTS, SUCH AS LIME AND FERTILIZER, INTO SOIL ACCORDING TO SOIL TEST AND THE SEEDING PLAN.

SEEDING

SEED AREA BEFORE BLANKET INSTALLATION FOR EROSION CONTROL AND RE–VEGETATION OR SEED AFTER MAT INSTALLATION FOR TURF REINFORCEMENT. WHEN SEEDING PRIOR TO BLANKET INSTALLATION, ALL CHECK SLOTS AND OTHER AREAS DISTURBED DURING INSTALLATION MUST BE RESEEDED. WHERE SOIL FILLING IS SPECIFIED, SEED THE MATTING AND THE ENTIRE DISTURBED AREA AFTER INSTALLATION AND PRIOR TO FILLING THE MAT WITH SOIL.

ANCHORING

U–SHAPED WIRE STAPLES, METAL GEOTEXTILE STAKE PINS OR TRIANGULAR WOODEN STAKES CAN BE USED TO ANCHOR MATS TO THE GROUND SURFACE. WIRE STAPLES SHOULD BE A MINIMUM OF 8 GAUGE. METAL STAKE PINS SHOULD BE 3/16" DIAMETER STEEL WITH A 1 1/2" STEEL WASHER AT THE HEAD OF THE PIN. WIRE STAPLES AND METAL STAKE SHOULD BE DRIVEN FLUSH TO THE SOIL SURFACE. WOODEN STAKES SHOULD BE 3" X 1 1/2" TRIANGULAR WOODEN SURVEY STAKES. TWO INCHES OF WOOD STAKING SHOULD REMAIN ABOVE THE SOIL SURFACE. ALL ANCHORS SHOULD BE 8"–18" LONG AND HAVE SUFFICIENT GROUND PENETRATION TO RESIST PULLOUT. LONGER ANCHORS MAY BE REQUIRED FOR LOOSE SOILS.

INSTALLATION IN CHANNELS

1. DIG INITIAL ANCHOR TRENCH 12" DEEP AND 6" WIDE ACROSS THE CHANNEL AT THE LOWER END OF THE PROJECT AREA.
2. EXCAVATE INTERMITTENT CHECK SLOTS, 6" DEEP AND 6" WIDE ACROSS THE CHANNEL AT 25' TO 30' INTERVALS ALONG THE CHANNEL.
3. CUT LONGITUDINAL CHANNEL ANCHOR SLOTS 4" DEEP AND 4" WIDE ALONG EACH SIDE OF THE INSTALLATION TO BURY EDGES OF MATTING, WHENEVER POSSIBLE EXTEND MATTING 2 – 3 ABOVE THE CREST OF CHANNEL SIDE SLOPES.
4. BEGINNING AT THE DOWNSTREAM END AND IN THE CENTER OF THE CHANNEL, PLACE THE INITIAL END OF THE FIRST ROLL IN THE ANCHOR TRENCH AND SECURE WITH FASTENING DEVICES AT 1' INTERVALS. NOTE: MATTING WILL INITIALLY BE UPSIDE DOWN IN ANCHOR TRENCH.
5. IN SAME MANNER, POSITION ADJACENT ROLLS IN ANCHOR TRENCH, OVERLAPPING THE PRECEDING ROLL A MINIMUM OF 3".
6. SECURE THESE INITIAL ENDS OF MATS WITH ANCHORS AT 1' INTERVALS, BACKFILL AND COMPACT SOIL.
7. UNROLL CENTER STRIP OF MATTING UPSTREAM. STOP AT NEXT CHECK SLOT OR TERMINAL ANCHOR TRENCH.
8. UNROLL ADJACENT MATS UPSTREAM IN SIMILAR FASHION, MAINTAINING 3" OVERLAP.
9. FOLD AND SECURE ALL ROLLS OF MATTING SNUGLY INTO ALL TRANSVERSE CHECK SLOTS. LAY MAT IN THE BOTTOM OF THE SLOT THEN FOLD BACK AGAINST ITSELF. ANCHOR THROUGH BOTH LAYERS OF MAT AT 1 INTERVALS THEN BACKFILL AND COMPACT SOIL. CONTINUE ROLLING ALL MAT WIDTHS UPSTREAM TO THE NEXT CHECK SLOT OR TERMINAL ANCHOR TRENCH.
10. ALTERNATE METHOD FOR NONCRITICAL INSTALLATIONS: PLACE TWO ROWS OF ANCHORS ON 6 CENTERS AT 25' TO 30' INTERVALS IN LIEU OF EXCAVATED CHECK SLOTS.
11. SHINGLE–LAP SPLICED ENDS BY A MINIMUM OF 1' WITH UPSTREAM MAT ON TOP TO PREVENT UPLIFTING BY WATER OR BEGIN NEW ROLLS IN A CHECK SLOT. ANCHOR OVERLAPPED AREA BY PLACING TWO ROWS OF ANCHORS, 1' APART ON 1' INTERVALS.
12. PLACE EDGES OF OUTSIDE MATS IN PREVIOUSLY EXCAVATED LONGITUDINAL SLOTS, ANCHOR USING PRESCRIBED STAPLE PATTERN, BACKFILL AND COMPACT SOIL.
13. ANCHOR, FILL AND COMPACT UPSTREAM END OF MAT IN A 12" X 6" TERMINAL TRENCH.
14. SECURE MAT TO GROUND SURFACE USING U–SHAPED WIRE STAPLES GEOTEXTILE PINS OR WOODEN STAKES.
15. SEED AND FILL TURF REINFORCEMENT MATTING WITH SOIL, IF SPECIFIED.

SOIL FILLING IF SPECIFIED FOR TURF REINFORCEMENT.

1. AFTER SEEDING, SPREAD AND LIGHTLY RAKE 1/2" – 3/4" OF FINE TOPSOIL INTO THE MAT APERTURES TO COMPLETELY FILL MAT THICKNESS.
2. USE BACKSIDE OF RAKE OR OTHER FLAT IMPLEMENT.
3. SPREAD TOPSOIL USING LIGHTWEIGHT LOADER, BACKHOE, OR OTHER POWER EQUIPMENT. AVOID SHARP TURNS WITH EQUIPMENT.
4. DO NOT DRIVE TRACKED OR HEAVY EQUIPMENT OVER MAT.
5. AVOID ANY TRAFFIC OVER MATTING IF LOOSE OR WET SOIL CONDITIONS EXIST.
6. USE SHOVELS, RAKES OR BROOMS FOR FINE GRADING AND TOUCH UP.
7. SMOOTH OUT SOIL FILLING JUST EXPOSING TOP NETTING OF MATRIX.

INSPECTION AND MAINTENANCE

1. ALL BLANKET AND MATS SHOULD BE INSPECTED PERIODICALLY FOLLOWING INSTALLATION.
2. INSPECT INSTALLATION AFTER SIGNIFICANT RAINSTORMS TO CHECK FOR EROSION AND UNDERMINING. ANY FAILURE SHOULD BE REPAIRED IMMEDIATELY.
3. IF WASHOUT OR BREAKAGE OCCURS, RE–INSTALL THE MATERIAL AFTER REPAIRING THE DAMAGE TO THE SLOPE OR DRAINAGEWAY.

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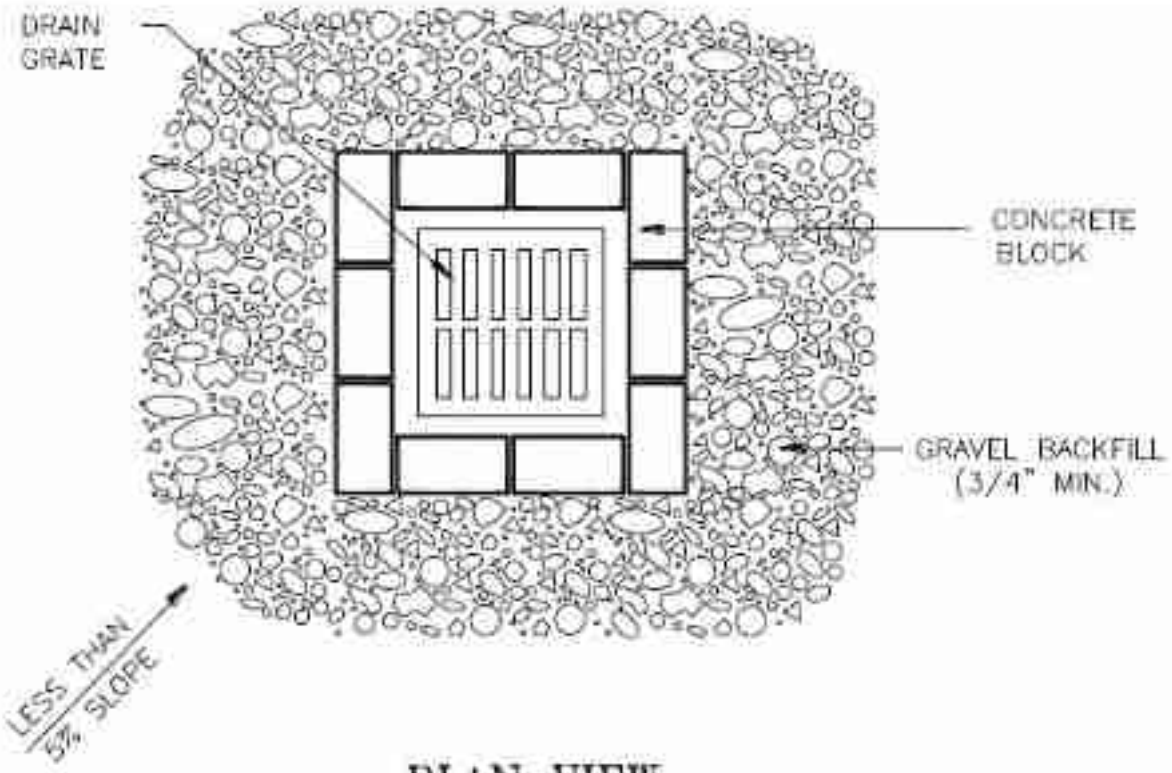
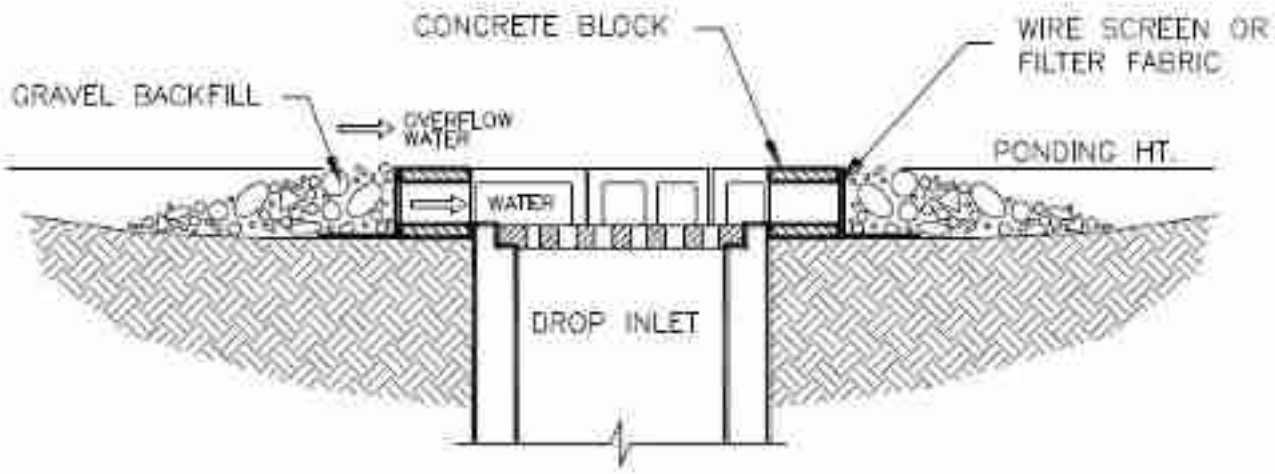
MODIFIED BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP15A.dwg
DATE: 01/09/1997

SPECIFICATIONS EROSION BLANKETS CHANNEL INSTALLATION

DRAWING NUMBER: 15A



PLAN VIEW



ELEVATION VIEW

NOTES:

1. DROP INLET SEDIMANT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS. (LESS THAN 5%)
2. THE TOP OF THE STRUCTURE (PONDING HEIGHT) MUST BE WELL BELOW THE GROUND ELEVATION DOWNSLOPE TO PREVENT RUNOFF FROM BY-PASSING THE INLET. A TEMPORARY DIKE MAY BE NECESSARY ON THE DOWNSLOPE SIDE OF THE STRUCTURE.

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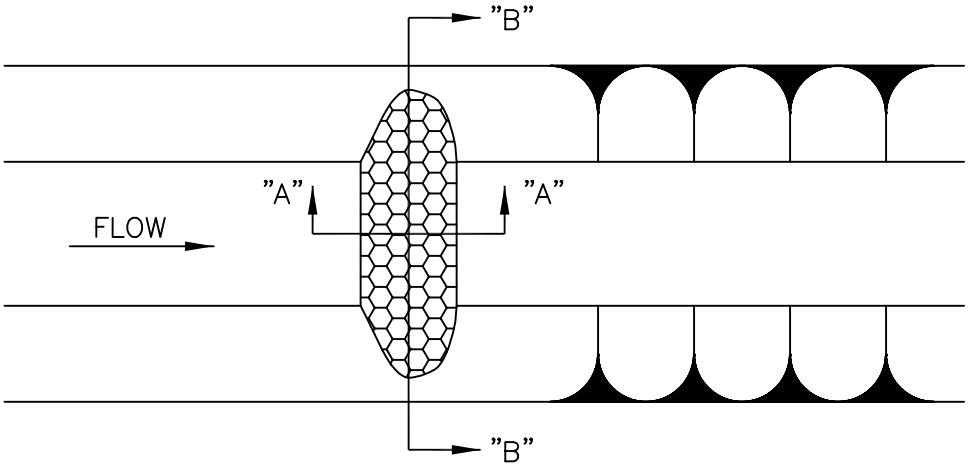
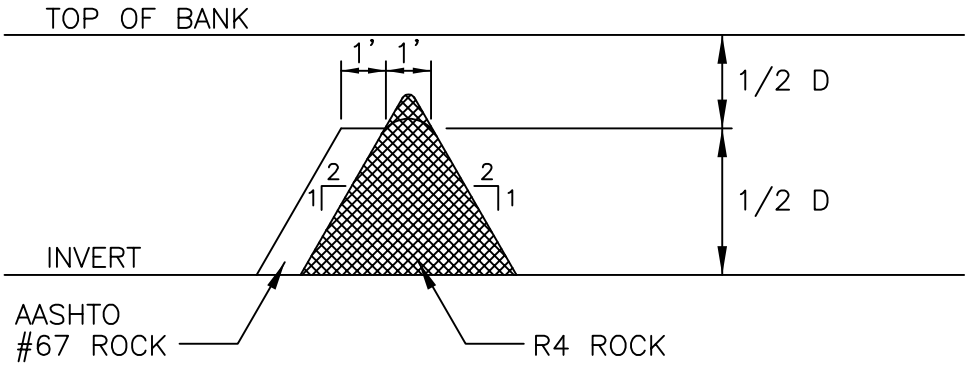
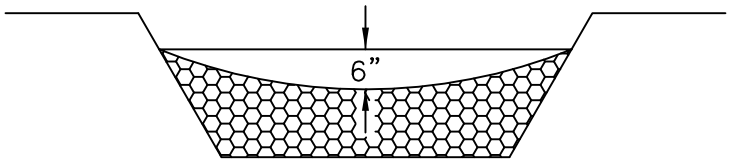
REVIEWED: 03/2017





D=DEPTH OF WATER
AT CHANNEL CAPACITY

SECTION "A–A"



SECTION "B–B"

1. ROCK FILTERS WILL BE CONSTRUCTED WITH AASHTO NUMBER 67 AND R–4 ROCK AS SPECIFIED IN SECTIONS 703.2 AND 850.2 OF PENNDOT'S PUBLICATION 408.
2. FREE STANDING ROCK CHANNEL FILTERS WILL BE CONSTRUCTED TO THE DIMENSIONS SHOWN ABOVE.
3. MAINTENANCE: ROCK FILTERS WILL BE REMOVED WHEN CLOGGED WITH SEDIMENTS. MATERIALS MUST BE WASHED COMPLETELY FREE OF ALL FOREIGN MATERIALS OR NEW ROCK USED TO REBUILD THE FILTER.

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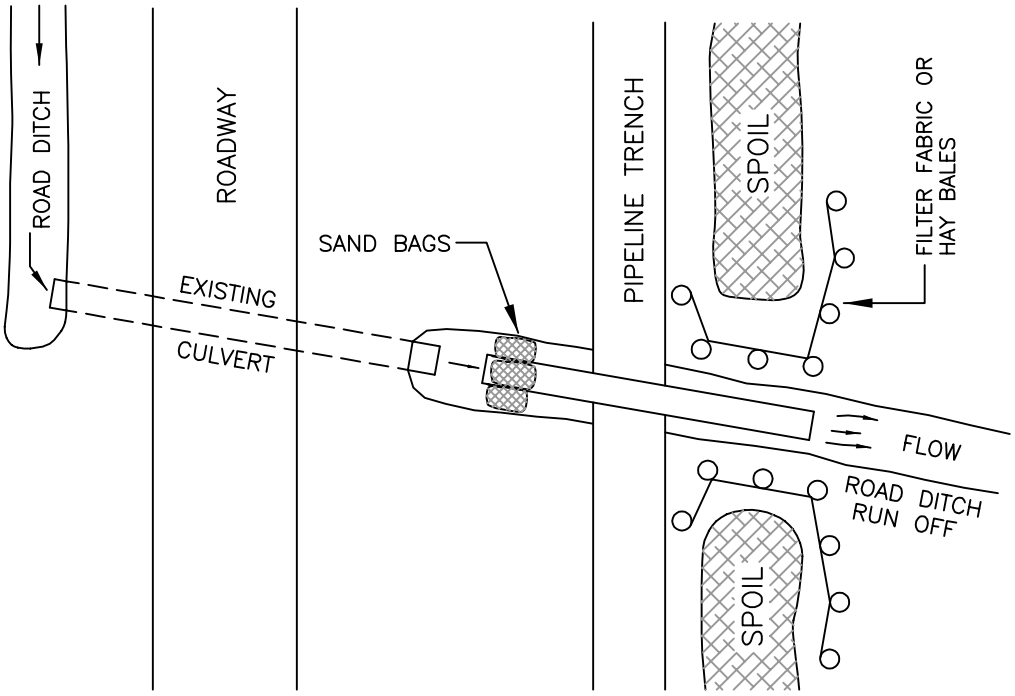

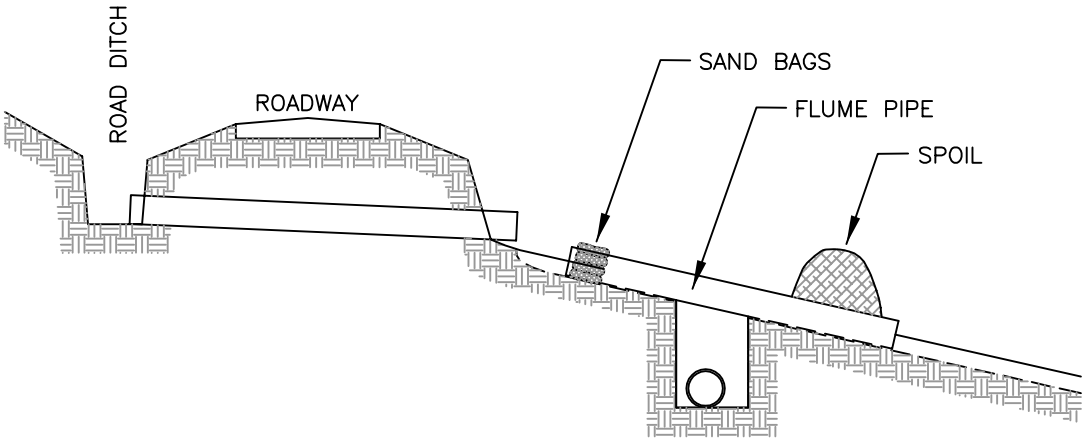

NOTES:

1. INSTALL TEMPORARY CULVERT ACROSS PIPELINE TRENCH AT ROAD CULVERT LOCATIONS WHERE PIPELINE TRENCH IS LOCATED BELOW ROAD SURFACE. AN 8" MINIMUM DIAMETER CULVERT IS TO BE INSTALLED.

2. REMOVE CULVERT WHEN BACK FILLING AND RESTORE ROAD DITCH RUN OFF TO ORIGINAL CONDITION.

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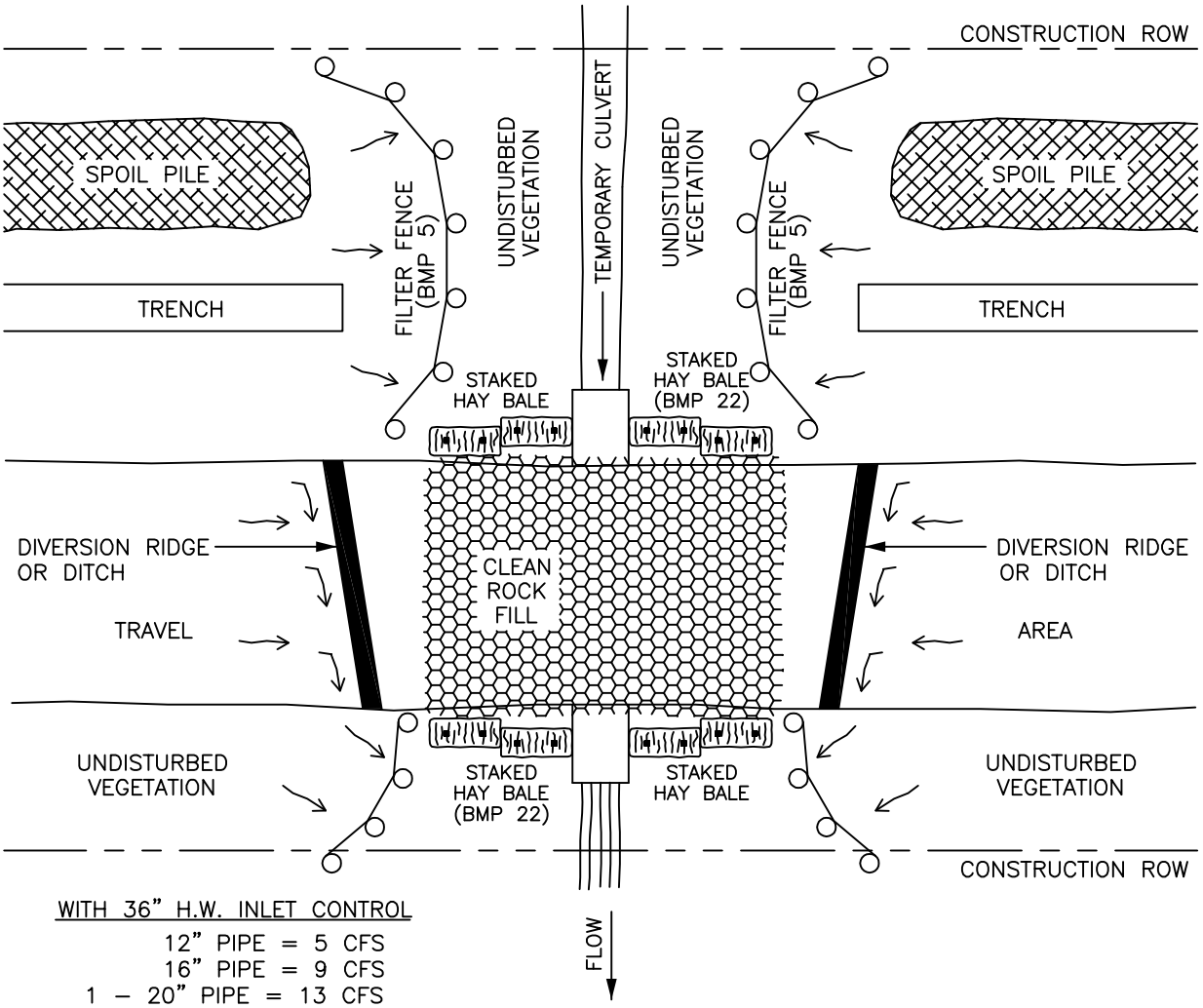
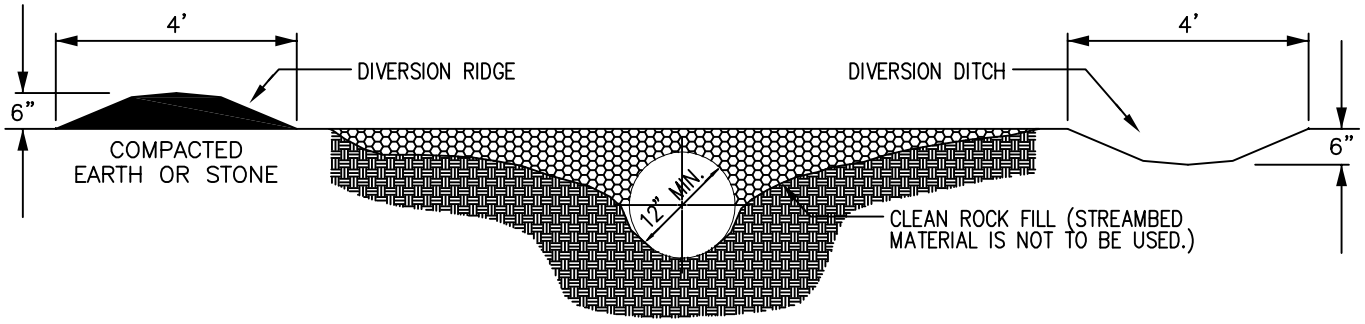
REVIEWED: 01/2014



WITH 36" H.W. INLET CONTROL

12" PIPE = 5 CFS
16" PIPE = 9 CFS
1 – 20" PIPE = 13 CFS
2 – 20" PIPE = 26 CFS
3 – 20" PIPE = 39 CFS



1. TEMPORARY CULVERT SHOULD EXTEND BEYOND TOE OF ROAD.
2. ROADWAY SHOULD BE DEPRESSED OVER CULVERT TO ALLOW FOR OVERFLOW.
3. CLEAN ROCK FILL SHALL BE USED TO GUARD AGAINST EROSION AND SEDIMENTATION. STREAMBED MATERIAL IS NOT TO BE USED.
4. INSTALL FILTER FENCE (BMP 5) ACROSS THE DISTURBED AREAS OF THE R.O.W.
5. INSTALL STAKED HAY BALES (BMP 22) ALONG TRAVEL AREA ON EACH SIDE OF CULVERT OPENING, TO CONTROL MUD FROM CONSTRUCTION TRAFFIC. THESE AREAS ARE TO BE CLEANED PERIODICALLY DURING CONSTRUCTION. **DO NOT INSTALL HAY BALES IN WATERWAY.**
6. DURING FINAL CLEAN UP WHEN CULVERT, CLEAN ROCK FILL, ETC. ARE REMOVED, INSTALL FILTER FENCE ACROSS THE ENTIRE R.O.W. ON BOTH SIDES OF STREAM.
7. LOCATE ALL SPOIL A MINIMUM OF 10 FEET FROM THE WATERS EDGE.

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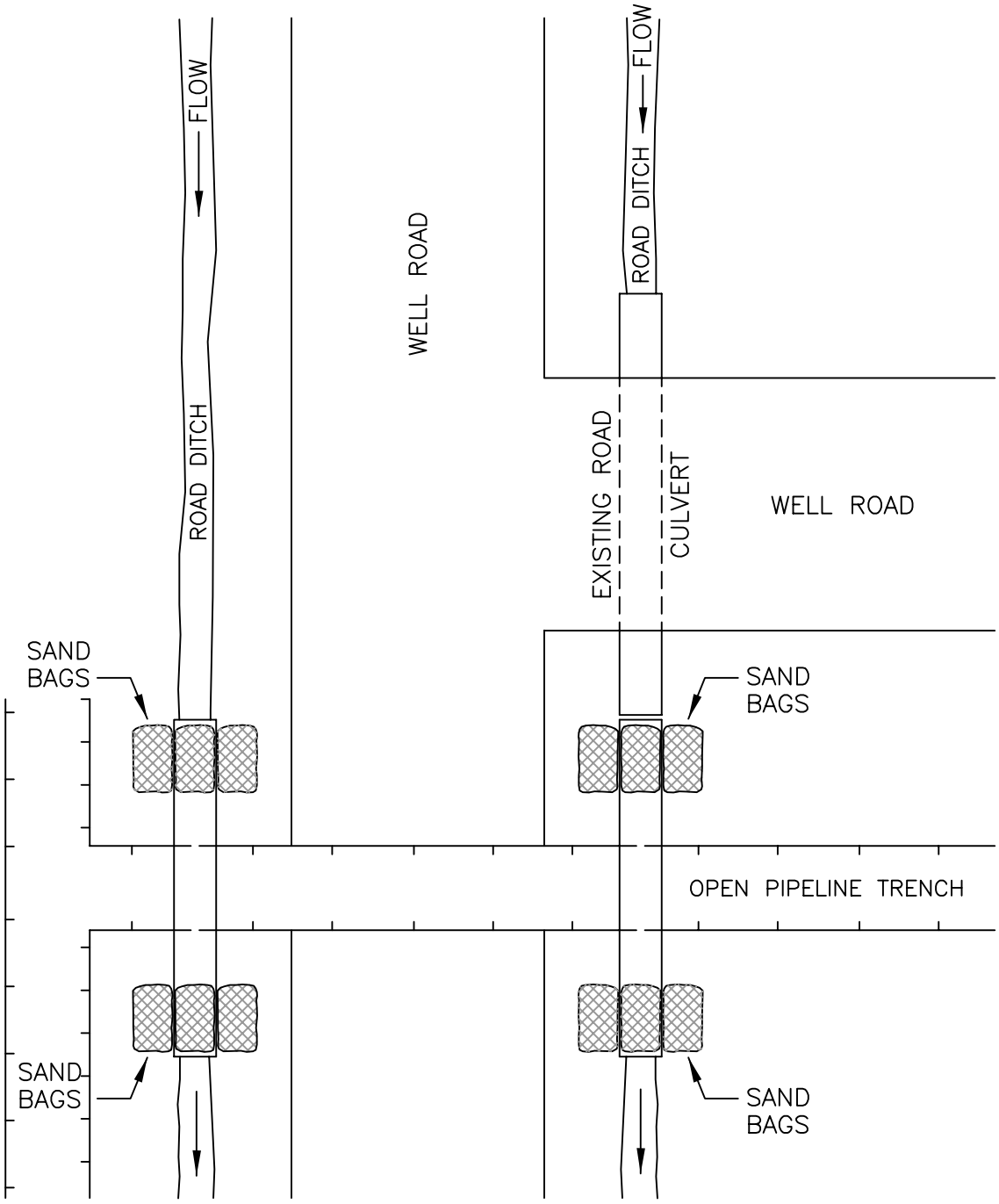
REVIEWED: 01/2014



NOTES:

1. INSTALL TEMPORARY CULVERT IN ROAD DITCH, ACROSS OPEN PIPELINE TRENCH. AN 8" MINIMUM DIAMETER CULVERT IS TO BE INSTALLED.

2. REMOVE CULVERT WHEN BACK FILLING AND RESTORE ROAD DITCH TO ORIGINAL CONDITION.

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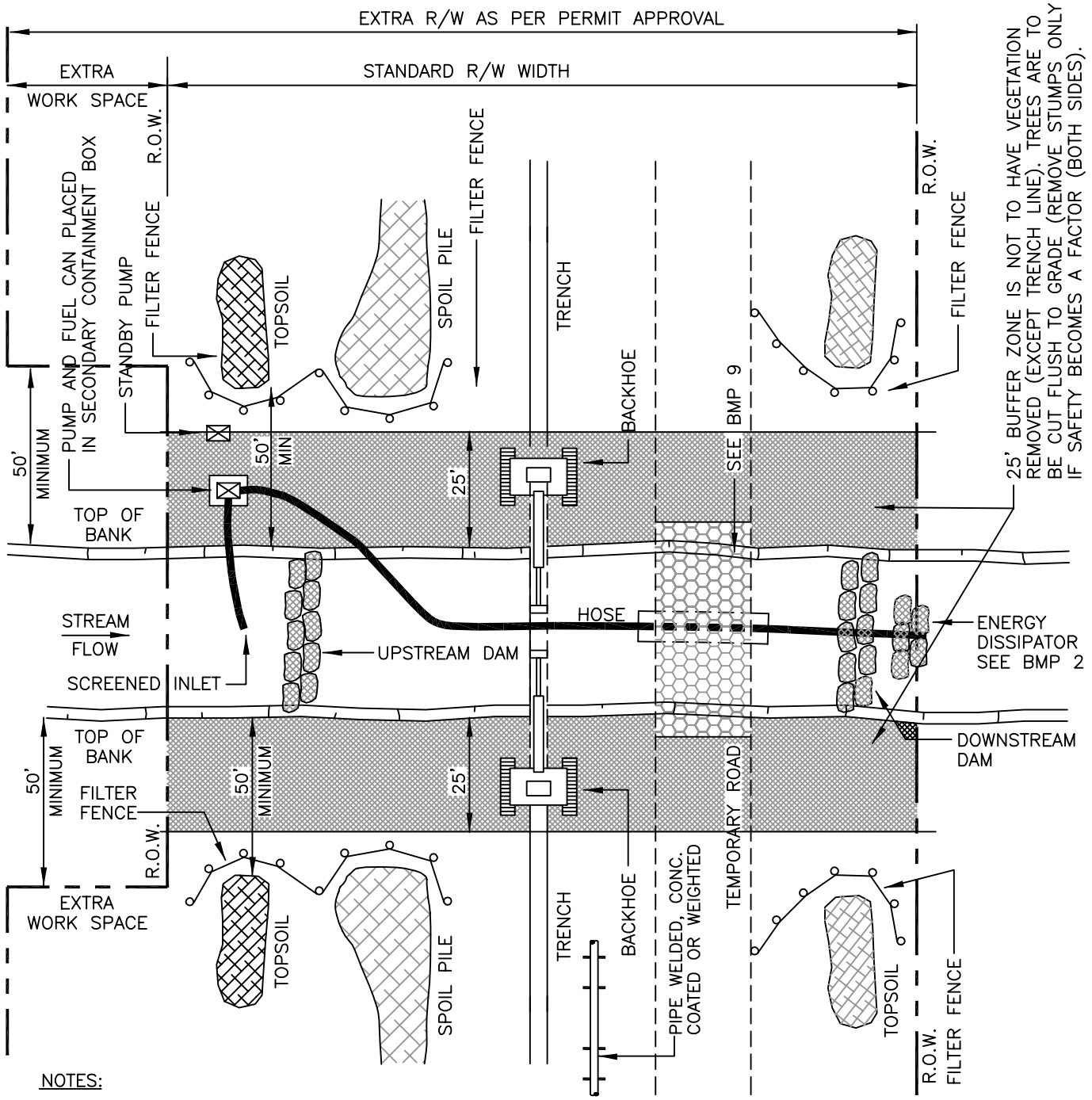
REVIEWED: 01/2014



NOTES:

1. USE DAM AND PUMP METHOD ON NARROW WATERCOURSES WITH LIMITED STREAM FLOW TO PREVENT SEDIMENTATION AND INTERRUPTION OF STREAM FLOW DURING CROSSING CONSTRUCTION. IF FISH PASSAGE IS A CONCERN, THIS METHOD IS NOT APPROPRIATE.
2. SCHEDULE CONSTRUCTION DURING LOW FLOW PERIOD.
3. SET UP PUMP AND HOSE AS SHOWN, OR USE OTHER PRACTICAL ALTERNATIVES. PUMP SHOULD HAVE TWICE THE PUMPING CAPACITY OF ANTICIPATED FLOW. HAVE STANDBY PUMP ON SITE.
4. INSTALL DAMS COMPOSED OF SANDBAGS OR CLEAN GRAVEL WITH PLASTIC LINER TO KEEP STREAM BED DRY.
5. EXCAVATE TRENCH AND LOWER IN PIPE UNDER HOSE. MOVE HOSE AS REQUIRED OR DISCONNECT IF TEMPORARY FLOW BLOCKAGE IS ACCEPTABLE. BACKFILL TRENCH.
6. DISMANTLE DOWNSTREAM DAM, THEN UPSTREAM DAM. KEEP PUMP RUNNING TO MAINTAIN FLOW.
7. MONITOR DAM AND PUMP FOR PROPER OPERATION THROUGHOUT THE CROSSING INSTALLATION.
8. SPOIL REMOVED DURING TRENCH CONSTRUCTION OF CROSSING MAY BE PLACED 10 FT BACK FROM ORDINARY HIGH WATER MARK PROVIDED E&S CONTROLS ARE INSTALLED.
9. UNDISTURBED VEGETATION BUFFER SHALL BE 25 FT OR TO EDGE OF EXISTING NON–NATIVE VEGETATION WHERE THAT DISTANCE IS <25 FT.

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REVIEWED: 01/2014

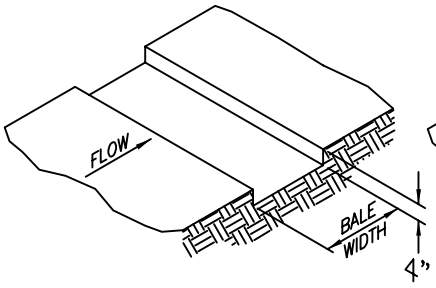
DESIGN RESTRICTIONS:

1. THE FORMATION OF CONCENTRATED FLOWS ON THE UPSLOPE DRAINAGE AREA IS NOT PERMITTED. IF CONCENTRATED FLOWS DO DEVELOP, DIRECT STABILIZATION MEASURES MUST BE EMPLOYED TO PREVENT SUCH CONDITIONS.
2. STRAW BALE BARRIERS MAY NOT BE PLACED IN ANY AREA OF CONCENTRATED FLOWS SUCH AS STREAMS, CHANNELS, DITCHES, SWALES, ETC.
3. STRAW BALE BARRIERS WILL NOT BE USED IN AREAS WHERE ROCK PREVENTS THE FULL AND UNIFORM DEPTH ANCHORING OF THE BARRIER.
4. STRAW BALE BARRIERS WILL BE REPLACED EVERY THREE (3) MONTHS OR MORE OFTEN IF THE BALES DETERIORATE AND BECOME INEFFECTIVE.

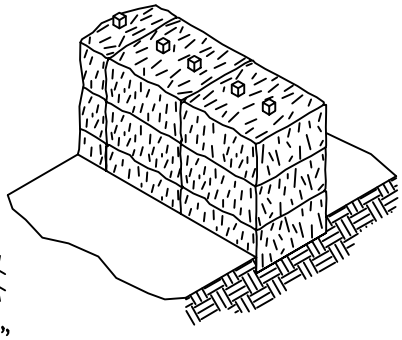
INSTALLATION:

1. THE ANCHORING TRENCH WILL BE CONSTRUCTED TO THE REQUIRED GRADE AND DEPTH AS SHOWN.
2. SUPPORT STAKES WILL BE DRIVEN TO THE REQUIRED DEPTH AS SHOWN.
3. THE ANCHORING TRENCH WILL BE BACKFILLED AND COMPACTED TO A DENSITY EQUAL TO UNDISTURBED SITE SOILS.

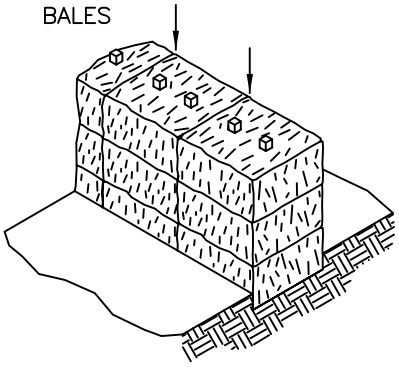
1. EXCAVATE ANCHORING TRENCH



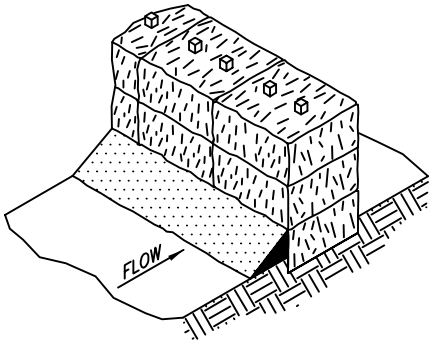
2. PLACE AND STAKE STRAW BALES



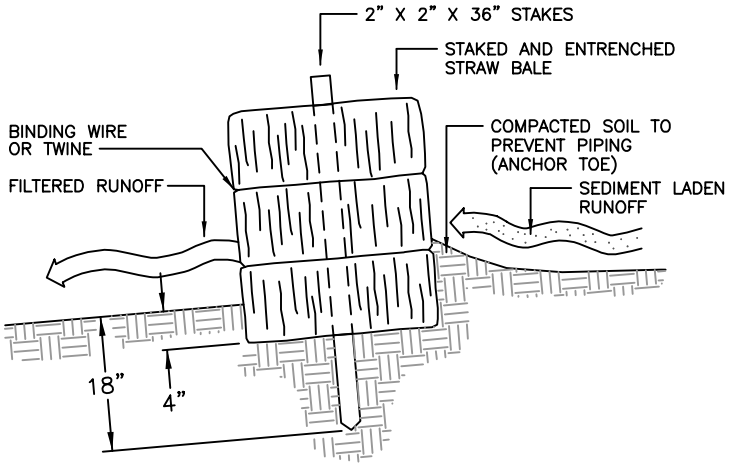
3. WEDGE LOOSE STRAW BETWEEN BALES



4. BACKFILL AND COMPACT THE EXCAVATED SOIL (ANCHOR TOE)



CROSS–SECTION OF STRAW BALE BARRIER



MAINTENANCE:

1. THE BARRIER WILL BE INSPECTED AFTER EVERY RUNOFF EVENT. DISLODGED BALES SHOULD BE RESET, STAKED AND BACKFILLED TO THE REQUIREMENTS LISTED UNDER "INSTALLATION". ALL CLOGGED OR INOPERATIVE BALES WILL BE REPLACED.
2. ACCUMULATED SEDIMENTS WILL BE REMOVED AS REQUIRED AND IN ALL CASES WHERE UNIFORM ACCUMULATIONS REACH 1/3 THE ABOVE GROUND HEIGHT OF THE BARRIER.
3. ALL UNDERCUTTING OR EROSION OF THE ANCHOR TOE WILL BE REPAIRED IMMEDIATELY WITH COMPACTED BACKFILL MATERIALS.

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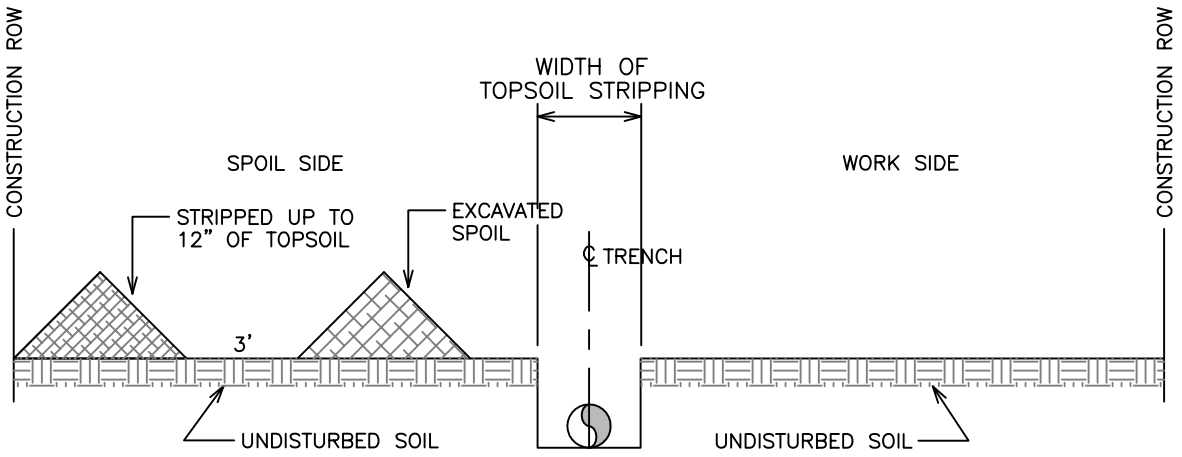
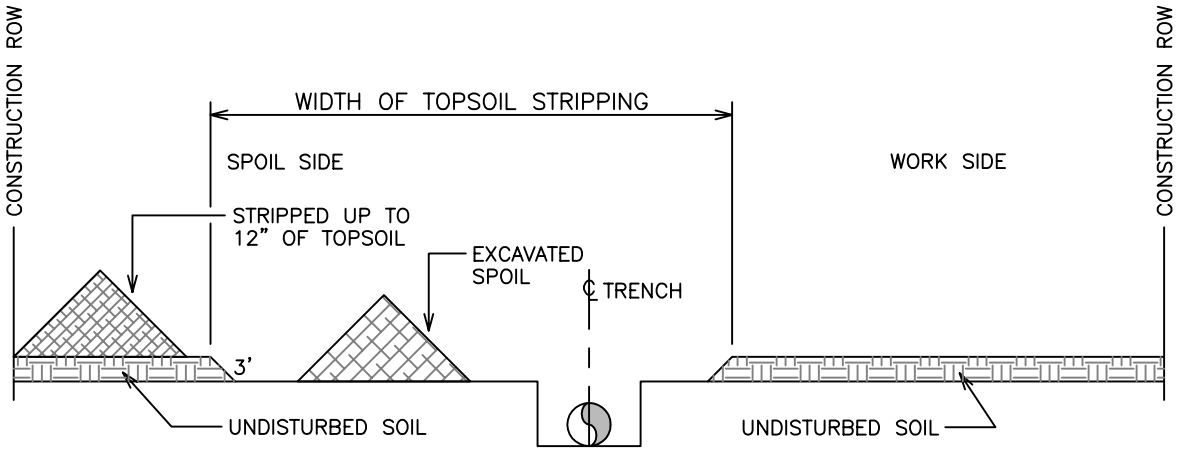


DITCH LINE TOPSOIL STRIPPING

ALSO USED IN NON-SATURATED WETLANDS



DITCH PLUS SPOIL SIDE SEGREGATION

NOTES:

1. ALLOW FOR A 3' SEPARATION BETWEEN THE TOPSOIL PILE AND THE TRENCH SPOIL.
2. RETURN TRENCH SPOIL TO TRENCH AND COMPACT. FEATHER OUT EXCESS SPOIL OVER STRIPPED AREA LEAVING A LOW CROWN CENTERED OVER THE TRENCH. ALLEVIATE COMPACTION OF SUBSOILS OVER THE STRIPPED AREA.
3. RETURN TOPSOIL EVENLY OVER THE STRIPPED AREA AFTER TRENCH HAS SUFFICIENTLY SETTLED OR HAS BEEN COMPACTED.
4. ALLEVIATE COMPACTION OF TOPSOIL OVER ENTIRE RIGHT-OF-WAY.
5. SEGREGATED TOPSOIL MAY NOT BE USED FOR PADDING THE PIPE.

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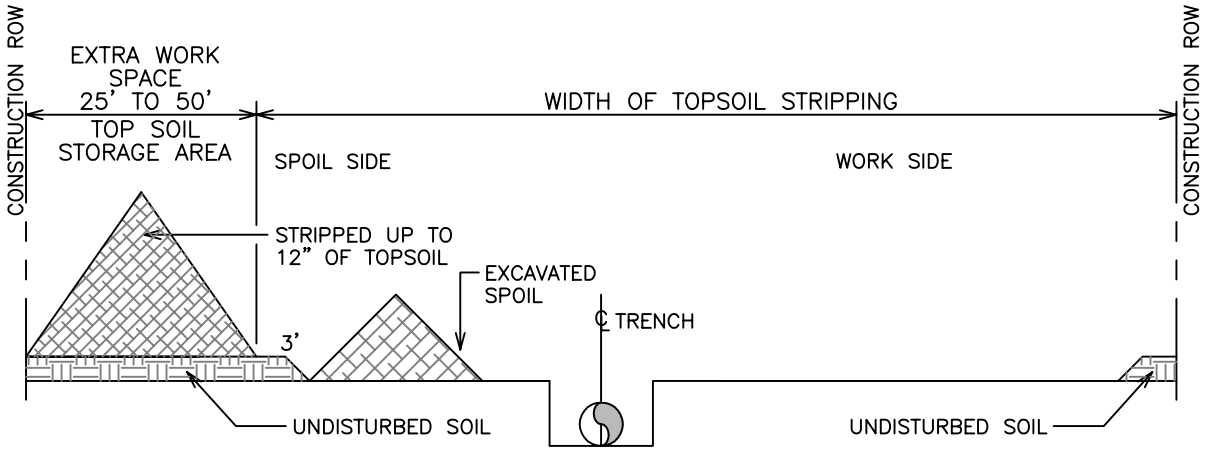
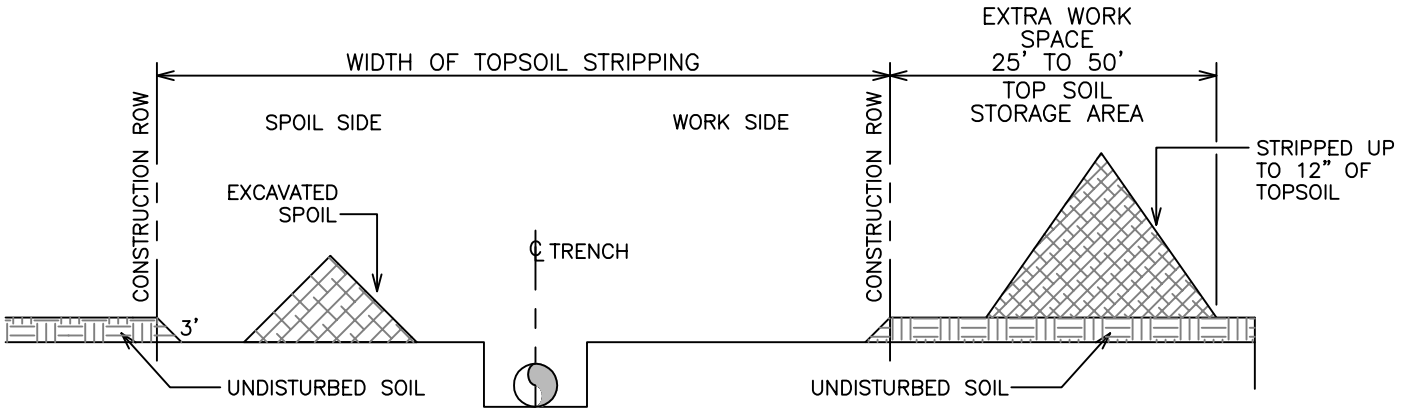
REVIEWED: 01/2014



FULL RIGHT-OF-WAY TOPSOIL STRIPPING - A



FULL RIGHT-OF-WAY TOPSOIL STRIPPING - B

NOTES:

1. ALLOW FOR A 3' SEPARATION BETWEEN THE TOPSOIL PILE AND THE TRENCH SPOIL.
2. RETURN TRENCH SPOIL TO TRENCH AND COMPACT. FEATHER OUT EXCESS SPOIL OVER STRIPPED AREA LEAVING A LOW CROWN CENTERED OVER THE TRENCH. ALLEVIATE COMPACTION OF SUBSOILS OVER THE STRIPPED AREA.
3. RETURN TOPSOIL EVENLY OVER THE STRIPPED AREA AFTER TRENCH HAS SUFFICIENTLY SETTLED OR HAS BEEN COMPACTED.
4. ALLEVIATE COMPACTION OF TOPSOIL OVER ENTIRE RIGHT-OF-WAY.
5. SEGREGATED TOPSOIL MAY NOT BE USED FOR PADDING THE PIPE.

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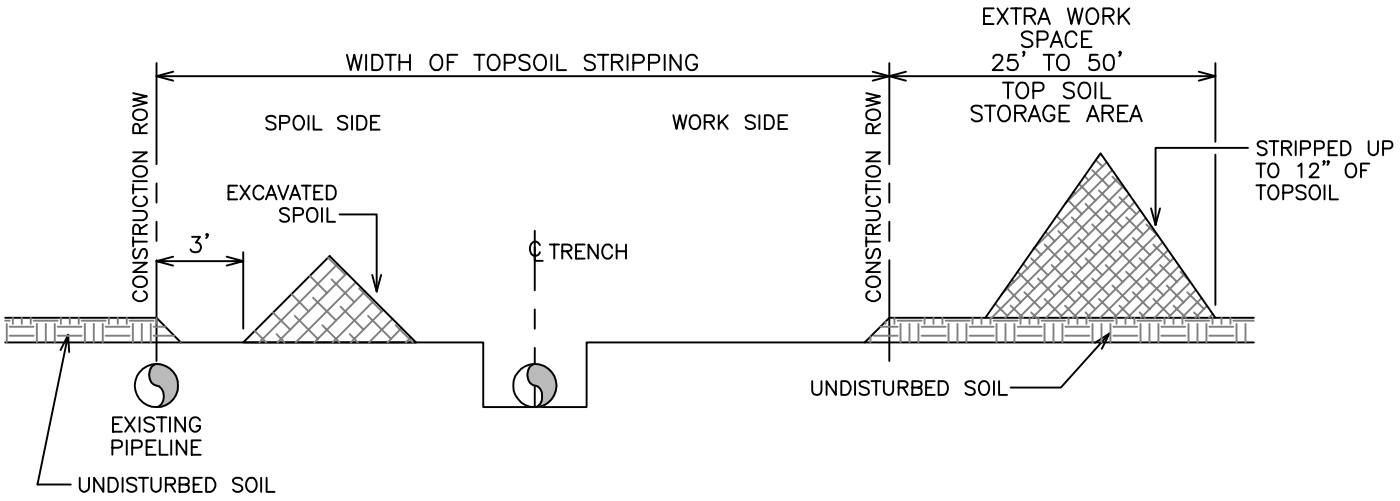
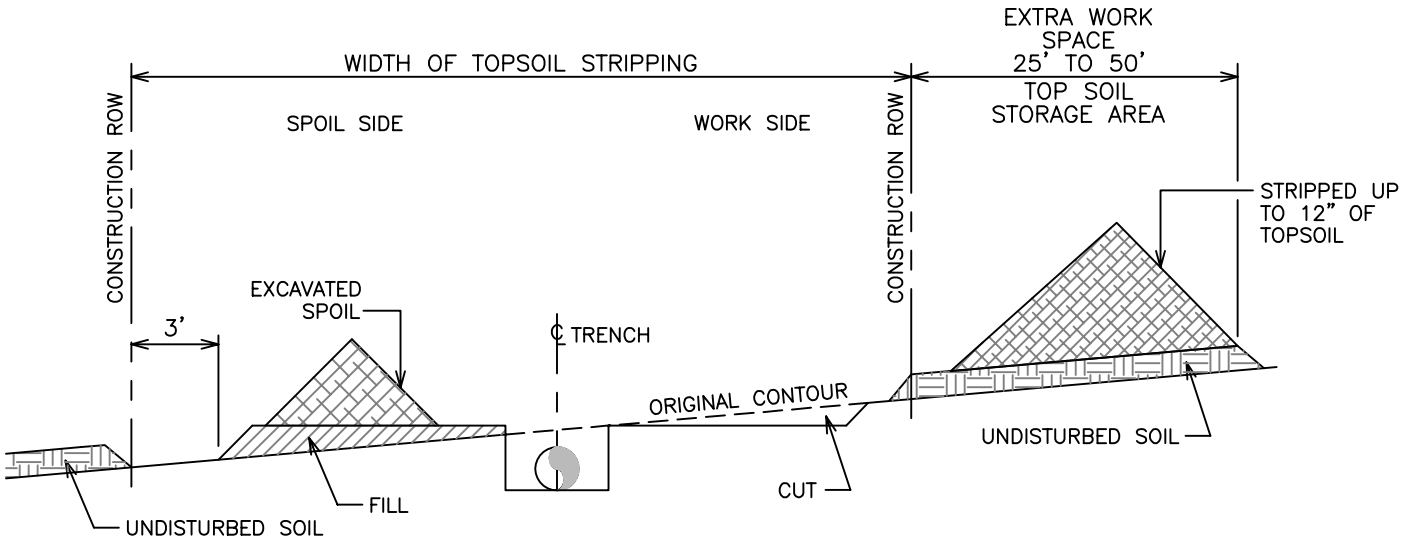
FILENAME: NFGSC\BMP23a.dwg
LAST REVISION DATE: 01/17/2014

TOPSOIL SEGREGATION

DRAWING NUMBER: 23A



FULL RIGHT–OF–WAY TOPSOIL STRIPPING – PARALLELING PIPELINES



FULL RIGHT–OF–WAY TOPSOIL STRIPPING – SIDE SLOPES

NOTES:

1. ALLOW FOR A 3' SEPARATION BETWEEN THE TOPSOIL PILE AND THE TRENCH SPOIL.
2. RETURN TRENCH SPOIL TO TRENCH AND COMPACT. FEATHER OUT EXCESS SPOIL OVER STRIPPED AREA LEAVING A LOW CROWN CENTERED OVER THE TRENCH. ALLEVIATE COMPACTION OF SUBSOILS OVER THE STRIPPED AREA.
3. RETURN TOPSOIL EVENLY OVER THE STRIPPED AREA AFTER TRENCH HAS SUFFICIENTLY SETTLED OR HAS BEEN COMPACTED.
4. ALLEVIATE COMPACTION OF TOPSOIL OVER ENTIRE RIGHT–OF–WAY.
5. SEGREGATED TOPSOIL MAY NOT BE USED FOR PADDING THE PIPE.

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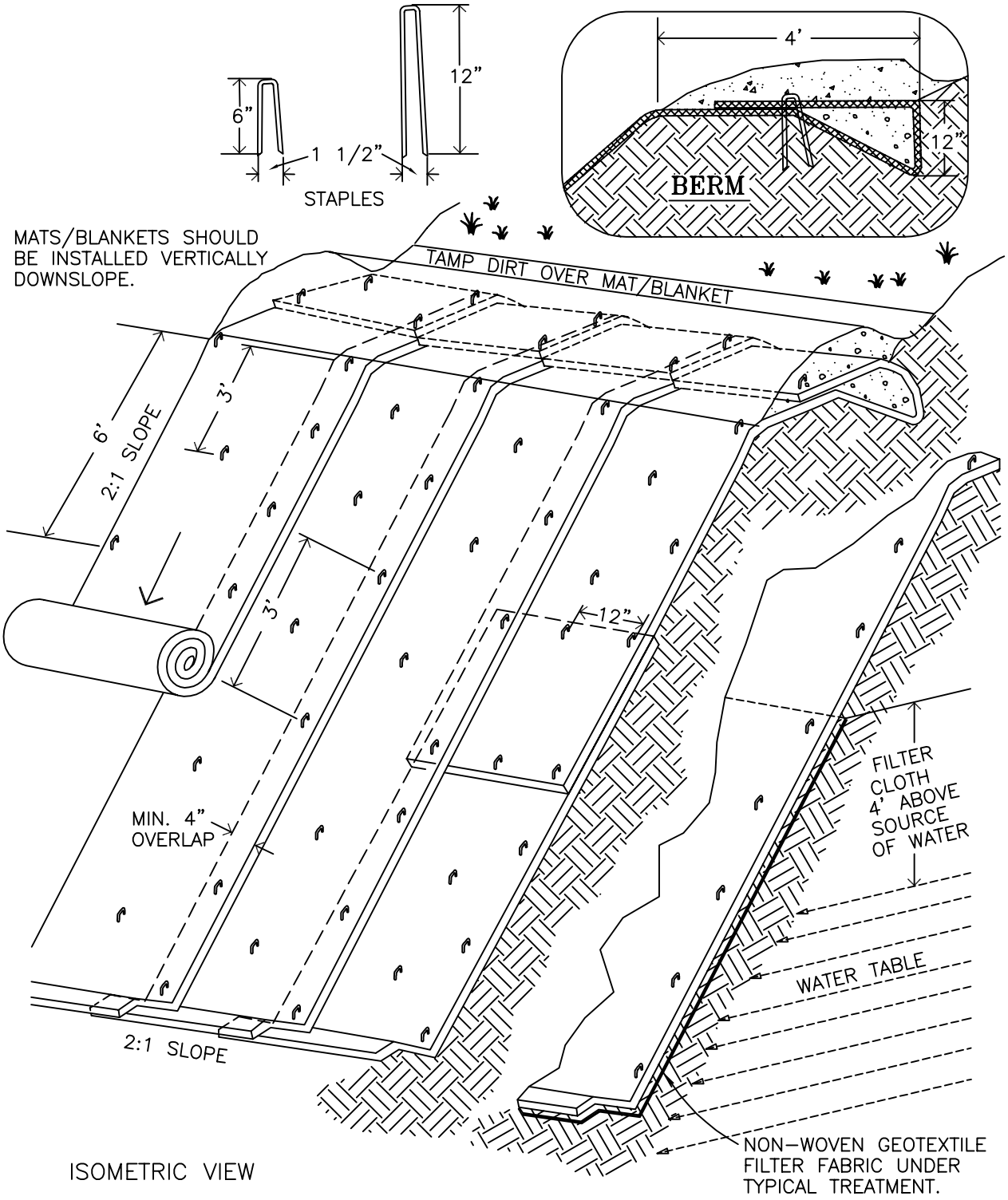
REVIEWED: 01/2014



ISOMETRIC VIEW

TYPICAL SLOPE SOIL STABLIZATION

NOTES:

1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS. MATS/BLANKETS SHALL HAVE GOOD SOIL CONTACT.

2. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.

3. SEE DRAWING NO. 24A FOR INSTALLATION SPECIFICATIONS.

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MODIFIED BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP24.dwg
DATE: 01/13/1997

EROSION BLANKETS
SLOPE INSTALLATION

DRAWING NUMBER:
24

CONSTRUCTION SPECIFICATIONS:

SITE PREPARATION

1. PROPER SITE PREPARATION IS ESSENTIAL TO ENSURE COMPLETE CONTACT OF THE PROTECTION MATTING WITH THE SOIL.
2. GRADE AND SHAPE AREA OF INSTALLATION.
3. REMOVE ALL ROCKS, CLODS, VEGETATIVE OR OTHER OBSTRUCTIONS SO THAT THE INSTALLED BLANKETS, OR MATS WILL HAVE DIRECT CONTACT WITH THE SOIL.
4. PREPARE SEEDBED BY LOOSENING 2"–3" OF TOPSOIL ABOVE FINAL GRADE.
5. INCORPORATE AMENDMENTS, SUCH AS LIME AND FERTILIZER, INTO SOIL ACCORDING TO SOIL TEST AND THE SEEDING PLAN.

SEEDING

SEED AREA BEFORE BLANKET INSTALLATION FOR EROSION CONTROL AND RE–VEGETATION OR SEED AFTER MAT INSTALLATION FOR TURF REINFORCEMENT. WHEN SEEDING PRIOR TO BLANKET INSTALLATION, ALL CHECK SLOTS AND OTHER AREAS DISTURBED DURING INSTALLATION MUST BE RESEEDED. WHERE SOIL FILLING IS SPECIFIED, SEED THE MATTING AND THE ENTIRE DISTURBED AREA AFTER INSTALLATION AND PRIOR TO FILLING THE MAT WITH SOIL.

ANCHORING

U–SHAPED WIRE STAPLES, METAL GEOTEXTILE STAKE PINS OR TRIANGULAR WOODEN STAKES CAN BE USED TO ANCHOR MATS TO THE GROUND SURFACE. WIRE STAPLES SHOULD BE A MINIMUM OF 8 GAUGE. METAL STAKE PINS SHOULD BE 3/16" DIAMETER STEEL WITH A 1 1/2" STEEL WASHER AT THE HEAD OF THE PIN. WIRE STAPLES AND METAL STAKE SHOULD BE DRIVEN FLUSH TO THE SOIL SURFACE. WOODEN STAKES SHOULD BE 3" X 1 1/2" TRIANGULAR WOODEN SURVEY STAKES. TWO INCHES OF WOOD STAKING SHOULD REMAIN ABOVE THE SOIL SURFACE. ALL ANCHORS SHOULD BE 8"–18" LONG AND HAVE SUFFICIENT GROUND PENETRATION TO RESIST PULLOUT. LONGER ANCHORS MAY BE REQUIRED FOR LOOSE SOILS.

INSTALLATION ON SLOPES

1. BEGIN AT THE TOP OF THE SLOPE AND ANCHOR ITS BLANKET IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL TRENCH AND TAMP EARTH FIRMLY.
2. UNROLL BLANKET DOWNSLOPE IN THE DIRECTION OF THE WATER FLOW.
3. THE EDGES OF ADJACENT PARALLEL ROLLS MUST BE OVERLAPPED 2" TO 3" AND BE STAPLED EVERY 3 FEET.
4. WHEN BLANKETS MUST BE SPLICED, PLACE BLANKETS END OVER END (SHINGLE STYLE) WITH 6" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART.
5. BLANKETS SHALL BE STAPLED SUFFICIENTLY TO ANCHOR BLANKET AND MAINTAIN CONTACT WITH THE SOIL. STAPLES SHALL BE PLACED DOWN THE CENTER AND STAGGERED WITH THE STAPLES PLACED ALONG THE EDGES STEEP SLOPES, 1:1 TO 2:1, REQUIRE 2 STAPLES PER SQUARE YARD. MODERATE SLOPES, 2:1 TO 3:1, REQUIRE 1 1/2 STAPLES PER SQUARE YARD (1 STAPLE 3' O.C.). GENTLE SLOPES REQUIRE 1 STAPLE PERSQUARE YARD.

SOIL FILLING IF SPECIFIED FOR TURF REINFORCEMENT.

1. AFTER SEEDING, SPREAD AND LIGHTLY RAKE 1/2" – 3/4" OF FINE TOPSOIL INTO THE MAT APERTURES TO COMPLETELY FILL MAT THICKNESS.
2. USE BACKSIDE OF RAKE OR OTHER FLAT IMPLEMENT.
3. SPREAD TOPSOIL USING LIGHTWEIGHT LOADER, BACKHOE, OR OTHER POWER EQUIPMENT. AVOID SHARP TURNS WITH EQUIPMENT.
4. DO NOT DRIVE TRACKED OR HEAVY EQUIPMENT OVER MAT.
5. AVOID ANY TRAFFIC OVER MATTING IF LOOSE OR WET SOIL CONDITIONS EXIST.
6. USE SHOVELS, RAKES OR BROOMS FOR FINE GRADING AND TOUCH UP.
7. SMOOTH OUT SOIL FILLING JUST EXPOSING TOP NETTING OF MATRIX.

INSPECTION AND MAINTENANCE

1. ALL BLANKET AND MATS SHOULD BE INSPECTEDPERIODICALLY FOLLOWING INSTALLATION.
2. INSPECT INSTALLATION AFTER SIGNIFICANT RAINSTORMS TO CHECK FOR EROSION AND UNDERMINING. ANY FAILURE SHOULD BE REPAIRED IMMEDIATELY.
3. IF WASHOUT OR BREAKAGE OCCURS, RE–INSTALL THE MATERIAL AFTER REPAIRING THE DAMAGE TO THE SLOPE OR DRAINAGEWAY.

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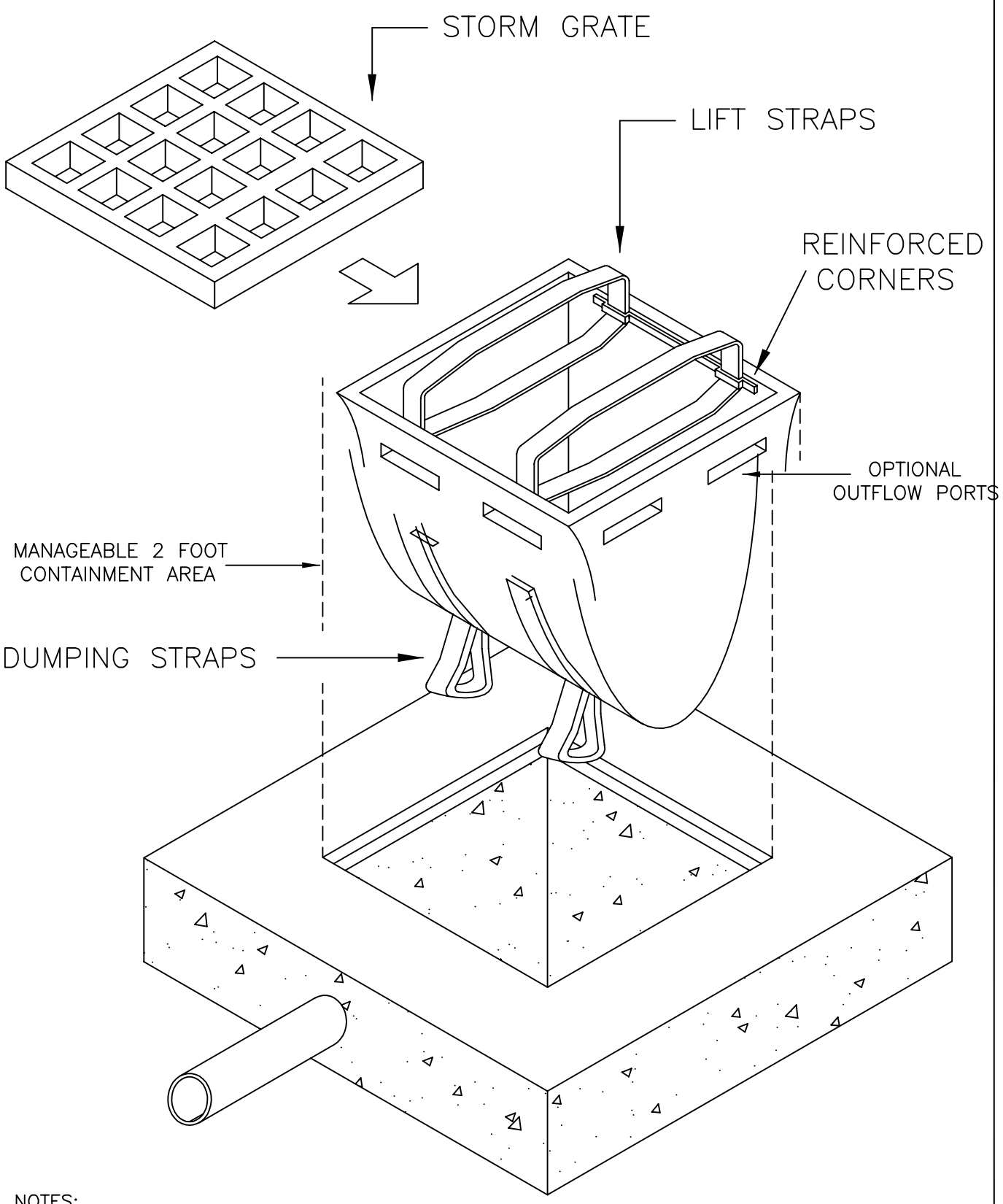
MODIFIED BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP24A.dwg
DATE: 01/13/1997

SPECIFICATIONS EROSION BLANKETS SLOPE INSTALLATION

DRAWING NUMBER: 24A



NOTES:

1. CATCH BASIN SEDIMANT SACK IS TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS. (LESS THAN 5%)

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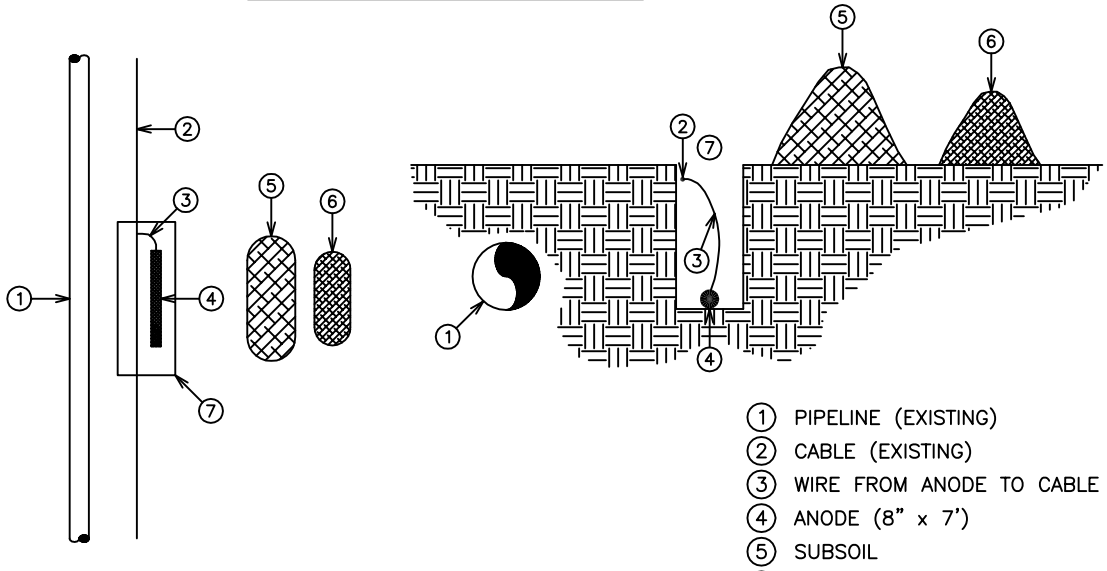
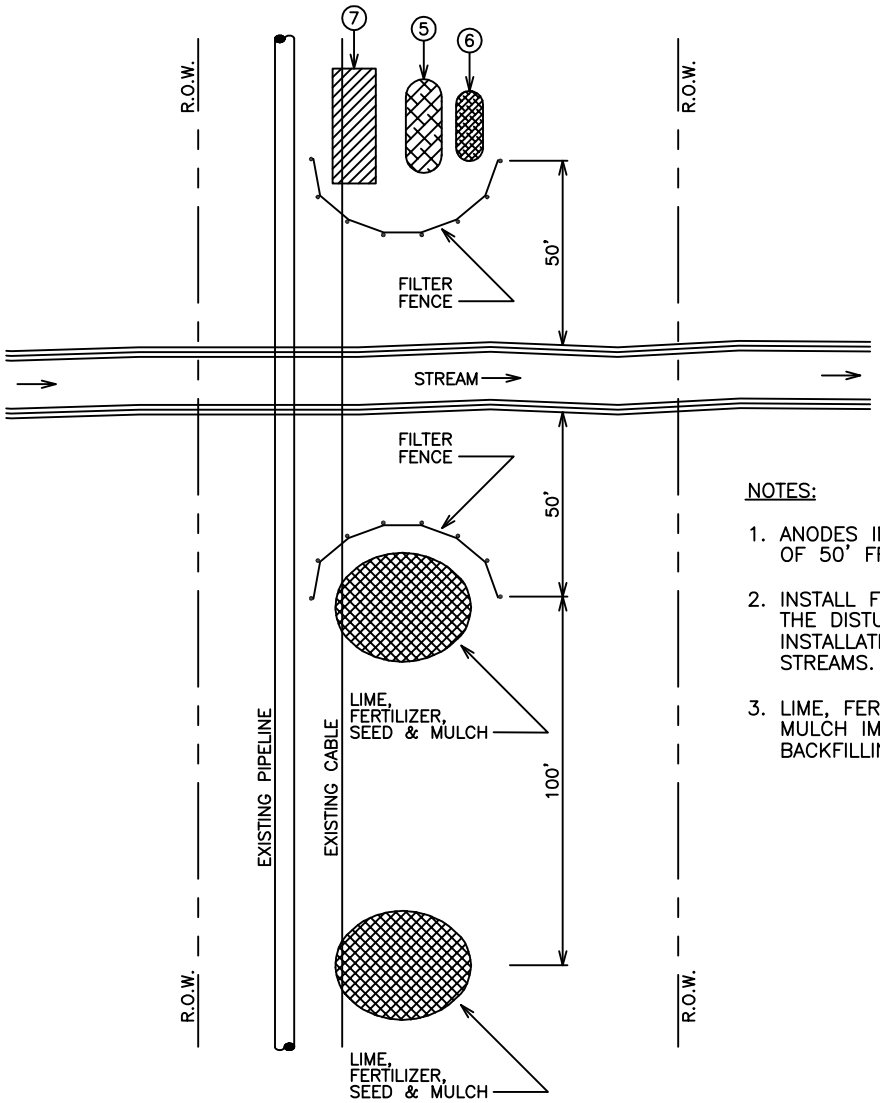
TYPICAL ANODE INSTALLATION



1. PIPELINE (EXISTING)
2. CABLE (EXISTING)
3. WIRE FROM ANODE TO CABLE
4. ANODE (8" x 7')
5. SUBSOIL
6. TOPSOIL
7. OPENING (4'W x 10'L x 5'D)



NOTES:

1. ANODES INSTALLED A MINIMUM OF 50' FROM EDGE OF WATER.
2. INSTALL FILTER FENCE ACROSS THE DISTURBED AREAS AT ANODE INSTALLATIONS ADJACENT TO STREAMS.
3. LIME, FERTILIZE, SEED AND MULCH IMMEDIATELY AFTER BACKFILLING.

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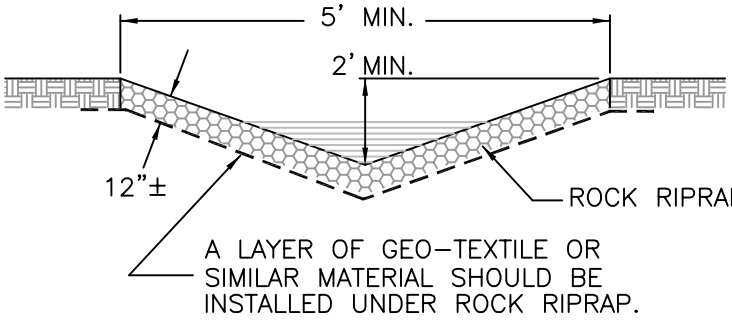
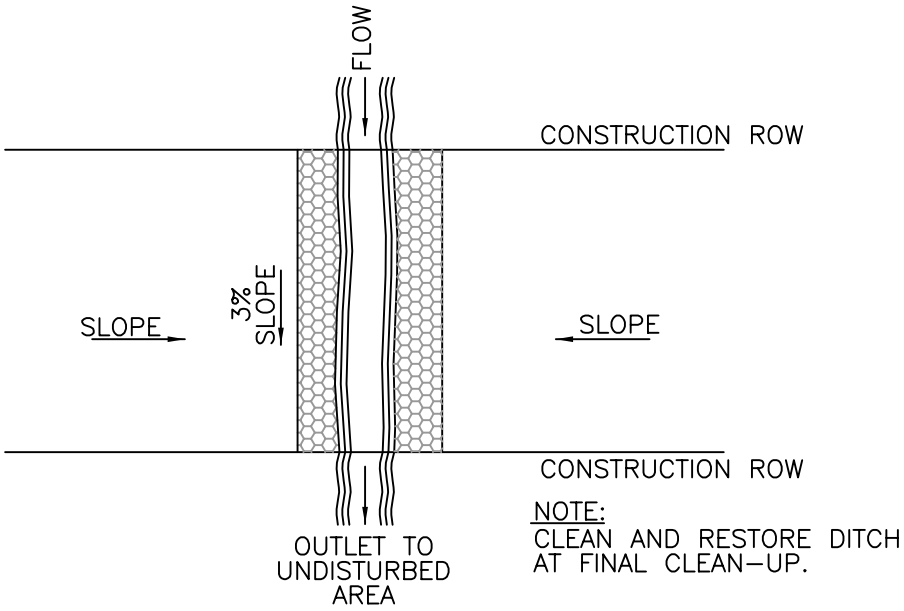


VELOCITY = 8.7'/SEC.
Q = 43 CFS



NOTE:
CLEAN AND RESTORE DITCH AT FINAL CLEAN-UP.

SEE BMP 14 FOR OPTIONAL DIMENSIONS

CONSTRUCTION SPECIFICATIONS

1. COMPACT ANY FILL REQUIRED IN THE SUBGRADE TO A DENSITY APPROXIMATING THAT OF THE SURROUNDING UNDISTURBED MATERIAL.
2. OVERFILL DEPRESSIONS WITH RIPRAP.
3. REMOVE BRUSH, TREES, STUMPS, AND OTHER OBJECTIONABLE MATERIAL.
4. CUT THE SUBGRADE SUFFICIENTLY DEEP SO THAT THE FINISHED GRADE OF THE RIPRAP WILL BE AT THE ELEVATION OF THE SURROUNDING AREA. CHANNELS SHOULD BE EXCAVATED SUFFICIENTLY TO ALLOW PLACEMENT OF THE RIPRAP IN A MANNER SUCH THAT THE FINISHED INSIDE DIMENSIONS AND GRADE OF THE RIPRAP MEET DESIGN SPECIFICATIONS.
5. PLACE THE SAND AND GRAVEL FILTER BLANKET IMMEDIATELY AFTER THE GROUND FOUNDATION IS PREPARED FOR GRAVEL, SPREAD FILTER STONE IN A UNIFORM LAYER TO THE SPECIFIED DEPTH. WHERE MORE THAN ONE LAYER OF FILTER MATERIAL IS USED, SPREAD THE LAYERS WITH MINIMAL MIXING.
6. PLACE THE FILTER FABRIC DIRECTLY ON THE PREPARED FOUNDATION. OVERLAP THE EDGES BY AT LEAST 12 INCHES, AND SPACE ANCHOR PINS EVERY 3 FEET ALONG THE OVERLAP. BURY THE UPPER AND LOWER ENDS OF THE CLOTH A MINIMUM OF 12 INCHES BELOW GROUND. TAKE CARE NOT TO DAMAGE THE CLOTH WHEN PLACING RIPRAP.
7. WHERE LARGE STONES ARE USED OR MACHINE PLACEMENT IS DIFFICULT, A 4-INCH LAYER OF FINE GRAVEL OR SAND MAY BE NEEDED TO PROTECT THE FILTER FABRIC.
8. PLACEMENT OF RIPRAP SHOULD FOLLOW IMMEDIATELY AFTER PLACEMENT OF THE FILTER.
9. PLACE RIPRAP SO THAT IT FORMS A DENSE, WELL-GRADED MASS OF STONE WITH A MINIMUM OF VOIDS.
10. PLACE RIPRAP TO ITS FULL THICKNESS IN ONE OPERATION.
11. DO NOT PLACE RIPRAP BY DUMPING THROUGH CHUTES OR OTHER METHODS THAT CAUSE SEGREGATION OF STONE SIZES.
12. TAKE CARE NOT TO DISLODGE THE UNDERLYING BASE OR FILTER WHEN PLACING THE STONES.
13. THE FINISHED SLOPE SHOULD BE FREE OF POCKETS OF SMALL STONE OR CLUSTERS OF LARGE STONES.

MAINTENANCE

RIPRAP SHOULD BE INSPECTED PERIODICALLY FOR SCOUR OR DISLODGED STONES. CONTROL OF WEED AND BRUSH GROWTH MAY BE NEEDED IN SOME LOCATIONS.

national Fuel SUPPLY CORPORATION

ENGINEERING DEPT.
1100 STATE STREET
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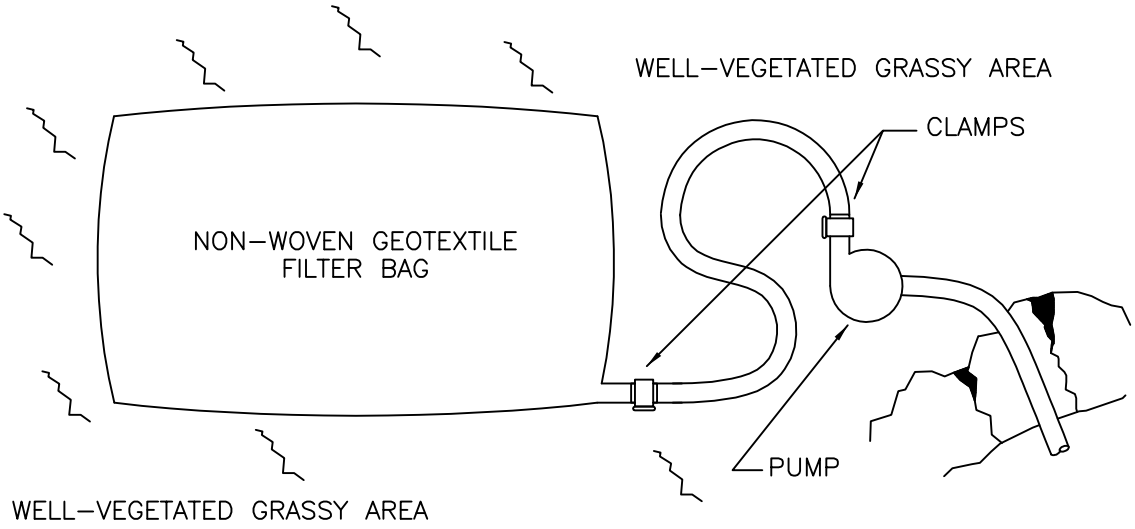
(814) 871-8676

DRAWN BY: L. A. PHILLIPS
FILENAME: EPC\BMP27.dwg
LAST REVISION DATE: 06/27/2007

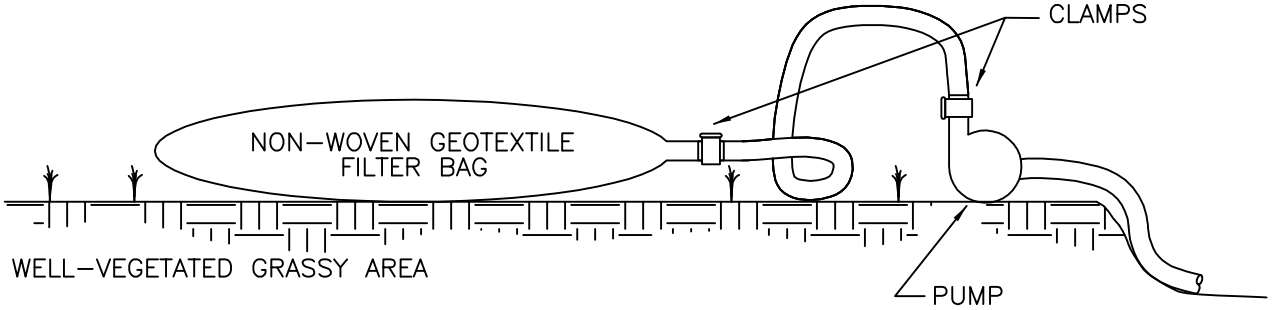
STORM WATER CHANNEL

DRAWING NUMBER: 27

FILTER BAGS FOR REMOVING SEDIMENT FROM PUMPED WATER



PLAN VIEW



ELEVATION VIEW

1. 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.
2. A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES MUST BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME 1/2 FULL. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE 1/2 FILLED WITH SEDIMENT.
3. BAGS SHALL BE LOCATED IN WELL–VEGETATED (GRASSY) AREA AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
4. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED.
5. THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHOULD BE FLOATING AND SCREENED.
6. ALL FILTER BAGS AND TRAPPED SEDIMENT SHALL BE REMOVED TO A SUITABLE WASTE AREA WHEN ACCUMULATED SEDIMENTS REACH 1/2 TOTAL BAG CAPACITY.

IF SEDIMENT IS OBSERVED LEAVING THE FILTER BAG, UTILIZE STRAW BALE CONTAINMENT SIMILAR TO BMPs 47–48.

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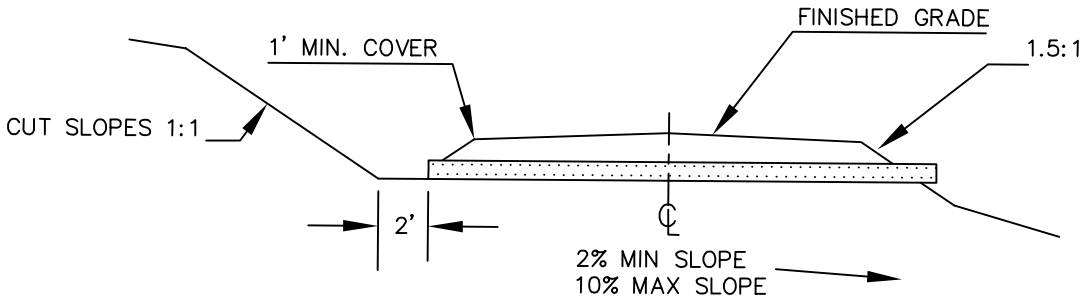
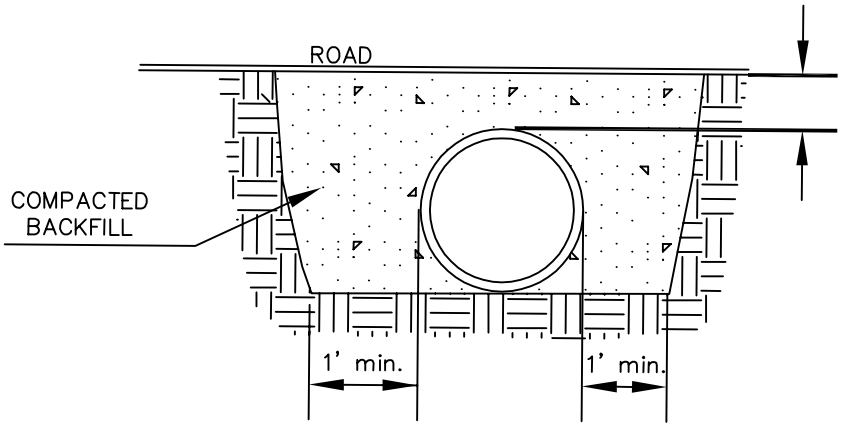
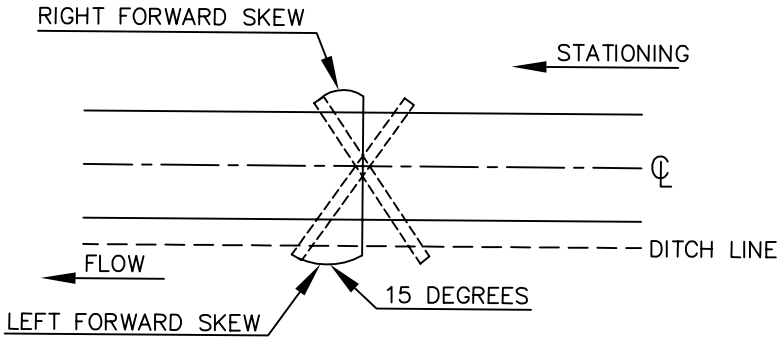


CULVERT SECTION

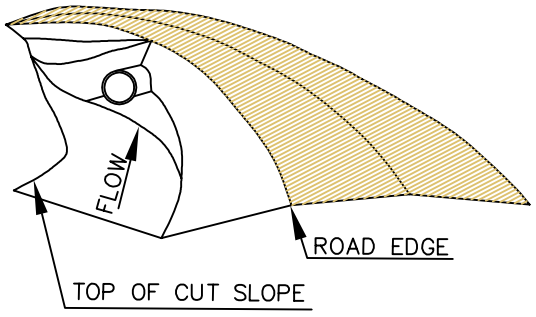


CULVERT – END VIEW

PROFILE VIEW

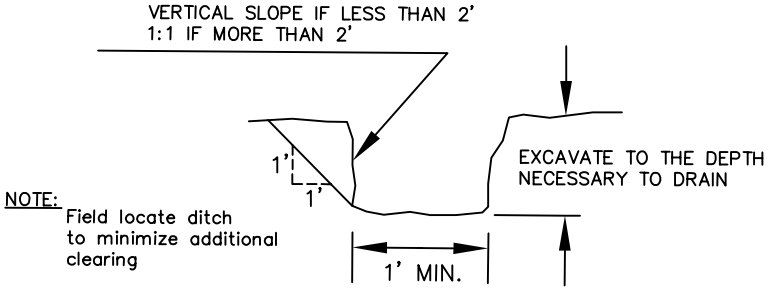


SKEW DETAIL



DITCH BLOCK

PERSPECTIVE VIEW



NOTE: Field locate ditch to minimize additional clearing

OUTLET DITCH SECTION

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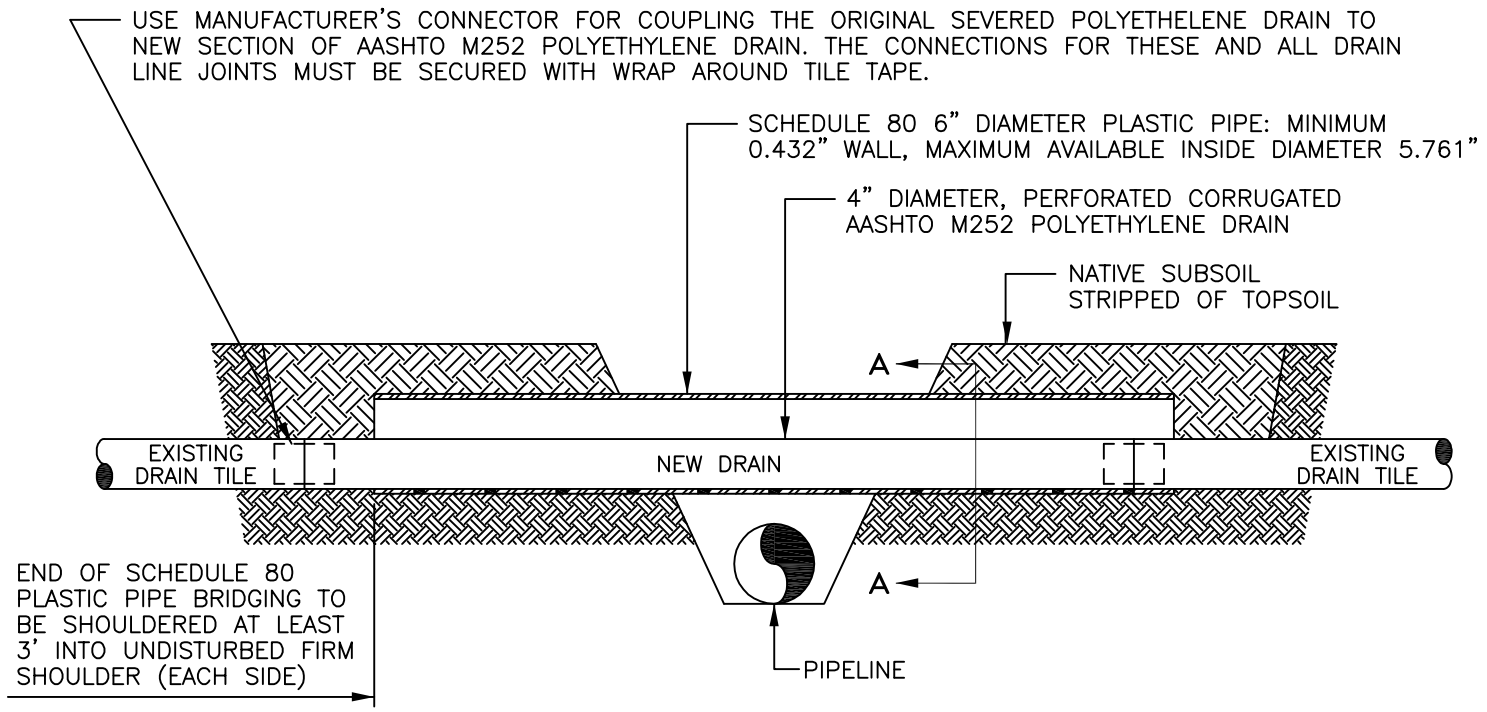


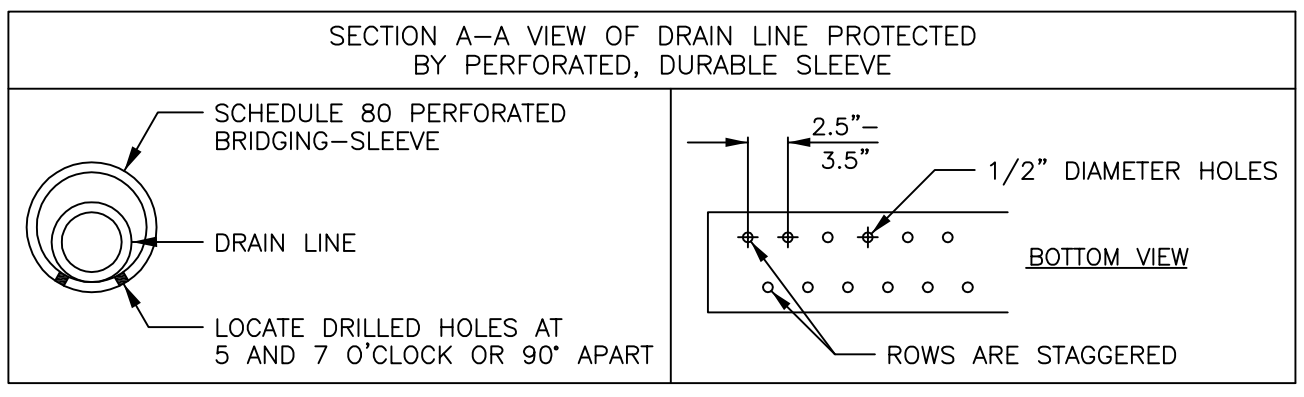
DRAINAGE TILE	SUPPORT SIZE
3" TO 5"	6" PIPE
6"	8" PIPE
7" TO 8"	10" PIPE
9" TO 10"	12" PIPE
12"	W12 x 14
15" TO 18"	W16 x 26
OVER 18"	W18 x 46

PVC SCHEDULE 80 PIPE (FOR BRIDGING–SLEEVES)

NOMINAL SIZE (INCHES)	AVERAGE O.D. (INCHES)	MAXIMUM WALL THICKNESS (INCHES)	MAXIMUM AVAILABLE I.D. (INCHES)
4	4.500	0.337	3.826
6	6.625	0.432	5.761
8	8.625	0.500	7.625
10	10.750	0.593	9.564
12	12.750	0.687	11.376

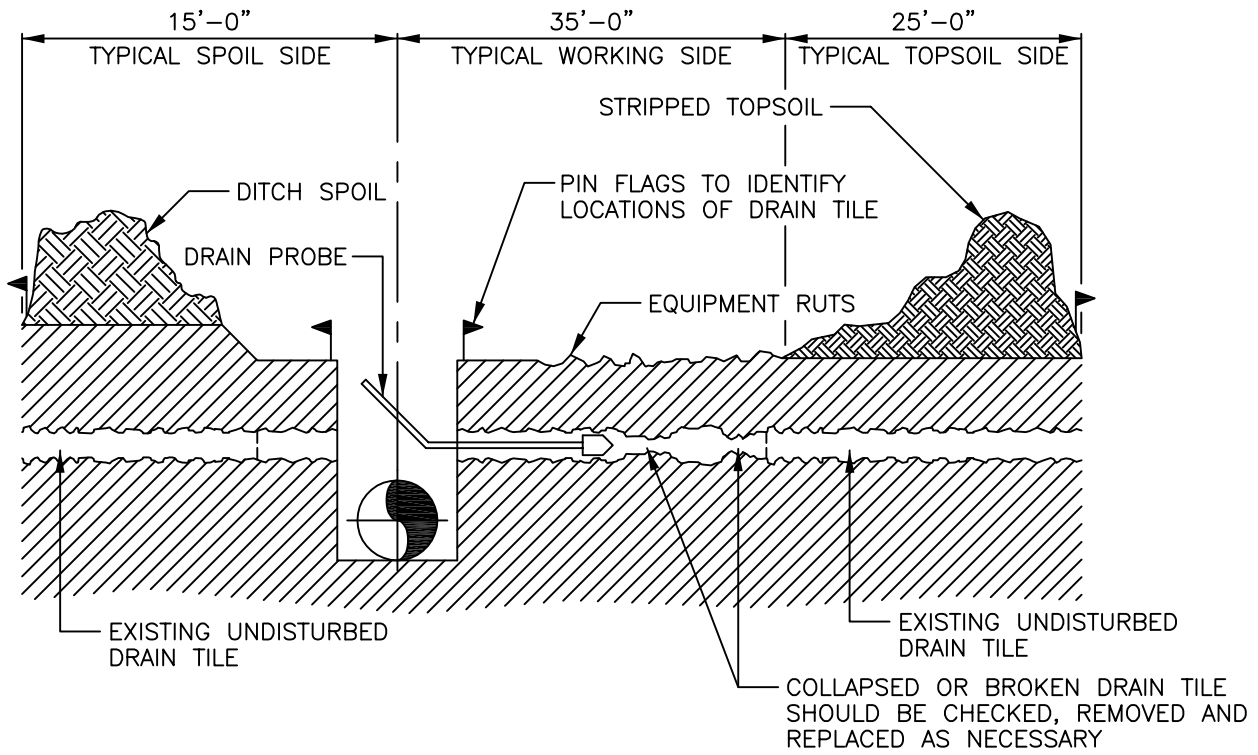
AASHTO M252
SINGLE WALL, CORRUGATED, PERFORATED (SLOTTED) POLYETHYLENE DRAIN LINE

NOMINAL SIZE (INCHES)	OUTSIDE DIAMETER (INCHES)
4	4.71
6	7.00
8	9.90
10	11.90
12	14.41
15	17.70



NOTES:

1. THE BRIDGING–SLEEVE REPAIR IS VERTICALLY POSITIONED ACROSS THE TRENCH SO IT MAINTAINS THE GRAVITY–FLOW GRADIENT OF THE ORIGINAL DRAIN TILE.
2. BOTH OF THE RECONNECTIONES MAY BE LOCATED PHYSICALLY OUTSIDE OF THE BRIDGING–SLEEVE (LEFT) OR INSIDE THE SLEEVE (RIGHT) AFTER SLIDING IT OVER THE REPAIR.



NOTE:

WITHIN ALL AREAS OF CONSTRUCTION ACTIVITIES;

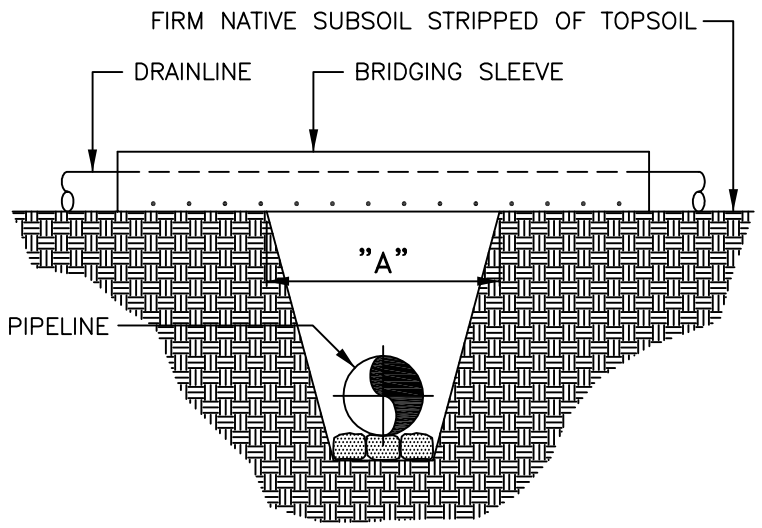
1. PROBE AND CLEAN OUT ALL DRAIN TILES.
2. REPLACE ANY DAMAGED TILES.
3. REPAIR ANY DAMAGED JOINTS.

National Fuel SUPPLY CORPORATION

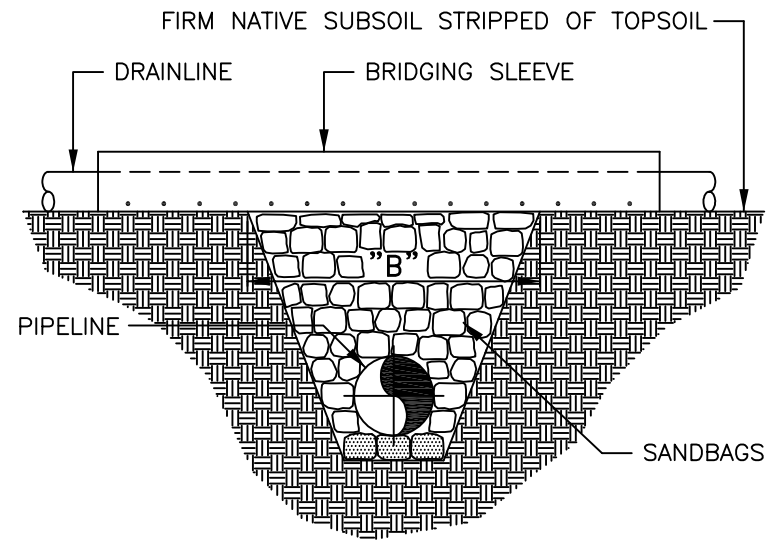
DRAWN BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP30.dwg
DATE: 06/24/2005

TYPICAL DRAIN TILE REPAIR ACROSS TRENCH

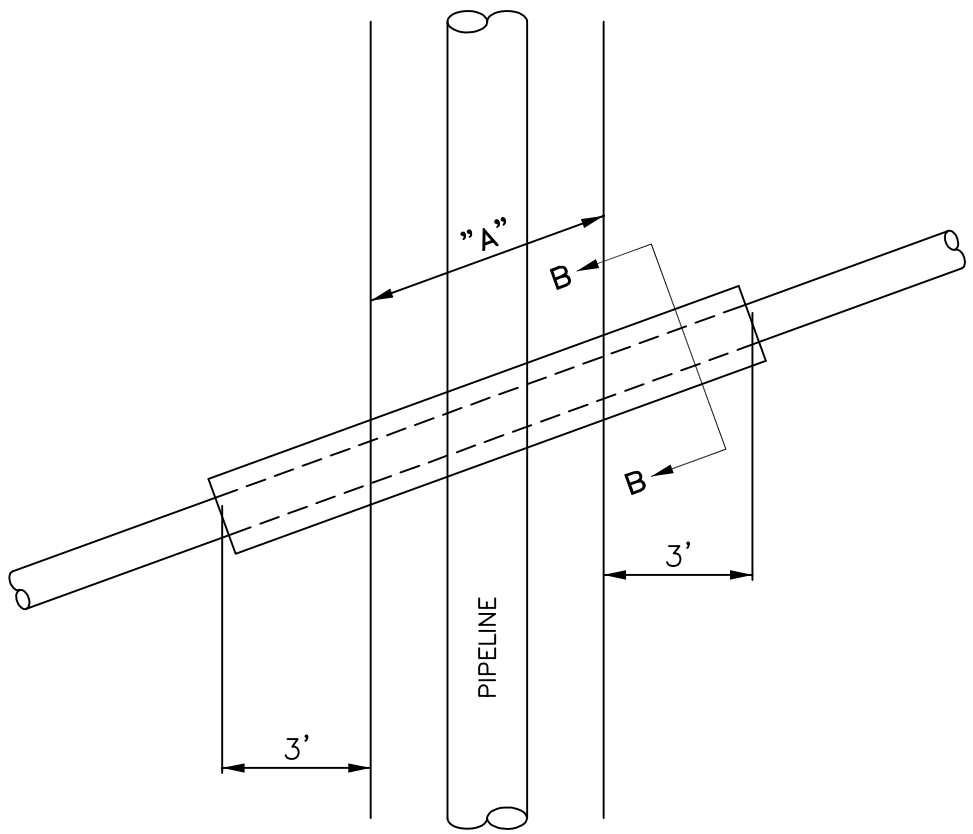
DRAWING NUMBER: 30

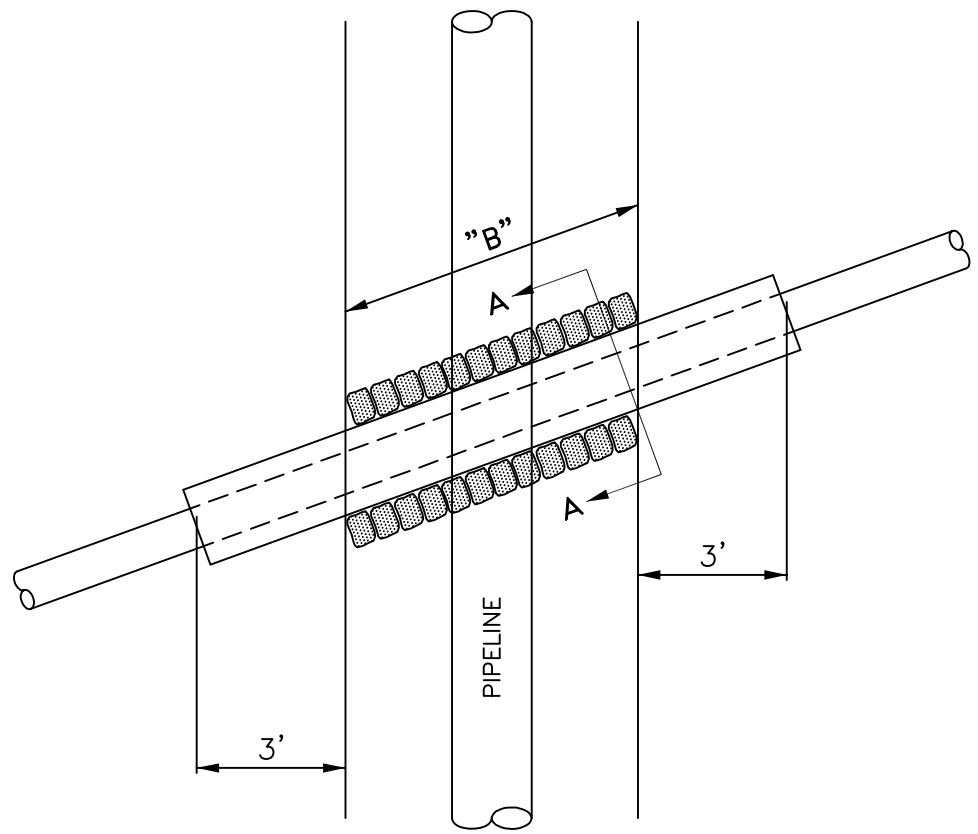


IF DISTANCE "A" DOES NOT EXCEED 10 FEET, THE SCHEDULE 80 PERFORATED BRIDGING–SLEEVE DOES NOT REQUIRE SUPPORT UNDER THE BRIDGING–SLEEVE.

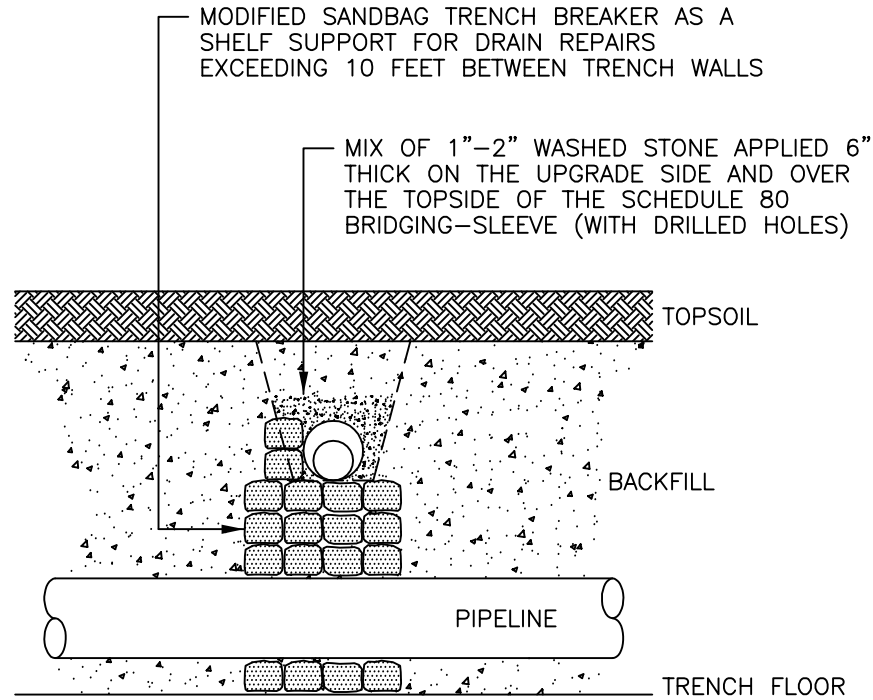


IF DISTANCE "B" EXCEEDS 10 FEET, THE SCHEDULE 80 PERFORATED BRIDGING SLEEVE REQUIRES A MODIFIED SANDBAG TRENCH BREAKER UNDER THE BRIDGING SLEEVE





CROSS SECTION "B–B" IS THE SAME AS CROSS SECTION "A–A", MINUS THE SAND BAG TRENCH BREAKER. MINIMUM OF 1"–2" WASHED STONE 4"–6" THICK UNDERNEATH, AROUND SIDES AND OVER TOP OF THE BRIDGING SLEEVE.



THE BRIDGING–SLEEVE DRAIN REPAIR RESTS ON THE UPGRADIENT SIDE OF THE MODIFIED SANDBAG TRENCH BREAKER. THE HIGHER PORTION OF THE TRENCH BREAKER IS ON THE DOWN GRADIENT SIDE OF THE REPAIR.

NOTE: IF THE REPAIR OF THE SEVERED DRAINLINE CROSSES THE PIPELINE TRENCH AT AN ANGLE REQUIRING MORE THAN 20' OF BRIDGING–SLEEVE BETWEEN THE FARTHEST ENDS OF THE FIRM SHELVES, MODIFY THE CROSSING ANGLE TO SHORTEN THE TOTAL LENGTH OF THE CROSSING AND THEN TIE TO THE EXISTING DRAIN TILE.

SECTION A-A

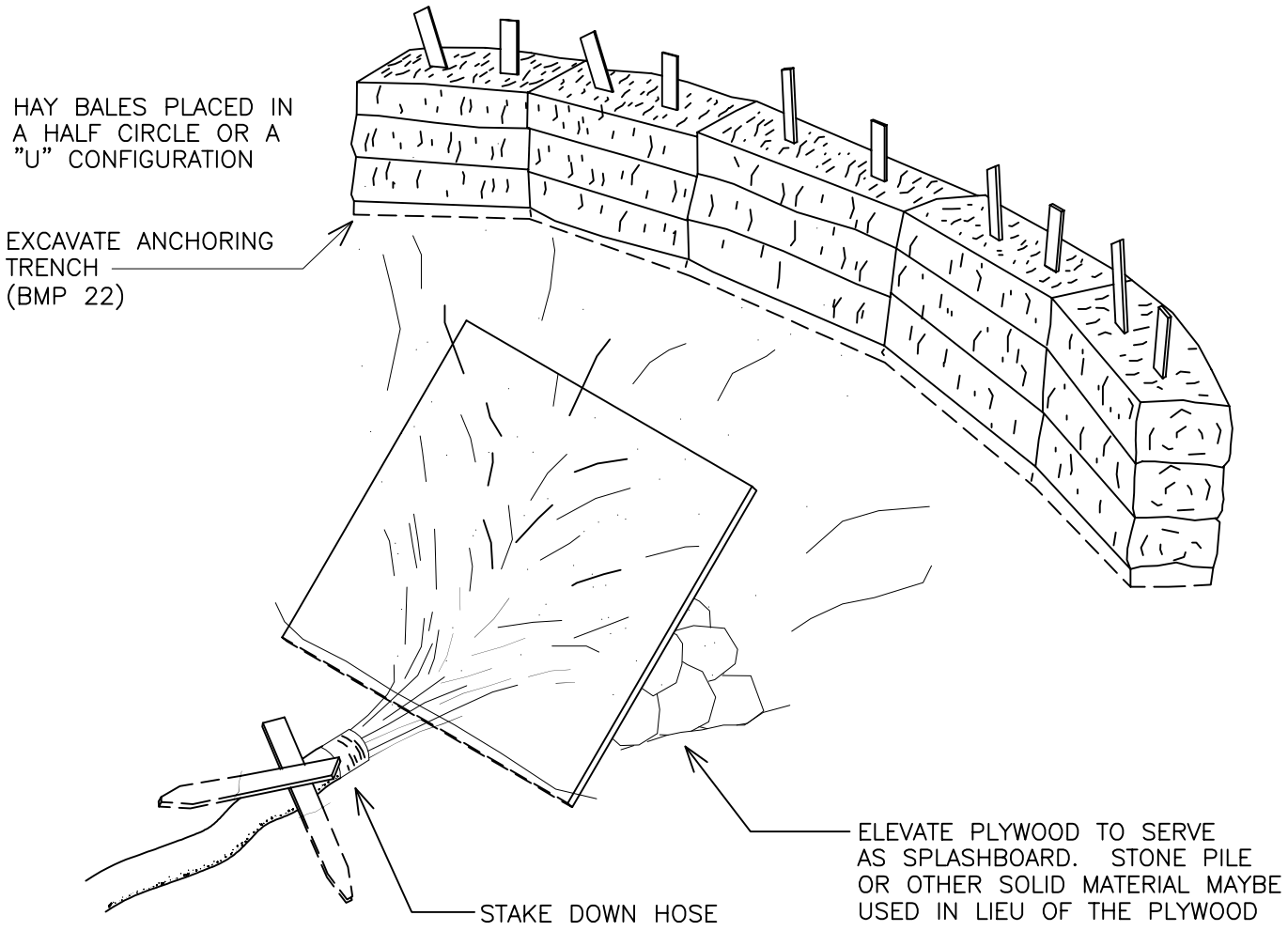
National Fuel SUPPLY CORPORATION

DRAWN BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP30A.dwg
DATE: 06/29/2005

TYPICAL DRAIN TILE REPAIR ACROSS TRENCH

DRAWING NUMBER: 30A

PREFER BARRIER LOCATION
IS IN A VEGETATED AREA

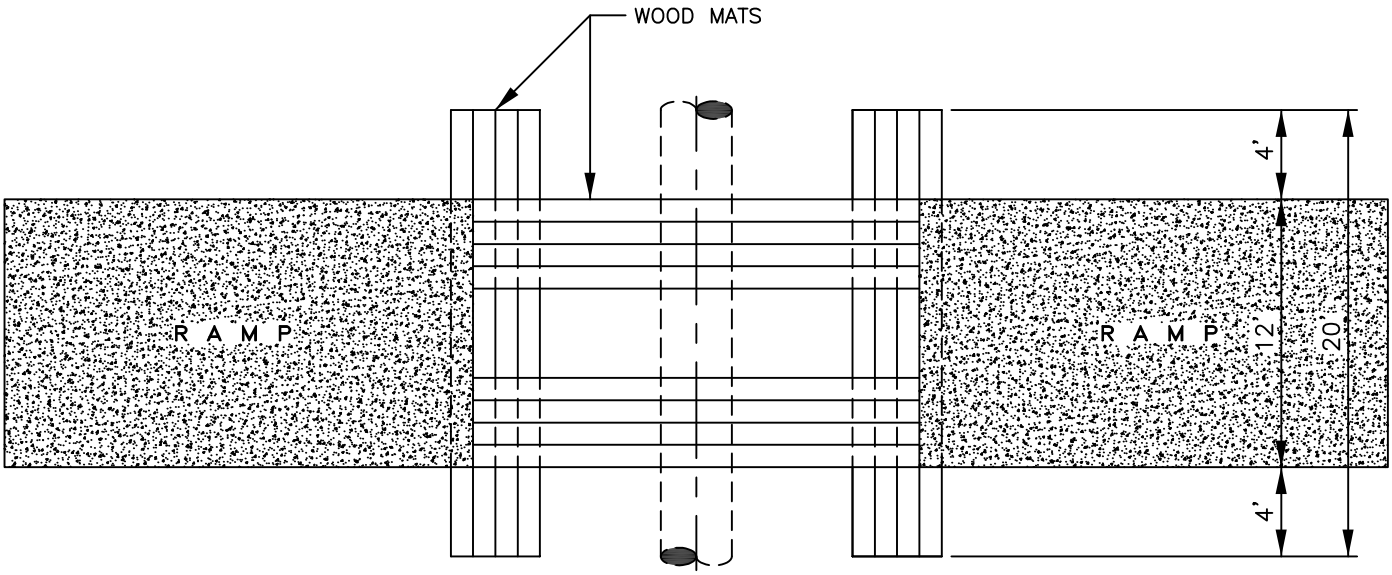


**ALTERNATIVE CONTROLS USED FOR TRENCH (BMP 28)
HYDROSTATIC DE-WATERING (BMP 3)**

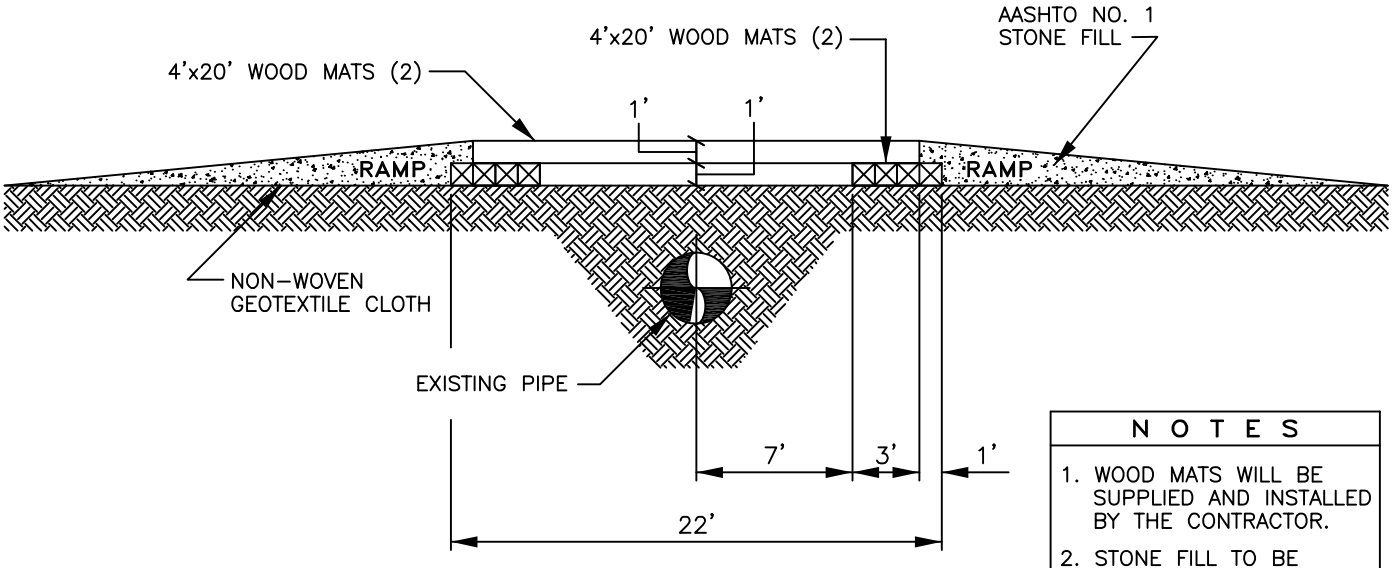
national fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512 (814) 871-8676	DRAWN BY: DRISCOLL/PHILLIPS FILENAME: EPC\BMP31.dwg LAST REVISION DATE: 06/27/2007	ENERGY DISSIPATER	DRAWING NUMBER: 31

REVIEWED: 01/2014

PLAN VIEW



SIDE VIEW



NOTES
1. WOOD MATS WILL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.
2. STONE FILL TO BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.
3. ADDITIONAL MATS, IF NEEDED, WILL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.

SPECIAL NOTE:

PROPOSED VEHICLE & EQUIPMENT WHEEL / TRACK LOAD WEIGHTS SHALL BE PROVIDED TO NFG ENGINEERING SERVICES TO DETERMINE IF ADDITIONAL MEASURES ARE NECESSARY BASE ON THE SPECIFIC PIPELINE TO BE CROSSED.

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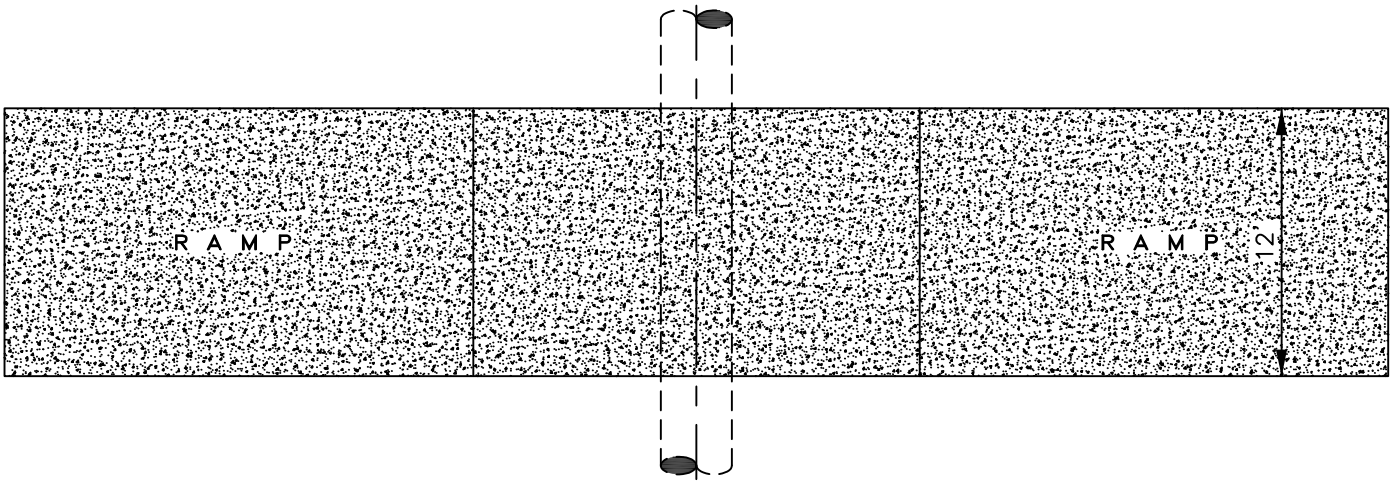
DRAWN BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP32.dwg
REVISED DATE: 01/17/2014

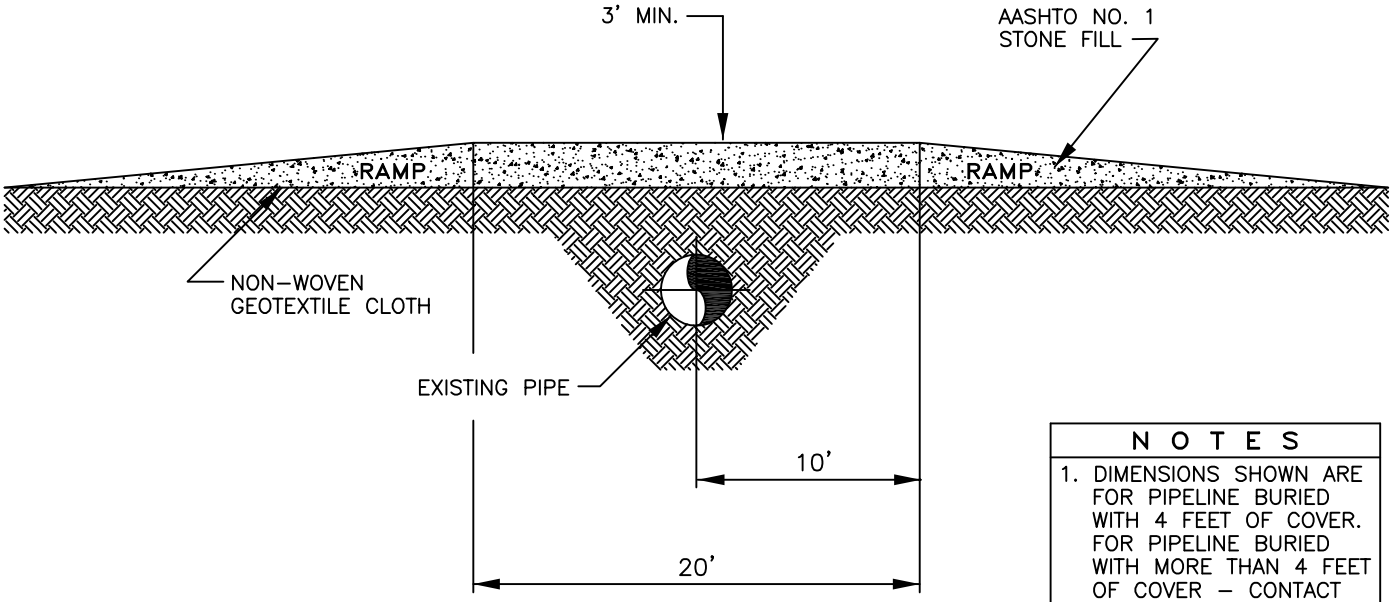
WOODEN MAT BRIDGE PIPELINE CROSSING

DRAWING NUMBER: 32

PLAN VIEW



SIDE VIEW



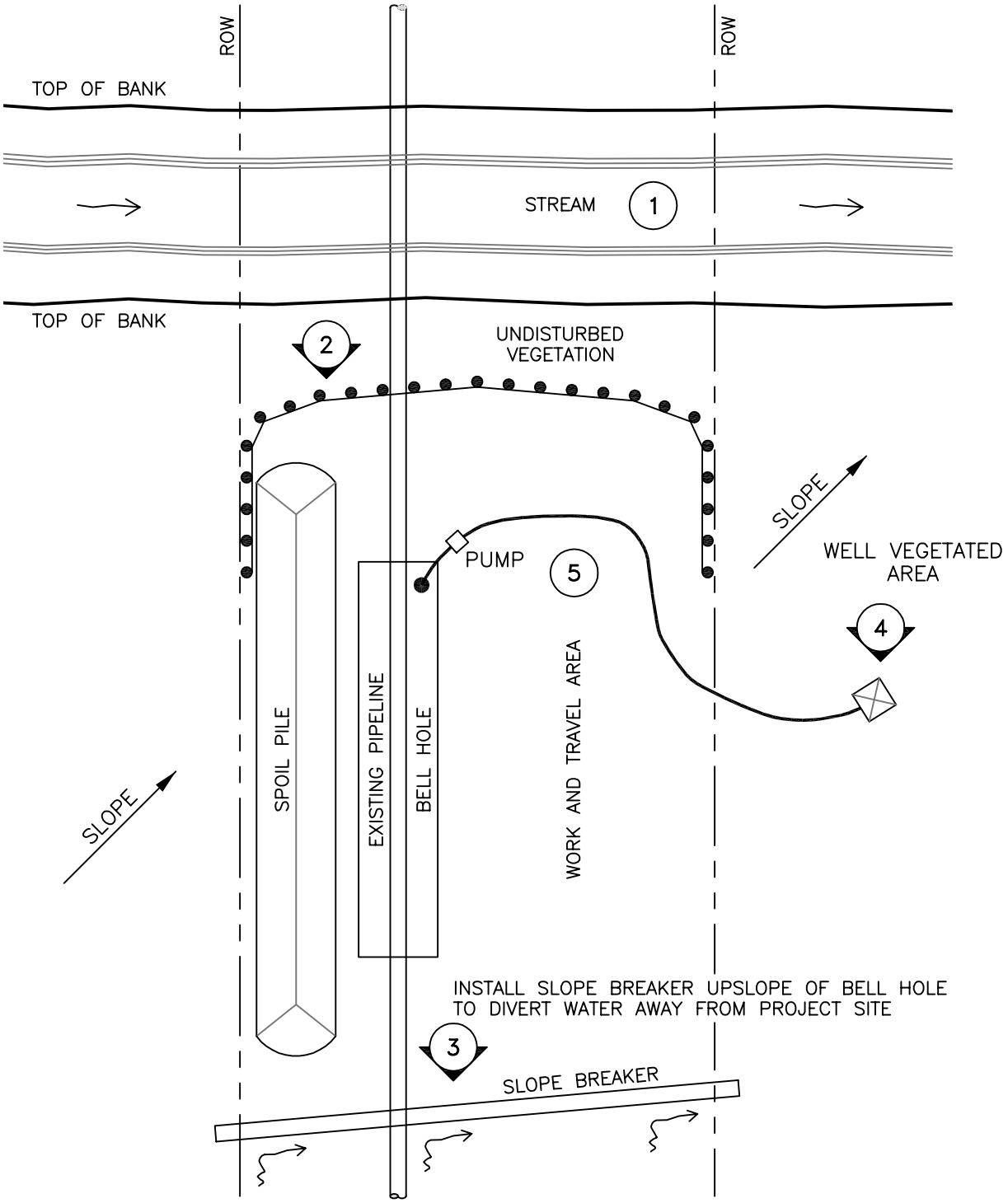
SPECIAL NOTE:

PROPOSED VEHICLE & EQUIPMENT WHEEL / TRACK LOAD WEIGHTS SHALL BE PROVIDED TO NFG ENGINEERING SERVICES TO DETERMINE IF ADDITIONAL MEASURES ARE NECESSARY BASED ON THE SPECIFIC PIPELINE TO BE CROSSED.

NOTES

1. DIMENSIONS SHOWN ARE FOR PIPELINE BURIED WITH 4 FEET OF COVER. FOR PIPELINE BURIED WITH MORE THAN 4 FEET OF COVER – CONTACT ENGINEER.
2. STONE FILL TO BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.

national Fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512	DRAWN BY: L. A. PHILLIPS FILENAME: NFGSC\BMP32.dwg REVISED DATE: 01/17/2014	STONE BRIDGE PIPELINE CROSSING	DRAWING NUMBER: 32A



1. REFER TO BMP NO. 9 FOR STREAM CROSSING REQUIREMENTS AND PROCEDURE.
2. REFER TO BMP NO. 5 FOR FILTER FENCE INSTALLATION AND BMP NO. 45A,B,C FOR COMPOST FILTER SOCK INSTALLATION AS PERMITTED AND AS PER PERMIT APPROVAL.
3. REFER TO BMP NO. 8A FOR SLOPE BREAKER INSTALLATION.
4. REFER TO BMP NO. 28 AND 31 FOR DEWATERING FILTER BAG AND ENERGY DISSIPATION.
5. ALL DISTURBED AREAS TO BE RESTORED AND STABILIZED IMMEDIATELY AFTER BACKFILLING.

National Fuel Supply Corporation
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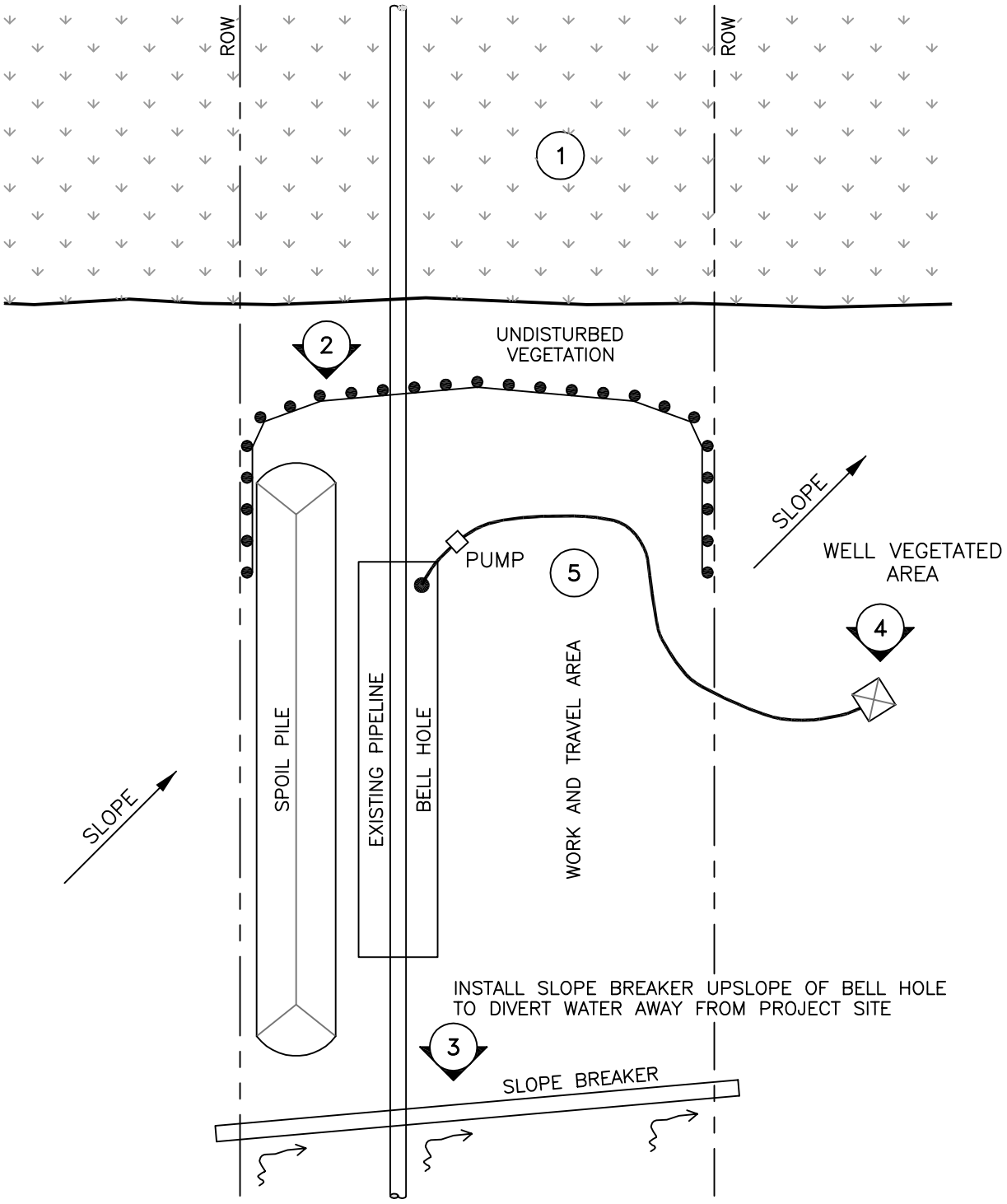
DRAWN BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP33.dwg
LAST REVISION DATE: 01/17/2014

BELL HOLE NEXT TO WATERBODY

DRAWING NUMBER: 33

REVIEWED: 01/2014



1. REFER TO BMP NO. 4/4A FOR WETLAND CROSSING/TRAVEL REQUIREMENTS AND PROCEDURES.
2. REFER TO BMP NO. 5 FOR FILTER FENCE INSTALLATION AND BMP NO. 45A,B,C FOR COMPOST FILTER SOCK INSTALLATION AS PERMITTED AND AS PER PERMIT APPROVAL.
3. REFER TO BMP NO. 8A FOR SLOPE BREAKER INSTALLATION.
4. REFER TO BMP NO. 28 AND 31 FOR DEWATERING FILTER BAG AND ENERGY DISSIPATION.
5. ALL DISTURBED AREAS TO BE RESTORED AND STABILIZED IMMEDIATELY AFTER BACKFILLING.

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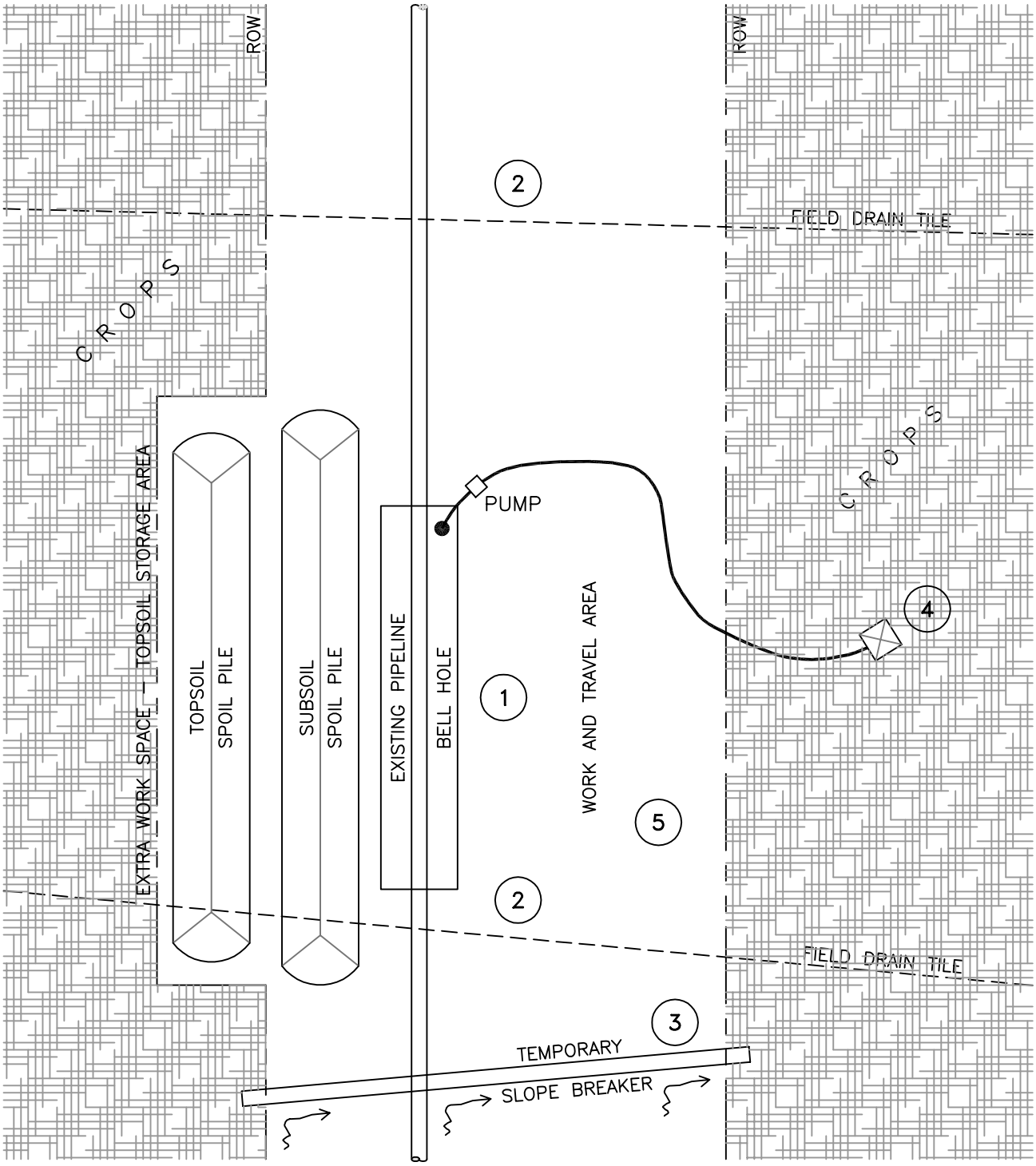
DRAWN BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP34.dwg
LAST REVISION DATE: 01/17/2014

BELL HOLE NEXT TO WETLAND

DRAWING NUMBER: 34



1. REFER TO BMP NO. 23A AND 23B FOR FULL ROW TOPSOIL SEGREGATION REQUIREMENTS AND PROCEDURES.
2. REFER TO BMP NO. 30 AND 30A FOR DRAIN TILE REPAIR ACROSS TRENCH REQUIREMENTS AND PROCEDURES.
3. REFER TO BMP NO. 8A FOR SLOPE BREAKER INSTALLATION.
4. REFER TO BMP NO. 28 AND 31 FOR DEWATERING FILTER BAG AND ENERGY DISSIPATION.
5. ALL DISTURBED AREAS TO BE RESTORED AND STABILIZED IMMEDIATELY AFTER BACKFILLING.

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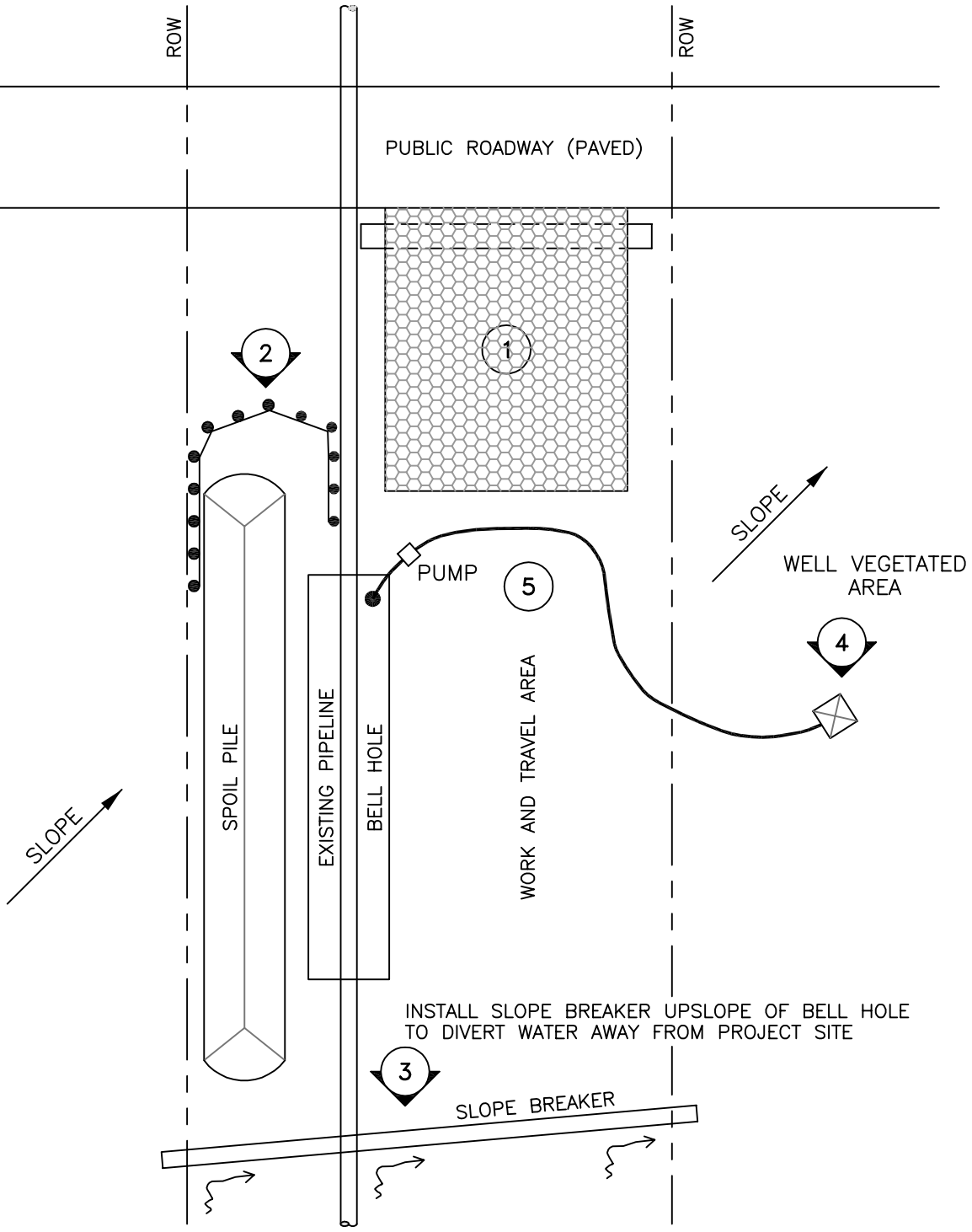
DRAWN BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP35.dwg
LAST REVISION DATE: 01/17/2014

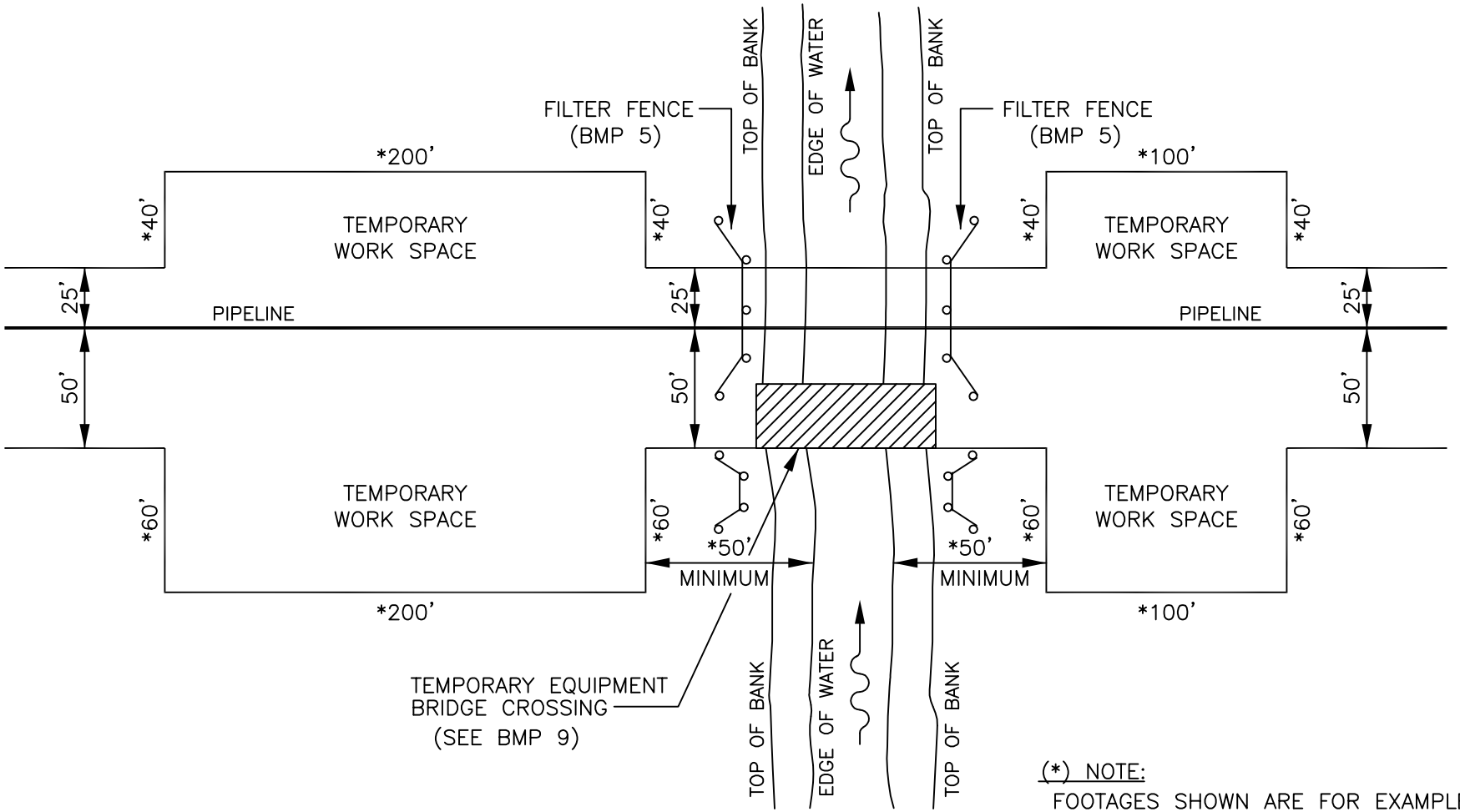
BELL HOLE AGRICULTURAL FIELD

DRAWING NUMBER: 35



1. REFER TO BMP NO. 1 FOR ENTRANCE PAD INSTALLATION.
2. REFER TO BMP NO. 5 FOR FILTER FENCE INSTALLATION AND BMP NO. 45A,B,C FOR COMPOST FILTER SOCK INSTALLATION AS PERMITTED AND AS PER PERMIT APPROVAL.
3. REFER TO BMP NO. 8A FOR SLOPE BREAKER INSTALLATION.
4. REFER TO BMP NO. 28 AND 31 FOR DEWATERING FILTER BAG AND ENERGY DISSIPATION.
5. ALL DISTURBED AREAS TO BE RESTORED AND STABILIZED IMMEDIATELY AFTER BACKFILLING.

National Fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512 (814) 871-8676	DRAWN BY: L. A. PHILLIPS FILENAME: NFGSC\BMP36.dwg LAST REVISION DATE: 01/17/2014	BELL HOLE ADJACENT TO PAVED ROAD	DRAWING NUMBER: 36



(*) NOTE:

FOOTAGES SHOWN ARE FOR EXAMPLE PURPOSES ONLY. ACTUAL EXTRA WORK SPACE AREAS WILL VARY DEPENDING ON INDIVIDUAL PROJECTS.

1. SPOIL REMOVED DURING TRENCH CONSTRUCTION OF CROSSING MAY BE PLACED 10 FT BACK FROM ORDINARY HIGH WATER MARK PROVIDED E&S CONTROLS INSTALLED.

2. UNDISTURBED VEGETATION BUFFER SHALL BE 25 FT OR TO EDGE OF EXISTING NON-NATIVE VEGETATION WHERE THAT DISTANCE IS <25 FT.

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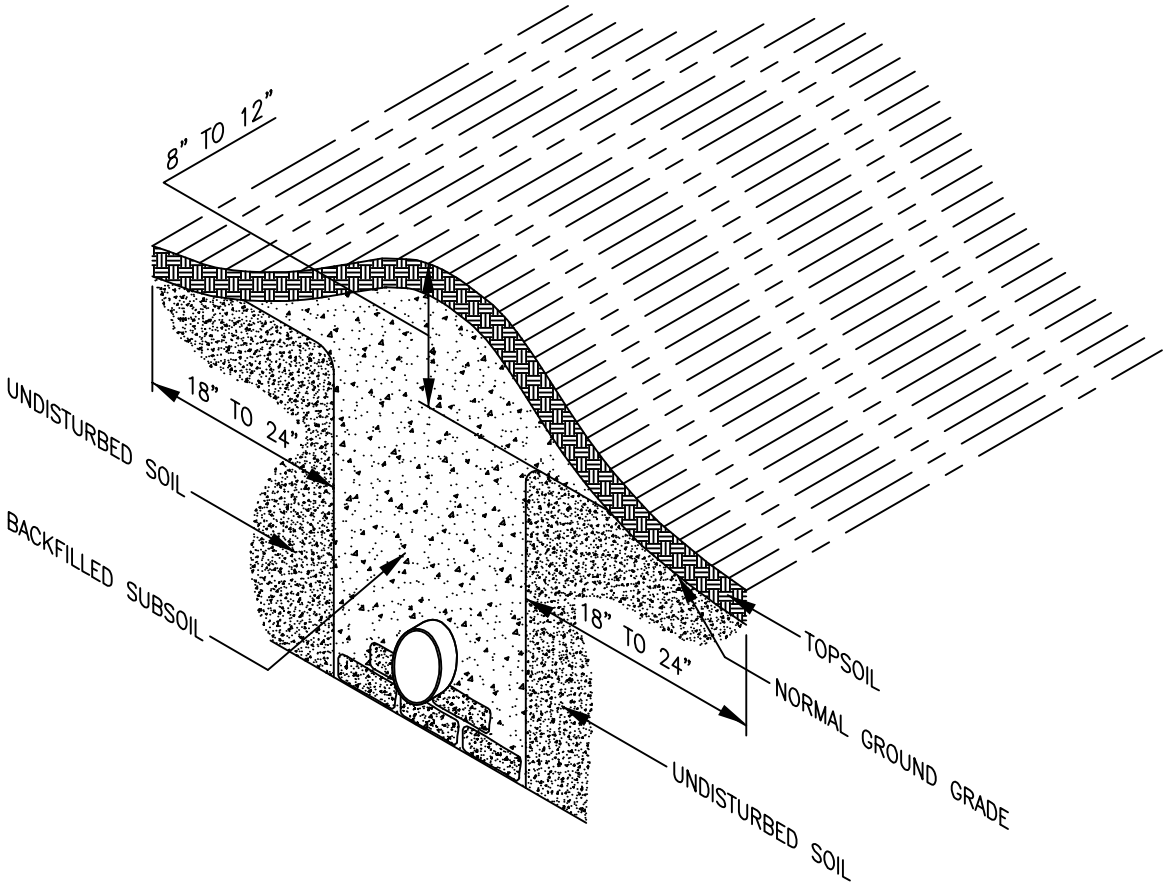
(814) 871-8676

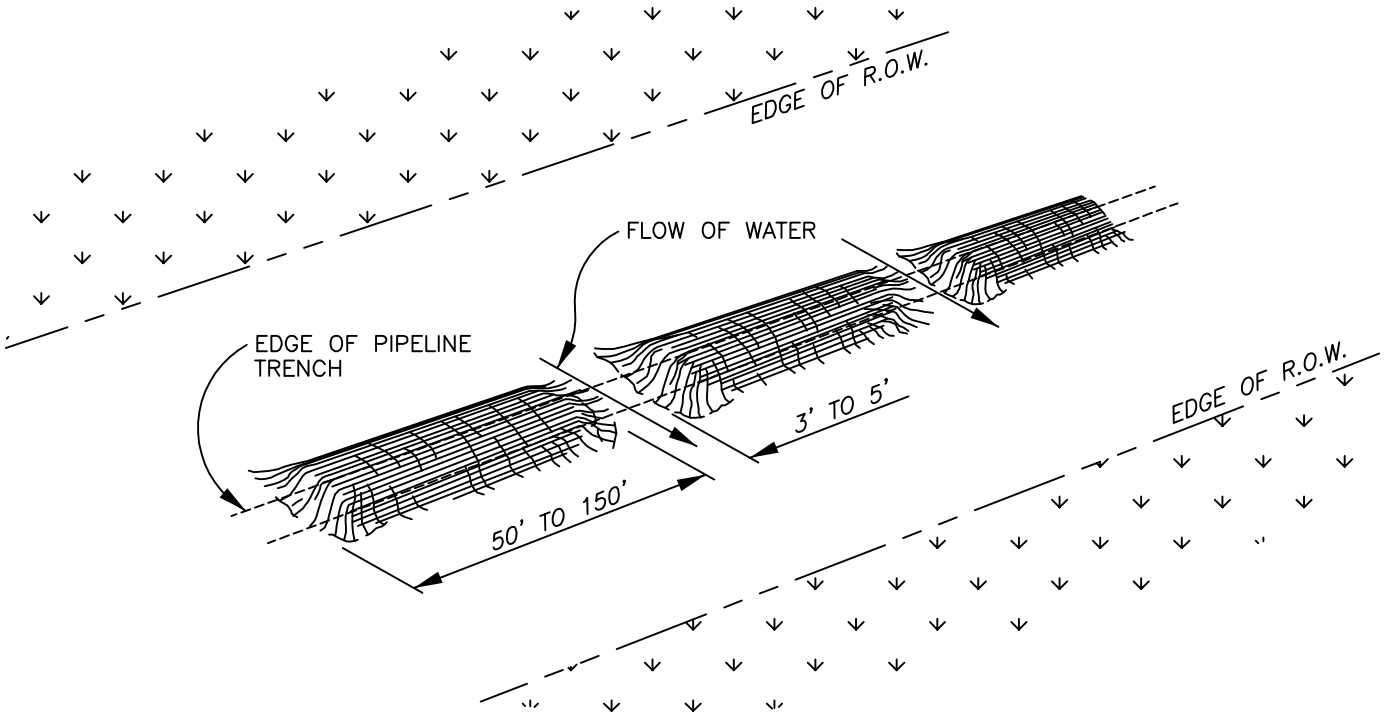
DRAWN BY: L. A. PHILLIPS
FILENAME: EPC\BMP37.dwg
LAST REVISION DATE: 01/17/2014

EXTRA WORK SPACES

DRAWING NUMBER: 37

CREST OF BACKFILL TO BE 8" TO 12" HIGH OVER CENTER LINE OF TRENCH AND FEATHERED OUT TO ZERO 18" TO 24" FROM TRENCH WALL





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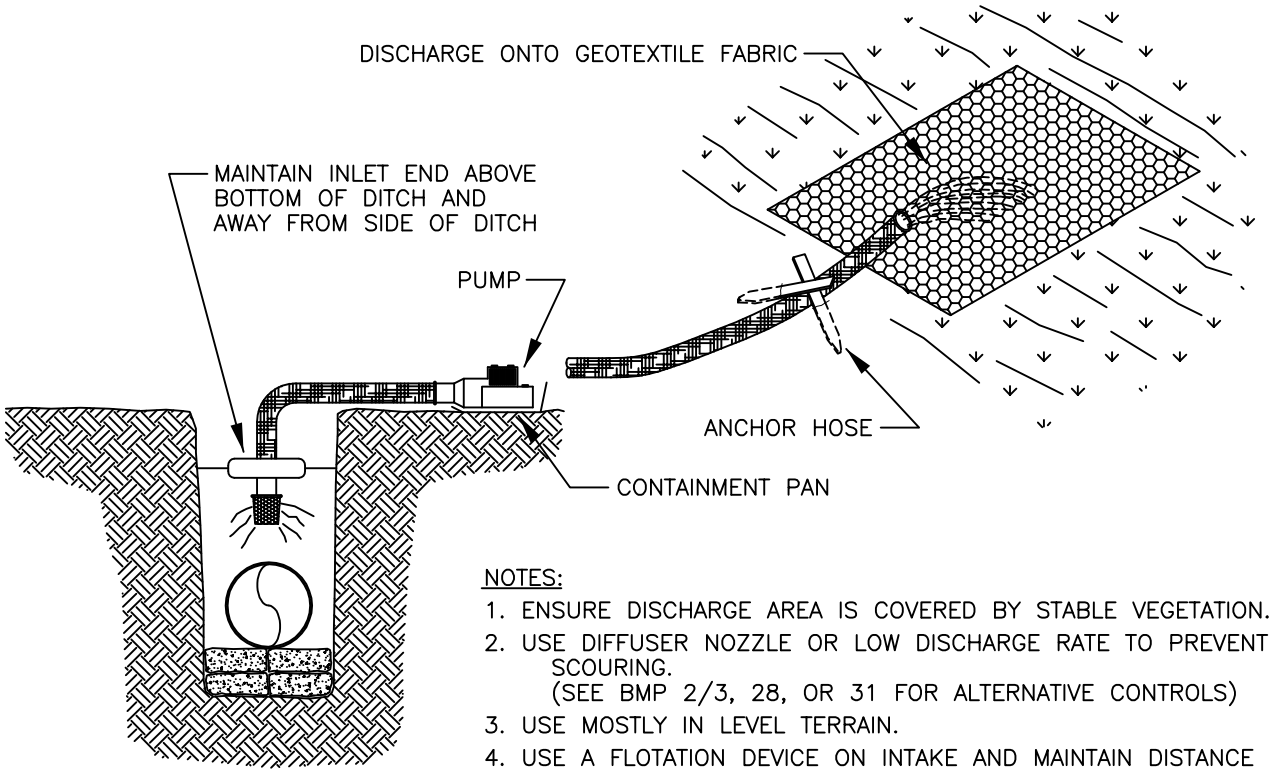
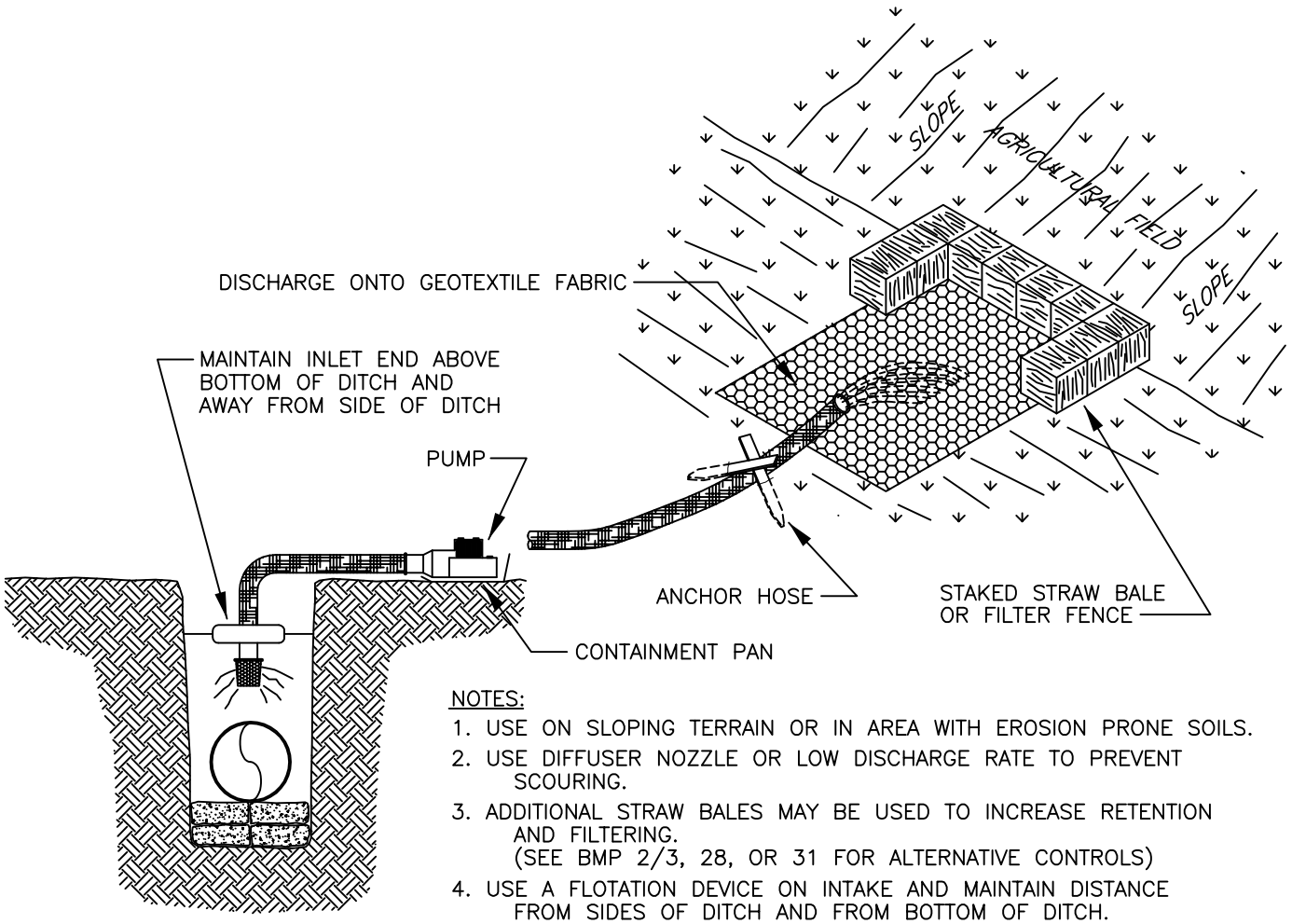


NOTES:

1. ENSURE DISCHARGE AREA IS COVERED BY STABLE VEGETATION.
2. USE DIFFUSER NOZZLE OR LOW DISCHARGE RATE TO PREVENT SCOURING.
   (SEE BMP 2/3, 28, OR 31 FOR ALTERNATIVE CONTROLS)
3. USE MOSTLY IN LEVEL TERRAIN.
4. USE A FLOTATION DEVICE ON INTAKE AND MAINTAIN DISTANCE FROM SIDES OF DITCH AND FROM BOTTOM OF DITCH.



NOTES:

1. USE ON SLOPING TERRAIN OR IN AREA WITH EROSION PRONE SOILS.
2. USE DIFFUSER NOZZLE OR LOW DISCHARGE RATE TO PREVENT SCOURING.
3. ADDITIONAL STRAW BALES MAY BE USED TO INCREASE RETENTION AND FILTERING.
   (SEE BMP 2/3, 28, OR 31 FOR ALTERNATIVE CONTROLS)
4. USE A FLOTATION DEVICE ON INTAKE AND MAINTAIN DISTANCE FROM SIDES OF DITCH AND FROM BOTTOM OF DITCH.

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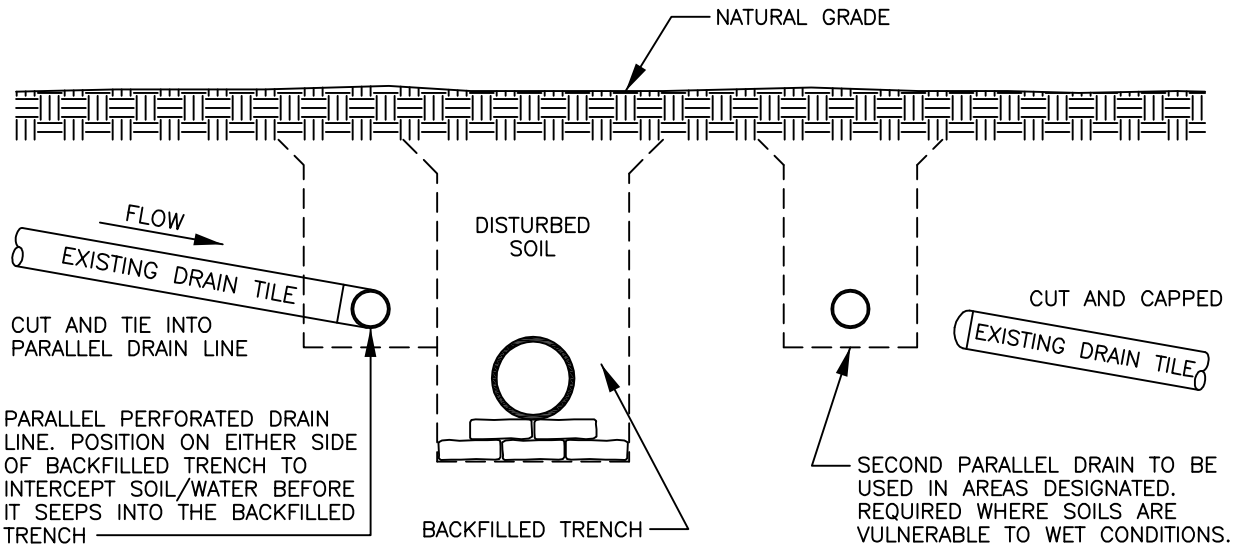
DRAWN BY: L. A. PHILLIPS
FILENAME: EPC\BMP39.dwg
LAST REVISION DATE: 01/17/2014

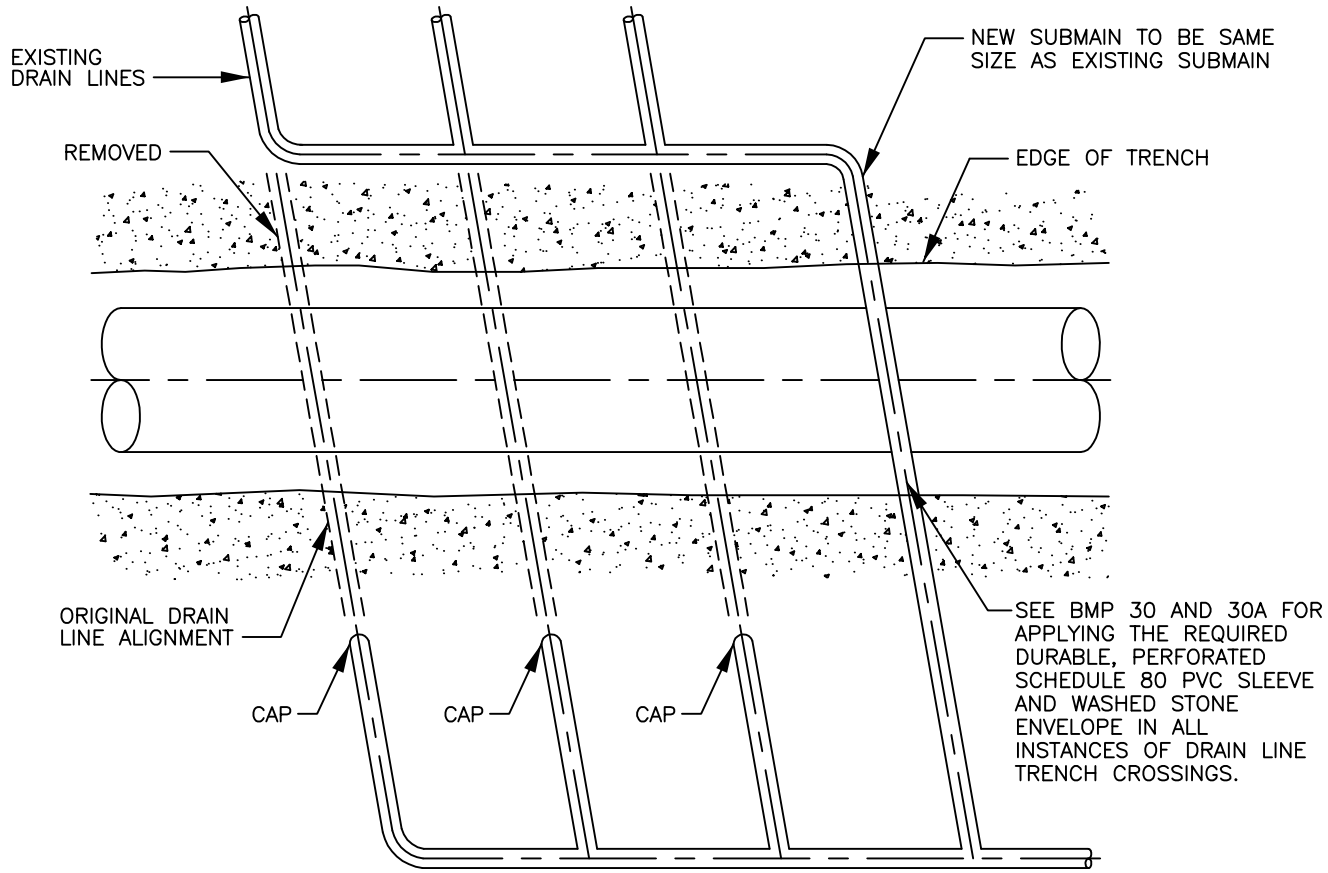
DISCHARGE METHOD FOR TRENCH DEWATERING

DRAWING NUMBER: 39



NOTE:

1. PARALLEL DRAINAGE TILE INSTALLATION TO BE APPROVED FOR SITE SPECIFIC AGRICULTURAL SOILS WHERE REPAIR OF EXISTING CROSS TILES WOULD BE LESS EFFECTIVE FOR EXAMPLE:
   A. SHALLOW BEDROCK.
   B. INTERFERENCE BY OTHER UTILITY LINES.
   C. TO HEADER CLOSELY SPACED SHALLOW TILES AND FRENCH DRAINS.
2. PARALLEL/NEW SUBMAIN TILE INSTALLATION MUST ACCOUNT FOR THE ISSUE OF LONG–TERM ROW SATURATION; AND MUST BE APPROVED BY THE AGRICULTURAL DRAINAGE SPECIALIST.



PLAN VIEW TILE SYSTEM WITH NEW SUBMAIN

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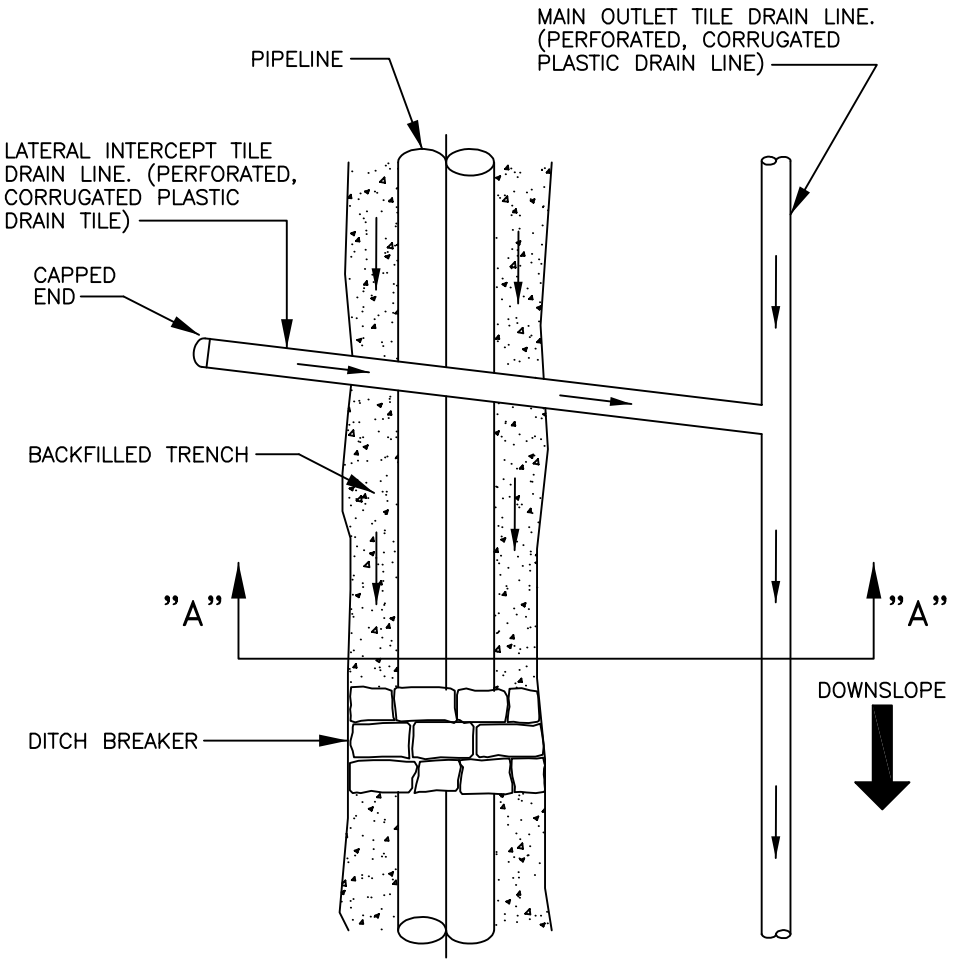
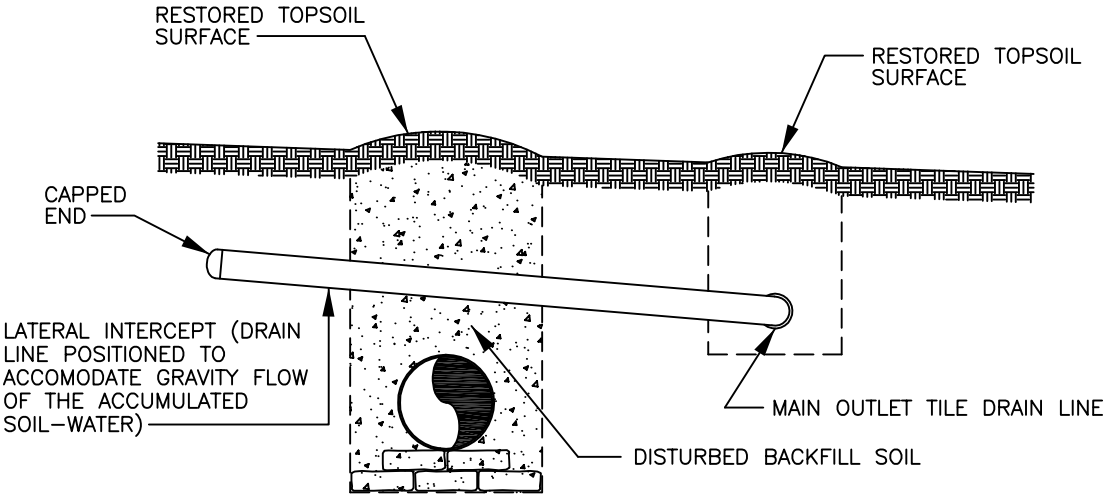


PLAN



PROFILE – SECTION "A"–"A"

NOTES:

1. DITCH BREAKERS PREVENT GULLY EROSION WHILE TRENCH IS OPEN AND HELP INHIBIT WATER PIPING AND WATER BLOWOUTS DOWN THE COURSE OF THE PIELINE AFTER BACKFILLING.
2. INTERCEPT DRAIN LINES ABSORB THE SOIL AND WATER WHICH DRAIN NATURALLY FROM THE UNDISTURBED SOIL PROFILE INTO THE DISTURBED BACKFILL SOIL MATERIAL OF THE TRENCH. THE INTERCEPT DRAIN LINES HELP PREVENT SATURATED SOIL CONDITIONS.
3. AGRICULTURAL CROPLAND MAY REQUIRE CROSS TRENCH DRAINAGE OR PARALLEL DRAINAGE.

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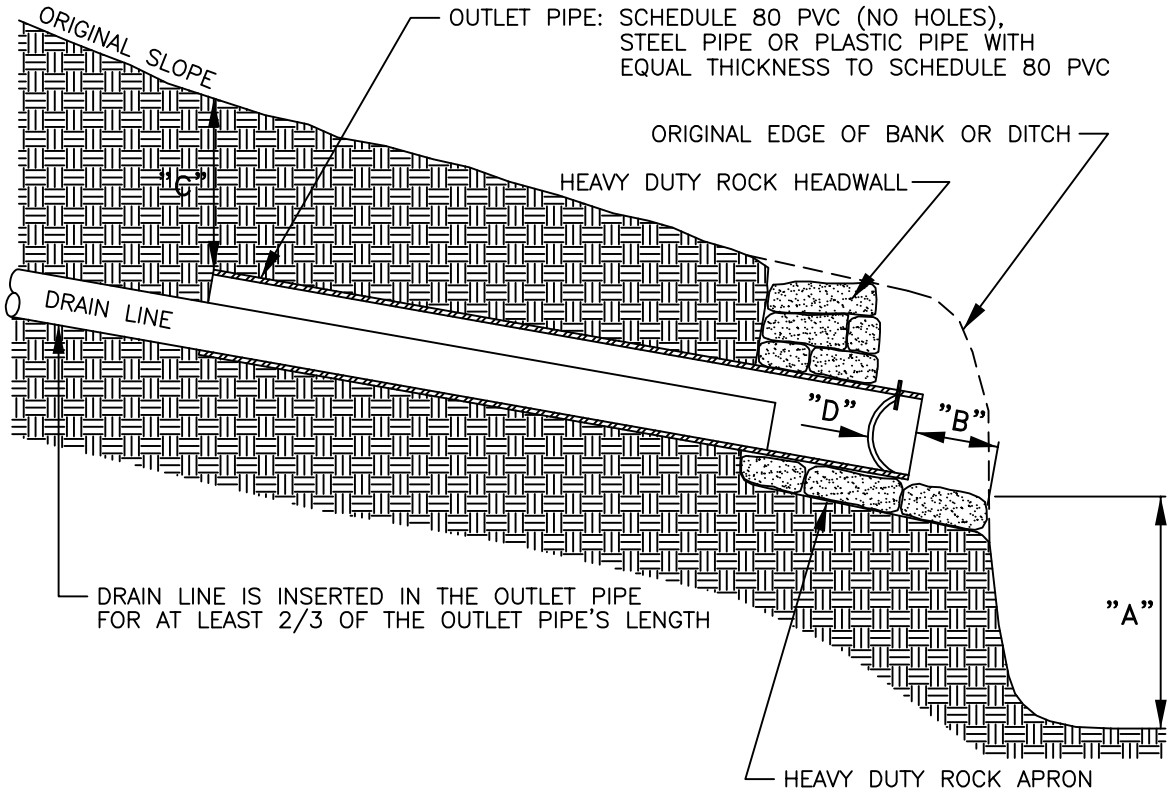

"A" – THE FREE DROP OR OUTFALL DISTANCE OF THE DRAINAGE WATER TO ITS UNRESTRICTED (FREE) DAYLIGHT OUTLET. GUIDELINE IS 2 FEET BUT NOT LESS THAN 1 FOOT WITHOUT SPECIAL DESIGN APPROVAL.

"B" – THE RECESS BACK FROM THE EDGE OF THE BANK OR DITCH OR OTHER POINT OF DAYLIGHT. GUIDLINE IS 2 FEET RECESSED BACK TO AVOID FUTURE DAMAGE.

"C" – THE MINIMUM DEPTH OF COVER OVER THE DRAIN LINE AT WHICH THE OUTLET PIPE MUST BEGIN. THE MINIMUM IS 2 FEET.

"D" – AN INTERNALLY HINGED ANIMAL (RODENT) GUARD, BOLTED FROM THE OUTSIDE. MOUNT THE GUARD 4"–6" BACK INSIDE THE OUTLET PIPE.

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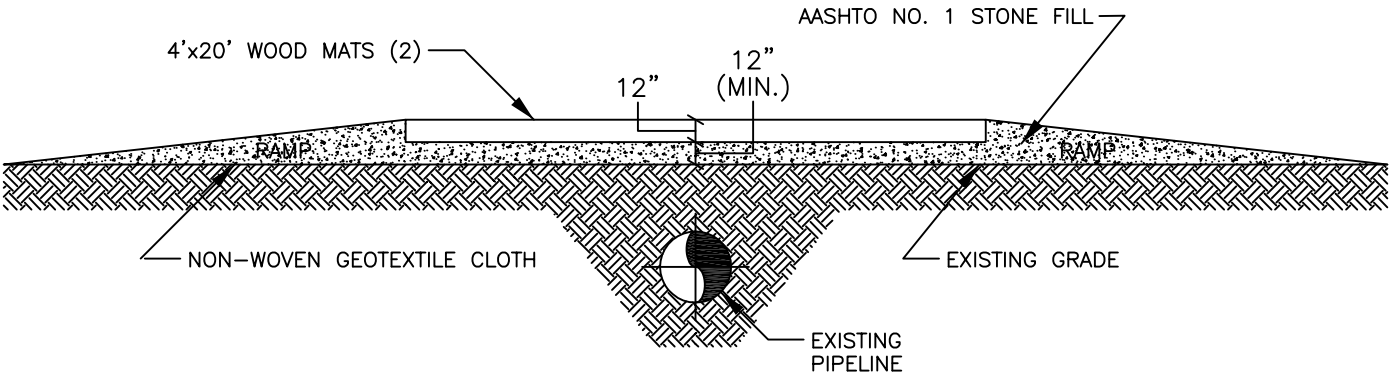


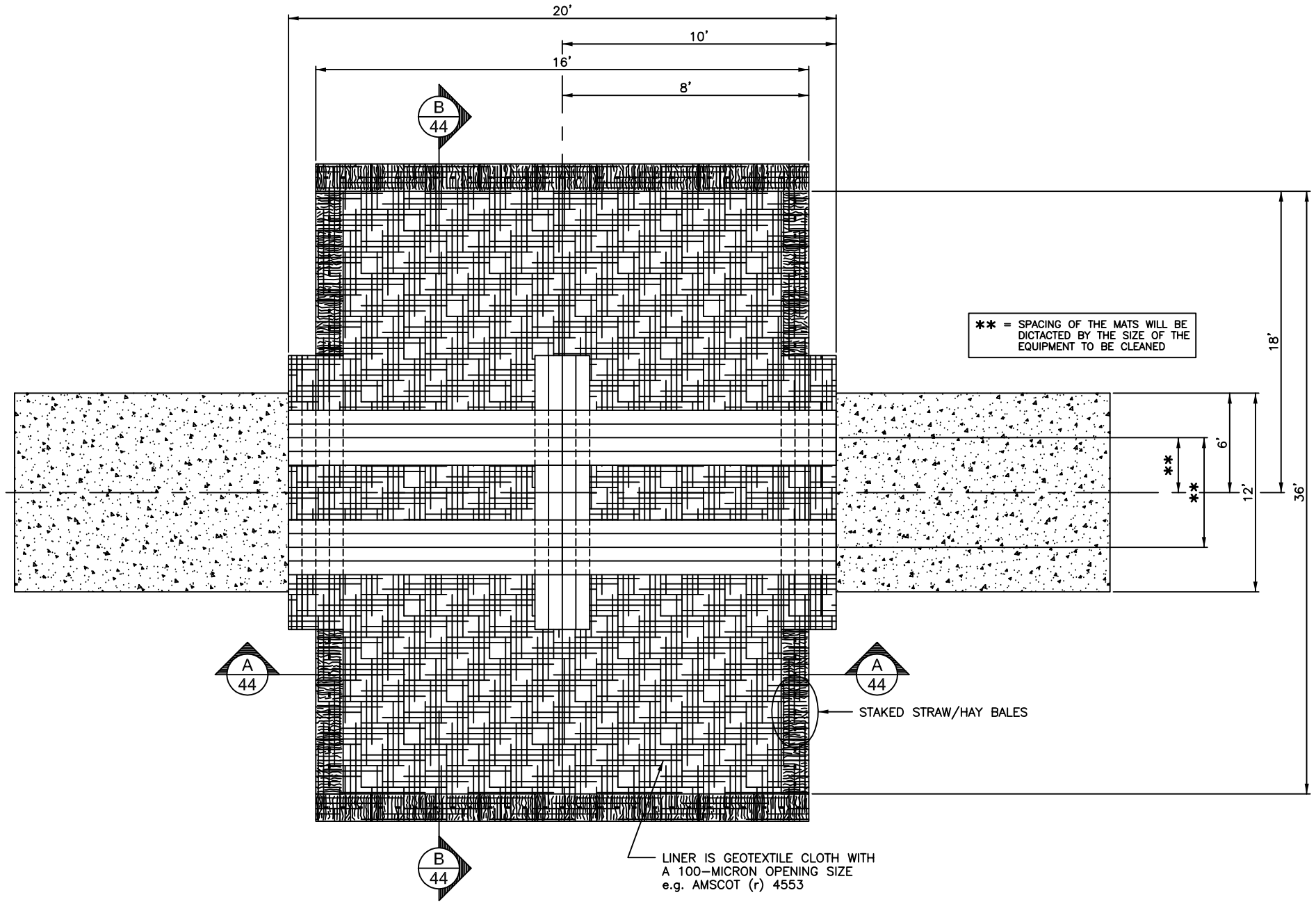
N O T E S

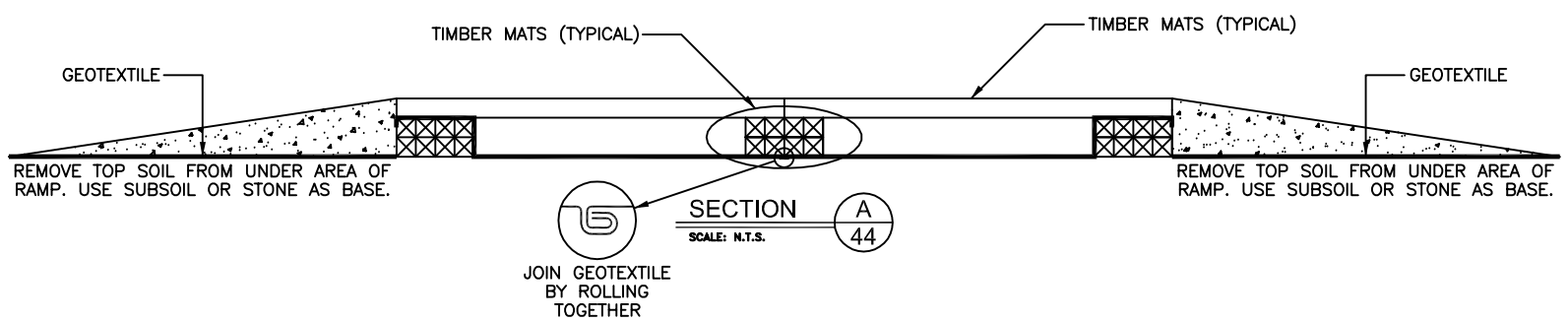
1. ADDITIONAL STONE DEPTH MAY BE REQUIRED – CONTACT ENGINEERING.
2. WOOD MATS WILL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.
3. STONE FILL TO BE SUPPLIED AND INSTALLED BY THE CONTRACTOR. INSTALL 1 (ONE) LAYER OF NON–WOVEN GEOTEXTILE CLOTH PRIOR TO INSTALLING THE STONE.
4. ADDITIONAL MATS, IF NEEDED, WILL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.

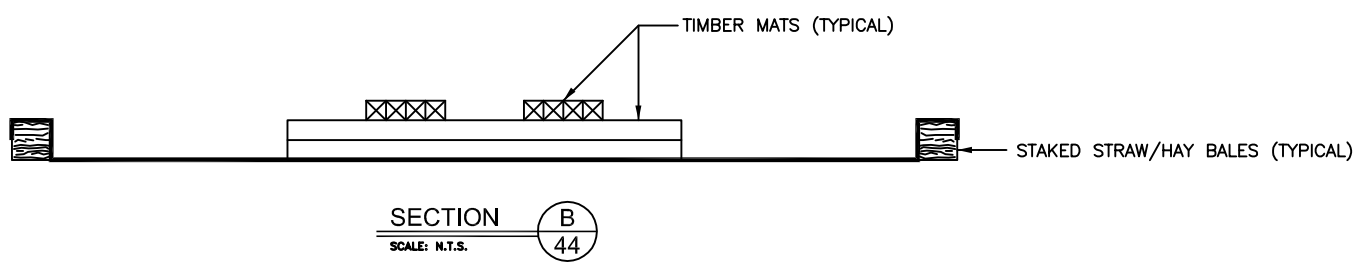
SPECIAL NOTE:

PROPOSED VEHICLE & EQUIPMENT WHEEL / TRACK LOAD WEIGHTS SHALL BE PROVIDED TO NFG ENGINEERING SERVICES TO DETERMINE IF ADDITIONAL MEASURES ARE NECESSARY BASED ON THE SPECIFIC PIPELINE TO BE CROSSED.

national fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512 (814) 871–8676	DRAWN BY: L. A. PHILLIPS FILENAME: NFGSC\BMP43.dwg REVISED DATE: 01/17/2014	TEMPORARY WOODEN MAT PIPELINE CROSSING	DRAWING NUMBER: 43







NOTES:

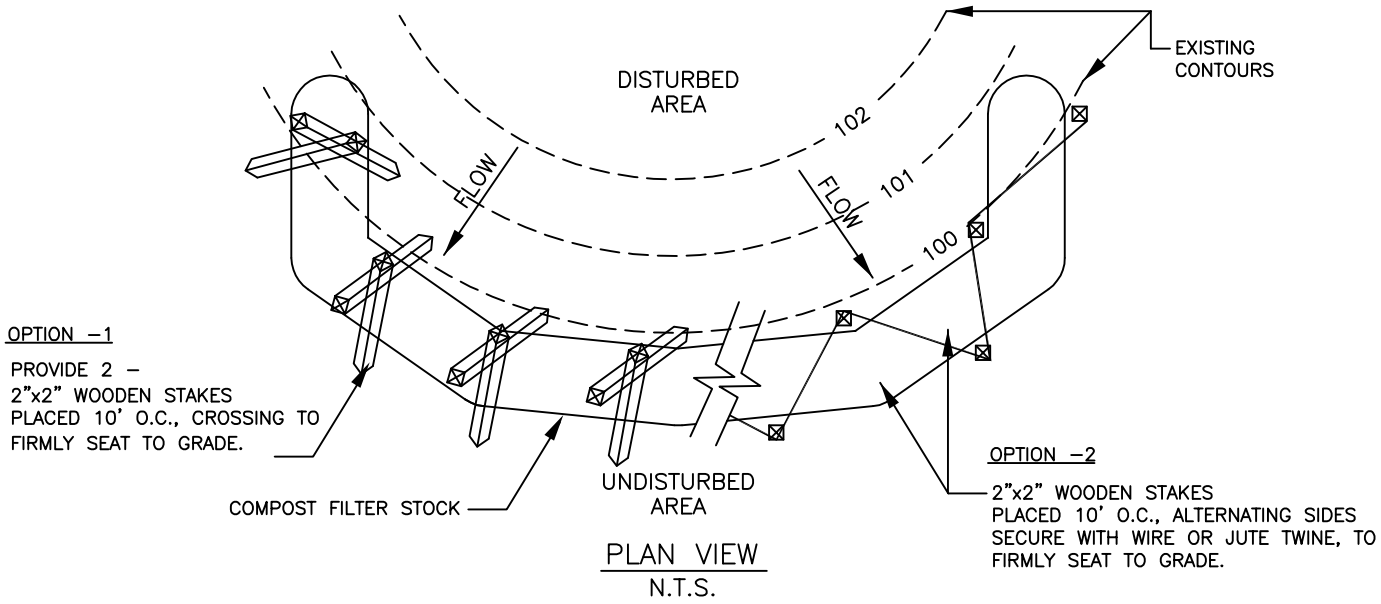
1. WASH STATION MUST BE WITHIN THE ENVIRONMENTALLY CLEARED RIGHT-OF-WAY AND OUTSIDE THE 100' WETLAND BUFFER ZONE.
2. IF WASH STATION IS IN AGRICULTURAL LANDS, REMOVE THE TOPSOIL AND STOCKPILE. BEFORE THE TOPSOIL IS REPLACED, THE SUBSOIL MUST BE DECOMPACTED AND ROCKS REMOVED. THE TOPSOIL MOISTURE MUST PASS THE ATTERBERG TEST PRIOR TO SPREADING THE TOPSOIL.
3. THE LOCATION OF THE PUMPING EQUIPMENT, WATER SUPPLY AND SPRAY EQUIPMENT WILL BE DICTATED BY THE LOCATION OF THE WASH STATION.
4. AFTER THE EQUIPMENT WASHING IS COMPLETE, FOLD OR ROLL THE GEOTEXTILE (CAUTION WILL BE EXERCISED NOT TO SPILL ANY OF THE CONTAINED MATERIAL) AND REMOVE TO AN APPROPRIATE DISPOSAL SITE. REMOVE THE CLEANING EQUIPMENT, RAMPS AND STRAW/HAY BALES AND COMPLETE THE CLEANUP.

National Fuel SUPPLY CORPORATION

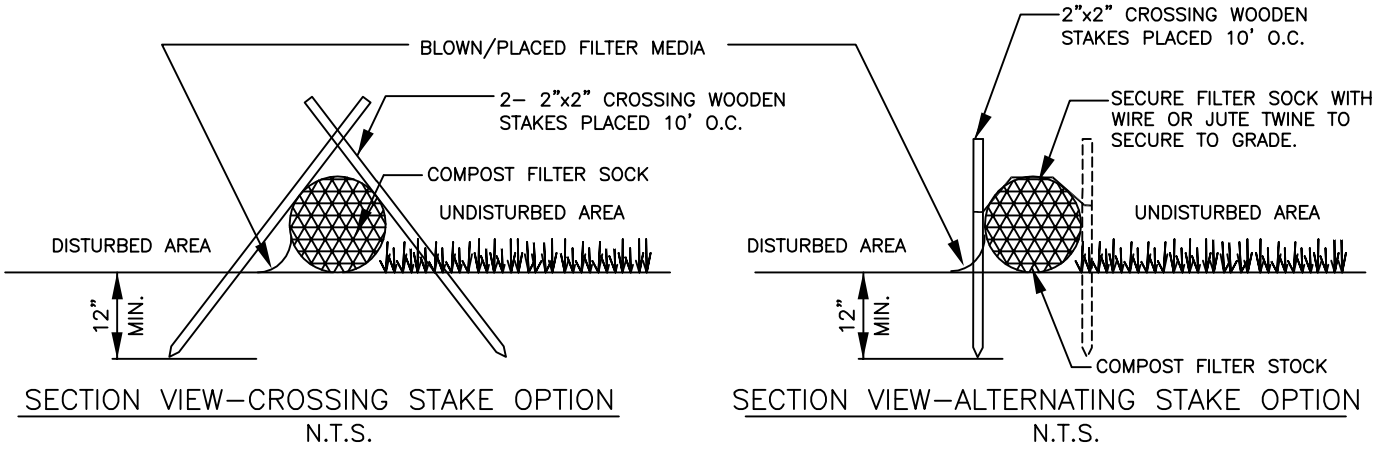
DRAWN BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP44.dwg
DATE: 05/03/2007

ELEVATED WASHRACK

DRAWING NUMBER: 44



PLAN VIEW
N.T.S.



SECTION VIEW–CROSSING STAKE OPTION
N.T.S.

SECTION VIEW–ALTERNATING STAKE OPTION
N.T.S.

Adapted from Filtrexx

Sock fabric shall meet standards of Table 4.1.
Compost shall meet the following standards:

Oganic Matter Content	80% – 100% (dry weight basis)
Organic Portion	Fibrous and elongated
pH	5.5 – 8.0
Moisture Content	35% – 55%
Particle Size	98% pass through 1" screen
Soluable Salt Concentration	5.0 dS Maximum

Compost Filter Sock shall be placed at existing level grade. Both ends of the sock shall be extended at least 8 feet up slope at 45 degrees to the main sock alignment (see Figure 4.1). Maximum slope length above any sock shall not exceed that shown on Figure 4.2.

Traffic shall not be permitted to cross filter socks.

Accumulated Sediment shall be removed when it reaches 1/2 the above ground height of the sock and disposed in the manner described elsewhere in the plan.

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.

Biodegradable filter sock shall be replaced after 6 months; photodegradable socks after 1 year. Polypropylene socks shall be placed according to manufacturer's recommendations.

Upon stabilization of the disturbed area 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 pupplement, dispose of mesh.

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DRAWN BY: L. A. PHILLIPS
FILENAME: NFGSC\BMP45a.dwg
DATE: 12/09/2013

COMPOST FILTER SOCK
(FOR PENNSYLVANIA USE)

DRAWING NUMBER: 45A
SHEET 1 OF 3

Compost Filter Sock

Sediment Removal Efficiency: HIGH. This devise is an ABACT (Antidegradation Best Available Combination of Technologies) for HQ and EV watersheds.

Compost filter socks are a type of contained compost filter berm. They consist of a biodegradable or photodegradable mesh tube filled (typically using a pneumatic blower) with a coarse compost filter media that meets certain performance criteria (e.g. hydraulic flow through rate, total solids removal efficiency, total suspended solids removal efficiency, turbidity reduction, nutrient removal efficiency, metals removal efficiency, and motor oil removal efficiency).

Filter socks are flexible and can be filled in place or filled and moved into position. They are especially useful on steep slopes. Heavy vegetation should be removed prior to installing the sock. Filter socks can also be used on rocky slopes if sufficient preparation is made to ensure good contact of the sock with the underlying soil along its entire length. They may also be used on pavement as a perimeter control. Socks used in this manner range in diameter from 8" to 32". **Note:** Some settlement of the tube typically occurs after installation. The diameter of the sock tube is the dimension to be used for slope design purposes (Figure 4.2). Socks with diameters less than 12" should only be used for residential housing lots of ½ acre or less that are a branch to a sediment basin or sediment trap.

As with other sediment barriers, filter socks must be placed parallel to contour with both ends of the sock extended upslope at a 45-degree angle to the rest of the sock to prevent end-arounds (See Figure 4.1). Socks placed on earthen slopes should be anchored with stakes driven through the center of the sock (see Standard Construction Detail 4-1) at intervals recommended by the manufacturer. Where socks are placed on paved surfaces, concrete blocks should be used immediately down-slope of the socks to help hold the sock in place.

The maximum slope length above a filter sock should not exceed those shown in Figure 4.2.

The anticipated functional life of a biodegradable filter sock should be 6 months; for photodegradable socks 1 year. Projects with anticipated disturbances lasting longer than the functional life of a sock should plan to replace the socks periodically or use another type of BMP.

Upon stabilization of the disturbed area, the filter sock may be left in place and vegetated or removed. In the latter case, the mesh is typically cut open and the compost/mulch spread as a soil supplement, the mesh is removed from the site and disposed of.

Filter socks using other fillers may be approved on a case-by-case basis if sufficient supporting information (including manufacturer's specs and independent test data) is provided.

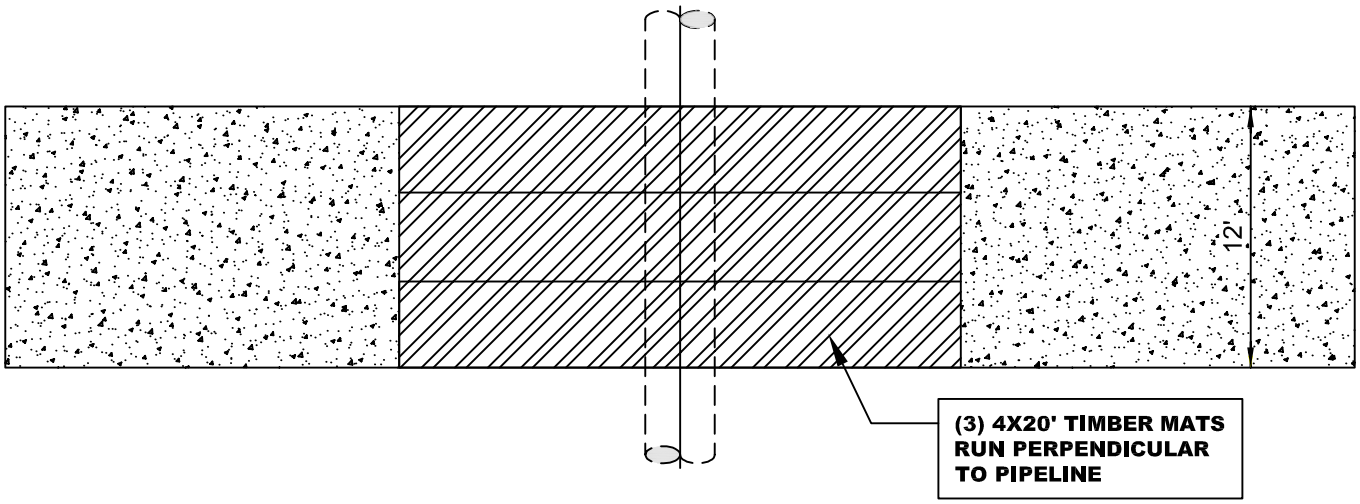
TABLE 4.1 Compost Sock Fabric Minimum Specifications		
Material Type	5 mil HDPE	5 mil HDPE
Material Characteristics	Biodegradable	Photodegradable
Sock Diameters	12-inch 18-inch 24-inch 32 inch	12-inch 18-inch 24-inch 32 inch
Mesh Opening	3/8"	3/8"
Tensile Strength	58 psi	26 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	--	78% at 1000 hr
Minimum Functional Longevity	6 months	9 months
Inner Containment Netting	Two-ply Systems HDPE biaxial net Continuously wound Heat-activated junctions 3/4" x 3/4" Max. aperture size	
Outer Filtration Mesh	Composite Polypropylene Fabric (Woven layer & 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.		

FIGURE 4.2

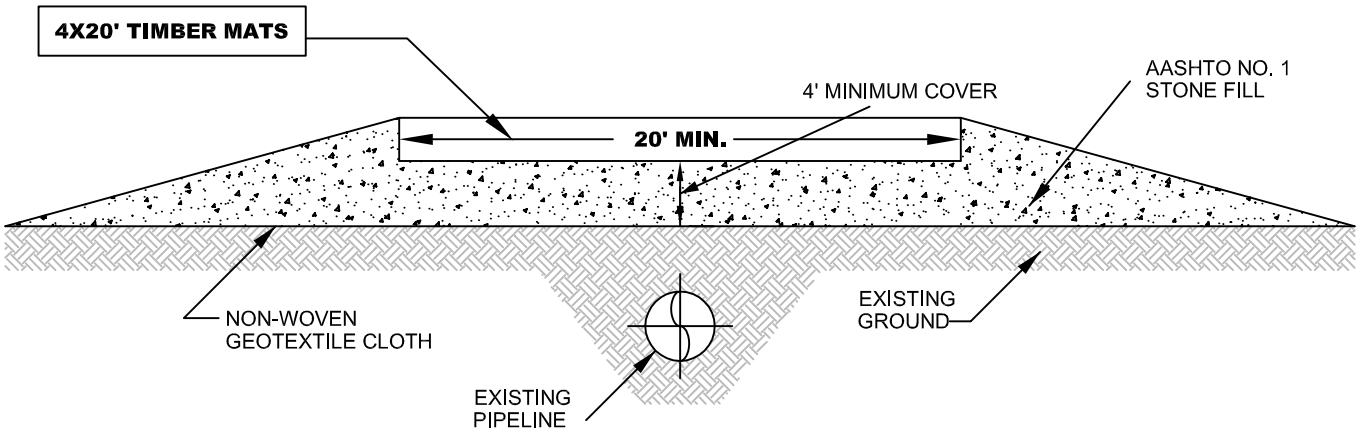
Maximim Permissible Slope Lengths Above Compost Filter Socks

12-inch Sock Diameter		18-inch Sock Diameter	
Maximum Slope Length (ft)	**Percent Slope**	**Maximum Slope Length (ft)**	**Percent Slope**
520	2	700	2
210	5	340	5
170	10	240	10
120	15	200	15
90	20	140	20
60	25	100	25
45	30	80	30
40	35	60	35
35	40	50	40
30	45	30	45
25	50	20	50

PLAN VIEW



SIDE VIEW



National Fuel
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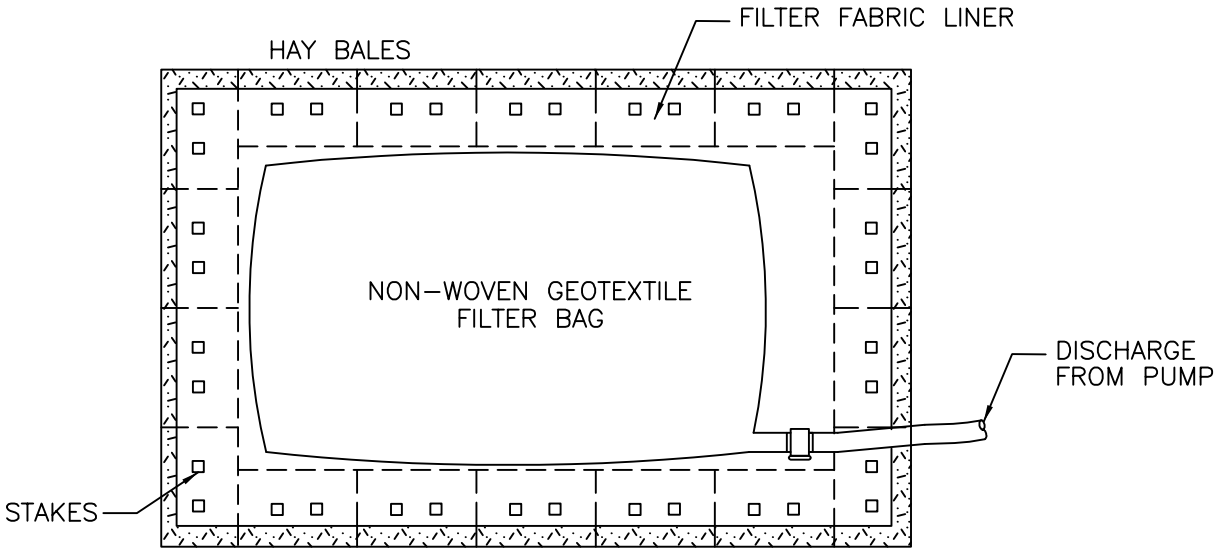
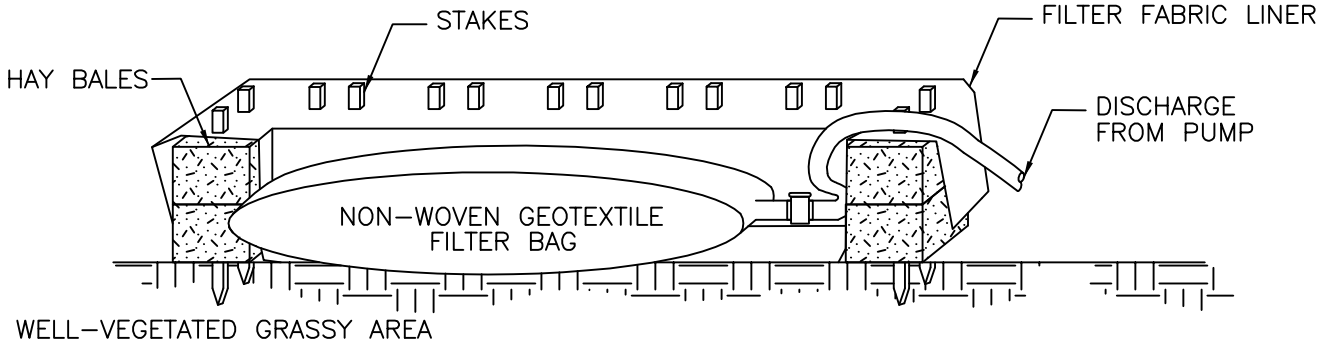
STONE PIPELINE CROSSING WITH TIMBER MATTING BMP 46

ENGINEERING DEPARTMENT
GEOMATICS SECTION
1100 STATE STREET
ERIE, PENNSYLVANIA 16501

DATE:	DRAWN BY:	APPROVED BY:
01/17/2014	Gary Hoffacker	M. P. WALLACE
SCALE: N.T.S.	FILENAME: BMP46.DWG	



PLAN VIEW



ELEVATION VIEW

NOTES:

1. RECTANGULAR DETWATERING DISCHARGE AREA CONSTRUCTED OUT OF HAY BALES STACKED ONE OR TWO ROWS HIGH AND SECURED WITH WOODEN STAKES (SEE BMP 22 FOR HAY BALE INSTALLATION).
2. FILTER FABRIC LINER INSTALLED COVERING ENTIRE INTERIOR OF STRUCTURE AND SECURED ATOP THE HAY BALES WITH WOODEN STAKES.
3. DEWATERING DEVICE SHALL BE LOCATED IN WELL–VEGETATED (GRASSY) AREA AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. DISCHARGE DEVICE SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
4. SEE BMP 28 FOR DEWATERING FILTER BAG DETAILS.
5. FOR LESS TURBID WATER DISCHARGE GEOTEXTILE FILTER BAG IS OPTIONAL AND STRUCTURE MAY UTILIZE JUST FILTER FABRIC LINER.

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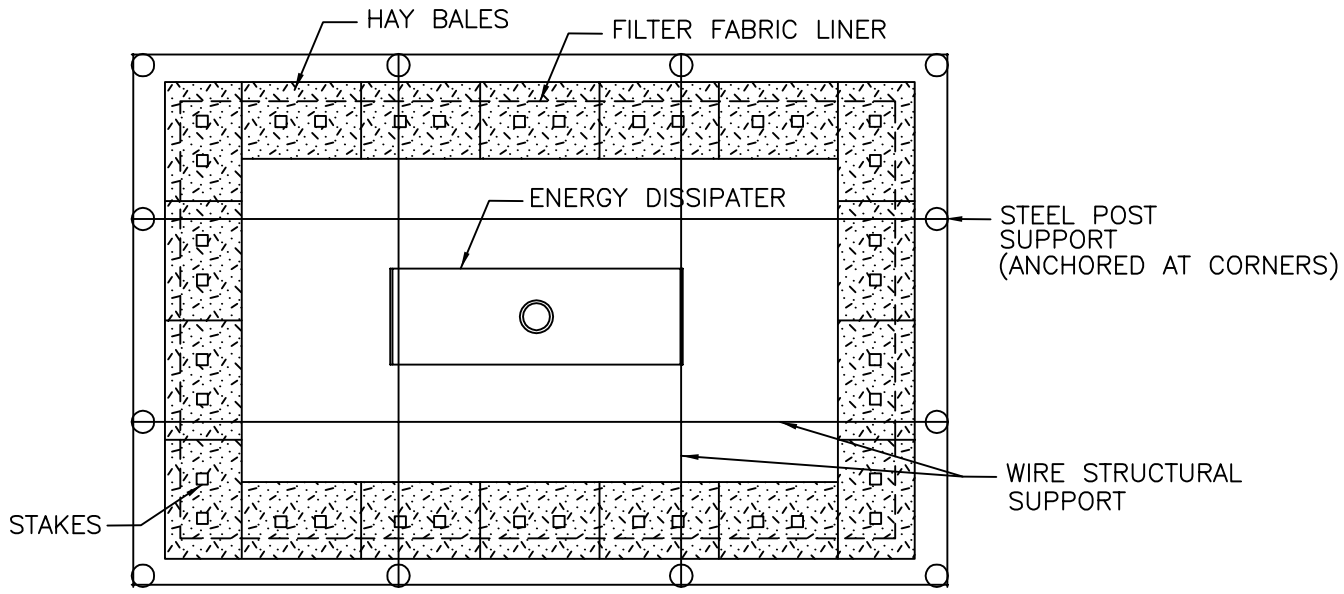
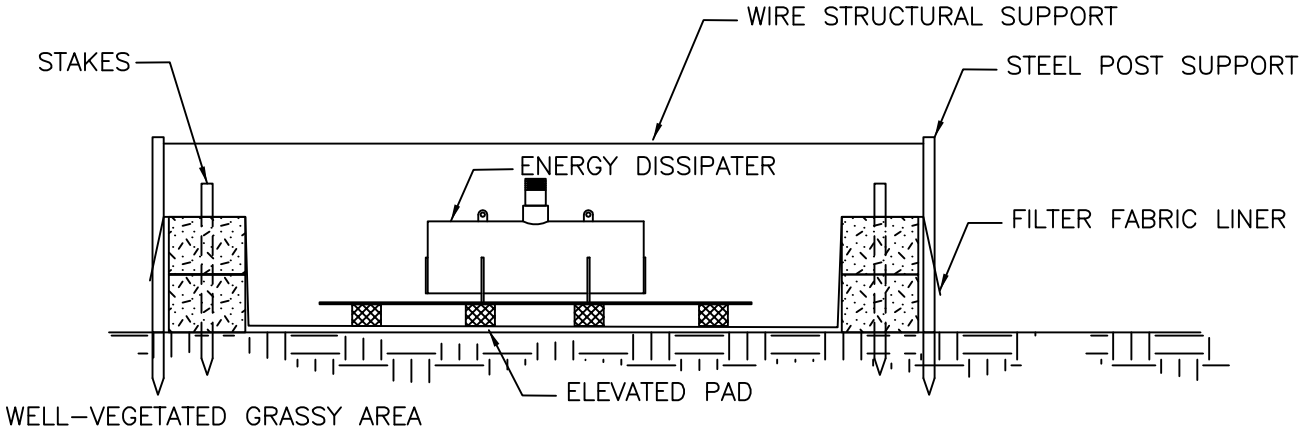
DRAWN BY: L. M. TELESCA
FILENAME: BMPs\BMP47.dwg
DATE: 09/13/2010

TRENCH DEWATERING SEDIMENT CORRAL

DRAWING NUMBER: 47



PLAN VIEW



ELEVATION VIEW

NOTES:

1. RECTANGULAR DETWATERING DISCHARGE AREA CONSTRUCTED OUT OF HAY BALES STACKED TWO HIGH SECURED WITH WOODEN STAKES (SEE BMP 22 FOR HAY BALE INSTALLATION) AND WIRED (STEEL) POSTS.
2. FILTER FABRIC LINER INSTALLED COVERING ENTIRE INTERIOR OF STRUCTURE AND SECURED BETWEEN THE HAY BALES WITH WOODEN STAKES.
3. DEWATERING DEVICE SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREA AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. DISCHARGE DEVICE SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
4. SEE BMP 3 FOR ENERGY DISSIPATER DETAILS.

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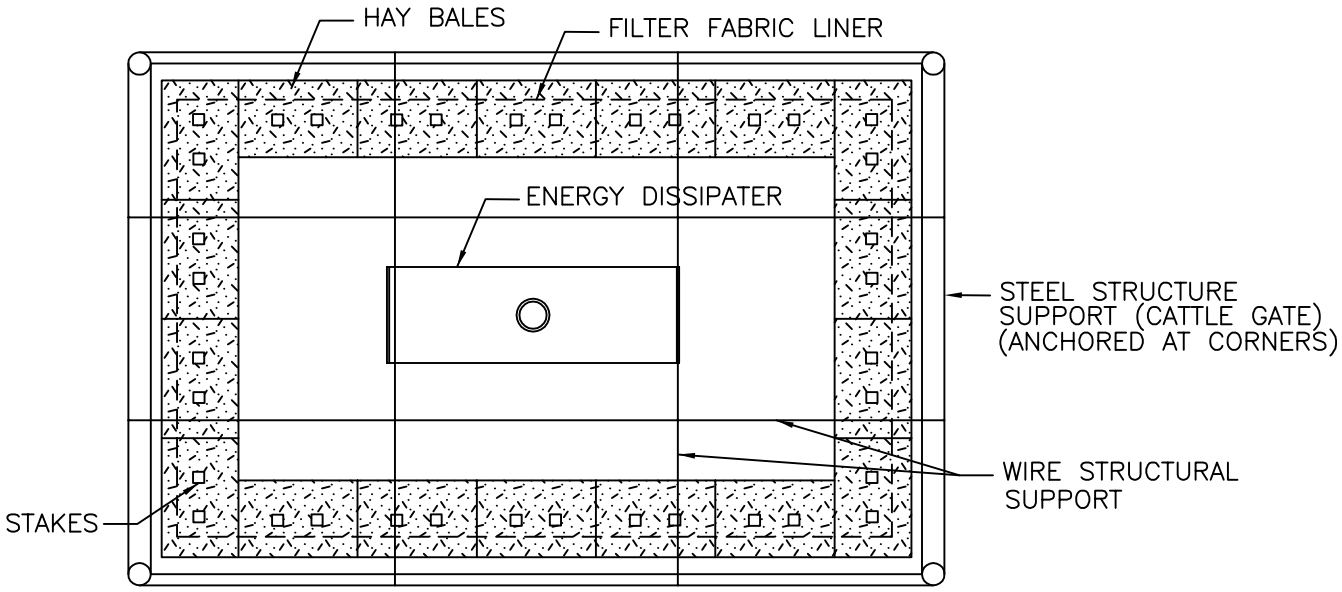
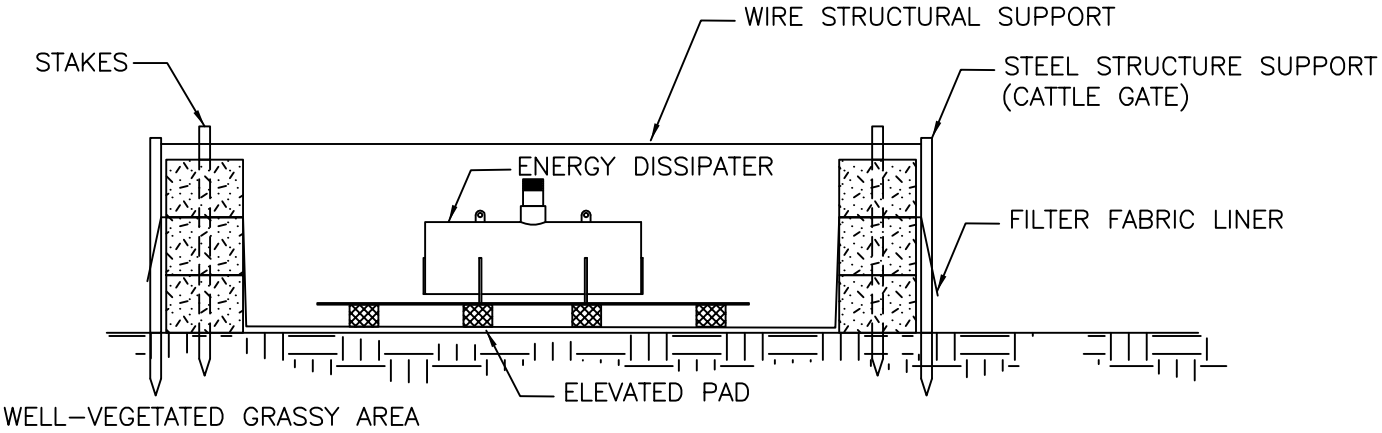
DRAWN BY: L. M. TELESCA
FILENAME: BMPs\BMP48.dwg
DATE: 01/17/2014

HYDROTEST WATER DISCHARGE DEVICE

DRAWING NUMBER: 48



PLAN VIEW



ELEVATION VIEW

NOTES:

1. RECTANGULAR DETWATERING DISCHARGE AREA CONSTRUCTED OUT OF HAY BALES STACKED THREE HIGH SECURED WITH WOODEN STAKES (SEE BMP 22 FOR HAY BALE INSTALLATION) AND WIRED (STEEL) CATTLE GATES.
2. FILTER FABRIC LINER INSTALLED COVERING ENTIRE INTERIOR OF STRUCTURE AND SECURED BETWEEN THE HAY BALES WITH WOODEN STAKES.
3. DEWATERING DEVICE SHALL BE LOCATED IN WELL–VEGETATED (GRASSY) AREA AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. DISCHARGE DEVICE SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
4. SEE BMP 3 FOR ENERGY DISSIPATER DETAILS.

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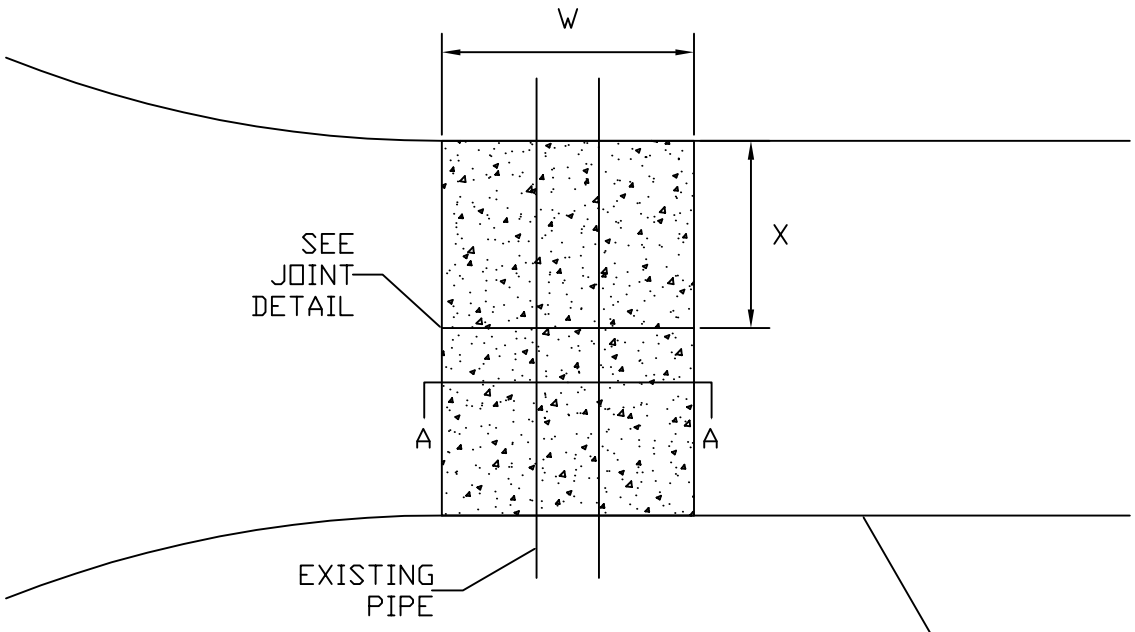
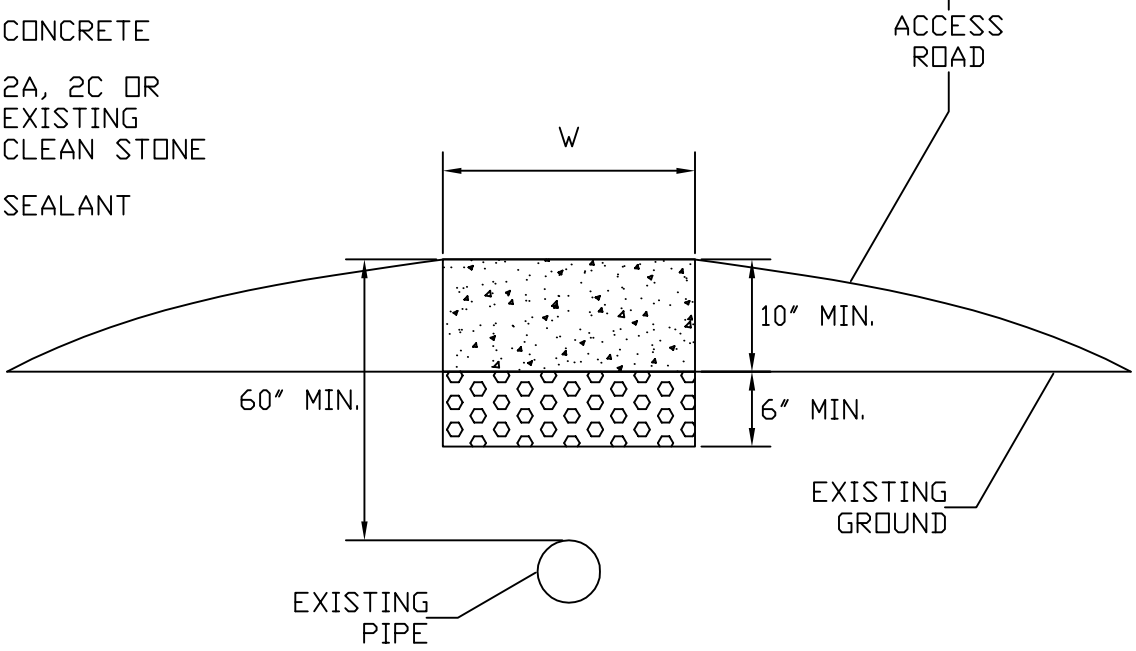


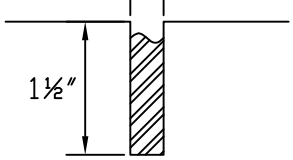
CONCRETE

2A, 2C OR
EXISTING
CLEAN STONE

SEALANT



CONTRACTION
JOINT
DETAIL
3/8"



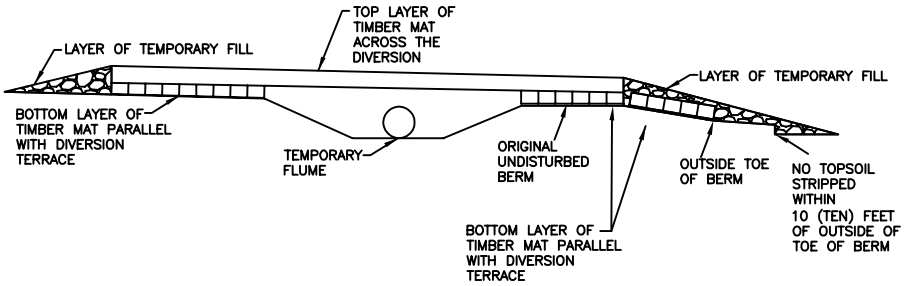
GENERAL NOTES

W=6'+OD+6' (15' MIN)
X=PUT JOINT ON ℄ OR
EVERY W×1.5

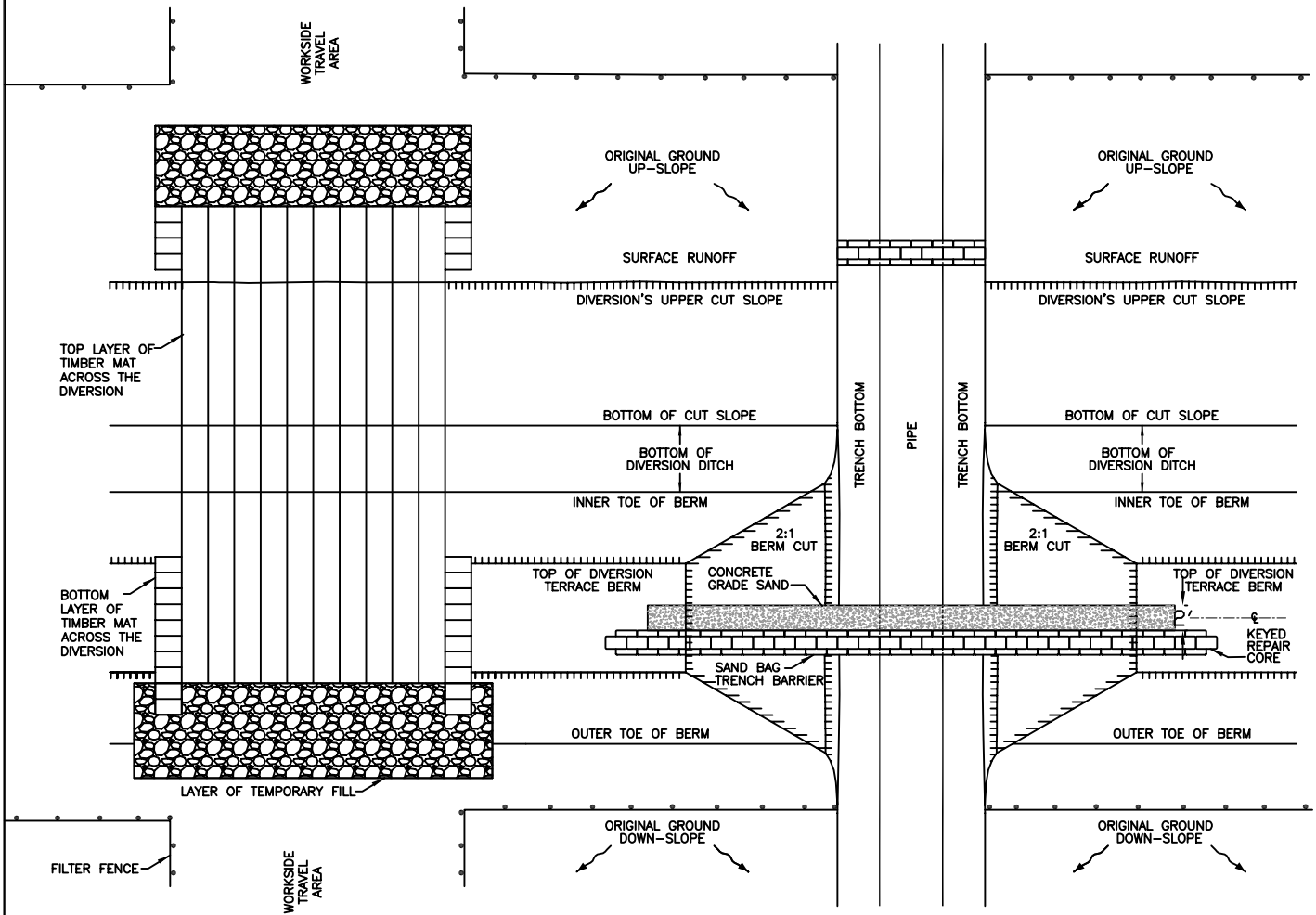
REFER TO C,S&P MANUAL
SECTION 16 FOR
CONCRETE PLACEMENT
AND CURING
INFORMATION

National Fuel SUPPLY CORPORATION	ENGINEERING DEPT. 1100 STATE STREET P.O. BOX 2081 ERIE, PA. 16512 (814) 871-8676	DRAWN BY: B. MCSHANE FILENAME: BMP49.dwg LAST REVISION DATE: 01/17/2014	CONCRETE SLAB PIPE PROTECTION DETAIL	DRAWING NUMBER: 49

DIVERSION TERRACE TIMBER MAT BRIDGE SIDE VIEW



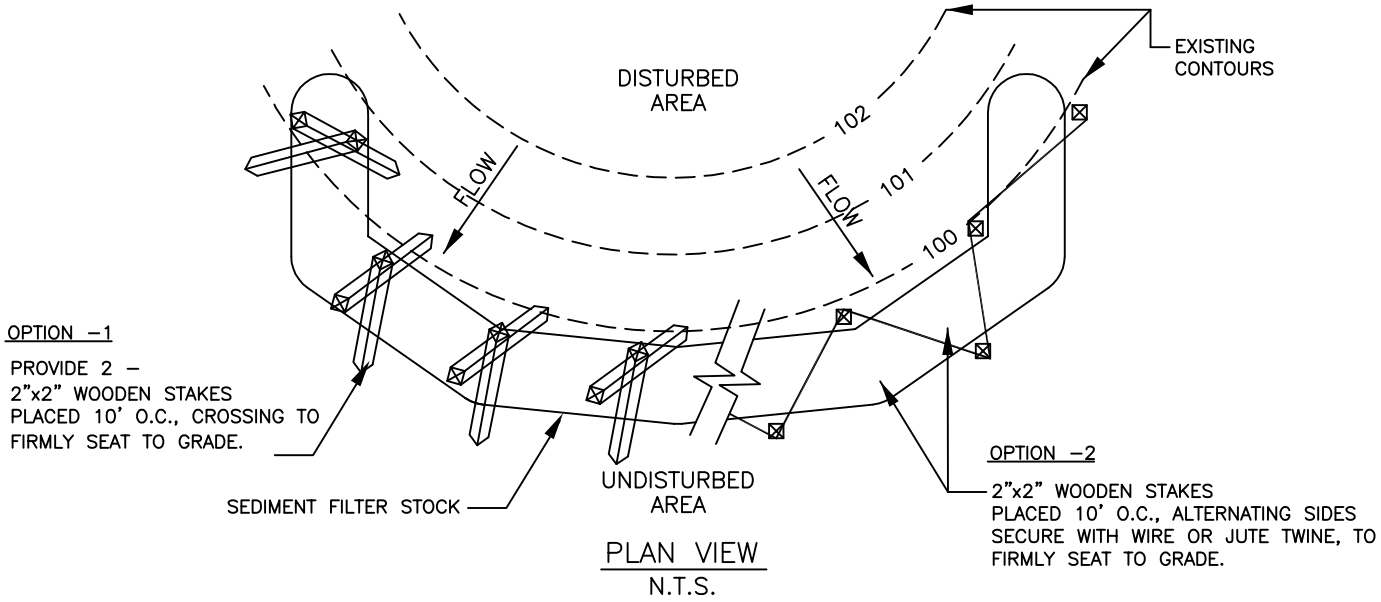
TOP VIEW OF DIVERSION BERM REPAIR AND TIMBER MAT BRIDGE



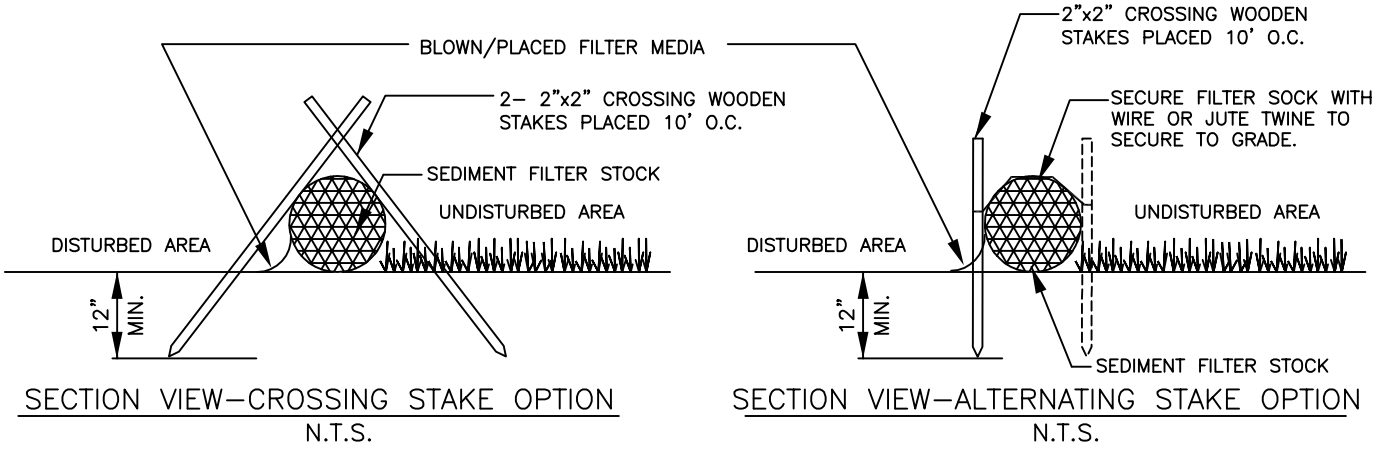
NOTES:

1. THE ONLY PORTION OF DIVERSION TO BE DISTURBED IS THE PIPELINE TRENCH AND THE 2:1 BERM CUT, DURING CONSTRUCTION; AND THE BERM'S KEYED-IN REPAIR CORE DURING THE RECONSTRUCTION OF THE DIVERSION TERRACE.
2. ALL OTHER ORIGINAL FEATURES OF THE DIVERSION TERRACE ARE PROTECTED THROUGHOUT THE RIGHT OF WAYS CONSTRUCTION AND RESTORATION STAGES OF WORK AND ACCESS BT TEMPORARY FILL LAYERS AND TIMBER BRIDGING.
3. A TEMPORARY FLUME WILL BE MAINTAINED UNTIL THE DIVERSION TERRACE IS FULLY RECONSTRUCTED.
4. FILTER FENCE WILL BE INSTALLED AT THE UPSLOPE AND DOWNSLOPE SIDES OF THE DIVERSION BERM (AT THE LIMITS OF THE TOPSOIL STRIPPING) TO LIMIT ACCESS AND DISTURBANCE.

National Fuel SUPPLY CORPORATION		DRAWN BY: T. HARRIS (H&A) FILENAME: Plan.dwg LAST REVISION DATE: 01/17/2014	DIVERSION TERRACE PROTECTION AND MAT	DRAWING NUMBER: 50



PLAN VIEW
N.T.S.



SECTION VIEW–CROSSING STAKE OPTION
N.T.S.

SECTION VIEW–ALTERNATING STAKE OPTION
N.T.S.

Adapted from Filtrexx

SEDIMENT FILTER SOCKS MAY BE FILLED WITH THE FOLLOWING MEDIA:
WOOD FIBER/CHIPS, SHREDDED ASPEN, COCONUT FIBERS, STRAW.

COMPOST FILLED LOGS ARE NOT ACCEPTABLE FOR USE IN NEW YORK STATE

SPREADING OF SEDIMENT SOCK MEDIA ON SITE AFTER UPGRADE STABILIZATION HAS BEEN ACHIEVED SHALL BE ACCEPTABLE ONLY AFTER APPROVAL IS GRANTED BY OWNER. HEAVY SEDIMENT SATURATION IN SOCK OR POOR SPREADING MEDIA MAY REQUIRE THE REMOVAL OF THE ENTIRE SOCK FROM THE PROJECT SITE UPON STABILIZATION.

REFER TO CHECK DAM BMP (17) FOR DESIGN STANDARDS WHEN UTILIZING SOCK FOR THAT PURPOSE.

Traffic shall not be permitted to cross filter socks.

Accumulated Sediment shall be removed when it reaches 1/2 the above ground height of the sock and disposed in the manner described elsewhere in the plan.

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.

Biodegradable filter sock shall be replaced after 6 months; photodegradable socks after 1 year. Polypropylene socks shall be placed according to manufacturer's recommendations.

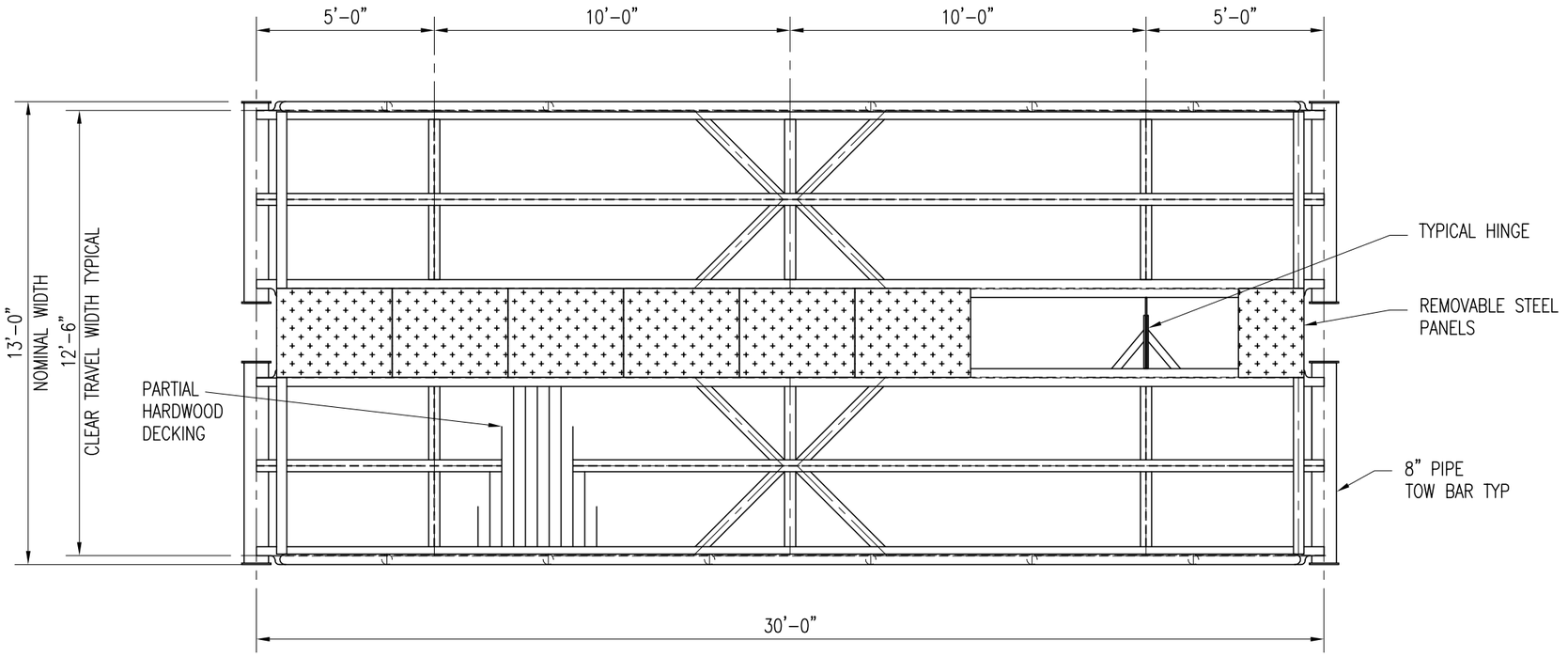
Upon Owner approval and stabilization of the disturbed area to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed. In the latter case, the mesh shall be cut open and the mulch spread as a soil supplement, dispose of mesh.

National Fuel Supply Corporation
ENGINEERING DEPT.
1100 STATE STREET
P.O. BOX 2081
ERIE, PA. 16512
(814) 871–8676

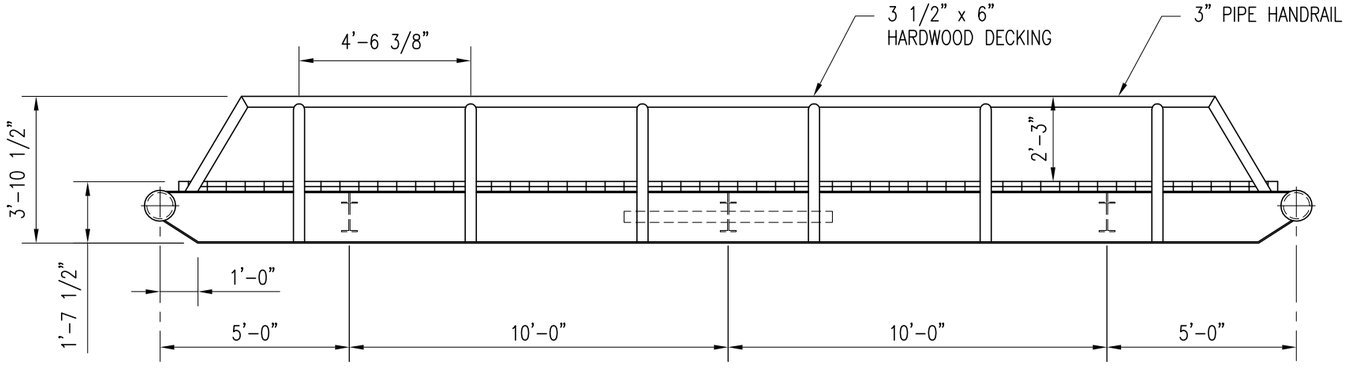
DRAWN BY: L. A. PHILLIPS
FILENAME:
DATE: 01/23/2014

SEDIMENT FILTER SOCK
(FOR NEW YORK USE)

DRAWING NUMBER: 51



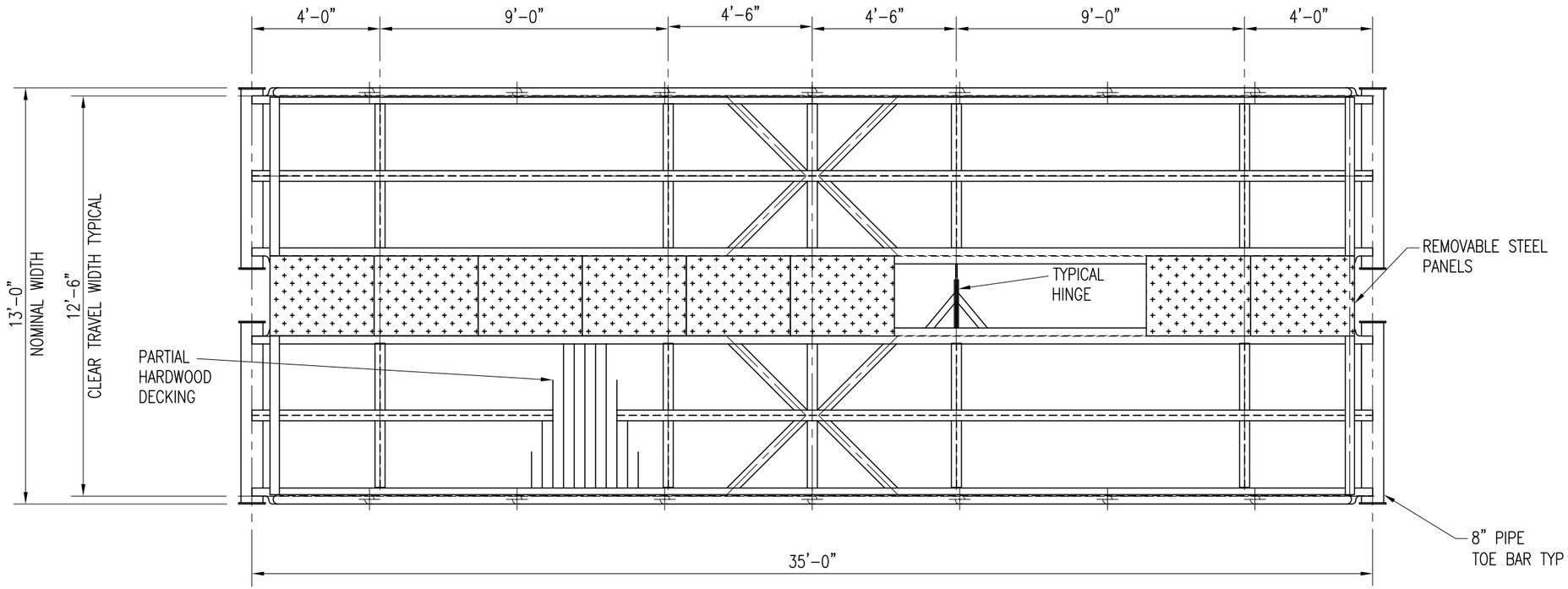
PLAN VIEW



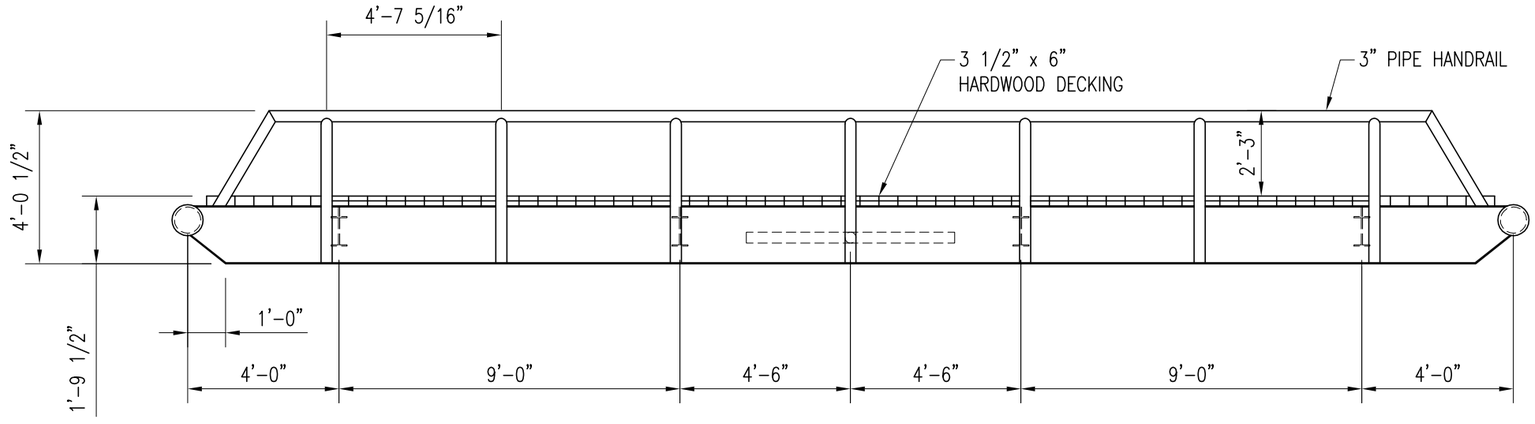
SIDE VIEW

SCALE: 3/8"=1'-0"

THIS BRIDGE - PRODUCT OF: ADM WELDING AND FABRICATION, LLC 37 BROADHEAD STREET WARREN, PA 16365 FILE No. HS25-30A PHONE: 814-723-7227 FAX: 814-723-7326 WWW.ADMWELDING.COM EMAIL: ADMWELDING@VERIZON.NET	national fuel	DRAWN BY: TD (ATSI) FILENAME: BMP 52.DWG DATE: 02/09/17	30'-0" PORTABLE BRIDGE	DRAWING NUMBER: 52



PLAN VIEW



SIDE VIEW

SCALE: 3/8"=1'–0"

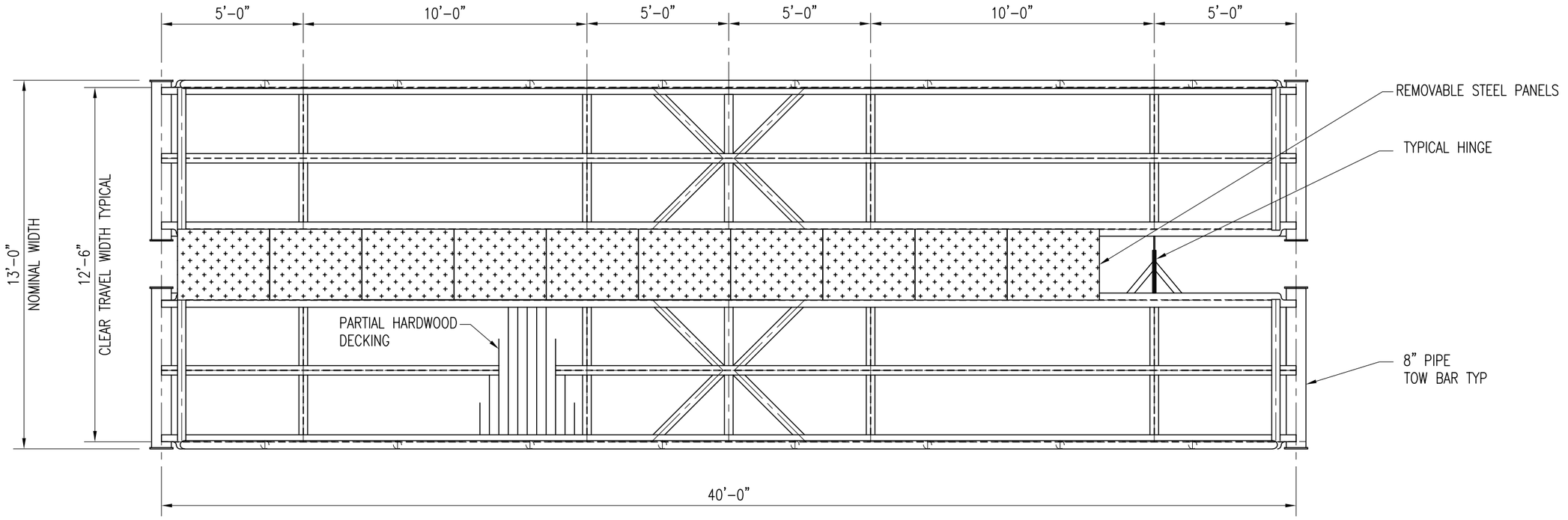
THIS BRIDGE – PRODUCT OF:
ADM WELDING AND FABRICATION, LLC
37 BROADHEAD STREET
WARREN, PA 16365
FILE No. HS25-35A
PHONE: 814-723-7227
FAX: 814-723-7326
WWW.ADMWELDING.COM
EMAIL: ADMWELDING@VERIZON.NET

national fuel

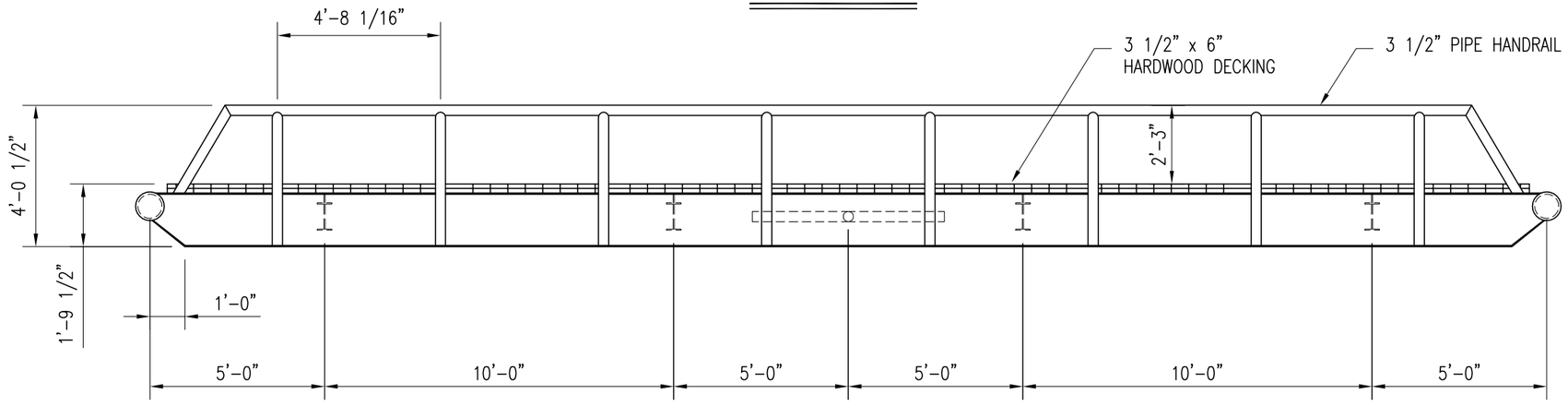
DRAWN BY: TD (ATSI)
FILENAME: BMP 52.DWG
DATE: 02/09/17

35'-0" PORTABLE BRIDGE

DRAWING NUMBER: 53



PLAN VIEW



SIDE VIEW

SCALE: 3/8"=1'-0"

THIS BRIDGE – PRODUCT OF:
ADM WELDING AND FABRICATION, LLC
37 BROADHEAD STREET
WARREN, PA 16365
PHONE: 814-723-7227
FAX: 814-723-7326
WWW.ADMWELDING.COM
EMAIL: ADMWELDING@VERIZON.NET

national fuel

DRAWN BY: TD (ATSI)
FILENAME: BMP 52.DWG
DATE: 02/09/17

40'-0" PORTABLE BRIDGE

13'W x40'L x 45-TON, 5 AXLE COMBINATION VEHICLE LOAD CAPACITY.
SUBJECT TO A 10 MPH MAXIMUM SPEED RESTRICTION

DRAWING NUMBER: 54

Attachment 3

Special Crop Productivity Monitoring Procedures

SPECIAL CROP
PRODUCTIVITY MONITORING PROCEDURES

February 1993

Provided by:
NYS Dept. of Agriculture & Markets
10-13 Airline Drive
Albany NY 12235-0001

The following outline explains the method the agriculture specialists should use to compare crop yields on and off the right-of-way. It is important that the specialist use sound judgment when selecting areas to sample. These areas should be representative of the field and should have similar soil types, drainage characteristics, and topography.

Evaluating Corn Crops

Plant Population

1.0 Check the plant population in the corn fields in late May or early June.

2.0 Count the number of plants in an area equal to 1/1000 of an acre (see table below). A population count should be done for the spoil area, the trench area, and the traffic area of the right-of-way. Do the same for the unaffected field.

Row Length to Sample 1/1000 Acre

Row Width Inches	Length of Row
42	12' 5"
40	13' 1"
38	13' 9"
36	14' 6"
34	15' 5"
32	16' 4"
30	17' 5"

3.0 Repeat the population counts for two other locations along the right-of-way in the same field.

4.0 Average the population counts from on the right-of-way and convert to plants per acre. Do the same for counts from off the right-of-way.

General Appearance

1.0 Observe the fields in late July/early August and note any visual differences in population, color, and size on and off the right-of-way.

Yield

1.0 Record differences in general appearance on and off the right-of-way during early September (silage) or early October (grain corn).

2.0 Select sample plots using the same method as in lb, above. Count the number of ears in each sample area. Count the number of rows of kernels and the number of kernels per row on at least three of the ears in the sample area. Kernels at the tip of the ear that are less than 1/2 normal size should not be counted.

3.0 Multiply the number of ears x the number of rows of kernels x the number of kernels per row x 0.01116 = bushels per acre.'

[1]Corn yields are calculated at 15.5% moisture

4.0 Average the results from the three ears from one sample plot. Average the results from the nine sample plots on the right-of-way, do the same for the three sample plots off right-of-way (see example below). Examples of corn yield estimates:

Row width = 30" Length of Row = 17' 5" #of ears in row = 21

	Ear #1	Ear #2	Ear #3
Rows of Kernels	12	10	10
Kernels/Row	40	38	44

21 x 40 x 12 x .0116 = 116.9 bu/ac
21 x 38 x 10 x .0116 = 92.6 buiac
21 x 44 x 10 x .0116 = 107.2 bu/ac

Avg. yield for plot #1 = 105.5 bu/ac

Evaluating Small Grains

1.0 Plant Population

1.1. Check populations in October (winter grains) or mid/late May (spring grains). Population counts should be done for the spoil area, trench area, the traffic area, and the unaffected field. Count the number of plants in 1/10,000 of an acre (2.09' x 2.09'). Repeat the population counts at the other two locations in the same field.

2.0 General Appearance

2.1. Observe the fields in June or early July and record any visual differences in color, size, and plant population on and off the right-of-way.

3.0 Yield

3.1. Harvest the crop for yield checks in mid-July/early August (earlier for winter grains).

3.2. Select sample plots using the same method that was used for the population checks.

3.3. Cut the crop from the sample plot by hand approximately three inches above the ground.

3.4. Separate the grain, weigh, test for moisture level, and average the results from on the right-of-way. Convert the results to bushels per acre and compare (see example below).

Yield estimate for small grains:

Plot size = 1/10,000 of an acre

crop — wheat Avg. weight = 60 lbs./bu

Sample weight = .25 lbs.
Moisture level = 22%
Ideal harvest moisture = 12%
22% - 12% = 8%
.25 lbs. x 8% = .02 lbs,

[1]Corn yields are calculated at 15.5% moisture

.25 lbs. - .02 lbs. = .2.3 lbs
.23 lbs. x 10,000 = 2300 lbs./ac
2300 lbs/ac : 60 lbs/bu = 38.3 bu/ac

Evaluating Soybeans

1) Plant Population
   a) Check the plant populations in late June/early July. if the soybeans are planted in rows use the same method that is used for corn. If the beans are planted with closer spacing use the method for small grains (2.09' x 2.09')

2) General Appearance
   a) Check the general appearance in early August, note any visual differences in population, color, and size on and off the right-of-way.
   b)

3) Yield
   a) Harvest the plants in late September and early October. If the soybeans are planted in rows use the same method that is used for corn. If they are planted with closer spacing use the method for small grains.
   b) Separate the beans, weigh them, and test for moisture. Average the results for the sample areas on the right-of-way using the same method that was used for small grains. Do the same for the areas off the right-of-way.
   c) Convert to bushels per acre.

Evaluating Hay Crops

1) Plant Population
   a) It is not necessary to do population counts for hay crops, however, the agricultural specialist will need to note the percentage of alfalfa in mixed stands on and Off the right-of-way.
   b) Any visible difference in populations of pure alfalfa stands should also be noted.

2) General Appearance
   a) The general appearance of hay stands should be recorded in late spring, mid summer, and late summer. Any differences in color, height, and stand quality should be noted.

3) Yield
   a) Complete yield checks for hay crops just before the second cutting is done.
   b) Cut vegetation from sample plot (1/10,000 of an acre) two to three inches above the ground. Test the moisture level and weigh the sample, adjust the weights using the example below. Average the results from on the right-of-way, do the same for the off right-of-way samples.

      Ideal moisture level = 18% Sample weight = .6 lbs.
      Moisture level of sample = 25%

      25% - 18% = 7%
      .6 lbs. x .07 = .042 lbs.
      .6 lbs. -.042 lbs. = .56 lbs.
      .56 lbs x 10,000 = 5,600 lbs./ac = 2.8 tons/ac.

[1]Corn yields are calculated at 15.5% moisture

Attachment 4

Seeding, Fertilizing, and Lime Recommendations
for
Gas Pipeline Right-of-Way Restoration in Farmlands

NEW YORK STATE FARMLANDS
SEEDING, FERTILIZING, AND LIME RECOMMENDATIONS
FOR GAS PIPELINE RIGHT-OF-WAY RESTORATION
IN FARMLANDS

Rev, 6-15-2005
Provided by
NYS Dept. of Agriculture and Markets
Division of Agricultural Protection and Development Services
10-B Airline Drive
Albany NY 12235-0001

NEW YORK STATE FARMLANDS

1.0 SEEDING, FERTILIZER, AND LIME RECOMMENDATIONS FOR GAS PIPELINE RIGHT-OF-WAY RESTORATION IN FARMLANDS

This paper supplements the Department of Agriculture and Markets' publication, "Pipeline Right-of-Way Construction Projects: Agricultural Mitigation Through Stages of Project Planning, Construction/ Restoration and Follow.. Up Monitoring (Rev. 1 I-97)." It is intended to familiarize the reader with varieties of seed mixes that are proven highly effective, in New York State farmlands affected by pipeline right-of-way construction, with full agricultural mitigation.

The paper lists several different seed mixes, for permanent cover, and provides other pertinent information including: temporary cover; the need for and use of soil nutrients; as well as follow-up monitoring and other useful notes. This paper is NOT intended as a guide to the sequential steps of disking and surface tillage for seedbed preparation and the sequence of liming, fertilizing, seeding, and mulching.

*** **ALL SEEDING RATES BELOW ARE FOR DRILL SEEDER APPLICATION** *[PREFERRED METHOD1.*

*** **IF BROADCAST SEEDING IS USED, ALL SEEDING RATES *[BELOW]* MUST BE DOUBLED.**

1.1 Permanent Seeding Mixtures.

1.1.1 Common for hayland planting:

a.) Alfalfa 20# if seeded alone, or with one of the following cold season grasses: Timothy, or Orchard grass, or Bromegrass should be added if one of these grasses is desired by the farm operator, at the rate of 8# per *acre. [See "3) Quick Erosion Control" below.]*

b.) Pardee Birdsfoot Trefoil 16# per acre, plus either:
Timothy, or Orchard grass, or Bromegrass should be added [per farm operator's choice] at 6# per acre rate. *[See "3) Quick Erosion Control" below.]*

c.) Medium Red Clover or Mammoth Red Clover 15# per acre, plus either: Timothy, or Orchard grass, or Bromegrass should be added [per farm operator's choice] at the rate of 6# per acre. *[See "3) Quick Erosion Control" below.]*

1.1.2 Common for pasture planting:

d.) Dutch White Clover 6# per acre; plus Pardee Birdsfoot Trefoil 6# per acre; plus Orchard grass 6# per acre

e.) Note: Reed Canary Grass at the rate of 18# per acre is excellent hay or pasture grass for wetter soils. For hay, cut early. Do not use Reed Canary Grass in wetlands
[See "3) Quick Erosion Control" below.]

1.1.3 *Quick Erosion Control.*

f.) For quick control of erosion when seeding the right-of-way: mix Annual Ryegrass as an additive into each of the Permanent Seeding Mixtures [see above]. Annual Ryegrass provides the quickest temporary cover against erosion [while the other plants are still in their slower/longer period of development]. Use approximately 6# or 7# per acre of the Annual Ryegrass when drill seeding the mix. Double the amount to 12# to 14# of Annual Ryegrass if broadcast.

g.) THE DRILL SEEDING RATES [LISTED ABOVE] FOR DISTURBED PIPELINE RIGHT-OF-WAY ARE SLIGHTLY INCREASED OVER THE STANDARD RATES IN ORDER TO HELP COMPENSATE FOR THE LOWER THAN NORMAL GERMINATION RATES DUE TO:

- THE LOWERING OF NUTRIENTS AVAILABLE TO THE PLANTS AFTER PIPELINE CONSTRUCI ION HAS DISTURBED TOPSOIL AND SUBSOIL.
- TIMING OF SEED MIX APPLICATION MAY BE IDEAL FOR SOME OF THE VARIETIES IN A MIX BUT ONLY MARGINAL FOR ONE OR MORE OTHERS.

h.) Special situation seeding, at project's risk for pastureland only: If the right-of-way's soil is restored by late September, a "risk" seeding can be applied between late September and the third week in October: Aroostook Winter Rye at 2 bu. or 112# per acre, mixed with: Pardee Birdsfoot Trefoil 16# per acre, Tall Fescue 20# per acre and Orchard Grass 8# per acre. The Aroostook Rye provides winter cover, and portions of the high rate of Trefoil, Fescue, and Orchard Grass seed may stay dormant until the following spring season. If successful in coverage, the permanent seeding of respective pastures is complete. If not, the site must be reseeded.

1.2 Temporary Cover.

1.2.1 For large-size pipeline right-of-way projects with a two-year plan, to construct one year and restore the following year.

i.) Topsoil berm

Topsoil stripping and stockpiling performed in late spring to mid-summer - broadcast seed the entire topsoil berm with either Oats at 2 bu. [80#] per acre, or Aroostook Winter Rye at 2 bu. [112#] per acre in July-August. A light to moderate rate [about 1500 -2000 #/acre] of weed-free straw mulch cover may be needed for retaining adequate summer soil moisture. *[For larger size topsoil berms, the temporary cover seeding may be more uniformly applied by `flattening the top of the berm and using small, light equipment to drop and broadcast seed from the top, covering all surfaces of the berm.]*

j.) Exposed construction zone/subsoil
After backfilling, by or before late October, plant the exposed right-of-way subsoil to Aroostook Winter Rye at the rate of 3 bu. [168#] per acre with broadcast seeder; or 2 bu. [112#] if drill seeded. In preparation, the surface of the exposed subsoil is first scarified generally parallel with the slope's contours and fertilized with 200# of 10-20-20 (N,P,K) per acre, for temporary winter cover to succeed, due to the subsoil compaction and its low fertility. Apply a light to moderate [not heavy] rate [about 1000 #/acre] of weed-free straw mulch over the temporary seeding,

Note that other temporary cover seedings, in addition to those noted above, may be used, pending on seasonal conditions and the mutual approval of the farmland operator and agricultural inspector.

1.2.2 For any pipeline right-of-way project, large or small where a "winterized" right-of-way is necessary and a seeding with Aroostook Winter Rye can be applied before the end of October:

Topsoil berm and exposed, backfilled construction zone
Apply 3 bu. [168#] per acre, broadcast, Refer to Exposed construction zone above regarding scarification of surface and rate of straw mulch.

1.2.3 For unavoidable, off-season construction ['mud and freeze-thaw" season construction], when topsoil is stripped after October, and effective, temporary cover seeding is impossible due to inherent climate factors: use a moderate rate of weed-free straw mulch cover over the topsoil berm. Establish and maintain all temporary erosion controls along the construction right-of-way corridor - throughout the off season construction - including but not limited to: outside perimeter runoff ditching; silt fencing; water bars and runoff drainage gaps through the topsoil berm and across right-of-way to prevent water ponding, berm saturation, and erosion.

1.3 Use Seed Inacculant.

1.3.1 Remember to apply the appropriate variety of fresh inocculant to all legume seed before use [e.g.: alfalfa, birdsfoot trefoil, etc.]. *Even if the seed label says it is pre-inocculated, the viable seed in the batch could easily be two or more years old while the pre-inocculant is past its life.* The certified seed itself may still be good, but non-responsive without the proper fresh inocculant applied at the time of seeding.

1.4 Fertilizer For Right-of-Way Reseeding:

Soil Testing, The fertilizer rates listed below are approximations. Prior to construction, before the topsoil is stripped, representative sampling is conducted: agronomic soil samples are obtained about 400 feet apart along the right-of-way, and submitted and laboratory tested for: pH; % organic material; cation exchange capacity, and N,P,K [Nitrogen, Phosphorus/Phosphate, and Potassium/Potash). The results are applied to determine the lime and fertilizer rate to apply for the respective soils and farms.

1.4.1 "10-20-20" This means 10# of nitrogen, 20# of phosphorus, 20# of potash per 100# of fertilizer.

Pending on test results, use 300# per acre, [This totals out to 30# of nitrogen, 60# of phosphorous, 60# of potash per acre.]

1.4.2 "5-10-10" This means 5# of nitrogen, 10# of phosphorus, 10# of potash per 100# of fertilizer. Pending on test results, use 600# per acre. [This totals out to 30# of nitrogen, 60# of phosphorous, 60# of potash per acre.]

1.5 Fertilizer for temporary cover seeding of exposed right-of-way construction work surface.

Refer to "Temporary Cover" B. 1. b. exposed construction zone/subsoil on page 2.
(Fertilizer is not recommended for temporary seed cover on the topsoil berm, but is strongly advised on the exposed subsoil surface.)

1.6 Fertilizer as a topdressing [follow-up additive] in haylands and pastures:

"16-8-8" This means 16# of nitrogen, 8# of phosphorous, 8# of potash per 100# of fertilizer. Use 200-300# per acre, depending on field conditions. This totals out to either:
32# of nitrogen, 16# of phosphorus, 16# of potash; or
48# of nitrogen, 24# of phosphorus, 24# of potash per acre,

1.7 Agricultural Lime.

See reference to Soil testing, for pH, in **D. Fertilizing For Right-of-Way Reseeding,** above.

- A minimum rate of 3 tons agricultural lime per acre for most permanent seedings in naturally low-lime soils [e,g.: Southern Tier/northern Allegheny Plateau]. A heavier amount will be applied if so indicated from pH test results. Use lower lime rate on naturally high-lime soils based on site specific soil pH test and farm record of recent lime application [e.g.: Central Plains/northern half of Finger Lakes Region].

- Pelletized and agriculture lime are rated the same in tons to be applied. Except pelletized is easier to handle and reacts to the soil quicker but it cannot be reduced in its amount. [Do not use "liquid lime" on agricultural land.]

1.8 Monitoring and Follow-Up.

Restored right-of-way is monitored for not less than two years after initial restoration seeding is completed. The seeding is satisfactory if it produces equal to or better than the adjacent undisturbed planting. Seasonal surface soil moisture conditions will vary from year to year, and may be ideal to poor [excessively dry] for germination when pipeline project applies the seed. Seedings that are unsatisfactory due to lower plant population/poor plant health or overpopulation of weeds will be replanted.

Far monitoring of crop productivity, refer to: "Special Crop Productivity Monitoring Procedures," a February 1993 paper, provided by the NYS Department of Agriculture and Markets.

1.9 Final Notes on Seedings.

- Always use certified seed for each variety used alone or in a mix.
-
- Always use a Brilion drill seeder with rear cultipacker, or similar implement, for hayland and improved pasture seedings.

- Do not try to seed when the ground is wet.

- While Empire birdsfoot trefoil has been a traditional variety applied throughout the region, the more recently developed "Pardee" birdsfoot trefoil is widely applied with proven performance in soils with drainage limitations and even better in well-drained soils. The Pardee variety has improved winter survival over other varieties when properly planted.

- Remember to double the permanent seeding rates when using broadcast seeding due to the mortality rate,

- Perennial Ryegrass is not a favorite grass with farmers and is not recommended in seed mixes on agricultural right-of-way.

- Incorporate fertilizer and lime into the soil; and apply fine surface tillage/seedbed preparation practices

- Creeping Fescue is shade tolerant.

Attachment 5

NFG General Seed Mixtures

Temporary Mixtures - October 15th through March 31st. New York requires the mixtures to be used between November 15th and April 1st.

Site preparation: Apply 1 ton of agricultural-grade limestone per acre, plus fertilizer at the rate of 10-10-10 per acre, and work in where possible. After seeding, mulch with hay or straw at a rate of 3 tons per acre.

Lime
One (1) ton per acre

Fertilizer
150 lbs. per acre
10-10-10

Mulch
Hay or Straw
3 tons per acre in PA
4 tons per acre in NY

Temporary Seed Mixture
Winter Rye
170lbs. per acre

Permanent Mixtures - April 1 through October 14

For non-agricultural lands use the following guidelines:

Lime
Six (6) ton per acre

Fertilizer
1,000 lbs. per acre
10-10-20

Mulch
Hay or Straw
3 tons per acre

☐**NFG Seed Mixture No. 1**
General R.O.W. Mixture
Application Rate 40 lbs. per acre
30% Fawn Tall Fescue
25% Annual Ryegrass
15% Timothy
10% Birdsfoot Trefoil
10% Alsike Clover
5% Yellow Blossom Clover
5% Red Top

☐**NFG Seed Mixture No. 3 Wet Upland Areas**
Application Rate 50 lbs. per acre
70% Perennial Ryegrass
24% Birdsfoot Trefoil
6% Red Top

☐**NFG Seed Mixture No. 4**
Residential Lawns
Application Rate 120 lbs. per acre
ERNST # ERNMX-114
"Penn State Mix"
50% Kentucky Bluegrass
30% Creeping Red Fescue
10% Perennial Ryegrass
10% Annual Ryegrass

☐**NFG Seed Mixture No. 5**
Agricultural Lands
Application Rate 30 lbs. per acre
50% Alfalfa
50% Timothy

☐**NFG Seed Mixture No. 6**
Wetlands
Application Rate 40 lbs. per acre
100% Annual Ryegrass

☐**NFG Seed Mixture No. 9**
Steep Slopes >20%
Application Rate 50 lbs. per acre
40% Perennial Ryegrass
40% Lathco Flatpea (2 x inoculm)
20% Birdsfoot Trefoil

☐**Ernst Seed Mixture**
Cattle Grazing Mix
Application rate 30 lbs. per acre
ERNST # ERNMX-118
30% Festuloliom
30% Orchardgrass
30% Perennial Ryegrass
5% Red Clover
5% White Clover

☐**Ernst Seed Mixture**
Cattle Hay mix
Application Rate 20 lbs. per acre
ERNST # ERNMX-108
40% Red Clover
30% Tall Fescue
20% Alfalfa
10% Timothy

☐**Ernst Seed Mixture**
Horse Pasture and Hay Mix
Application rate 25 lbs. per acre
ERNST # ERNMX-107
40% Orchardgrass
28% perennial Ryegrass
20% Tall Fescue
5% Timothy
5% Kentucky Bluegrass
2% Meadow Brome

☐**Strip Mine Seed Mixture**
Application Rate 43 lbs. per acre
20 lbs. Annual Ryegrass
8 lbs. Switchgrass
6 lbs. Alsike Clover
5 lbs. Creeping Red Fescue
4 lbs. Red Top

Attachment 6

Winter Construction Plan

WINTER CONSTRUCTION PLAN

Revised: January 2017

NOTE: All elements of this Plan are subject to applicable permit requirements and conditions, as well as general or specific applicable regulatory requirements imposed by Federal, State or Local agencies (Regulatory Authorities). Any contradictions between regulations or activities imposed by Regulatory Authorities and those outlined in this Plan, shall default to the measures prescribed by the Regulatory Authorities.

It will be required by The Contractor to correct any trenchline subsidence that occurs during spring thaw prior to final restoration.

PRECONSTRUCTION PLANNING

The Company has developed and suggests the implementation of this winter construction plan when any of the following conditions could occur:

- Sustained cold temperatures occur that result in the freezing to a depth of 2 inches or more;
- Backfill material could freeze to the extent that adequate compaction becomes difficult;
- Topsoil stockpiles could freeze and cannot be uniformly redistributed across disturbed areas or separated from the sub-grade material;
- Snow accumulations are great enough to prevent visual observation of the construction work area; or
- Historical conditions in the region indicate that significant runoff from spring snow melt may require additional protective measures.

This plan addresses and identifies the chain of decision making that will occur on a day-to-day basis for determining the construction practices that can occur in any one area.

SAFETY RECOMMENDATION

Tips to Protect Workers

Workers who have prolonged exposure to freezing or cold temperatures may cause serious health problems such as trench foot, frostbite, and hypothermia. I extreme cases, including cold water immersion, exposure can lead to death. Danger signs include uncontrolled shivering, slurred speech, clumsy movements, fatigue, and confused behavior. If these signs are observed, call for emergency help.

OSHA's Cold Stress Card (attached) provides a reference guide and recommendations to combat and prevent many illnesses and injuries. Other tips include the following:

Recommendations for Employers

Employers should take the following steps to protect workers from cold stress:

- Schedule construction, repair, and maintenance projects in cold areas for warmer months, if possible.
- Schedule cold projects for the warmer part of the day, if possible.
- Reduce the physical demands of workers.
- Use relief workers or assign extra workers for long, demanding tasks.
- Provide warm liquids to workers.
- Provide warm areas for use during break periods.
- Monitor workers who are a risk of cold stress.
- Provide cold stress training that includes information about:
    - Worker risk
    - Prevention
    - Symptoms
    - The importance of monitoring yourself and coworkers for symptoms
    - Treatment Personal protective equipment

Recommendations for Workers

Workers should avoid exposure to extremely cold temperatures when possible. When cold environments or temperatures cannot be avoided, workers should follow these recommendations to protect themselves from cold stress.

- Wear appropriate clothing.
    - Wear several layers of loose clothing. Layering provides better insulation.
    - Tight clothing reduces blood circulation. Warm blood needs to be circulated to the extremities.
    - When choosing clothing, be aware that some clothing may restrict movement resulting in a hazardous situation.
- Make sure to protect the ears, face, hands, and feet in extremely cold weather.
    - Boots should be waterproof and insulated.
    - Wear a warm hat; it will keep your whole body warmer. (Hats reduce the amount of body heat that escapes from your head.)
- Move into warm locations during work breaks; limit the amount of time outside on extremely cold days.
- Carry cold weather gear, such as extra socks, gloves, hats, jackets, a change of clothes, and a thermos of hot liquid.
- Include a thermometer and chemical hot packs in your first aid kit.
- Avoid touching cold metal surfaces with bare skins.

<u>Monitor your physical condition and that of your coworkers.</u>

SNOW USES, REMOVAL, AND STORAGE

Uses

Snow can be used for insulation over the trench line prior to excavation to reduce frost penetration along the line until ditching process begins.

Removal

Snow should be removed from the construction workspace to provide safe and efficient working conditions and to expose soils for grading/excavation when snow impedes safe working conditions. Removal of snow along the access roads is necessary to ensure safe access to the right-of-way. Snow should be removed from all storage locations to allow the subsurface to freeze.

Storage

Snow storage within the right of way should clearly separate snow from spoil storage to avoid mixing.

Snow removal and storage shall be placed in an area to avoid any potential erosion problems due to sudden melting.

Landowner Requirements

Prior to construction, if winter construction is anticipated, The Company will identify appropriate snow removal and storage areas, and secure approval from affected landowners, addressing landowner access, fences and gates.

Acceptable Snow Removal and Storage Methods

Snow removal on the right-of-way and access roads should be accomplished by minimizing spoil being removed along with the snow. The snow should be stockpiled in designated areas, as allowed by landowner agreements and permit conditions.

The placement and protection of the stockpiles should ensure that snow melt will not cause erosion and sedimentation issues.

Sensitive Areas

No stockpiled snow shall be placed in designated avoidance areas, such as cultural resource sites, residential mitigation areas, sensitive species or habitat areas, or within wetlands/waterbodies including buffer areas. In New York, edges of disturbed areas that drain within 100 feet of a waterbody will have two rows of silt fence, five feet apart, installed on the contour. The Company will identify these areas and provide signage and/or safety fence as applicable, to ensure compliance with this condition.

CROSSING WETLANDS AND WATERBODIES

Topsoil Segregation

Prior to trench excavation, snow can be piled over the trench line to form an insulating barrier and prevent deep frost penetration. The stockpiled snow is then removed just prior excavation to prevent mixing of the snow and the topsoil material. Where the excavated materials are exposed to freezing ambient air temperatures for extended periods of time the backfill will tend to be larger, angular blocks. The blocks should be broken into smaller pieces to reduce trench subsidence during spring thaw.

The Contractor should not use frozen backfill. To avoid frozen backfill, strip off the outer frozen layer of the spoil pile to expose the inner unfrozen subsoil. The frozen soil should then be broken up into smaller pieces to avoid voids which cause subsidence. In winter conditions a slight crown should be created over the trench line, this will allow for backfill subsidence. During final grading and clean-up, restore the trench line back to surrounding contours.

To minimize high water content wetland spoil freezing to ground surface, minimize the amount of open trench during frozen conditions. Fill should not be placed on saturated or frozen surfaces. To avoid this The Contractor should place timber mats and/or geotextile matting on the ground prior to excavation and fill placed on top. In New York, a barrier must be installed at least fifteen feet from the toe of the stockpile to prevent migration.

Pipeline excavation activities should limit the length of open ditch to allow for excavation, lowering in, and backfilling to a range of 24 to 72 hours. Frozen or soft, mucky, or highly compressible materials should not be incorporated into fills. Frozen material should be set aside and placed on top of the backfilled trench or the trench backfilled with a crown. The crown should only be constructed directly over the backfilled trench with native material and should not extend out beyond the trench line.

Subsoil that is used to crown the trench line should not extend above the natural surface grade. The crown will be capped with native topsoil to ensure elevations will be restored with topsoil at the surface. If the topsoil has been removed as a frozen material, the topsoil should be placed on top of the trench line as the cap of the crown. Small gaps can be left in the crown to allow for natural surface drainage before the material is completely settled during thaw conditions.

<u>All backfilled material should be monitored for subsidence and excessive crowning conditions</u>.

Final restoration of wetlands should be completed to the maximum extent practicable during winter conditions. Complete remediation may be required during non-frozen conditions as necessary.

Temporary Bridges

During construction temporary bridges will be installed across wetlands and waterbodies. If construction activities cease during winter periods, all bridges will be removed that will be impacted by high flow during spring runoff. **UPLAND AREAS**

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

- Cultivated or rotated croplands, and managed pastures;
- Residential areas;
- Hayfields; and
- Other areas that are defined by the restriction list.

The average duration and intensity of winter conditions in the project region should be considered early in project planning and scheduling. Regions that have extended periods of freezing temperatures and deeper frost depths will require more deliberate planning for topsoil segregation. Long-term topsoil stockpiling to manage the topsoil may be required to ensure a more effective seeding and restoration after the spring thaw.

Residential Area Construction

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

Where topsoil segregation is required, the Company will:

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

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

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

Stabilize topsoil piles and minimize loss due to wind and erosion with use of sediment barriers, mulch, temporary seeding, tackifiers, or functional equivalents, where necessary. Topsoil segregation should be accomplished, where practicable, prior to frozen conditions. Specialized equipment may be used to break up the topsoil prior to stripping.

Restoration of the topsoil should ideally occur after both the topsoil and the exposed subsoil have thawed, the ground has dried after the spring melt, and the soils are more easily worked. If an extended wet period occurs after the spring thaw, proper erosion and sediment controls should be set into place to avoid topsoil loss and discharges into wetlands or waterbodies. Right-of-way stabilization needs to be implemented regardless of whether topsoil restoration has taken place. Temporary stabilization of the right-of-way and topsoil pile can take place by re-mulching and dormant seeding if necessary.

For all properties with residences located within 50 feet of construction work areas, The Company will; avoid removal of mature trees and landscaping within the construction work area unless necessary for safe operation of construction equipment, or as specified on landowner agreements; fence the edge of the construction work area for a distance of 100 feet on either side of the residence; and restore all lawn areas

and landscaping, if possible, immediately following clean up operations, or as specified in landowner agreements. If frozen conditions prevent compliance with these time frames, maintain and monitor temporary erosion controls (sediment barriers and mulch) until conditions allow completion of restoration.

Throughout construction, traffic lanes and access to homes will be maintained except for the brief periods essential for laying the new pipeline. The Contractor will erect temporary safety fences in the vicinity of streets and homes to keep the public away from the construction zone. The Company may use techniques such as stovepipe and drag section construction in order to minimize the impacts of construction in residential areas on a site-specific basis. Site-specific residential mitigation plans will be utilized in areas with residences within 25 feet from the edge of construction right-of-way.

Homeowners will be notified in advance of any scheduled disruption of household utilities and the duration of the interruption will be kept as brief as possible. Representatives of the local utility companies will be on-site during construction when necessary. In addition, The Company and Contractor will strive to accommodate any special concerns regarding ornamental shrubs, trees, or structures by avoiding them as long as such avoidance will not unduly interfere with construction and operation of the pipeline.

The Company and Contractor will take measures to ensure that construction activities will not prevent access to residential areas by fire and emergency vehicles. At least one lane of traffic will be kept open for emergency vehicles when constructing on or across residential streets. During the brief period of road closure, steel plates will be available on site to cover the open area to permit travel by emergency vehicles.

WATER HANDLING

The Contractor will maintain, at all times during winter construction, sufficient means to promptly remove and dispose of water entering the trench or other parts of the right-of-way or construction area.

Fill should not be placed on saturated or frozen surfaces. Any and all ice should be removed from the open trench prior to backfill. If not removed significant subsidence following spring melt can occur.

Dewatering activities performed during frozen conditions will be continuously monitored and adjusted as necessary. Discharge locations should be carefully evaluated and selected based on the site conditions including vegetation cover, soil type, and topography. When dewatering pumps are not in use, pumps and hoses should be properly drained to prevent damage.

Structure Installation / Removal

Planning for dewatering structure locations that include filter bags and straw bale structures should be completed early in the construction process and if possible(before freezing) when ground conditions are favorable.

Removal of dewatering structures should take place promptly after final use. If conditions do not allow for a prompt removal, clearly mark structures until proper removal can take place.

Hydrostatic Testing

In areas where test water discharges are occurring on top of frozen ground, the discharge water will not absorb into the ground, resulting in increased surface water runoff and ponding in low lying areas. The increased runoff can melt and erode the upper layer of frozen soil, especially in areas where the water may become channelized. Discharge water can also flow underneath snow, causing unobserved erosion and potentially deposition in sensitive resource areas.

Similar to dewatering activities during standard non-frozen construction conditions, dewatering activities performed during frozen conditions should be continuously monitored and adjusted as necessary. Discharge locations should be carefully evaluated and selected based on site conditions including vegetation cover, soil type, and topography. Dewatering activities will only take place during daylight hours.

Where testing will occur during low-flow periods, The Company will discuss any appropriation volume or rate restrictions with the appropriate regulatory agencies.

TEMPORARY EROSION AND SEDIMENT CONTROL

Temporary erosion and sediment control measures installed prior to or during frozen conditions may not remain functional under these conditions. The Company and Contractor will review the construction right-of-way in advance of frozen ground conditions and install the necessary temporary erosion and sediment control devices in advance of changing weather.

Advance placement will allow for the “keying” in of bales to the ground that will enable the devices to be more effective throughout construction. Sediment barriers (silt fence, straw bales, earthen berms, filter sock) will be installed across the right-of-way at waterbodies, wetlands, and road crossings as determined necessary by the Environmental Inspector. New York requires a minimum twenty-five foot buffer to be maintained from all perimeter controls. In New York, silt fence should be marked with stakes that are visible above the snow.

The Company and/or Contractor will keep an Environmental Inspector (EI) and environmental labor crew on site or on call through the periods of thaw to monitor erosion control structures and stabilization efforts and make adjustments or repairs as necessary and as right-of-way conditions allow. Crews should have proper equipment available to allow access to the right-of-way under soft soil conditions.

If final cleanup and restoration activities have not occurred prior to the spring melt, monitoring of the right-of-way should be implemented during the delay between construction and restoration or temporary shutdown of construction activities. The monitoring program should include:

- Erosion control structures requiring repair;
- Areas of slope instability; and
- Areas where significant levels of erosion are occurring.

The Environmental Inspector should determine the most effective means of dealing with identified problems, taking into consideration the suitability of the right-of-way for access by equipment, potential damages that could occur by equipment accessing the right-of-way, and the urgency / significance of the problem.

WINTER STABILIZATION PLANNING

When construction is complete or has been postponed, and final restoration (i.e. decompaction, final grading, topsoil replacement, and lime/fertilization/seeding) is delayed until the spring or summer, the development of a site specific winter stabilization plan should be implemented. The purpose of this plan is to avoid excess site disturbance resulting from freeze/thaw periods and precipitation events in the winter months and into the spring.

The plan should be drafted using any applicable information including, but not limited to: guidelines provided by appropriate agencies, specifications found within the ESCAMP, and guidance from the Company or third-party environmental inspector personnel. The plan should identify key areas of concern, additional erosion control measures to be implemented, timeframes for site inspections over winter shutdown, timeframes for restoration activities, and any site-specific factors that may affect proper restoration of the project area (i.e. landowner restrictions).

General Guidelines

As construction approaches winter months, weather conditions must be closely monitored and The Contractor must take measures to stabilize areas that will not be restored before winter freeze. These areas should be properly stabilized ahead of time, during favorable weather conditions when soils are more easily worked, if possible. In areas in New York where soil disturbance has temporarily or permanently ceased, soil stabilization measures should be initiated by the end of the next business day and completed within three days. In advance of a melt event, New York requires that disturbed soil should be stabilized at the end of each work day unless work will resume within 24 hours in the same area and no precipitation is in the forecast or the work is in disturbed areas that collect and retain runoff (i.e. open utility trenches).

When construction timeframes and/or seasonality do not allow for, or are not likely to allow for, proper restoration of the ROW after backfilling, all non-active areas should be stabilized once facilities are installed.

When construction in an area ceases, open excavations will be backfilled as necessary, or safety fencing will be installed for protection. Because restoration will be delayed, any compacted subsoil must be roughened to reduce the potential for erosion during snowmelt or significant rain events.

Slope breakers, berms, and other erosion and sediment control measures will be installed to minimize erosion along the ROW and deposition of sediments off the ROW. If not already completed, gaps will be cut into topsoil and subsoil piles and through the crown over the trench to allow drainage across the ROW. Environmental Inspectors may determine the need for additional erosion and sediment controls, where necessary.

Equipment bridges will be removed from water courses where potential for high spring flows could compromise the integrity of bridges. Stream banks and adjacent areas on either side of stream or wetland crossings will be stabilized, where needed. Wetland areas where mats are removed will be cleaned up to the extent possible and disturbed soils adjacent to streams and wetlands will be stabilized, if necessary.

All disturbed areas will require temporary mulch before a winter shutdown. Temporary mulch will be applied at a rate of 3 tons per acre to all disturbed areas. In New York, a rate of 4 tons per acre will be used. The temporary mulch will be crimped in where possible, or will be track-walked into the right-of-way where ground conditions or slopes make the use of the crimping tool impractical. One hundred percent (100%) mulch will be spread on non-stabilized slopes of 10% or steeper. Only weed-free straw mulch, not hay mulch, will be used where mulch is needed on agricultural land. If significant snow cover or frozen conditions exist on the right-of-way, the decision to apply mulch to disturbed areas will be determined by the Environmental Inspector. If the situation permits, consultation with local erosion control professionals and applicable agencies may be necessary to determine the best methods for anchoring the mulch (i.e. soil tackifiers).

All temporary erosion and sediment controls and stabilization measures should be inspected prior to winter shutdown and periodically throughout the shutdown period to ensure they are functioning properly. If deficient erosion and sediment control measures are discovered during winter shutdown, The Contractor must mobilize personnel to the site to remedy the problem upon notification.

Seeding

For instances where weather conditions allow proper decompaction of soils, final grading, and topsoil replacement, the following temporary mixtures may be used to stabilize the right-of way between the dates **October 15th** and **March 31st. New York requires the mixtures to be used between the dates November 15th and April 1st,**

Lime	**Fertilizer**	**Mulch**
One (1) ton per acre	150 lbs. per acre 10-10-10	Hay or Straw 3 tons per acre in PA 4 tons per acre in NY

Temporary Seed Mixture
Winter Rye
170 lbs. per acre

If winter rye is unavailable, an alternative such as winter oats or winter wheat may be substituted. For other seed mixes, to ensure adequate vegetation growth when seeding outside of the recommended seeding windows, seed at a higher rate to account for lower germination success. Before permanent seeding is planted in spring, the right-of-way will be inspected and any grade or water control structures that have been damaged over the winter will be repaired.

APPENDIX D

INVASIVE SPECIES CONTROL PLAN

HALEY ALDRICH

INVASIVE SPECIES CONTROL PLAN
National Fuel Gas Distribution Corporation
National Fuel Greenbush Road FY2020 Pipeline Installation Project
Erie County, New York

INTRODUCTION

New York State Environmental Conservation Law (ECL) defines invasive species as "a species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. Harm must significantly outweigh benefit", [ECL §9-1703 (10)(a)]. An invasive species could be a plant, animal, or microbial species. Invasive plant species are typically the most problematic of all the possible invasive species present on proposed projects such as National Fuel Gas Distribution Corporations (National Fuel) proposed Greenbush Road FY2020 Pipeline Installation Project, which includes installation of approximately 930-feet of new 2-inch plastic natural gas distribution pipeline and 7,650-feet of new plastic 4-inch natural gas distribution pipeline located within the Town of Newstead, Erie County, New York.

In 2014, the New York State Department of Environmental Conservation (NYSDEC), in coordination with the New York State Department of Agriculture and Markets, established new rulemaking to promulgate regulations of the introduction of invasive species (6 NYCRR Part 575 Prohibited and Regulated Invasive Species). The regulations include a list of prohibited species which shall be unlawful to knowingly possess with the intent to sell, import, purchase, transport or introduce; a list of regulated species which shall be legal to possess, sell, purchase, propagate and transport but may not be knowingly introduced into a free-living state; and require a permit for research, education and other approved activities involving prohibited species and release of regulated species into a free-living state. On September 10, 2014 Part 575 was published in the State Register, these take effect six (6) months from this date (March 10, 2015). The NYSDEC has issued a Quarantine Order, per ECL section 9-1303(9), for the purpose of controlling or to prevent the spread of emerald ash borer, *Agrilus planipennis* (EAB), their pupae, eggs, larvae and any plants and trees infested by them, all of which the NYSDEC considers a public nuisance.

The above referenced invasive species list will be use used to determine the presence of common invasive plant species within the Project corridor and the Quarantine Order will be used identify the regulated articles.

PURPOSE

The purpose of this plan is to describe the procedures to minimize the introduction and spread of target invasive plant species into currently uninfected areas. National Fuel has already committed to implementing the procedures and mitigation measures contained in the Project's Erosion Sedimentation Control and Agricultural Mitigation Plan (ESCAMP) as part of the required Stormwater Pollution Prevention Plan (SWPPP). The ESCAMP describes environmental construction, agricultural mitigation techniques, and best management practices that National Fuel's contractors will use to construct and operate the Project. Impacts to delineated wetlands and streams will be minimized through the implementation of practices outlined in the ESCAMP, adherence to general and special conditions of issued permits, and application of invasive species control measures. Potential construction impacts may include, but not be limited to, the movement or introduction of non-native invasive species into these communities. Transport of invasive species can occur through the movement of heavy equipment and/or fill materials during the clearing, installation and restoration phases of the Project.

INVENTORY

Ecological investigations along with wetland and stream delineations were conducted along the Project's limits of disturbance (LOD) in the Fall of 2019. At the time of the delineation, no common reed (Phragmites australis), or Japanese knotweed (*Fallopia japonica*) were documented within the Project corridor. Purple loofestrife (Lythrum salicaria) was observed in several locations throughout the Project corridor, including wetlands KLA, KLB, KLF, and KLG. Concentrations of purple loofestrife ranged from approximately 5% to 30% of herbaceous cover in these areas.

INVASIVE SPECIES CONTROL

Controlling the spread of target invasive plant species will be accomplished by applying the following control measures:

1. Inspector training
   At least one Environmental Inspector having knowledge of the wetland and stream conditions in the Project corridor is required throughout construction and restoration. The number and experience of Environmental Inspectors assigned to each construction spread will be appropriate for the length of the construction spread and the number/significance of resources affected. At least one inspector shall be trained on identifying the target invasive plant species and site-specific measures for preventing their possible transport onto or throughout the construction spread.

2. Equipment sanitation
   The contractor(s) shall be instructed to bring in clean machinery and materials free of any visible soil, vegetation or debris prior to entering construction spreads. As necessary, cleaning will take place within an elevated wash rack station with clean water (no soaps). This wash water will be discharged and disposed appropriately.

3. Construction materials
   Construction materials such as seed mixes, mulch material, gravel, and soil if being brought into the construction spread from an outside source shall be visually inspected or documented by vendors (as practicable) to be free of possible invasive plant material. During the monitoring phase, the contractor(s) shall avoid of mowing infested invasive areas into non-infested invasive areas.

4. Restoration
   All areas impacted by construction activities will be restored to preconstruction conditions as soon as applicable. An appropriate seed or planting plan will be utilized based on the pre-existing conditions prior to disturbance. National Fuel will use their typical seed mixes appropriate for site restoration and in compliance with the ESCAMP. If possible, seed mixes will be utilized from a local source.

5. Monitoring
   Restoration monitoring, including invasive species assessment, will take place following the restoration phase of this Project by appropriately trained personnel. Inspection of the corridor will occur during the growing season (April-November). A measurable increase in areal coverage

of invasive plant species will be reported to the U.S. Army Corps of Engineers (USACE) and the NYSDEC. This plan will be considered successful if at the end of the monitoring period there is no net increase in the areal coverage. If there is an increase, then this plan will be reviewed with the USACE and NYSDEC to formulate new alternative control criteria. This new criterion will be used to develop a restoration plan.

6. EAB

   As no tree clearing is proposed for the Project, it is not anticipated that the Project will result in the spread of the EAB.

APPENDIX E

AGENCY CORRESPONDENCE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Fish and Wildlife, New York Natural Heritage Program
625 Broadway, Fifth Floor, Albany, NY 12233-4757
P: (518) 402-8935 | F: (518) 402-8925
www.nature.ny.gov

December 16, 2019

Thomas Robitaille
Haley & Aldrich of New York
200 Town Centre Drive, Suite 2
Rochester, NY 14623

Re: Greenbush Road FY2020 Pilot Project
County: Erie Town/City: Newstead

Dear Mr. Robitaille:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to the above project.

Enclosed is a report of rare or state-listed animals and plants, and significant natural communities that our database indicates occur at the project site or in its vicinity.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our database. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or significant natural communities. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

Our database is continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the NYS DEC Region 9 Office, Division of Environmental Permits, at dep.r9@dec.ny.gov, (716) 851-7165.

Sincerely,

Andrea Chaloux

Andrea Chaloux
Environmental Review Specialist
New York Natural Heritage Program

1345

The following state-listed animals have been documented in the vicinity of the project site.

The following list includes animals that are listed by NYS as Endangered, Threatened, or Special Concern; and/or that are federally listed or are candidates for federal listing.

For information about any permit considerations for the project, contact the NYSDEC Region 9 Office, Division of Environmental Permits, at dep.r9@dec.ny.gov.
A listing of Regional Offices is at http://www.dec.ny.gov/about/558.html.

The following species has been documented within 3.4 miles of the project site. Individual animals may travel 5 miles from documented locations. The main impact of concern for the bats is the removal of potential roost trees.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Mammals				
Northern Long-eared Bat *Hibernaculum*	*Myotis septentrionalis*	Threatened	Threatened	14148

This report only includes records from the NY Natural Heritage database.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the listed animals in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, and from NYSDEC at www.dec.ny.gov/animals/7494.html.

The following rare plants, rare animals, and significant natural communities have been documented at the project site, or in its vicinity.

We recommend that potential impacts of the proposed project on these species or communities be addressed as part of any environmental assessment or review conducted as part of the planning, permitting and approval process, such as reviews conducted under SEQR. Field surveys of the project site may be necessary to determine whether a species currently occurs at the site, particularly for sites that are currently undeveloped and may still contain suitable habitat. Final requirements of the project to avoid, minimize, or mitigate potential impacts are determined by the lead permitting agency or the government body approving the project.

The following animals, while not listed by New York State as Endangered or Threatened, are rare in New York and are of conservation concern.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*HERITAGE CONSERVATION STATUS*
Freshwater Mussels			
Rainbow	*Villosa iris*	Unlisted	Imperiled in NYS
Murder Creek, at the project site and in its immediate vicinity, 2018-07-18.			5239
Wabash Pigtoe	*Fusconaia flava*	Unlisted	Imperiled in NYS
Murder Creek, north of the project site, 2018-07-18.			9205
Round Pigtoe	*Pleurobema sintoxia*	Unlisted	Critically Imperiled in NYS
Murder Creek, north of the project site, 2017-09-21.			15695
Slippershell Mussel	*Alasmidonta viridis*	Unlisted	Critically Imperiled in NYS
Murder Creek, at the project site and in its immediate vicinity, 2017-06-20.			15688

This report only includes records from the NY Natural Heritage database. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the rare animals and plants in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, from NatureServe Explorer at www.natureserve.org/explorer, and from USDA's Plants Database at http://plants.usda.gov/index.html (for plants).

Information about many of the natural community types in New York, including identification, dominant and characteristic vegetation, distribution, conservation, and management, is available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org. For descriptions of all community types, go to www.dec.ny.gov/animals/97703.html for Ecological Communities of New York State.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045-9385
Phone: (607) 753-9334 Fax: (607) 753-9699
http://www.fws.gov/northeast/nyfo/es/section7.htm

In Reply Refer To: November 11, 2019
Consultation Code: 05E1NY00-2020-SLI-0558
Event Code: 05E1NY00-2020-E-01796
Project Name: Greenbush Road NFGDC FY2020 Pilot Project

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). This list can also be used to determine whether listed species may be present for projects without federal agency involvement. New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list.

Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the ESA, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC site at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list. If listed, proposed, or candidate species were identified as potentially occurring in the project area, coordination with our office is encouraged. Information on the steps involved with assessing potential impacts from projects can be found at: http://www.fws.gov/northeast/nyfo/es/section7.htm

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/

eagle_guidance.html). Additionally, wind energy projects should follow the Services wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the ESA. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045-9385
(607) 753-9334

Project Summary

Consultation Code: 05E1NY00-2020-SLI-0558

Event Code: 05E1NY00-2020-E-01796

Project Name: Greenbush Road NFGDC FY2020 Pilot Project

Project Type: OIL OR GAS

Project Description: National Fuel Gas Distribution Corporation is proposing the installation of approximately 8,550-feet of 4-inch plastic natural gas distribution pipeline along Greenbush Road in the Town of Newstead, Erie County, New York.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/43.05772694028905N78.52972257026371W

Counties: Erie, NY

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

NEW YORK STATE OF OPPORTUNITY | Parks, Recreation, and Historic Preservation

ANDREW M. CUOMO
Governor

ERIK KULLESEID
Commissioner

March 27, 2020

Ms. Tori Liberty
Engineer II
National Fuel Gas Distribution Corporation
6363 Main St
Williamsville, NY 14221

Re: DEC
Greenbush Road NFGDC FY2020 Pilot Project
Greenbush, Swift Mills, Rapids & Mill Roads, Town of Newstead, Erie County, NY
19PR07851

Dear Ms. Liberty:

Thank you for requesting the comments of the Division of Historic Preservation within the Office of Parks, Recreation and Historic Preservation (OPRHP). We have reviewed the report prepared by Panamerican Consultants, Inc. (Button et al March 2020; 20SR00166) in accordance with the New York State Historic Preservation Act of 1980 (section 14.09 of the New York Parks, Recreation and Historic Preservation Law). These comments are those of the Division for Historic Preservation and relate only to Historic/Cultural resources. They do not include other environmental impacts to New York State Parkland that may be involved in or near your project. Such impacts must be considered as part of the environmental review of the project pursuant to the National Environmental Policy Act and/or the State Environmental Quality Review Act (New York Environmental Conservation Law Article 8).

It is OPRHP's understanding that no archaeological sites were identified during the above-mentioned investigation. Based upon this review, it is the opinion of OPRHP that no properties, including archaeological and/or historic resources, listed in or eligible for the New York State and National Registers of Historic Places will be impacted by this project. This recommendation pertains only to the Project Area examined during the above-referenced investigation. It is not applicable to any other portion of the project property. Should the project design be changed OPRHP recommends further consultation with this office.

If you have any questions, I can be reached at (518) 268-2218 or via e-mail at Josalyn.Ferguson@parks.ny.gov.

Sincerely,

Josalyn Ferguson, Ph.D.
Scientist Archaeology

via e-mail only

c.c. Robert Hanley, Panamerican Consultants
c.c. DEC Region 9
c.c. Steve Phillips & Thomas Robitaille, Haley & Aldrich

APPENDIX F

INADVERTENT RETURN PLAN

Contingency Plan for Horizontal Directional Drilling
National Fuel Greenbush Road FY2020 Pipeline Installation Project

The Greenbush Road FY2020 Pipeline Installation Project proposes to cross several streams, wetlands, and the regulated 100-ft adjacent areas of NYSDEC Wetlands WO-22 and WO-35 by means of the Horizontal Directional Drill (HDD) method. HDD is a means of creating a crossing path beneath surface features without intruding directly on that feature, compared to conventional open-cut trenching methods where the surface feature(s) would otherwise sustain direct disturbance. HDD uses specific drilling equipment capable of boring a drill path at a shallow inclined angle into the subsurface, and steering the borehole at depth beneath a surface feature(s), such as a stream, roadway, railroad, or combination of these features, and re-emerging at the surface on the other side of the surface feature(s). Once the borehole is created, it is successively reamed by larger bits until the borehole is wide enough for pre-assembled pipeline to to be pulled through the borehole. Conventionally-constructed (trenched) pipeline segments are connected to the two ends of the HDD segment once it has been successfully pulled back through the HDD borehole.

HDD drilling requires specialty drill equipment to allow shallow-angled entry of a drill bit, steering and remote telemetry tracking of the drill head and advancing the drill string by addition of successive segments of drill pipe until a pre-determined exit point is reached that may be several hundred to thousands of feet distant from the entry point. HDD requires drill "mud" to be pumped down the drill string through the head of the drill bit. Drill mud is required for several critical functions:

- It cools the drill head and string as it grinds through soil and/or rock;
- It helps to lubricate and support the borehole side-walls while the bit and drill string pass through;
- It provides a fluid to carry rock and soil cuttings in suspension from the drill path face back to the point of entry so the cuttings can be cleared from the HDD borehole path, and;
- It assists in stabilizing an open bore hole, by exerting positive pressure on the borehole wall and through the buildup of a wall cake, also produces a bridging mechanism to hold soil particles in place.

The drill mud must be maintained under pressure within the borehole in order to carry out all of these functions.

HDD crossings are specifically designed to follow a pre-determined path to carry the boring at depths below the surface features being crossed so as to avoid disturbance of the feature(s) and create a borehole of sufficient diameter and configuration to allow the pipeline to pass through the completed borehole smoothly from end to end once the HDD is completed.

Despite specific engineering design of an HDD crossing, it is possible to unexpectedly lose circulation of the drill mud. Lost circulation may be signified by unexpected drop of the desired pressure of the drill mud, failure of it to return to the borehole entry point, or change in other monitored conditions during HDD drilling. An "inadvertent return" is the condition where drilling mud is inadvertently released through the soil stratigraphy or fractured bedrock and travel to the surface. Because drill mud must be maintained under pressure the potential for inadvertent return tends to be greatest where the HDD drill path is near the entry or exit points of the drill. Other features, such as unexpected geologic fractures or material may also provide pathways for loss of pressure and circulation that could lead to inadvertent return at other points along an HDD drill path.

Drilling muds consist largely of a bentonite clay-water mixture, sometimes with non-toxic polymer additives to maintain specific viscosity, density or other properties; they are not classified as toxic or hazardous substances. However, they may become a potential concern when an HDD is used to cross beneath sensitive habitats, waterways, or areas of concern for cultural resources. Bentonite is a naturally occurring type of clay, is non-toxic and commonly used in farming practices. Similarly, if polymer additives are used, they are also specified to be non-toxic materials. However, release of drilling mud into a stream or similar (especially clear-water) habitat, may subject benthic invertebrates, aquatic plants and/or fish and their eggs to sedimentation or suspended solids that can be detrimental to their well-being.

The purpose of this Contingency Plan is to:

- Minimize the potential for an inadvertent return associated with HDD activities
- Provide for the timely detection of lost drilling mud circulation and the inadvertent return(s) that may result
- Protect areas that are considered environmentally sensitive (streams, wetlands, other biological resources, cultural resources)
- Ensure and establish organized, timely, and "minimum-impact" response procedures to address loss of circulation and inadvertent return loss and the proposed clean-up of the event.
- Provide for notifications to the applicable parties and regulatory agencies, in the event an inadvertent drilling mud loss occurs.

Measures to be deployed as part of this contingency plan include site inspection, proper training of the contractor and construction personnel, development of response procedures, deployment of containment materials ahead of drilling and at locations to allow timely and minimum impact use of the materials, and implementation of appropriate clean up procedures. These measures are described in detail below.

Site Personnel Responsibilities

The Contractor(s) has overall responsibility for implementing this contingency plan. The Contractor(s) will be familiar with the aspects of the HDD drilling and plan for the project, the contents of this contingency plan and the conditions of approval under which the activity is permitted to take place. The Contractor(s) will provide a copy of this plan to its construction personnel involved with performance of and potential response to the HDD crossing. The Contractor(s) will ensure that workers are properly trained and familiar with the necessary procedures for response to an inadvertent return, prior to initiation of drilling operations. The Contractor will provide the anticipated schedule of HDD operations around protected streams, rivers, wetlands, cultural resource sites and other features (non-road, structure or railroad bores) to the site inspector responsible for monitoring environmental compliance ("Environmental Inspector" or "EI") and an on-call cultural resource monitor (CRM) prior to commencement of work.

Monitoring of HDD operations by the Contractor will include the following parameters in order to evaluate and detect potential loss of circulation or inadvertent return during drilling operations:

- Monitor the direction, progress and telemetry of the drill head and drill string along the designed HDD drill path.

- Monitor the condition and character of soil & rock cuttings emerging from the borehole for consistency with geologic conditions anticipated along the drill path.

- Monitor drill mud pressure for unexpected changes (particularly decreases in pressure) as the borehole is advanced.

- Perform visual monitoring of the ground surface along the drill path for signs of inadvertent return (unexpected expansion cracks or emergence of drill mud)

Field crews will provide timely notifications and responses to observed inadvertent returns in accordance with procedures identified in the contingency plan.

Notifications

Upon indication of a potential loss of circulation, the Contractor shall notify the drill foreman & appropriate drilling personnel to temporarily suspend drilling operations until verification can be made that an inadvertent return has not occurred. If it is determined that an inadvertent return has occurred, the drilling procedure will be discontinued until clean-up and repair has been successfully implemented and Owner has authorized drilling to commence.

Contractor shall also notify its response personnel to implement containment and response procedures summarized below.

The Contractor(s) and the EI will have the authority to stop work and commit the resources (personnel and equipment) necessary to implement this plan. The Contractor(s) and/or the Construction supervisor are responsible for promptly notifying the EI of the inadvertent return, and coordinating personnel to oversee proper clean-up and disposal of recovered material. The EI will be on the ROW, available during drilling operations to consult with HDD personnel and conduct inspections. The EI will inspect the drilling operation (e.g., monitoring HDD drill path during pilot hole operations) for the purpose of identifying signs of inadvertent return and will coordinate with the Construction supervisor to implement the appropriate measures to address an inadvertent return. Should an inadvertent return occur, the EI will evaluate the situation and location, and will determine the appropriate level of response to the incident based on the guidelines contained in this contingency plan. To the extent practicable, the EI will consult with Owner before determining the appropriate level of response to the incident. If the inadvertent return is within, or the clean-up requires disturbance of a cultural resource site, the on-call CRM will also be notified to coordinate response.

The New York State Department of Environmental Conservation (NYSDEC) and United States Army Corps of Engineers (USACE) will also be notified promptly, as described below, when an inadvertent return is detected during drilling under wetlands or streams. Owner personnel will coordinate any communication and reporting with regulatory agencies, including the NYSDEC/USACE. To the extent cultural resource sites are affected by inadvertent return or require disturbance for response measures, the on-call CRM will provide input on response coordination, and NY SHPO contacts will be notified in accordance with the contingency measures summarized below.

Training

Prior to the start of construction, the Construction supervisor and EI will verify that the construction field crew members receive the following site-specific training:

- review provisions of the contingency plan, equipment maintenance and site-specific permit and monitoring requirements;
- review location of sensitive environmental resources at the site and relevant permit conditions; review inspection procedures for inadvertent return prevention and be familiar with containment equipment and materials;
- review inspection procedures for inadvertent return prevention and be familiar with containment equipment and materials;
- review contractor/crew obligations to temporarily suspend forward progress of the drilling upon first evidence of the occurrence of lost circulation and potential inadvertent return, and to report any observed inadvertent returns to the EI;
- review operation of inadvertent return control equipment and the location of inadvertent return control materials, as necessary and appropriate; and
- review protocols for reporting observed inadvertent returns and project team communication with appropriate regulatory agencies.

Pre-Construction Considerations:

Prior to construction, environmental and cultural resources will be protected by implementing the following measures:

- Environmental, biological and cultural surveys, clearances and applicable permitting for proposed HDD and associated workspace(s) will have been completed prior to commencing drilling operations in order to minimize potential impacts to resources.
- Where present, sensitive cultural and biological resources within the construction right-of-way (CROW) will be flagged for avoidance, restricted activity locations, and construction limits will be clearly marked.
- Barriers (straw bales or sedimentation fences) will be erected between the bore site and nearby sensitive resources within or bounding the edge of the CROW prior to drilling, as appropriate, to prevent the potential for released material to reach resources nearby.
- On-site briefings will be conducted for the workers to ensure they have received site specific training for the HDD drilling operations and contingencies for drilling fluid inadvertent return procedures and clean-up.
- Ensure that all field personnel understand their responsibility for timely reporting of inadvertent returns.

- Maintaining necessary response equipment on-site or at a readily accessible location(s) and in good working order.

To further reduce the potential impacts of an inadvertent return, construction of the pipeline is expected to occur during low-flow periods for Project streams. The drilling entry and exit areas will be clearly marked, surrounded by construction fencing and silt fencing to minimize the potential for all-site migration of drilling mud. Access and egress locations will be designated and clearly marked.

The primary areas of concern for inadvertent returns typically occur near the entrance and exit points where the drill bit and leading parts of the drill string are at shallower depths. The likelihood of inadvertent return decreases as the depth of the pipe increases. HDD drilling on this project will be located at least 50 feet from riparian vegetation.

Containment Materials

At a minimum, the following containment, response, and clean-up equipment will be available in sufficient quantities, during all drilling operations at both ends of the HDD crossing location at the time such crossing occurs:

- straw bales/hay bales and 2 stakes per bale (min.);
- weighted sediment logs, sand/gravel bags;
- silt fence;
- erosion control blankets;
- plastic sheeting;
- turbidity barriers;
- shovels, pails, drums;
- push brooms;
- squeegees;
- pumps with sufficient hoses;
- mud storage tanks; and
- vacuum truck on 24-hour call, with 1 hour response time.

Photographs of inadvertent drilling fluid return shall be taken to document the size, location and clean-up procedures of any inadvertent return occurrence.

Inadvertent return Contingency Response Plan

If an inadvertent return is suspected:

- Contractor will temporarily suspend all HDD drilling operations immediately upon a substantive lack of drilling fluid return or a drop in back pressure in the drilling pipe or other indications of potential inadvertent return occurrence.

- Owner and the EI shall be notified by the Contractor.

- Pipeline construction personnel tasked with the observation of the directional drill path shall be dispatched to walk the alignment and visually monitor the area for inadvertent drilling fluid release and report back any findings.

If an inadvertent return is identified:

- All work stops, including the recycling of drilling mud/lubricant. The pressure of water above the pipe will keep excess mud from escaping through the fracture. Drilling operations will be suspended if the release poses a threat to human health and safety or the environment.

- Owner shall be notified of the findings and release location and in return will contact the appropriate concerned parties and regulatory agencies.

- Determine the location and extent of the inadvertent return. The EI will document the size, impact and conditions of the release with notes and photographs.

- Immediately contain the inadvertent drilling fluid return to minimize further migration of drilling fluids/slurry mixture across the surrounding area by use of hay bales, sand bags, or silt fencing to surround and contain the drilling mud.

- Direction from the Environmental Inspector shall be followed for clean-up and mitigation requirements.

- Remove the drilling fluids and restore the site to pre-existing conditions. Clean-up work will be performed by hand if a vacuum truck cannot access the release area. The clean-up shall be to the maximum extent possible. All waste and collected materials will be disposed of at an approved location or recycled to the return pit.

- The EI shall document the conditions of the cleaned up area with photographs.

- To the extent the impacts are in an identified cultural resource site or sensitive area, the on-call CRM shall observe activities. Owner will notify the appropriate project agency contacts (e.g. NY SHPO and tribal contacts) of the discovery of cultural materials in association with the inadvertent return, inadvertent return clean-up, post-construction maintenance, and restoration.

- If the release area is not accessible, National Fuel will consult with the landowner representatives regarding next appropriate action, including leaving the drilling mud in place to avoid potential damage from vehicles entering the area or safety concerns to personnel.

- Once excess drilling mud is removed, the area will be seeded and/or replanted using species similar to those in the adjacent area, or allowed to re-grow from existing vegetation at the direction of the EI.

- National Fuel shall contact the appropriate agencies in the event that an inadvertent return occurs under water or migrates to water. National Fuel will notify the USACE and NYSDEC (see below), as long as such

notification is possible (e.g., there is cell phone service) and it does not interfere with response activities, these agencies shall be notified within two (2) hours of the Inadvertent return event.

US Army Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, NY 14207
1-800-833-6390

NYSDEC Region 9 Office
270 Michigan Avenue
Buffalo, NY 14203
Regional Natural Resources Supervisor
Paul McKeown
Phone: (716) 372-0645
Fax: (716) 372-2113

- Containment is not always feasible for in-stream inadvertent returns. National Fuel will consult with the above-noted agencies and the relevant property owners regarding next appropriate action among the following:

    - If drilling mud congeals, take no other action that would potentially suspend sediments in the water column. Monitor the inadvertent return for at least 2 hours to determine if the drilling mud congeals. (Bentonite will usually harden, effectively sealing the inadvertent return location).

    - If drilling mud does not congeal, erect isolation/containment environment (underwater boom and curtain).

    - If the fracture becomes excessively large, a spill response team would be called in to contain and clean up excess drilling mud in the water. Phone numbers of spill response teams in the area will be on site.

- If the spill affects an area that is vegetated, the area will be seeded and/or replanted using species similar to those in the adjacent area, or allowed to re-grow from existing vegetation at the direction of the EI.

- Revegetated areas will be monitored to confirm revegetation is successful.

- After inadvertent return is stabilized and any required removal is completed, the EI shall document post-cleanup conditions with photographs and prepare inadvertent return incident report describing time, place, actions taken to remediate inadvertent return and measures implemented to prevent recurrence.

Response Close-Out

Site-specific clean up measures will be developed by National Fuel, the EI and the Construction supervisor following an inadvertent return, in consultation with the appropriate agencies where practicable. National Fuel will coordinate restoration measures with the agencies prior to the site restoration, as applicable. However, the following measures are generally considered appropriate:

- Drilling mud will be cleaned up by hand using hand shovels, buckets and soft bristled brooms as possible without causing damage to existing vegetation. Fresh water washes will be employed if deemed beneficial and feasible.

- The recovered drilling fluid will either be recycled to the return pit or hauled to an approved facility for disposal. No recovered drilling fluids will be discharged into streams, storm drains or any other water source. Off-site disposal in other than commercially operated disposal locations is subject to compliance with all applicable survey, landowner permission, and mitigation requirements. These materials will not be disposed on or buried in agricultural lands without landowner permission. Other construction materials and wastes shall be recycled, or disposed of, as appropriate.

- All inadvertent return excavation and clean-up sites will be returned to pre-project contours using clean fill, as necessary.

- All containment measures (fiber rolls, straw bale, etc.) will be removed, unless otherwise specified by the Site Supervisor.

- Containment structures will be pumped out and the ground surface scraped to bare topsoil without causing undue loss of topsoil or ancillary damage to existing and adjacent vegetation. Bare soil will be seeded and stabilized with mulch or erosion blankets as applicable. Material will be collected in containers for temporary storage prior to removal from the site.

Construction Re-start

For releases not requiring external notification, drilling may continue, if 100 percent containment is achieved through the use of a leak stopping compound or redirection of the bore and the clean-up crew remains at the inadvertent return location until directed by the EI that the HDD operations have stabilized and release potential has subsided.

If the release poses a threat to human health and safety or the environment, drilling operations will be not be restarted until conditions have been adequately addressed. For releases requiring external

notification and/or other agencies, construction activities will not restart without prior approval from Owner.

Prior to restart, the Contractor shall evaluate the current drill profile (e.g., drill pressures, pump volume rates, drilling mud consistency) to identify means to prevent further inadvertent return events.

Crossing Alternatives

If HDD proves unfeasible for the Project crossings, alternative crossings may consist of bridge/structure attachment, re-routing/alternative routing, or open cut of streams. Any such route changes would be forwarded to the commission and any federal, state, and local agencies for proper approvals prior to construction.