Received by City Clerk:

City of Greenfield

The Commonwealth of Massachusetts
Zoning Board of Appeals

GREENFIELD, MASS
2023 AUG 29 AM 9:37
OFFICE OF THE CITY CLERK

APPLICATION FOR SPECIAL PERMIT

Name of Applicant: NSTAR Electric Co. d/b/a Eversource Energy (as successor in interest to Wester Mass Electric Co.) Mailing Address: 247 Station Drive, Westwood, MA 02090

Phone Number: (860) 573-7213 Name of Agent if not the Applicant: McLane Middledton c/o John Weaver

Mailing Address of Agent: 300 Trade Center Suite 7000, Woburn, MA 01801 Phone Number: (781)904-2685

Location of Project (Street Number & Name): 12 Lower Road; Parcel ID R41-28-0

Zoning District property is located in: General Industry

Name and Mailing Address of PROPERTY OWNER if not the applicant: _____

Applicant is: (Circle One) Agent, (Owner), Tenant, Licensee, Prospective Purchaser

Application is hereby made for a Special Permit as under Section(s) 200-4.11 of the Zoning Ordinance in order to: Build an expansion to a public substation

Property Deed recorded under Book 1127 Page 25

Has there been a previous variance, special permit, and/or site plan requested for this property (confirm with the City Clerk's records)? Yes If yes, what was the date of the decision? June 19, 2014

The following information must be submitted to the Planning Department to consider the application complete:

✓ 1 original application form filled out in entirety

✓ 12 copies of the proposed plans

✓ 1 copy of a certified list of abutters within 300' of the subject property obtained through the City's public records request portal Next Request: https://greenfield.nextrequest.com/

n/a A notarized statement from the property owner authorizing action by the applicant

✓ A check made payable to "City of Greenfield" as indicated in the Fee Schedule

✓ A completed "Site Plan Submittal Checklist"

I hereby request a hearing before the Zoning Board of Appeals with reference to the above noted application.

Signed: John Weaver BSB Title: Attorney for Eversource

Signed: _____ Title: _____

For Office Use Only

Received by City Clerk:

Date: August 29, 2023

Time: 9:36 AM

Signature: Kathy Fiske

Filing Fee Received: by Dept of Planning & Development 08/28/2023

JOHN F. WEAVER
Direct Dial: 781.904.2685
Email: john.weaver@mclane.com
Admitted in MA and NH
900 Elm Street, P.O. Box 326
Manchester, NH 03105-0326
T 603.625.6464
F 603.625.5650

MCLANE MIDDLETON

August 23, 2023

VIA EMAIL (eric.twarog@greenfield-ma.gov)

Greenfield Zoning Board of Appeals
City of Greenfield
14 Court Square
Greenfield, MA 01301

Re:	**Expansion of Cumberland Electric Substation #22B (the "Substation")**
Location:	**12 Lower Road, Greenfield, Massachusetts, Parcel ID R41-28-0 (the "Property")**
Application:	**Applications for Special Permit and Site Plan Approval (collectively, the "Application")**
Applicant:	**NSTAR Electric Co. d/b/a Eversource Energy (as successor in interest to Western Mass Electric Co.) ("Eversource" or the "Applicant")**

Dear Members of the Zoning Board of Appeals:

Eversource submits this request for the issuance of a special permit and seeks site plan review approval from the City of Greenfield Zoning Board of Appeals (the "Board") in connection with its proposed substation expansion and upgrades (the "Project") at the Cumberland Electric Substation #22B located at 12 Lower Road, Greenfield, MA.

Background, Existing Conditions and Project Need.

The Property consists of an approximately 13.99 acre parcel of land that has been owned by Eversource or its predecessors and continuously used as an electric substation since 1961. The Property is located within the General Industry District (the "GI") and all the proposed work lies entirely within the GI. Per Section 200-4.11 of the Greenfield Zoning Ordinance (the "Ordinance"), the purpose of the GI is to provide areas for light industry and manufacturing which do not intrude on residential areas. The Applicant currently uses the Property as a public substation, which is a use permitted by special permit under Section 200-4.11(C)(3) of the Ordinance. Per Section 200-8.4(B) of the Ordinance, all uses requiring a special permit require site plan review and approval. The Substation is lawfully pre-existing nonconforming with respect to use. There is no change in use of the Property based upon the work scope of the proposed Project and the Substation will continue to operate as an electric substation consistent

with its use since 1961. The City of Greenfield's ("Greenfield" or the "City") electric load is served out of the Substation.

The Substation lies within an electric transmission line right of way and is surrounded by a mix of commercial properties and residences, including a closed landfill and transfer station, a solar array and residences. The Property abuts to the north and east the Wisdom Way Landfill and Greenfield Transfer Station, to the south the Deerfield River, and to the west an undeveloped parcel of land also on Lower Road. The Property is going to be expanded through land acquisition of approximately 12,734 square feet of land directly west of the current Property. This lot line adjustment has already been approved by the City on June 15, 2023 and recorded with the City Clerk on June 16, 2023 (Plan entitled Cumberland Substation Approval Not Required Plan Property Survey, Cumberland Road, Greenfield, MA). The closest residence is located approximately 525 feet to the northwest of the Substation. The Substation is currently comprised of various substation-related equipment and facilities (e.g., transformers, control building, circuit breakers, switches, dead-end structures, etc.). Other than existing substation equipment, there are no structures nor equipment on the Property. The Property is not located within a flood zone or the floodplain district. The Substation is secured by an 8 foot chain link fence topped with barbed wire in accordance with Eversource Substation Specification.

The primary objective of the Project is to modernize the substation equipment to accommodate the Lines 1231-1242 Reconductor & Structure Replacement Project, which is replacing 100-year-old structures that have exceeded their service life. The Project is necessary for Eversource to continue to provide reliable electric utility service to the City and to accommodate for potential growth in the future. More specifically, this Project will eliminate the obsolete equipment and modernize the Substation to help prevent service disruptions and improve reliability with respect to capacity in the City.

Project Description

Eversource is in the process of completing a structure replacement and reconductoring project for transmission Lines 1231 and 1242 to improve electricity service and reliability for the City of Greenfield and surrounding communities (the "Transmission Project"). The Transmission Project began in Q4 2022 and will conclude in Q4 2024. The Project is designed to accommodate interconnection of the new transmission structures and is anticipated to begin in Q1 2024 and also be online in Q4 2024.

The scope of the work associated with the Application for this Property is limited. There is no residential or commercial use intended. Currently, there are no structures on the Property other than existing utility equipment associated with Eversource's Cumberland Electric Substation #22B. The Project primarily includes the installation and/or construction of the following components: (a) replacement of a terminal structure with a new tubular steel structure; (b) replacement of a mobile transformer tap and associated circuit switcher; (c) installation of new lightning arrestors; (d) modification of the existing perimeter fence by extending a section of fencing 31 feet west to accommodate new equipment, which will result in an expansion of the

substation yard by approximately 6,600 square feet; e) installation of a pre-cast modular retaining wall approximately 20 feet in height in the area of the fence modification; (f) installation of 4 inches of crushed stone within the substation yard expansion area; and (g) installation of typical conduit and necessary trenching within the substation yard (collectively, the "Project Facilities").

When completed, the Substation will be unmanned and remotely monitored by Eversource. The Substation will not be illuminated at night except rare occasions when night work may be required. The addition of the equipment will not require additional structures, nor generate any wastewater. Traffic associated with the Project will be minimal and typically will be associated with periodic inspections or maintenance. There will be no changes to the Property associated with noise, lighting, drainage or other environmental factors relating to the addition of the Project Facilities.

Eversource also requests that the continued use of a fence that exceeds four feet in height along the frontage be affirmed through this special permit and site plan review. Per Section 6.2(E) of the Ordinance, "fence requirements may be modified by the Zoning Board of Appeals by the issuance of a Special Permit, based upon finding that such modification is not detrimental to the neighborhood nor that such modification will jeopardize vehicular and/or pedestrian traffic." The replacement fence will be extended 31 feet to the west along the side yard and will comply with the required setbacks of Section 6.2(E) of the Ordinance, while the new area of fencing along the frontage and rear will comply with required setbacks. The fence is required for compelling reasons of safety, aesthetics, and site design, as it remains necessary for public safety to maintain a uniform fence height around the entire perimeter of the Substation and to meet Eversource safety standards.

The requested special permit and site plan approval should be granted by the Board based on the information above, the factors set forth below, and the findings that the Project, including the expansion of the Substation yard, will not adversely impact adjacent properties, the neighborhood, the City, or the environment, consistent with how the Substation has operated for decades.

Requirements of the Greenfield Zoning Ordinance:

I. Special Permit criteria in Section 200-8.3(F) of the Ordinance;
II. Site Plan Submittal Requirements in Section 200-8.4(D) of the Ordinance;
III. Site Plan Approval Guidelines in Section 200-8.4(E) of the Ordinance.

The sections below address each of the above.

Exhibits

The following exhibits are enclosed with this letter to complete the record before the Zoning Board and for reference by Zoning Board members and members of the public:

1) Completed Application for Special Permit;
2) Completed Application for Site Plan Approval;
3) List of abutters;
4) Site Plan Submission Checklist;
5) Site Plan (the "Plans"), as follows:
    a. Site Grading Plan;
    b. Precast Retaining Wall Layout
    c. Yard Arrangement Plan View
    d. Yard Arrangement Sections A-A to B-B
6) Retaining Wall Specs Sheets;
7) Eversource's Best Management Practices Manual for Massachusetts and Connecticut;
8) Eversource's Excess Soil and Groundwater Management Policy; and
9) One check totaling $664.80, calculated as follows:
    a. $100.00 – Site plan application fee;
    b. $200.00 – Commercial/Industrial/Manufacturing ZBA special permit fee;
    c. $64.80 – Notification of abutters, which equals $8.10 per abutter (8); and
    d. $300– Cost of publication of two (2) legal notices ($150 per each publication).

Per the City's requirements, we are also delivering with the Application 10 11x17 hard copies of the Plans and 2 full size copies.

(Remainder of the page left intentionally blank)

REQUIREMENTS OF THE ORDINANCE

I. Special Permit Criteria, Section 200-8.3(F)

The Application satisfies the following *italicized* criteria of Section 200-8.3(F) in the Ordinance as explained in **bold**:

The special permit granting authority shall grant a special permit only after finding that the proposed use or structure will not adversely impact adjacent properties, the neighborhood, the City, or the environment. The following criteria shall be considered:

1. *Provision shall be made for convenient and safe vehicular and pedestrian circulation within the site and in relation to adjacent streets and property. The service level of adjacent streets shall not be significantly reduced due to added traffic volume or type of traffic in accordance with the most recent edition of the Highway Capacity Manual.*

   Access to the Property via Lower Road will remain unchanged and continue to provide for safe and effective flow of traffic to and from the Property for the service and maintenance vehicles visiting the site to perform routine inspections and equipment maintenance, as necessary, as well as services needed during an emergency or unplanned outage. The Project will not result in a nuisance or hazard to vehicles or pedestrians within or off the Property. The Project Facilities will not create any line-of-sight hazards along streets. Because the Substation will continue to be an unmanned facility and closed to the public, the Project will not result in increases in traffic volumes or negative impacts on adjacent streets and ways. Existing parking areas within the Substation yard will remain unchanged and are not the subject of the proposed project's work scope. No access to adjoining properties or joint access driveways are proposed for the Project. Based on the location and limited, size, scope and nature of the Project, the Project Facilities will not adversely impact the adjacent properties, the neighborhood, the City or the environment.

2. *The proposed use shall not overload the capacity of water and sewer systems, storm drainage, schools, solid waste disposal facilities, and other public facilities.*

   Given its limited scope, the Project will not interfere with or negatively impact Greenfield resources. The Project does not require any new water or sewer

connections or service. The Substation will continue to generate minimal amounts of refuse and waste, and Eversource will continue to provide for disposal of any refuse or waste generated.

3. *The design of the project shall provide for adequate methods of disposal of sewage, refuse, or other wastes generated by the proposed use.*

   The Project does not require any new water or sewer connections or service. The Substation will continue to generate minimal amounts of refuse and waste, and Eversource will continue to provide for disposal of any refuse or waste generated.

4. *The proposed project shall not increase erosion, flooding, or sedimentation either on-site or on neighboring properties and shall be consistent with the Massachusetts Wetlands Protection Act (MGL c. 131, § 40) and Chapter 423 of the Greenfield Code.*

   The Property is not located within a floodplain or floodway. No new impervious areas are proposed. The Project Facilities will be securely affixed to foundations and other supports to prevent movement during severe weather events in accordance with the National Electric Safety Code and Eversource standards. No modifications to any existing septic or subsurface sewage systems or water supply systems are proposed for the Project.

   The proposed expansion of the Substation yard will be placed on 4 inches of crushed stone, which is consistent with the existing Substation yard. This crushed stone surface treatment promotes the infiltration of stormwater, enhances water quality and diminishes overland flow velocities while dissipating concentrated flows. The proposed design will prevent pollution of and degradation to surface water and groundwater, minimize erosion and sedimentation, prevent changes in groundwater levels and limit the potential for flooding. As a result, there will be no substantial increase of volume or rate of surface water runoff to neighboring properties and streets.

5. *The proposed project shall not create a significant adverse impact on the quality of the natural environment including wildlife, vegetation, air, surface and groundwater, during or after construction.*

The Project will have minimal environmental impact as the project work area is already developed and the site will continue to be used as an unmanned electric substation. The limited natural features of the site located outside of the Substation fence line will largely remain undisturbed and will be compatible with the Project Facilities to be located within the minor expansion area. The Project will not create adverse impacts on or off the site with respect to noise, light, traffic, storm water runoff or other environmental or performance standards. The Project Facilities are not anticipated to result in a substantial increase in noise levels that would be noticeable at any abutting properties due to the limited number of visitors to the Substation. The continued Substation use will not produce dust or smoke.

The design elements of the Project are consistent with the protection of groundwater quality and quantity. Both during and after the construction of the Project, the Substation will result in zero reduction to the groundwater yield. The Project use is not noxious, harmful or hazardous, will not involve the storage or generation of hazardous materials or wastes and will have no harmful or negative effects pertaining to pollution of surface water, waterways or groundwater. The Project will not negatively affect any public water, sewer or storm drainage systems.

During construction, stormwater on the site will be controlled using approved erosion and sedimentation perimeter controls, if necessary, and as set forth in the enclosed Eversource's Best Management Practices Manual for Massachusetts and Connecticut, such controls may include perimeter controls, a stabilized construction entrance, and stockpile stabilization. Minor excavation / trenching is anticipated as part of the Project. Management and off-site disposal of excess soil generated during construction activities will be in accordance with the enclosed Eversource's Excess Soil and Groundwater Management Policy. The site topography is relatively level and will remain so after Project completion. Eversource intends to address construction-period impacts to the extent practicable using standard construction mitigation.

6. *The design of the project shall minimize earth removal, volume of cut and fill, grade changes, and the removal of existing trees and vegetation.*

The existing grade of the Substation will largely remain unchanged, with the exception of the fence expansion on the western side of the Substation. An approximately 170 foot long interlocking precast concrete modular wall with a

maximum height of 20 feet will be installed to facilitate the Substation expansion. The estimated volume of soil to be removed is 955 cubic yards. Minimal vegetation removal will be required in this area.

7. *The proposed project shall not have a significant adverse fiscal impact on the City in terms of balancing as near as possible the cost of public services and public revenue provided through taxes and other income.*

Given its limited scope, the Project will not increase the need for public services and will not have an adverse fiscal impact on the City.

8. *The project shall be compatible with existing uses and other uses allowed by right in the district, and shall not detract from the character and scale of neighboring properties.*

The Project is necessary to improve capacity and reliability of electric service in Greenfield, which will contribute to the economic growth and vitality and social welfare of the community, and promote the health, welfare, amenities and safety of the inhabitants of the City and surrounding communities. The nature and purpose of the Project use is for the public benefit. Substation use is the most appropriate use of the Property considering the decades-long use of the site as an unmanned electric substation. The Substation and proposed Project are utilitarian in nature, design, and function. The Substation is located within an electric transmission line right of way, approximately 580 feet west of Interstate 91, and 400 feet southeast of the closed and capped Wisdom Way Landfill, currently used as a solar farm. The City of Greenfield Transfer Station abuts the landfill to the northeast. The Substation is an existing use and has been compatible with these uses for many years. Because the Project proposes only a minor expansion of the Substation, it does not detract from the character of neighboring properties.

9. *The design of the project shall minimize the visibility of visually degrading elements and maximize the use of screening, vegetated buffer zones, and open space.*

Except as provided herein, the Project will comply with all requirements of the Zoning Ordinance, including dimensional regulations set forth in the Ordinance Table of Dimensional Requirements. The fence height along the frontage will exceed the current restriction of 4 feet as discussed herein; however, the new fence should be approved by the Board because the height exceedance is necessary for

safety and security reasons. The fence will be set back at a distance at least equal to its height. The Project proposes only a minor expansion of the substation footprint to accommodate the new terminal structure. The new structure will be 52 feet in height. The closest residence is located approximately 525 feet northwest of the Substation. Substation equipment is screened from nearby residences by tress along the Substation access road.

10. *The proposed project shall be consistent with the purposes and intent of this ordinance.*

The Project is consistent and in conformance with the general purpose and intent of the Zoning Ordinance and satisfies the criteria and standards for approval of a special permit.

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II. Site Plan Submittal Requirements, Section 200-8.4(D)

The Application satisfies the following *italicized* criteria of Section 200-8.4(D) in the Ordinance as explained in **bold**:

1. All site plans shall be prepared to scale and shall, at a minimum, accurately show the following information if applicable:

a. *A locus map;*

Applicant requests a waiver.

b. *The name of the applicant and property owner, the name of the person preparing the plan, the scale, north arrow, and the date of plan;*

See the enclosed Plans.

c. *The location and boundaries of the lot, adjacent streets or ways, and the location and owners' names of all adjacent properties;*

Applicant requests a waiver.

d. *Existing and proposed topography including contours, the location of wetlands, streams, waterbodies, drainage swales, areas subject to flooding, and unique natural land features showing how it enhances and preserves scenic or environmentally sensitive areas along the water frontage;*

See the enclosed Plans.

e. *Existing and proposed structures including dimensions and interior layout of proposed structures;*

See the enclosed Plans.

f. *An elevation plan showing front, side and rear views of the proposed structure to be built;*

See the enclosed Plans.

g. *The location of parking and loading areas, driveways, walkways, access and egress points and distance to the nearest driveways and intersections;*

See the enclosed Plans. Note, no access/egress, driveways, parking, or walkways are changing as a part of the Project. All vehicles enter and exit through the gravel access road where there is plenty of space for parking as necessary to maintain and oversee the Property.

h. *The location and a description of all proposed septic systems, water supply, storm drainage systems, utilities, lighting, and refuse and other waste disposal methods;*

N/A – no proposed changes

i. *Proposed landscape features including the location and a description of screening, fencing and plantings;*

See the enclosed Plans.

j. *The location, dimensions, height and characteristics of proposed signs;*

N/A – no proposed signs

k. *The location, description and percentage of proposed open space or recreation areas;*

N/A – no proposed open space or recreation areas

l. *A snow removal plan;*

Applicant requests a waiver. Eversource will continue to clear the snow on the Property to allow for safe access to and from the Substation as needed.

m. *Handicapped parking/access;*

N/A – no handicapped parking

n. *Bicycle parking;*

N/A – no bicycle parking

o. *The location and description of all existing and proposed exterior storage;*

See the enclosed Plans.

p. *The location and description of all existing and proposed easements;*

Applicant requests a waiver.

q. *Measures to prevent pollution of surface and groundwater, increased runoff, changes in groundwater levels, and flooding;*

See the enclosed Plans and Retaining Wall Specs Sheets.

r. *Design features which will integrate the proposed development into the existing landscape, maintain neighborhood character, enhance aesthetic assets and screen objectionable features from neighbors and roadways;*

See the enclosed Plans and Retaining Wall Specs Sheets.

s. *Control measures to prevent erosion and sedimentation during and after construction and the sequence of grading and construction activities, location of temporary control measures, and final stabilization of the site;*

See the enclosed Plans and Retaining Wall Specs Sheets.

t. *Estimated average daily and peak hour vehicle trips to be generated by the site and traffic flow patterns for both vehicles and pedestrians showing adequate access to and from the site and adequate circulation within the site;*

Applicant requests a waiver. See explanation of traffic to and from the Property above and below stating that the Substation is unmanned and will not result in increases in traffic volumes or negative impacts on adjacent streets and ways.

u. *Any other information required by the reviewing authority in its rules and regulations.*

N/A

III. Site Plan Approval Guidelines, Section 200-8.4(E)

The Application satisfies the following *italicized* criteria of Section 200-8.4(E) in the Ordinance as explained in **bold**:

In considering any site plan submittal, the following concerns shall be reviewed:

1. *Provision for integrating the project into the existing terrain and surrounding landscape by minimizing use of wetlands, steep slopes, and hilltops; protecting visual amenities and scenic views; preserving unique natural or historical features; minimizing tree, vegetation and soil removal; and minimizing grade changes.*

The Project is limited in scope to the confines of the current Substation and will not be affecting any wetlands due to the Substation not being located near or abutting a wetland. There are no historic features in the Project area of expansion and there are no existing historic features at the current Substation. The existing grade of the Substation will largely remain unchanged with the exception of the fence expansion on the western side of the Substation. An approximately 170 foot long interlocking precast concrete modular wall with a maximum height of 20 feet will be installed to facilitate the Substation expansion. The estimated volume of soil to be removed is 955 cubic yards. Minimal vegetation removal will be required in this area.

2. *The use of landscaping to establish buffers between incompatible land uses and to screen unsightly features.*

   The existing grade of the Substation will largely remain unchanged, with the exception of the fence expansion on the western side of the Substation. The Substation is located approximately within an electric transmission line right of way, approximately 580 feet west of Interstate 91, and 400 feet southeast of the closed and capped Wisdom Way Landfill, currently used as a solar farm. The City of Greenfield Transfer Station abuts the landfill to the northeast. The closest residence is located approximately 525 feet to the northwest of the Substation. The Substation is effectively screened by mature trees and vegetation along Lower Road and the driveway.

3. *The provision of open spaces and pedestrian amenities available to the public.*

   Given the nature of the public utility use, utilitarian function of the site, and restricted access to the Substation, there are no features or other portions of the Property that are intended or designed for pedestrian use or public access.

4. *The arrangement of access points, service roads, driveways, parking areas, lighting, and pedestrian walkways in a manner which maximizes the convenience and safety of pedestrian and vehicular movement within the site and in relation to adjacent ways.*

   Access to the Property via Lower Road will remain unchanged and continue to provide for safe and effective flow of traffic to and from the Property for the service and maintenance vehicles visiting the Property to perform routine inspections and equipment maintenance, as necessary, as well as services needed during an emergency or unplanned outage. The Project will not result in a nuisance or hazard to vehicles or pedestrians within or off the Property. The Project Facilities will not create any line-of-sight hazards along streets. Because the Substation will continue to be an unmanned facility and closed to the public, the Project will not result in increases in traffic volumes or negative impacts on adjacent streets and ways. The existing parking areas within the Substation yard will remain unchanged and are not the subject of the Project's work scope. Based on the

location and limited, size, scope and nature of the Project, the Project Facilities will have no greater impact on, adversely affect, or be detrimental to adjoining premises or zones or the neighborhood.

5. *Ease of access, travel and on-site movement for fire and police equipment and other emergency services for public safety.*

   Property access will remain unchanged and continue to provide for safe and effective flow of traffic to and from the Property for emergency service vehicles visiting the site to perform routine inspections, provide emergency services and equipment maintenance, as necessary, as well as services needed during an emergency or unplanned outage and to provide public safety services.

6. *Provisions for underground placement of utilities.*

   Conduits associated with the proposed structures will be placed underground. No new utility poles or overhead electrical lines are required.

7. *Provisions for surface runoff and drainage which protects the site and adjacent properties from erosion, maximizes groundwater recharge through low-impact development (LID) stormwater techniques, and prevents the collection of surface runoff on paved surfaces which may obstruct pedestrian or vehicular flow.*

   No new impervious areas are proposed. The proposed Substation yard expansion will be placed on 4 inches of crushed stone, which is consistent with the existing Substation yard. This crushed stone surface treatment promotes the infiltration of stormwater and diminishes overland flow velocities while dissipating concentrated flows. As a result, there will be no substantial increase of volume or rate of surface water runoff to neighboring properties and streets.

8. *The siting of buildings, structures, and open spaces to permit maximum use of passive solar energy, to permit maximum protection from adverse impacts of winds, vapors or other emissions, shadows and noise, and to provide for adequate light, air and circulation.*

   The siting of electrical equipment is based on the existing layout of the Substation. No new buildings are proposed at the Property. The Project will not create adverse impacts on or off the site with respect to noise, light, shadows, or other environmental or performance standards. The Project Facilities are not anticipated to result in a substantial increase in noise levels that would be noticeable at any abutting properties due to the limited number of visitors to the Substation, and the continued Substation use will not produce dust or smoke.

9. *Protection of historic features and design which does not detract from properties in the area.*

   There are no notable natural terrain features, scenic or public views, or landscapes at the Property, and the Project will not obstruct any views of same from publicly accessible locations or otherwise, and will not obstruct access to sunlight. The Property is not within a historic district, contains no historic or cultural features, landmarks or designations, and is not listed in the Massachusetts Cultural Resource Information System (MACRIS), the Inventory of Historic Assets of the Commonwealth, the National Register of Historic Places or the State Register of Historic Places.

10. *Measures to prevent pollution of surface or groundwater, and to prevent increased flooding.*

    The Substation yard expansion will be placed on 4 inches of crushed stone, which is consistent with the existing Substation yard. The proposed design will prevent pollution of and degradation to surface water and groundwater, minimize erosion and sedimentation, prevent changes in groundwater levels and limit the potential for flooding.

11. *Compliance with the parking, loading, dimensional, performance standards and all other sections of this ordinance.*

    The Project is consistent with the general purpose and intent of the Ordinance, and will not interfere with or negatively impact the resources protected thereby. The Substation will not overcrowd the land. The Project Facilities will comply with the dimensional provisions of the Ordinance, including minimum yard setbacks and height. Traffic generated by the Substation will continue to be limited to service vehicles visiting the site to perform routine inspections and equipment maintenance, as necessary, therefore, no minimum parking or loading spaces are applicable. Given that the Substation will continue to be used as an electric switching station facility, there will be no increase in congestion in the streets and will avoid undue concentration of population.

    The Project will promote the health, welfare, amenities and safety of the inhabitants of the City by improving the reliability of electric service and contributing to the economic growth and vitality and social welfare of the community. The nature and purpose of the Project use is for the public benefit. The Property has, and will continue to be, assessed real estate taxes, and the Project will not require any new town services, such as public water, sewer, rubbish removal, schools or roadway infrastructure.

(Remainder of the page left intentionally blank)

Waivers Requested

The Applicant has requested waivers from some of the requirements listed above and asks the Board to grant any additional waivers they see fit and which is considered reasonable.

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CONCLUSION

We look forward to discussing the above information with the Zoning Board at its October meeting. Thank you for your assistance with this matter. Please feel free to contact me if you have any questions.

Very truly yours,

John F. Weaver

Enclosures

ec: K. Collette, Esq.
N. Williams
H. Sites
M. Boehnert
K. Prior
M. Kane
B. Burns, Esq.

EXHIBIT 1

Received by City Clerk:

City of Greenfield

The Commonwealth of Massachusetts

Zoning Board of Appeals

APPLICATION FOR SPECIAL PERMIT

Name of Applicant: NSTAR Electric Co. d/b/a Eversource Energy (as successor in interest to Wester Mass Electric Co.) Mailing Address: 247 Station Drive, Westwood, MA 02090

Phone Number: (860) 573-7213 Name of Agent if not the Applicant: McLane Middledton c/o John Weaver

Mailing Address of Agent: 300 Trade Center Suite 7000, Woburn, MA 01801 Phone Number: (781)904-2685

Location of Project (Street Number & Name): 12 Lower Road; Parcel ID R41-28-0

Zoning District property is located in: General Industry

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Applicant is: (Circle One) Agent, (Owner), Tenant, Licensee, Prospective Purchaser

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I hereby request a hearing before the Zoning Board of Appeals with reference to the above noted application.

Signed: John Weaver BES3 Title: Attorney for Eversource

Signed: _____ Title: _____

For Office Use Only

Received by City Clerk:

Date: _____

Time: _____

Signature: _____

Filing Fee Received: _____

EXHIBIT 2

CITY OF GREENFIELD
Zoning Board of Appeals
The Commonwealth of Massachusetts

APPLICATION FOR SITE PLAN APPROVAL FROM THE ZONING BOARD OF APPEALS

Name of Applicant: NSTAR Electric Co. d/b/a Eversource Energy (as successor in interest to Western Mass Electric Co.)

Mailing Address of the Applicant: 247 Station Drive, Westwood, MA 02090

Telephone Number: (860) 573-7213

Name of Agent if not the Applicant: McLane Middleton c/o John Weaver

Mailing Address of Agent 300 Trade Center Suite 7000, Woburn, MA 01801 Phone Number: (781) 904-2685

Location of Property (Street Number and Name): 12 Lower Road, Parcel ID R41-28-0

Zoning District property is located in General Industry Zoning District

Applicant is: (Circle One) (owner) tenant, licensee, prospective purchaser, other

Name and Address of property owner if not the Applicant: _____

Application is being made for site plan approval under Section 200-8.4 of the Greenfield Zoning Bylaw.

Briefly Describe the Proposed Project (use additional paper if necessary):

The scope of the work associated with this application for the Property is limited. There is no residential or commercial use intended. Currently, there are no structures on the parcel other existing utility equipment associated with Eversource's Cumberland Electric Substation #22B. The total work proposed by Eversource is as follows:

- Replacement of a terminal structure with a new tubular steel structure.
- Replacement of a mobile transformer tap and associated circuit switcher.
- Installation of new lightning arrestors;
- Modification of the existing perimeter fence by extending a section of fencing 31 feet west to accommodate new equipment, which will result in an expansion of the substation yard by approximately 6,600 square feet.
- Installation of a pre-cast modular retaining wall approximately 20 feet in height in the area of the fence modification.
- Installation of 6-inches of crushed stone within the substation yard expansion area.
- Installation of typical conduit and necessary trenching within the substation yard.

Property Deed recorded under Book 1127 Page 25

Has there been a previous variance, special permit, and/or site plan requested for this property? Yes
If yes, what was the date of the decision? June 19, 2014

The following information must be submitted to the Planning Department to consider the application complete:

✓ 1 original application form filled out in entirety

✓ 12 copies of the proposed plans

n/a A notarized statement from the property owner authorizing action by the applicant

✓ A check made payable to "City of Greenfield" as indicated in the Fee Schedule

✓ A completed "Site Plan Submittal Checklist"

Signed: John Weaver
BEB

Signed: _____

Title: Attorney for Eversource

Received by City Clerk:

Date: _____

Time: _____

Signature: _____

Filing Fee Received: $_____

EXHIBIT 3

City of
GREENFIELD, MASSACHUSETTS

BOARD OF ASSESSORS OFFICE

Roxann Wedegartner
Mayor

Assessor
City Hall • 14 Court Square • Greenfield, MA 01301
Phone 413-772-1506 or 413-772-1509 • www.greenfield-ma.gov

REQUEST FOR CERTIFIED LIST OF ABUTTERS

Date 8-22-23 Request # 23-25

PROPERTY LOCATION: Off Lower Rd R41-28-0

Applicant Name: Brianna Burns

Mailing Address: 300 Trade Center
Suite 7000
Woburn MA 01801

Purpose of Request: _____

Requested By: Planning/Zoning____ Licensing____ Conservation____
Other: _____
Applicant Signature: PRR System

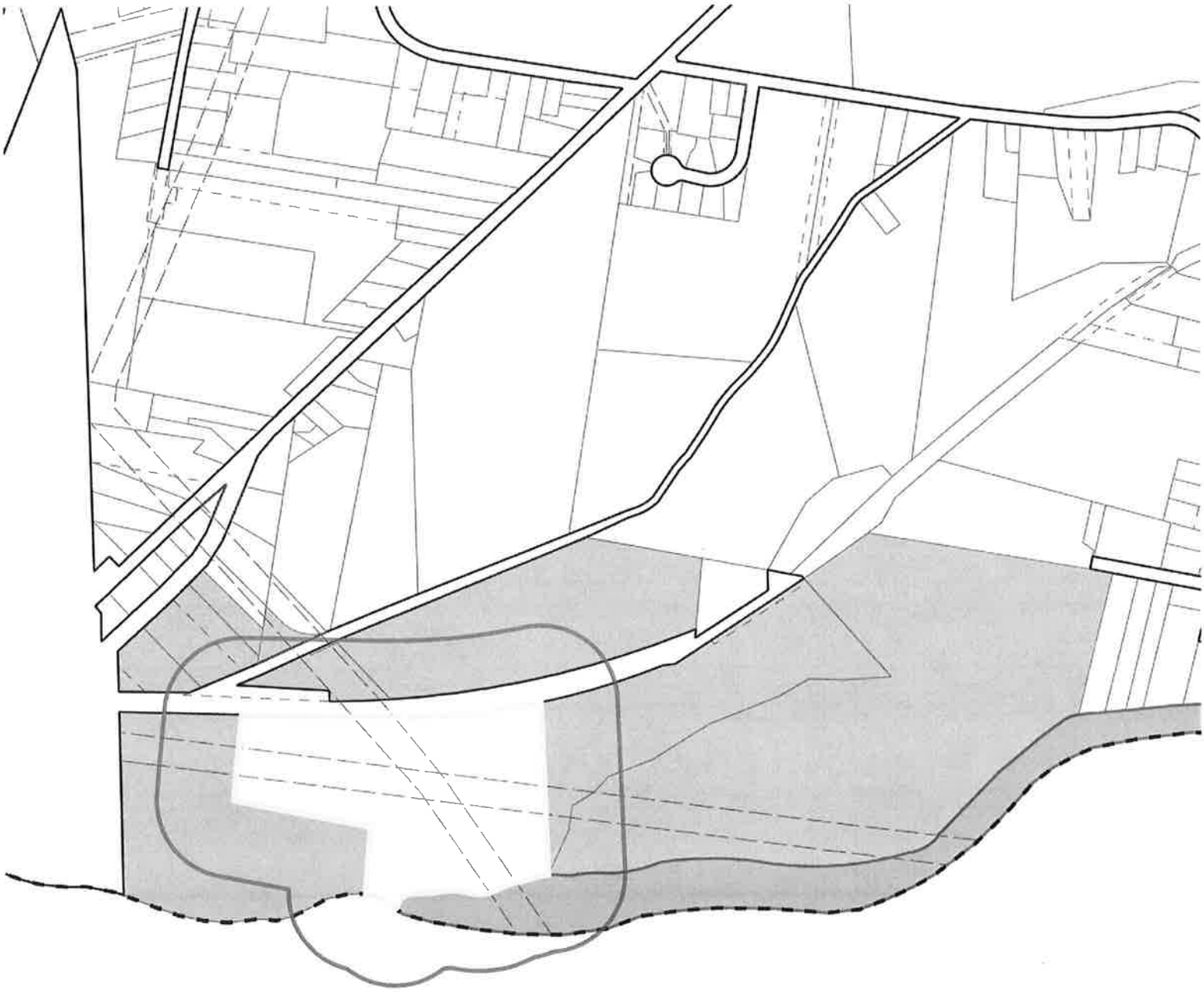
Contact Information: Phone # : 781-904-2715 E-Mail : brianna.burnes@mclane.com

↓↓↓↓↓↓↓↓↓Board of Assessors Use Only ↓↓↓↓↓↓↓↓↓

Certified By

Randall Austrew

Date: 8/22/23



DEERFIELD

300 foot Abutters List Report

Greenfield, MA
August 22, 2023

Subject Property:

Parcel Number:	R41-28-0	Mailing Address:	WESTERN MASS ELECTRIC PO BOX 270 HATFORD, CT 06141
CAMA Number:	R41-28-0		
Property Address:	OFF LOWER RD		

Abutters:

Parcel Number:	R41-19A-0	Mailing Address:	KIMBALL TERRY J KIMBALL SARA L 216 OLD ALBANY ROAD GREENFIELD, MA 01301
CAMA Number:	R41-19A-0		
Property Address:	256 WISDOM WAY		
Parcel Number:	R41-21A-0	Mailing Address:	CLOUTIER ROBERT L CAROL D CLOUTIER 266 WISDOM WAY GREENFIELD, MA 01301
CAMA Number:	R41-21A-0		
Property Address:	266 WISDOM WAY		
Parcel Number:	R41-23-0	Mailing Address:	BELLESFIELD SCOTT J BELLESFIELD CAROLINE 755 EAST KICKLIGHTER ROAD LAKE HELEN, FL 32744
CAMA Number:	R41-23-0		
Property Address:	274 WISDOM WAY		
Parcel Number:	R41-26-0	Mailing Address:	GREENFIELD TOWN OF C/O SKY SOLAR ACCOUNTING 14 COURT SQUARE GREENFIELD, MA 01301
CAMA Number:	R41-26-0		
Property Address:	CUMBERLAND RD		
Parcel Number:	R41-26A-0	Mailing Address:	WESTERN MASS ELECTRIC PROPERTY TAX UNIT P O BOX 270 HARTFORD, CT 06141
CAMA Number:	R41-26A-0		
Property Address:	PETTY PLAIN RD		
Parcel Number:	R41-30-0	Mailing Address:	AMENT, BRENDA L DAVENPORT, CHRISTOPHER D CLAYTON E, ANTHONY J, JACOB D 228 S SHELBURNE RD GREENFIELD, MA 01301
CAMA Number:	R41-30-0		
Property Address:	WISDOM WAY		
Parcel Number:	R41-9A-0	Mailing Address:	GREENFIELD TOWN OF 14 COURT SQUARE GREENFIELD, MA 01301
CAMA Number:	R41-9A-0		
Property Address:	OLD COUNTY RD		
Parcel Number:	R42-4-0	Mailing Address:	KEYES ALAN E + JANET KEYES 340 LEYDEN ROAD GREENFIELD, MA 01301
CAMA Number:	R42-4-0		
Property Address:	28 COLORADO AVE		

WESTERN MASS ELECTRIC
PROPERTY TAX UNIT
P O BOX 270 HARTFORD, CT 06141

TERRY J. KIMBALL SARA L.
KIMBALL
216 OLD ALBANY ROAD
GREENFIELD, MA 01301

SCOTT J. & CAROLINE BELLESFIELD
755 EAST KICKLIGHTER ROAD
LAKE HELEN, FL 32744

AMENT & BRENDA L. DAVENPORT
CLAYTON E., ANTHONY J, JAC
288 S. SHELBURNE ROAD
GREENFIELD, MA 01301

TOWN OF GREENFIELD
C/O SKY SOLAR ACCOUNTING
14 COURT SQUARE
GREENFIELD, MA 10301

TOWN OF GREENFIELD
14 COURT SQUARE
GREENFIELD, MA 01301

ALAN E + JANET KEYE
340 LEYDEN ROAD
GREENFIELD, MA 01301

ROBERT L. & CAROL D. CLOUTIER
266 WISDOM WAY
GREENFIELD, MA 01301

EXHIBIT 4

City of Greenfield

The Commonwealth of Massachusetts

SITE PLAN SUBMISSION CHECKLIST

Please read all sections in the Greenfield Zoning Ordinance which pertain to your project; additional information not listed on this checklist may be required for application submittal.

*For site plans accompanying special permit applications for dog kennels, requirements 1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 21 and 26 shall be submitted.

*For site plans accompanying special permit applications for signage, requirements 1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 21 and 26 shall be submitted.

*For all other site plans submitted, everything must be submitted unless the Site Plan Reviewing Authority states in writing what is not applicable.

In order for the Site Plan Reviewing Authority to consider an application packet "COMPLETE" all of the following items must be submitted as specified above. A written explanation for any omissions from these submission requirements must be included if any box is not checked off.

Applicant: NSTAR Electric Co. d/b/a Eversource Energy (as successor in interest to Western Mass Electric Co.)

Assessor's Tax Map and Lot #: R41-28-0

Type of Development: Residential _____ Commercial/Industrial X

Date of Application: 8/21/2023

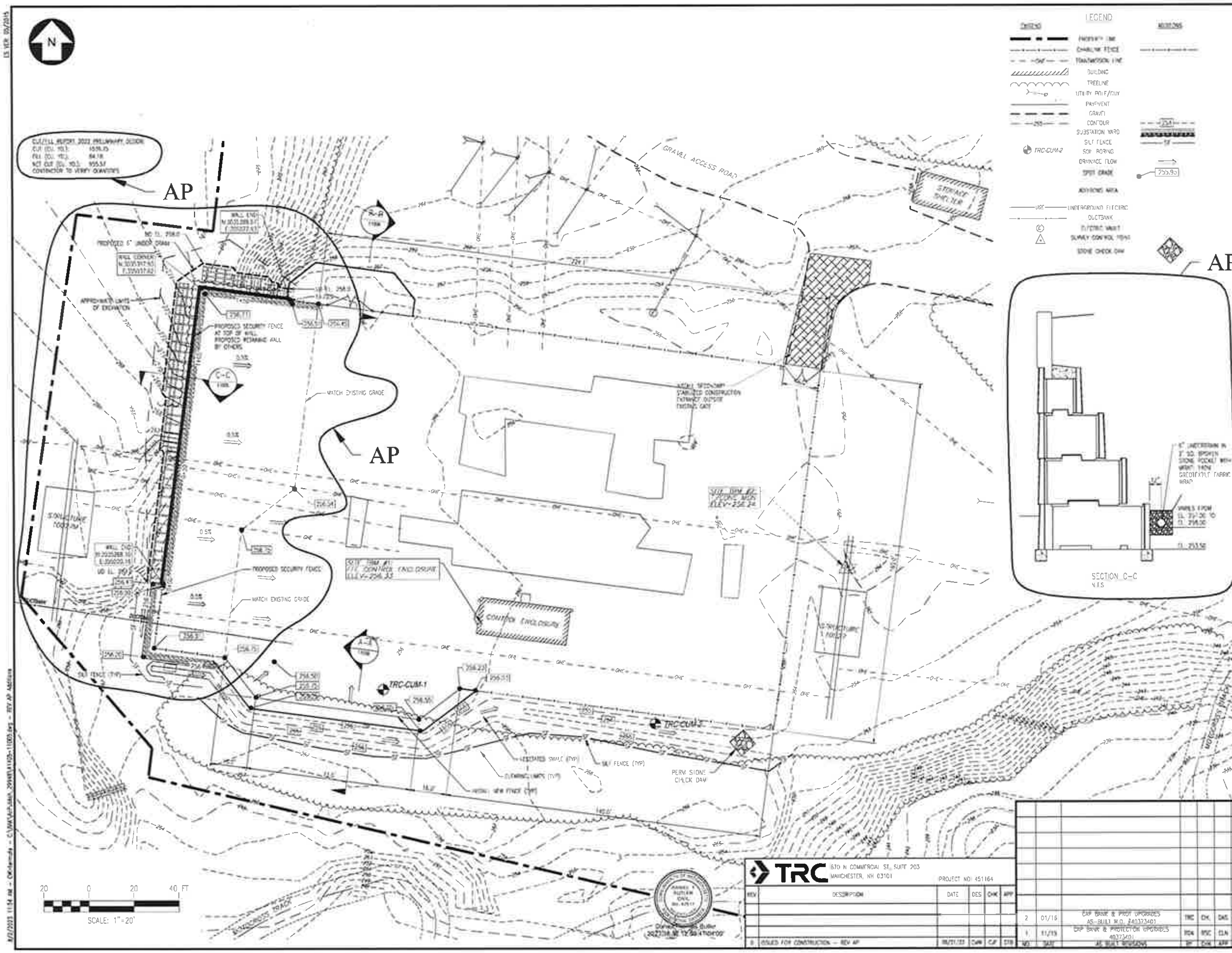
#	Submittal Requirements	Site Plan Reviewing Authority requirement	Submitted (check-off)
General Submission Requirements			
1.	One (1) copy of the completed Application Form.	(Yes) / No	✓
2.	Twelve (12) copies of Site Plan prints showing all requested information.	(Yes) / No	✓
3.	Application fee as indicated in the Fee Schedule	(Yes) / No	✓
4.	Notarized letter of authorization from property owner for applicant to act as his/her agent, if applicant is not the property owner.	(Yes) / No	n/a
Site Plan Content Requirements			
5.	The location and boundaries of the lot with dimensions *(Section 200-8.4 D. (1)(b))*	(Yes) / No	✓
6.	Adjacent streets or ways, with names and the location *(Section 200-8.4 D. (1)(b))*	(Yes) / No	Waiver
7.	The location and owner's names of all abutting properties *(Section 200-8.4 D. (1)(b))*	(Yes) / No	Waiver
8.	North arrow	(Yes) / No	✓
9.	Graphic scale	(Yes) / No	✓
10.	Date of plan	(Yes) / No	✓
11.	Name of applicant, designer and surveyor	(Yes) / No	✓

12.	Locus map *(Section 200-8.4 D. (1)(a))*	(Yes) / No	Waiver
13.	Existing and proposed vegetation and topography, including contours *(Section 200-8.4 D. (1)(c))*	(Yes) / No	✓
14.	The location of wetlands, streams, water bodies, drainage swales, areas subject to flooding, and unique natural land features Existing and proposed vegetation and topography, including contours *(Section 200-8.4 D. (1)(c))*	(Yes) / No	✓
15.	Existing and proposed structures including dimensions (ingress, egress, loading areas, etc.) *(Section 200-8.4 D. (1)(d))*	(Yes) / No	✓
16.	The location and dimensions of parking and loading areas; driveways, walk ways, access and egress points and distance to the nearest driveways and intersections *(Section 200-8.4 D. (1)(e))*	(Yes) / No	✓
17.	The location and description of all proposed septic systems *(Section 200-8.4 D. (1)(f))*	(Yes) / No	n/a
18.	The location and description of all water supply to include gallons per day *(Section 200-8.4 D. (1)(f))*	(Yes) / No	n/a
19.	The location and description of all storm drainage systems *(Section 200-8.4 D. (1)(f))*	(Yes) / No	n/a
20.	The location and description of all proposed and existing utilities *(Section 200-8.4 D. (1)(f))*	(Yes) / No	n/a
21.	The location and description of all proposed and existing lighting (cut sheets of all fixtures) *(Section 200-8.4 D. (1)(f))*	(Yes) / No	n/a
22.	The location and description of all proposed and existing refuse and other waste disposal methods *(Section 200-8.4 D. (1)(f))*	(Yes) / No	n/a
23.	The location and description of all existing and proposed exterior storage	(Yes) / No	✓
24.	The location and description of all existing and proposed easements	(Yes) / No	Waiver
25.	Proposed landscape features including the location and a description of screening, fencing and plantings *(Section 200-8.4 D. (1)(g))*	(Yes) / No	✓
26.	Locations, dimensions, height and characteristics of proposed signs *(Section 200-8.4 D. (1)(h))*	(Yes) / No	n/a
27.	The location and description of proposed open space of recreation areas *(Section 200-8.4 D. (1)(i))*	(Yes) / No	n/a
28.	A snow storage/removal plan	(Yes) / No	Waiver
29.	Percentage of Open Space	(Yes) / No	n/a
30.	Handicapped parking/access	(Yes) / No	n/a
31.	Bicycle Parking	(Yes) / No	n/a
32.	The existing and proposed interior layout of the structure	(Yes) / No	✓
33.	Measures to prevent pollution of surface and groundwater, increased runoff, changes in groundwater levels, and flooding *(Section 200-8.4 D. (2)(a))*	(Yes) / No	✓
34.	Design features which will integrate the proposed development into the existing landscape, maintain neighborhood character, enhance aesthetic asset and screen objectionable features from neighbors and roadways *(Section 200-8.4 D. (2)(b))*	(Yes) / No	✓
35.	Control measures to prevent erosion and sedimentation during and after construction and the sequence of grading and construction activities, location of temporary measures, and final stabilization of the site *(Section 200-8.4 D. (2)(c))*	(Yes) / No	✓
36.	Estimated average daily and peak hour vehicle trips to be generated by the site and traffic flow patterns for both vehicles and pedestrians showing adequate access to and from the site and adequate circulation within the site. *(Section 200-8.4 D. (2)(d))*	(Yes) / No	Waiver

Requirement numbers 37 - 41 are only for projects located in the Corridor Overlay District			
37.	Facade elevations of all proposed new construction or renovation including at least one (1) color rendering. *(Section 200-4.16 I. (2)(a))*	Yes / (No)	
38.	Photographs showing the proposed building site and surrounding properties. *(Section 200-4.16 I. (2)(b))*	Yes / (No)	
39.	Drawings of proposed signs as they are to be located on the property including at least one (1) copy of a color rendering.*(Section 200-4.16 I. (2)(c))*	Yes / (No)	
40.	A landscaping plan including plan and elevation views with at least one (1) color rendering.*(Section 200-4.16 I. (2)(d))*	Yes / (No)	
41.	Narrative addressing all guidelines in the document titled, "Corridor Design Guidelines" *(Section 200-4.16 J.)*	Yes / (No)	
Requirement numbers 42 - 46 are only for projects which fall under Major Development Review			
42.	Eight (8) copies of the impact statement prepared in accordance with the Major Development Review Rules and Regulations for Impact Statements	Yes / (No)	
43.	Facade elevations of all sides of any new building or structure or alterations to any existing building or structure *(Section 200-7.12 D. (1)(a))*	Yes / (No)	
44.	Photographs showing the proposed building site and abutting properties. *(Section 200-7.12 D. (1)(b))*	Yes / (No)	
45.	Plans for phased construction. *(Section 200-7.12 D. (1)(c))*	Yes / (No)	
46.	Contingency plans or bond relative to financial ability to complete the project. *(Section 200-7.12 D. (1)(d))*	Yes / (No)	

EXHIBIT 5

EXHIBIT A



CAUTION
OVERHEAD ENERGIZED TRANSMISSION LINES

CAUTION
UNDERGROUND CONDUITS + ENERGIZED CABLES

ALL EXCAVATION MUST BE PERFORMED WITH CAUTION

1. THIS SUBSTATION CONTAINS ENERGIZED CONDUIT AND DUCT BANKS.
2. THIS SUBSTATION MAY ALSO CONTAIN BURIED SERVICES SUCH AS WATER LINES, GAS LINES, SEWER LINES AND STORM WATER LINES.
3. THE CONDUIT DRAWING(S) AND SITE DRAWING(S) MUST BE THOROUGHLY REVIEWED PRIOR TO PERFORMING ANY EXCAVATION.
4. THE SITE AND CONDUIT DRAWINGS REFLECT THE BEST AVAILABLE INFORMATION FOR THE EXISTING LOCATIONS AND ROUTING OF THE CONDUIT DUCT BANKS, AND OTHER FACILITY SERVICES.
5. THE ACCURACY, HOWEVER, MAY VARY SIGNIFICANTLY IN THE FIELD BASED ON THE AGE OF THE SUBSTATION AND INFORMATION RETAINED OVER THE YEARS. THEREFORE, EXCAVATION ACTIVITIES MUST BE ASSUMED THAT THERE MAY BE AN UNKNOWN BURIED CONDUIT, DUCT BANK OR OTHER SERVICE IN CLOSE PROXIMITY.

GENERAL NOTES: (2014 ADDITIONS)

1. [illegible] LIFTS OR LESS. REFER TO SUB 010 & SUB 012. [illegible] STRUCTURAL FILL SHALL BE [illegible] 95% MODIFIED OPTIMUM DENSITY (ASTM 1557D). COMPACTION OF FILL SHALL BE PERFORMED IN 6" LIFTS OR LESS. REFER TO SUB 010, SUB_210, AND SUB 212.I
2. FENCE MATERIALS AND FOUNDATIONS TO BE INSTALLED PER NU CONSTRUCTION AND COMMISSIONING_STANDARD SUB 215 (LATEST REV) "CHAIN_LINK PERIMETER FENCE".
3. MATERIALS TO BE PER NU PROCUREMENT STANDARD SUB 115 (LATEST REV) "CHAIN LINK PERIMETER FENCE"
4. REFER TO DWG 41405-33103 FOR FENCE GROUNDING DETAILS TO GROUND GRID PLAN/LAYOUT.
5. CONTRACTOR SHALL HAND DIG OR USE VAC ALL TO EXCAVATE TO DETERMINE NO UNDERGROUND OBSTRUCTIONS SUCH AS CONDUIT AND OTHER UTILITIES CONFLICT WITH NEW INSTALLATIONS. NOTIFY CIVIL ENGINEERING IF (EXISTING) UTILITIES CONFLICTING WITH (NEW) CONSTRUCTION WORK.

NOTES:

1. TOPOGRAPHIC & BOUNDARY SURVEY PROVIDED BY NORTHEAST UTILITIES, 2013. HORIZONTAL DATUM: MASS STATE PLANE, NAD83, US SURVEY FEET. VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM, 1988 (NAVD88)
2. [illegible]
3. [illegible]

REFERENCE DRAWINGS:

41405-11008	SITE SECTIONS & DETAILS
41405-33005 PG	YARD ARRANGEMENT PLAN
41405-33006	CONDUIT PLAN
41405-33007	GROUNDING PLAN
41405-33303	GROUNDING DETAILS

REV AP ADDITIONS

REVISIONS DURING CONSTRUCTION					
AP	02/22	FIBER OPTIC EXPANSION PROGRAM ADD ADSS TO 1231 & 1242 OPGW WO #40503XCU	TRC	TRC	TRC

TRC
670 N COMMERCIAL ST, SUITE 203
MANCHESTER, NH 03101
PROJECT NO: 451164

REV	DESCRIPTION	DATE	DES	CHK	APP
0	ISSUED FOR CONSTRUCTION – REV AP	08/21/22	CWM	CJF	STB

NO	DATE	AS BUILT REVISIONS	BY	CHK	APP	APP
2	01/16	CAP BANK & PROT UPGRADES AS-BUILT W.O. #40373401	TRC	CH	DAS	STB
1	11/15	CAP BANK & PROTECTION UPGRADES 40373401	RDK	BSC	CLN	WS

EVERSOURCE ENERGY

CUMBERLAND 22B
SITE GRADING PLAN
PLAN VIEW
GREENFIELD, MA

SCALE 1" = 20'

41405-11005

EXHIBIT B

ALL EXCAVATION MUST BE PERFORMED WITH CAUTION

1. THIS SUBSTATION CONTAINS ENERGIZED CONDUITS AND DUCT BANKS.
2. THIS SUBSTATION MAY ALSO CONTAIN BURIED SERVICES SUCH AS WATER LINES, GAS LINES, SEWER LINES AND STORM WATER LINES.
3. THE CONDUIT DRAWING(S) AND SITE DRAWING(S) MUST BE THOROUGHLY REVIEWED PRIOR TO PERFORMING ANY EXCAVATION.
4. THE SITE AND CONDUIT DRAWINGS REFLECT THE BEST AVAILABLE INFORMATION FOR THE EXISTING LOCATIONS AND ROUTING OF THE CONDUIT DUCT BANKS, AND OTHER FACILITY SERVICES.
5. THE ACCURACY, HOWEVER, MAY VARY SIGNIFICANTLY IN THE FIELD BASED ON THE AGE OF THE SUBSTATION AND INFORMATION RETAINED OVER THE YEARS. THEREFORE, EXCAVATION ACTIVITIES MUST BE ASSUMED THAT THERE MAY BE AN UNKNOWN BURIED CONDUIT, DUCT BANK OR OTHER SERVICE IN CLOSE PROXIMITY.

GENERAL NOTES:

1. SITE WORK TO BE PER NU CONSTRUCTION STANDARD SUB 210 "SITE DEVELOPMENT", OTRM 230 "VEGETATION CLEARING PROCEDURES AND PRACTICES FOR TRANSMISSION LINE SECTIONS" (LATEST REV) AND ANY SITE SPECIFIC DEVELOPMENT & MANAGEMENT (D&M) PLAN. RE-GRADING SHALL INCLUDE SOIL/FILL TO BE COMPACTED TO 95% MODIFIED OPTIMUM DENSITY (ASTM 1557D). COMPACTION OF FILL SHALL BE PERFORMED IN 6" LIFTS OR LESS. REFER TO SUB 010 & SUB 012. APPROXIMATELY 25' RADIUS OF STRUCTURAL FILL SHALL BE PLACED AROUND THE FOUNDATIONS AND COMPACTED TO 95% MODIFIED OPTIMUM DENSITY (ASTM 1557D). COMPACTION OF FILL SHALL BE PERFORMED IN 6" LIFTS OR LESS. REFER TO SUB 010, SUB 210, AND SUB 212.1
2. FENCE MATERIALS AND FOUNDATIONS TO BE INSTALLED PER NU CONSTRUCTION AND COMMISSIONING STANDARD SUB 215 (LATEST REV) "CHAIN LINK PERIMETER FENCE".
3. MATERIALS TO BE PER NU PROCUREMENT STANDARD SUB 115 (LATEST REV) "CHAIN LINK PERIMETER FENCE"
4. CONTRACTOR SHALL HAND DIG OR USE VAC-ALL TO EXCAVATE TO DETERMINE NO UNDERGROUND OBSTRUCTIONS SUCH AS CONDUIT AND OTHER UTILITIES CONFLICT WITH NEW INSTALLATIONS. NOTIFY CIVIL ENGINEERING IF (EXISTING) UTILITIES CONFLICTING WITH (NEW) CONSTRUCTION WORK.

NOTES:

1. TOPOGRAPHIC & BOUNDARY SURVEY PROVIDED BY NORTHEAST UTILITIES, 2014. HORIZONTAL DATUM: MASS STATE PLANE, NAD83, US SURVEY FEET. VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM, 1988 (NAVD88)
2. THE PROJECT SITE IS NOT LOCATED IN A SPECIAL FLOOD HAZARD AREA. THIS PROJECT SITE FALL WITHIN ZONE C "AREAS OF MINIMAL FLOODING" AS DESIGNATED ON THE FLOOD INSURANCE RATE MAP PANEL NUMBER 250118 0007 B EFFECTIVE DATE JULY 2, 1980

REFERENCE DRAWINGS:

41405-11008	SITE SECTIONS & DETAILS
41405-33005	YARD ARRANGEMENT PLAN
41405-33006	CONDUIT PLAN
41405-33001	GROUNDING PLAN
41405-33303	GROUNDING DETAILS

NEW DRAWING
REV AP ADDITIONS

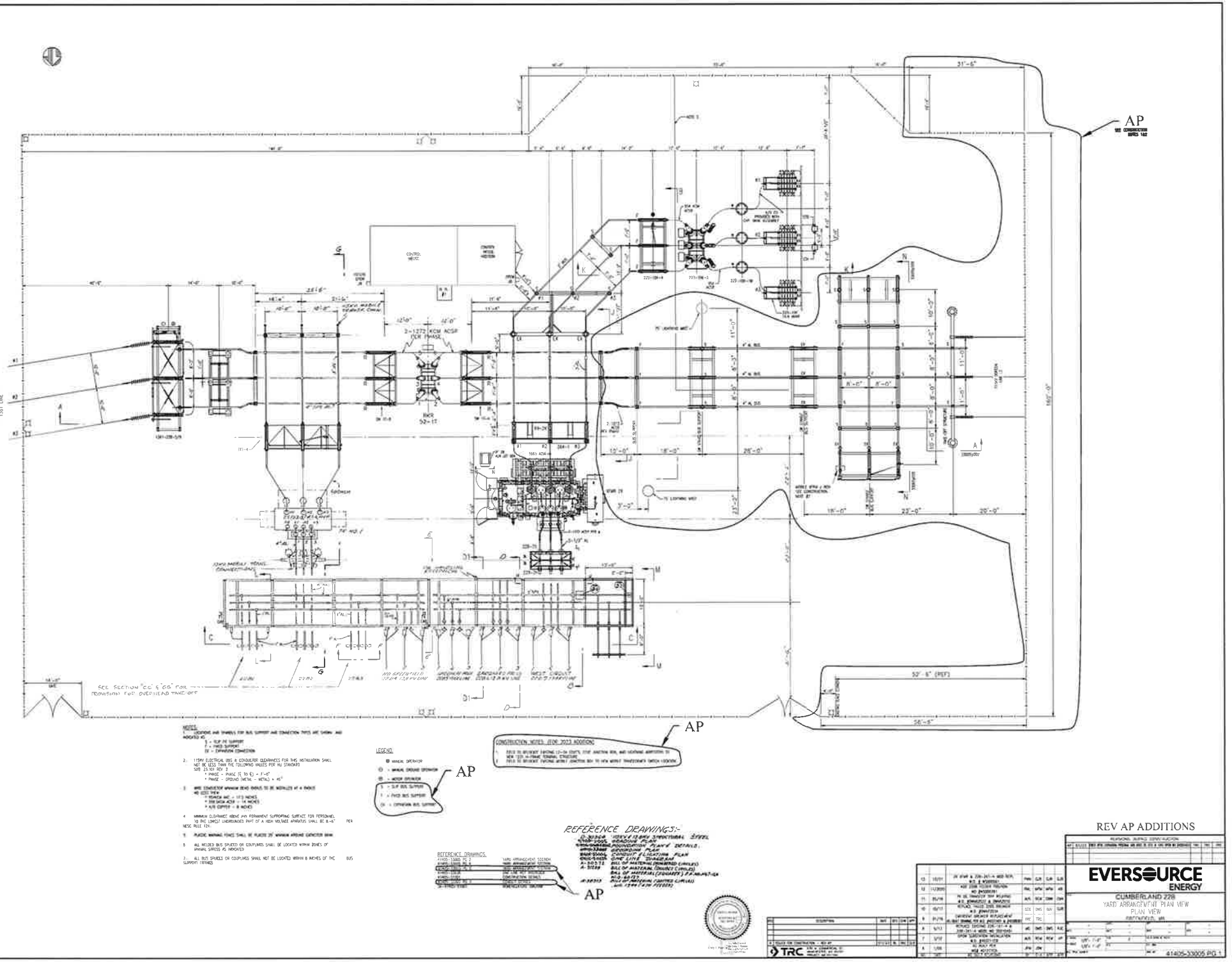
REVISIONS DURING CONSTRUCTION

EVERSOURCE ENERGY

CUMBERLAND 22B
PRECAST RETAINING WALL LAYOUT
PLAN VIEW
GREENFIELD, MA

CMM/TRC	CJF/TRC	DTB/TRC	CN/NU
12/02/22	12/05/22	12/06/22	-
1" = 10'	D		
1" = 10'	-		
-			41405-11012

EXHIBIT C



REV AP ADDITIONS

EVERSOURCE ENERGY

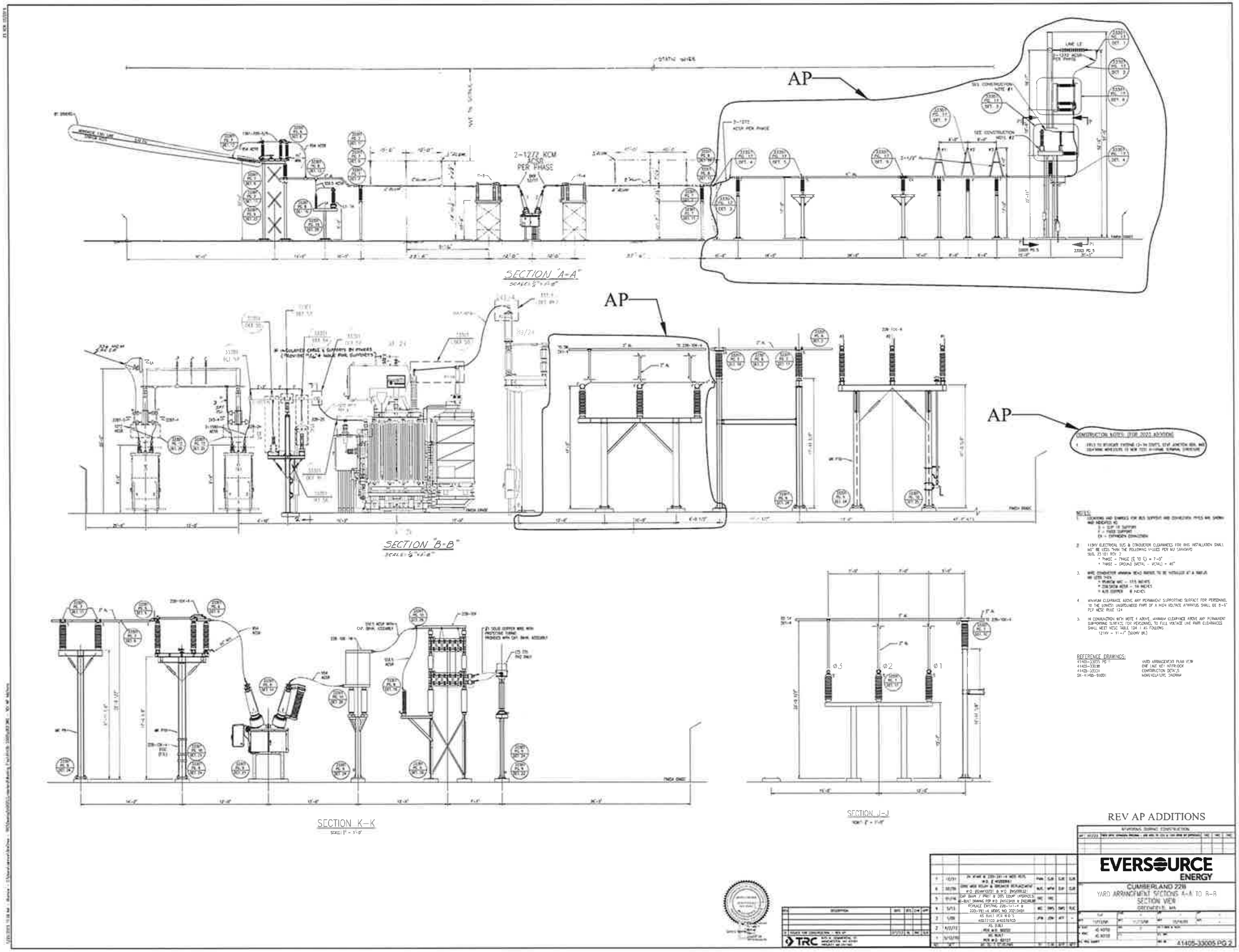
CUMBERLAND 228

YARD ARRANGEMENT PLAN VIEW

PLAN VIEW

41405-33005 PG 1

EXHIBIT D



AP
AP
AP
STATIC WIRE
2-1272 KCM ACSR PER PHASE
SECTION "A-A"
SECTION "B-B"
CONSTRUCTION NOTES: (FOR 2023 ADDITIONS)
NOTES:
2. 115KV ELECTRICAL BUS & CONDUCTOR CLEARANCES FOR THIS INSTALLATION SHALL NOT BE LESS THAN THE FOLLOWING VALUES PER NU STANDARD SUB. 23.101 REV. 2
* PHASE - PHASE (℄ TO ℄) = 7-0"
* PHASE - GROUND (METAL - METAL) = 46"
3.
* AL/S COPPER 8 INCHES
4. MINIMUM CLEARANCE ABOVE ANY PERMANENT SUPPORTING SURFACE FOR PERSONNEL TO THE LOWEST UNGROUNDED PART OF A HIGH VOLTAGE APPARATUS SHALL BE 8-6" PER NESC RULE 124
5. IN CONJUNCTION WITH NOTE 4 ABOVE, MINIMUM CLEARANCE ABOVE ANY PERMANENT SUPPORTING SURFACE FOR PERSONNEL TO FULL VOLTAGE LIVE PART CLEARANCES SHALL MEET NESC TABLE 124-1 AS FOLLOWS
121KV - 11'-7" (550KV BIL)
REFERENCE DRAWINGS:
41405-33005 PG 1 YARD ARRANGEMENT PLAN VIEW
41405-33038 ONE LINE KEY INTERLOCK
41405-33301 CONSTRUCTION DETAILS
SK-41405-91001 NOMENCLATURE DIAGRAM
SECTION K-K
SCALE: 1" = 1'-0"
SECTION J-J
ø3
ø2
ø1
FINISH GRADE
REV AP ADDITIONS
EVERSOURCE ENERGY
CUMBERLAND 22B
YARD ARRANGEMENT SECTIONS A-A TO B-B
SECTION VIEW
41405-33005 PG 2
TRC

EXHIBIT 6

UNITED
CONCRETE PRODUCTS

173 Church Street Yalesville, CT 06492
(800) 234-3119 or (203) 269-3119
Fax: 203-265-4941
www.unitedconcrete.com

EVERSOURCE ENERGY
CUMBERLAND SUBSTATION 22B
GREENFIELD, MASSACHUSETTS

PRECAST MODULAR
DOUBLEWAL RETAINING WALL

DOUBLEWAL JOB NO. 22086
JULY 2023

UNITED
CONCRETE PRODUCTS

173 Church Street Yalesville, CT 06492
(800) 234-3119 or (203) 269-3119
Fax: 203-265-4941
www.unitedconcrete.com

EVERSOURCE ENERGY
CUMBERLAND SUBSTATION 22B
GREENFIELD, MASSACHUSETTS

PRECAST MODULAR
DOUBLEWAL RETAINING WALL
SECTIONS WITH PARAPETS

DOUBLEWAL JOB NO. 22086
JULY 2023

PROJECT	CUMBERLAND SUBSTATION			
JOB NUMBER	22086		DATE 07/13/23	
WALL	DOUBLEWAL		JOB2208t	FILE NAME
PHI =	34	DEGREES	II	PARAPET TYPE
WT. OUTSIDE =	0.125	KCF	20	DELTA
WT. INSIDE =	0.1	KCF		
COS =	0.5		COC= 0.6	
SOS =	0.65			
HORIZ. LOAD =	10	KIPS	A=	
LOAD DIST. =	16	FT.	Kv=	
BATTER =	0	DEGREES	4.5	ALLOWABLE BEARING CAPACITY
SURCHARGE=	0.25		PARA T 1.25	
			P HT AB 3.5	

PROJECT: CUMBERLAND SUBSTATION 22 | WALL: DOUBLEWAL | DATE: 07/13/23 | FILENAME: JOB2208t
DOUBLEWAL #: 22086 | STATION: 1 | PAGE: B

MODULES	H design	Beta	Theta	Delta	Ka	Surch.	Pa	Net Pax	Pay	Windhor.ld	M ot
2 x 8 x 6	4.60	0.00	90.00	20.00	0.2549	0.25	0.6303	0.5923	0.2156	5.063	6.18

Para Ht.	6.100
Para Wt.	1.763
Para Mom.	2.573
M SLAB=1	0.000
W SLAB F	0.000
In Mod.=1	1.000

Soil above Para Base	
Weight	Moment
1.54	5.60

Parapet Height Above grade
3.50

MODULES	Module Wt.	Module Wt-Mom.	Soil In Mod-Wt.	Soil In Mod-Mom	Pay Moment	Weight Soil Abv	Soil Abv-Moment	Add'l Wt. Abv.	Add'l Mom Abv.	Resisting Moment	F.S Overturn	CONC WT.	SOIL WT.	F.S. SLIDING
2 x 8 x 6	0.535	1.605	0.330	0.991	1.293	0.000	0.000	1.1875	4.3047	16.36	**2.65**	5.25	1.60	**6.18**
	0.535	1.605	0.330	0.991		0.000	0.000	1.188	4.305					

DESIGN BEARING PRESSURE
1.43

PROJECT: CUMBERLAND SUBSTATION 21 | WALL: DOUBLEWAL | DATE: 07/13/23 | FILENAME: JOB2208t
DOUBLEWAL #: 22086 | STATION: 2 | PAGE: C

MODULES	H design	Beta	Theta	Delta	Ka	Surch.	Pa	Pax	Pay	Mom hor.ld	M ot
4 x 8 x 6	6.95	0.00	90.00	20.00	0.2549	0.25	1.2125	1.1394	0.4147	6.531	9.65

Para Ht.	6.450
Para Wt.	1.829
Para Mom.	2.614
M SLAB=1	0.000
W SLAB F	0.000
In Mod.=1	1.000

Soil above Para Base	
Weight	Moment
1.75	6.35

Parapet Height Above grade
3.50

MODULES	Module Wt.	Module Wt-Mom.	Soil In Mod-Wt.	Soil In Mod-Mom	Pay Moment	Weight Soil Abv	Soil Abv-Moment	Add'l Wt. Abv.	Add'l Mom Abv.	Resisting Moment	F.S Overturn	CONC WT.	SOIL WT.	F.S. SLIDING
4 x 8 x 6	1.070	3.210	0.9906	2.9718	2.488	0.000	0.000	1.1875	4.3047	21.94	**2.27**	6.25	2.43	**4.13**
	1.070	3.210	0.991	2.972		0.000	0.000	1.188	4.305					

DESIGN BEARING PRESSURE
1.82

PROJECT	CUMBERLAND SUBSTATION 22	WALL	DOUBLEWAL	DATE	FILENAME JOB2208t
DOUBLEWAL #	22086	STATION	3	07/13/23	PAGE D

Para Ht.	6.130
Para Wt.	1.769
Para Mom.	2.577
M SLAB=1	0.000
W SLAB F	0.000
In Mod.=1	1.000

Soil above Para Base	
Weight	Moment
1.56	5.66

Parapet Height Above grade
3.50

MODULES	H design	Beta	Theta	Delta	Ka	Surch.	Pa	Pax	Pay	Mom hor.ld	M ot
2 x 8 x 6	4.63	0.00	90.00	20.00	0.2549	0.25	0.6366	0.5982	0.2177	5.081	6.22
4 x 8 x 6	8.63	0.00	90.00	20.00	0.2549	0.25	1.7366	1.6319	0.5940	5.054	10.49

MODULES	Module Wt.	Module Wt-Mom.	Soil In Mod-Wt.	Soil In Mod-Mom	Pay Moment	Weight Soil Abv	Soil Abv-Moment	Add'l Wt. Abv.	Add'l Mom Abv.	Resisting Moment	F.S Overturn	CONC WT.	SOIL WT.	F.S. SLIDING
2 x 8 x 6	0.535	1.605	0.3304	0.9912	1.306	0.000	0.000	1.1875	4.3047	16.44	**2.64**			
4 x 8 x 6	1.070	3.210	1.3208	3.9624	3.564	0.000	0.000			25.87	**2.47**	5.53	3.25	**2.99**
	1.605	4.815	1.651	4.954		0.000	0.000	1.188	4.305					

DESIGN BEARING PRESSURE
1.69

PROJECT	CUMBERLAND SUBSTATION 23	WALL	DOUBLEWAL	DATE	FILENAME JOB2208t
DOUBLEWAL #	22086	STATION	4	07/13/23	PAGE E

MODULES	H design	Beta	Theta	Delta	Ka	Surch.	Pa	Pax	Pay	Mom hor.ld	M ot
2 x 8 x 6	3.75	0.00	90.00	20.00	0.2549	0.25	0.4630	0.4351	0.1584	4.531	5.22
4 x 8 x 6	7.75	0.00	90.00	20.00	0.2549	0.25	1.4509	1.3634	0.4962	4.688	8.81
4 x 8 x 8	11.75	0.00	90.00	20.00	0.2549	0.25	2.9486	2.7707	1.0085	4.766	17.00

Para Ht.	5.250
Para Wt.	1.604
Para Mom.	2.474
M SLAB=1	0.000
W SLAB F	0.000
In Mod.=1	1.000

Soil above Para Base	
Weight	Moment
1.04	3.77

Parapet Height Above grade
3.50

MODULES	Module Wt.	Module Wt-Mom.	Soil In Mod-Wt.	Soil In Mod-Mom	Pay Moment	Weight Soil Abv	Soil Abv-Moment	Add'l Wt. Abv.	Add'l Mom Abv.	Resisting Moment	F.S Overturn	CONC WT.	SOIL WT.	F.S. SLIDING
2 x 8 x 6	0.535	1.605	0.3304	0.9912	0.950	0.000	0.000	1.1875	4.3047	14.09	**2.70**			
4 x 8 x 6	1.070	3.210	1.3208	3.9624	2.977	0.000	0.000			23.29	**2.64**			
4 x 8 x 8	1.232	4.928	1.8768	7.5072	8.068	1.550	10.850			51.67	**3.04**	6.49	7.54	**2.94**
	2.837	9.743	3.528	12.461		1.550	10.850	1.188	4.305					

DESIGN BEARING PRESSURE
2.22

PROJECT: CUMBERLAND SUBSTATION 22 | WALL: DOUBLEWAL | DATE: 07/13/23 | FILENAME JOB2208t
DOUBLEWAL # 22086 | STATION 5 | PAGE F

MODULES	H design	Beta	Theta	Delta	Ka	Surch.	Pa	Pax	Pay	Mom hor.ld	M ot
4 x 8 x 6	6.90	0.00	90.00	20.00	0.2549	0.25	1.1983	1.1260	0.4098	6.500	9.57
4 x 8 x 8	10.90	0.00	90.00	20.00	0.2549	0.25	2.5876	2.4316	0.8850	6.000	16.02
4 x 8 x 8	14.90	0.00	90.00	20.00	0.2549	0.25	4.4868	4.2162	1.5346	5.750	28.91

Para Ht.	6.400
Para Wt.	1.820
Para Mom.	2.609
M SLAB=1	0.000
W SLAB F	0.000
In Mod.=1	1.000

Soil above Para Base	
Weight	Moment
1.72	6.24

Parapet Height Above grade
3.50

MODULES	Module Wt.	Module Wt-Mom.	Soil In Mod-Wt.	Soil In Mod-Mom	Pay Moment	Weight Soil Abv	Soil Abv-Moment	Add'l Wt. Abv.	Add'l Mom Abv.	Resisting Moment	F.S Overturn	CONC WT.	SOIL WT.	F.S. SLIDING
4 x 8 x 6	1.070	3.210	0.9906	2.9718	2.459	0.000	0.000	1.1875	4.3047	21.80	**2.28**			
4 x 8 x 8	1.232	4.928	1.8768	7.5072	7.080	1.380	9.660			48.51	**3.03**			
4 x 8 x 8	1.232	4.928	1.8768	7.5072	12.277	0.000	0.000			66.14	**2.29**	8.61	8.84	**2.38**
	3.534	13.066	4.744	17.986		1.380	9.660	1.188	4.305					

DESIGN BEARING PRESSURE
3.06

PROJECT	CUMBERLAND SUBSTATION 22	WALL	DOUBLEWAL	DATE	FILENAME JOB2208t
DOUBLEWAL #	22086	STATION	6	07/13/23	PAGE G

MODULES	H design	Beta	Theta	Delta	Ka	Surch.	Pa	Pax	Pay	Mom hor.ld	M ot
2 x 8 x 6	4.20	0.00	90.00	20.00	0.2549	0.25	0.5487	0.5156	0.1877	4.813	5.71
4 x 8 x 6	8.20	0.00	90.00	20.00	0.2549	0.25	1.5939	1.4978	0.5452	4.875	9.64
4 x 8 x 8	12.20	0.00	90.00	20.00	0.2549	0.25	3.1490	2.9591	1.0770	4.906	18.43
4 x 8 x 8	16.20	0.00	90.00	20.00	0.2549	0.25	5.2138	4.8994	1.7832	4.925	34.00

Para Ht.	5.700
Para Wt.	1.688
Para Mom.	2.526
M SLAB=1	0.000
W SLAB F	0.000
In Mod.=1	1.000

Soil above Para Base	
Weight	Moment
1.31	4.74

Parapet Height Above grade
3.50

MODULES	Module Wt.	Module Wt-Mom.	Soil In Mod-Wt.	Soil In Mod-Mom	Pay Moment	Weight Soil Abv	Soil Abv-Moment	Add'l Wt. Abv.	Add'l Mom Abv.	Resisting Moment	F.S Overturn	CONC WT.	SOIL WT.	F.S. SLIDING
2 x 8 x 6	0.535	1.605	0.3304	0.9912	1.126	0.000	0.000	1.1875	4.3047	15.29	**2.68**			
4 x 8 x 6	1.070	3.210	1.3208	3.9624	3.271	0.000	0.000			24.61	**2.55**			
4 x 8 x 8	1.232	4.928	1.8768	7.5072	8.616	1.640	11.480			53.87	**2.92**			
4 x 8 x 8	1.232	4.928	1.8768	7.5072	14.266	0.000	0.000			71.95	**2.12**	8.85	9.99	**2.23**
	4.069	14.671	5.405	19.968		1.640	11.480	1.188	4.305					

DESIGN BEARING PRESSURE
3.49

PROJECT: CUMBERLAND SUBSTATION 22 | WALL: DOUBLEWAL | DATE: 07/13/23 | FILENAME JOB2208t
DOUBLEWAL #: 22086 | STATION: 7 | PAGE: H

MODULES	H design	Beta	Theta	Delta	Ka	Surch.	Pa	Pax	Pay	Mom hor.ld	M ot
4 x 8 x 6	6.64	0.00	90.00	20.00	0.2549	0.25	1.1256	1.0578	0.3850	6.338	9.12
4 x 8 x 8	10.64	0.00	90.00	20.00	0.2549	0.25	2.4818	2.3322	0.8488	5.892	15.29
4 x 8 x 8	14.64	0.00	90.00	20.00	0.2549	0.25	4.3479	4.0857	1.4871	5.669	27.75
4 x 8 x 10	18.64	0.00	90.00	20.00	0.2549	0.25	6.7238	6.3183	2.2997	5.535	48.26

Para Ht.	6.140
Para Wt.	1.771
Para Mom.	2.578
M SLAB=1	0.000
W SLAB F	0.000
In Mod.=1	1.000

Soil above Para Base	
Weight	Moment
1.57	5.68

Parapet Height Above grade
3.50

MODULES	Module Wt.	Module Wt-Mom.	Soil In Mod-Wt.	Soil In Mod-Mom	Pay Moment	Weight Soil Abv	Soil Abv-Moment	Add'l Wt. Abv.	Add'l Mom Abv.	Resisting Moment	F.S Overturn	CONC WT.	SOIL WT.	F.S. SLIDING
4 x 8 x 6	1.070	3.210	0.9906	2.9718	2.310	0.000	0.000	1.1875	4.3047	21.06	**2.31**			
4 x 8 x 8	1.232	4.928	1.8768	7.5072	6.791	1.328	9.296			47.27	**3.09**			
4 x 8 x 8	1.232	4.928	1.8768	7.5072	11.897	0.000	0.000			64.81	**2.34**			
4 x 8 x 10	1.397	6.985	2.4320	12.1600	22.997	2.928	26.352			121.41	**2.52**	10.57	15.48	**2.43**
	4.931	20.051	7.176	30.146		4.256	35.648	1.188	4.305					

DESIGN BEARING PRESSURE
3.64

PROJECT: CUMBERLAND SUBSTATION 22 | WALL: DOUBLEWAL | DATE: 07/13/23 | FILENAME JOB2208t
DOUBLEWAL # 22086 | STATION 8 | PAGE 1

MODULES	H design	Beta	Theta	Delta	Ka	Surch.	Pa	Pax	Pay	Mom hor.ld	M ot
2 x 8 x 6	4.91	0.00	90.00	20.00	0.2549	0.25	0.6970	0.6550	0.2384	5.256	6.57
4 x 8 x 6	8.91	0.00	90.00	20.00	0.2549	0.25	1.8327	1.7222	0.6268	5.171	11.08
4 x 8 x 8	12.91	0.00	90.00	20.00	0.2549	0.25	3.4783	3.2685	1.1896	5.128	20.86
4 x 8 x 8	16.91	0.00	90.00	20.00	0.2549	0.25	5.6336	5.2939	1.9268	5.103	37.80
4 x 8 x 10	20.91	0.00	90.00	20.00	0.2549	0.25	8.2989	7.7984	2.8384	5.085	63.80

Para Ht.	6.410
Para Wt.	1.821
Para Mom.	2.610
M SLAB=1	0.000
W SLAB F	0.000
In Mod.=1	1.000

Soil above Para Base	
Weight	Moment
1.73	6.26

Parapet Height Above grade
3.50

MODULES	Module Wt.	Module Wt-Mom.	Soil In Mod-Wt.	Soil In Mod-Mom	Pay Moment	Weight Soil Abv	Soil Abv-Moment	Add'l Wt. Abv.	Add'l Mom Abv.	Resisting Moment	F.S Overturn	CONC WT.	SOIL WT.	F.S. SLIDING
2 x 8 x 6	0.535	1.605	0.3304	0.9912	1.430	0.000	0.000	1.1875	4.3047	17.20	**2.62**			
4 x 8 x 6	1.070	3.210	1.3208	3.9624	3.761	0.000	0.000			26.71	**2.41**			
4 x 8 x 8	1.232	4.928	1.8768	7.5072	9.517	1.782	12.474			57.37	**2.75**			
4 x 8 x 8	1.232	4.928	1.8768	7.5072	15.415	0.000	0.000			75.71	**2.00**			
4 x 8 x 10	1.397	6.985	2.4320	12.1600	28.384	3.382	30.438			138.26	**2.17**	11.85	17.44	**2.21**
	5.466	21.656	7.837	32.128		5.164	42.912	1.188	4.305					

DESIGN BEARING PRESSURE
4.41

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PRECAST MODULAR
DOUBLEWAL RETAINING WALL
SECTIONS WITH COPINGS

DOUBLEWAL JOB NO. 22086
JULY 2023

PROJECT	CUMBERLAND SUBSTATION			
JOB NUMBER	22086		DATE 07/13/23	
WALL	DOUBLEWAL		JOB2208C	FILE NAME
PHI =	34	DEGREES	II	PARAPET TYPE
WT. OUTSIDE =	0.125	KCF	20	DELTA
WT. INSIDE =	0.1	KCF		
COS =	0.5		COC= 0.6	
SOS =	0.65			
HORIZ. LOAD =	0	KIPS	A=	
LOAD DIST. =	16	FT.	Kv=	
BATTER =	0	DEGREES	4.5	ALLOWABLE BEARING CAPACITY
SURCHARGE=	0.25		PARA T	1.25
			P HT AB	0.5

PROJECT: CUMBERLAND SUBSTATION 22 | WALL: DOUBLEWAL | DATE: 07/13/23 | FILENAME: JOB2208C
DOUBLEWAL #: 22086 | STATION: A | PAGE: B

MODULES	H design	Beta	Theta	Delta	Ka	Surch.	Pa	Net Pax	Pay	Windhor.ld	M ot
4 x 8 x 4	8.90	0.00	90.00	20.00	0.2549	0.25	1.8292	1.7189	0.6256	0.000	5.89
4 x 8 x 6	12.90	0.00	90.00	20.00	0.2549	0.25	3.4735	3.2640	1.1880	0.000	15.70
4 x 8 x 8	16.90	0.00	90.00	20.00	0.2549	0.25	5.6276	5.2882	1.9248	0.000	32.64
4 x 8 x 10	20.90	0.00	90.00	20.00	0.2549	0.25	8.2916	7.7915	2.8359	0.000	58.64

Para Ht.	5.400
Para Wt.	1.372
Para Mom.	1.351
M SLAB=1	0.000
W SLAB F	0.000
In Mod.=1	1.000

Soil above Para Base	
Weight	Moment
1.68	4.42

Parapet Height Above grade
0.50

MODULES	Module Wt.	Module Wt-Mom.	Soil In Mod-Wt	Soil In Mod-Mom	Pay Moment	Weight Soil Abv	Soil Abv-Moment	Add'l Wt. Abv.	Add'l Mom Abv.	Resisting Moment	F.S Overturn	CONC WT.	SOIL WT.	F.S. SLIDING
4 x 8 x 4	0.905	1.810	0.575	1.150	2.503	0.000	0.000	1.1875	4.3047	15.54	**2.64**			
4 x 8 x 6	1.070	3.210	1.3208	3.962	7.128	1.780	8.900			36.24	**2.31**			
4 x 8 x 8	1.232	4.928	1.8768	7.507	15.398	2.580	18.060			75.00	**2.30**			
4 x 8 x 10	1.397	6.985	2.4320	12.160	28.359	3.380	30.420			137.53	**2.35**	10.50	18.62	**2.23**
	4.604	16.933	6.204	24.779		7.740	57.380	1.188	4.305					

DESIGN BEARING PRESSURE
4.31

PROJECT	CUMBERLAND SUBSTATION 22	WALL	DOUBLEWAL	DATE	FILENAME JOB2208C
DOUBLEWAL #	22086	STATION	B	07/13/23	PAGE C

MODULES	H design	Beta	Theta	Delta	Ka	Surch.	Pa	Pax	Pay	Mom hor.ld	M ot
2 x 8 x 4	5.88	0.00	90.00	20.00	0.2549	0.25	0.9256	0.8698	0.3166	0.000	2.05
4 x 8 x 6	9.88	0.00	90.00	20.00	0.2549	0.25	2.1849	2.0532	0.7473	0.000	7.74
4 x 8 x 8	13.88	0.00	90.00	20.00	0.2549	0.25	3.9541	3.7156	1.3524	0.000	19.11
4 x 8 x 8	17.88	0.00	90.00	20.00	0.2549	0.25	6.2331	5.8572	2.1319	0.000	38.10

Para Ht.	4.380
Para Wt.	1.181
Para Mom.	1.232
M SLAB=1	0.000
W SLAB F	0.000
In Mod.=1	1.000

Soil above Para Base	
Weight	Moment
1.33	3.50

Parapet Height Above grade
0.50

MODULES	Module Wt.	Module Wt-Mom.	Soil In Mod-Wt.	Soil In Mod-Mom	Pay Moment	Weight Soil Abv	Soil Abv-Moment	Add'l Wt. Abv.	Add'l Mom Abv.	Resisting Moment	F.S Overturn	CONC WT.	SOIL WT.	F.S. SLIDING
2 x 8 x 4	0.452	0.904	0.1916	0.3832	1.266	0.000	0.000	1.1875	4.3047	11.59	**5.65**			
4 x 8 x 6	1.070	3.210	1.3208	3.9624	4.484	1.176	5.880			27.86	**3.60**			
4 x 8 x 8	1.232	4.928	1.8768	7.5072	10.819	1.976	13.832			60.46	**3.16**			
4 x 8 x 8	1.232	4.928	1.8768	7.5072	17.055	0.000	0.000			79.13	**2.08**	8.63	11.71	**2.04**
	3.986	13.970	5.266	19.360		3.152	19.712	1.188	4.305					

DESIGN BEARING PRESSURE
4.05

PROJECT	CUMBERLAND SUBSTATION 2	WALL	DOUBLEWAL	DATE	FILENAME JOB2208C
DOUBLEWAL #	22086	STATION	C	07/13/23	PAGE D

Para Ht.	4.660
Para Wt.	1.233
Para Mom.	1.265
M SLAB=1	0.000
W SLAB F	0.000
In Mod.=1	1.000

Soil above Para Base	
Weight	Moment
1.43	3.75

Parapet Height Above grade
0.50

MODULES	H design	Beta	Theta	Delta	Ka	Surch.	Pa	Pax	Pay	Mom hor.ld	M ot
2 x 8 x 4	6.16	0.00	90.00	20.00	0.2549	0.25	0.9972	0.9370	0.3410	0.000	2.30
4 x 8 x 8	10.16	0.00	90.00	20.00	0.2549	0.25	2.2922	2.1539	0.7840	0.000	8.33
4 x 8 x 8	14.16	0.00	90.00	20.00	0.2549	0.25	4.0970	3.8500	1.4013	0.000	20.17

MODULES	Module Wt.	Module Wt-Mom.	Soil In Mod-Wt.	Soil In Mod-Mom	Pay Moment	Weight Soil Abv	Soil Abv-Moment	Add'l Wt. Abv.	Add'l Mom Abv.	Resisting Moment	F.S Overturn	CONC WT.	SOIL WT.	F.S. SLIDING
2 x 8 x 4	0.452	0.904	0.1916	0.3832	1.364	0.000	0.000	1.1875	4.3047	11.97	**5.20**			
4 x 8 x 8	1.232	4.928	1.8768	7.5072	6.272	2.464	14.784			44.10	**5.30**			
4 x 8 x 8	1.232	4.928	1.8768	7.5072	11.210	0.000	0.000			61.47	**3.05**	6.98	9.20	**2.46**
	2.916	10.760	3.945	15.398		2.464	14.784	1.188	4.305					

DESIGN BEARING PRESSURE
2.80

PROJECT CUMBERLAND SUBSTATION 22 WALL DOUBLEWAL DATE 07/13/23 FILENAME JOB2208C
DOUBLEWAL # 22086 STATION D PAGE E

MODULES	H design	Beta	Theta	Delta	Ka	Surch.	Pa	Pax	Pay	Mom hor.ld	M ot
2 x 8 x 4	6.46	0.00	90.00	20.00	0.2549	0.25	1.0766	1.0117	0.3682	0.000	2.60
4 x 8 x 6	10.46	0.00	90.00	20.00	0.2549	0.25	2.4099	2.2645	0.8242	0.000	8.99

Para Ht.	4.960
Para Wt.	1.289
Para Mom.	1.300
M SLAB=1	0.000
W SLAB F	0.000
In Mod.=1	1.000

Soil above Para Base	
Weight	Moment
1.53	4.02

Parapet Height Above grade
0.50

MODULES	Module Wt.	Module Wt-Mom.	Soil In Mod-Wt.	Soil In Mod-Mom	Pay Moment	Weight Soil Abv	Soil Abv-Moment	Add'l Wt. Abv.	Add'l Mom Abv.	Resisting Moment	F.S Overturn	CONC WT.	SOIL WT.	F.S. SLIDING
2 x 8 x 4	0.452	0.904	0.1916	0.3832	1.473	0.000	0.000	1.1875	4.3047	12.39	**4.77**			
4 x 8 x 6	1.070	3.210	1.3208	3.9624	4.945	1.292	6.460			29.49	**3.28**	5.17	4.69	**2.49**
	1.522	4.114	1.512	4.346		1.292	6.460	1.188	4.305					

DESIGN BEARING PRESSURE
2.22

PROJECT: CUMBERLAND SUBSTATION 22 | WALL: DOUBLEWAL | DATE: 07/13/23 | FILENAME: JOB2208C
DOUBLEWAL #: 22086 | STATION: E | PAGE: F

MODULES	H design	Beta	Theta	Delta	Ka	Surch.	Pa	Pax	Pay	Mom hor.ld	M ot
2 x 8 x 4	5.73	0.00	90.00	20.00	0.2549	0.25	0.8883	0.8347	0.3038	0.000	1.92

Para Ht.	4.230
Para Wt.	1.152
Para Mom.	1.214
M SLAB=1	0.000
W SLAB F	0.000
In Mod.=1	1.000

Soil above Para Base	
Weight	Moment
1.28	3.37

Parapet Height Above grade
0.50

MODULES	Module Wt.	Module Wt-Mom.	Soil In Mod-Wt.	Soil In Mod-Mom	Pay Moment	Weight Soil Abv	Soil Abv-Moment	Add'l Wt. Abv.	Add'l Mom Abv.	Resisting Moment	F.S Overturn	CONC WT.	SOIL WT.	F.S. SLIDING
2 x 8 x 4	0.452	0.904	0.1916	0.3832	1.215	0.000	0.000	1.1875	4.3047	11.39	5.92	4.38	1.43	3.73
	0.452	0.904	0.192	0.383		0.000	0.000	1.188	4.305					

DESIGN BEARING PRESSURE
1.87

UNITED CONCRETE PRODUCTS

MIX	5k Standard	PROJECT	DW Standard Mix
TYPE	5000 psi	IN SERVICE DATE	5/26/2021

	SG	MOISTURE%
CEMENT	3.15	
FLYASH	2.36	
MICRO SILICA	2.24	
STONE 1	1.35	1.0%
STONE 2	2.94	0.7%
SAND	2.67	3.5%

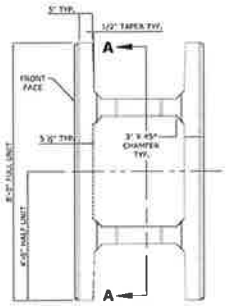
	CUBIC FT
BATCH SIZE	27
FACTOR	1.000

TOTAL CEMENT	660	100.0%	CEMENT	660
			FLYASH	
			MICRO SILICA	
			TOTAL	660

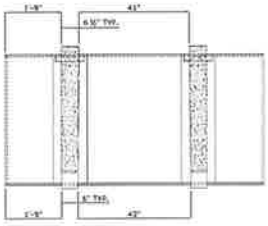
ONE YARD WEIGHTS			CUBIC FOOT		BATCH WTS		CUMULATIVE TOTAL CEMENTITIOUS	
CEMENT (lbs)		660	3.36		660.0	LBS	660.00	LBS
FLY ASH (lbs)						LBS		
MICRO SILICA						LBS		
STONE 1						LBS		
STONE 2		1576	8.59	32%	1576.1	LBS		
SAND		1410	8.46		1410.5	LBS		
WATER (gallons)		34.8	4.64		289.5	LBS		
AIR % Range 5-8%		6.5	1.76					
AIR ENTRAINMENT	PER CWT	1.44			281.0	ML	9.50	OZS
SUPER PLASTISIZER	PER CWT	9.00			1756	ML	60.00	OZS
RETARDER	PER CWT					ML		OZS
HYDRATION INHIBITOR	PER CWT					ML		OZS
		TOTAL YIELD	26.8					

W/C RATIO	0.44
UNIT WT	145.76

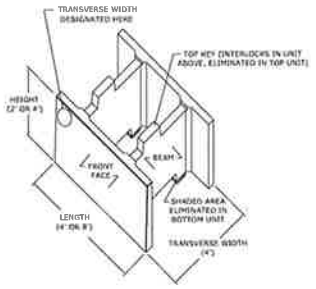
Cement	McInnis -Port Daniel QB, Canada Type III
Sand supplier	Windham Sand and Gravel
Stone supplier	Tilcon - Wallingford, CT, #67 stone
Air entrainment	SIKA-Sika Air 260
Super plastisizer	SIKA- Sika Viscocrete -1000



PLAN



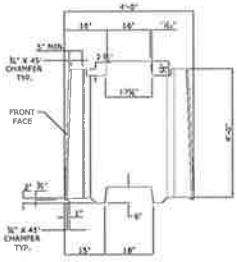
SECTION A-A



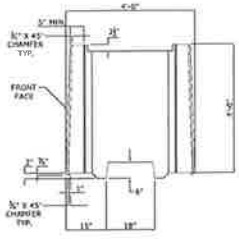
DOUBLEWAL MODULE

N.T.S.

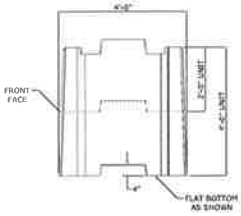
NOTE: 2 FOOT HIGH WALL UNITS ALSO AVAILABLE



ELEVATION - STANDARD WALL UNIT



ELEVATION - TOP WALL UNIT



ELEVATION - BOTTOM WALL UNIT

UNITED
CONCRETE PRODUCTS, INC.
173 CHURCH STREET
YALESVILLE, CT 06492
TEL: (203) 269-3119
FAX: (203) 265-4941
WWW.UNITEDCONCRETE.COM

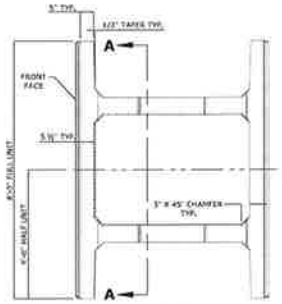
DOUBLEWAL
RETAINING WALL SYSTEM

PROJECT: EVERSOURCE ENERGY
CUMBERLAND SUBSTATION 228
GREENFIELD, MASSACHUSETTS

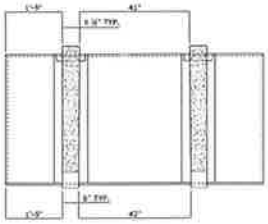
TITLE: DIMENSIONAL PROPERTIES
4 FOOT WIDE
DOUBLEWAL MODULES

NO.	BY	REVISION

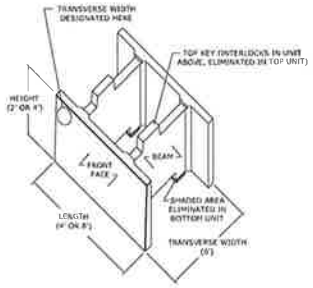
DATE: 7-12-23
SCALE: 3/4"=1'-0"
DRAWN BY: MMB
CHK'D BY: DCM
DWG NO: 22086
SHEET NO: D1 of 6



PLAN



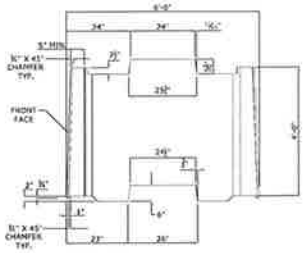
SECTION A-A



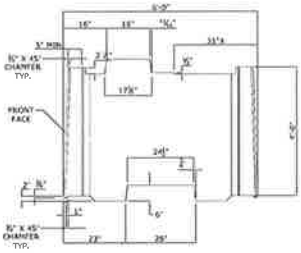
DOUBLEWAL MODULE

N.T.S.

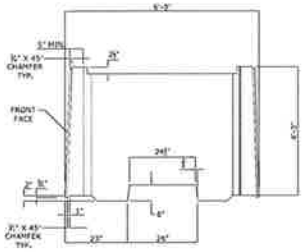
NOTE: 2 FOOT HIGH WALL UNITS ALSO AVAILABLE



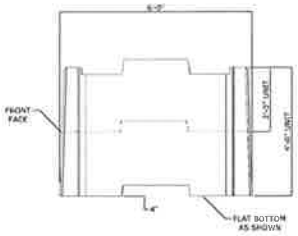
ELEVATION - STANDARD WALL UNIT



ELEVATION - TRANSITION WALL UNIT



ELEVATION - TOP WALL UNIT



ELEVATION - BOTTOM WALL UNIT

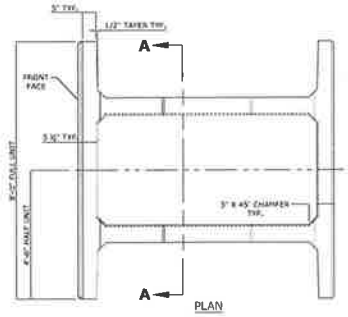
UNITED CONCRETE PRODUCTS, INC.
173 CHURCH STREET
YALESVILLE, CT 06492
TEL: (203) 269-3119
FAX: (203) 265-4941
WWW.UNITEDCONCRETE.COM

DOUBLEWAL RETAINING WALL SYSTEM

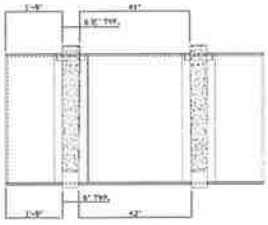
EVERSOURCE ENERGY
CUMBERLAND SUBSTATION 22B
GREENFIELD, MASSACHUSETTS

DIMENSIONAL PROPERTIES
6 FOOT WIDE
DOUBLEWAL MODULES

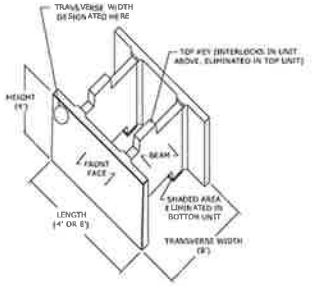
DATE	7-12-23	SCALE	3/4"=1'-0"
DRAWN BY	MMB	CHECKED BY	
APPROVED BY	DCM	JOB NO.	22086



PLAN

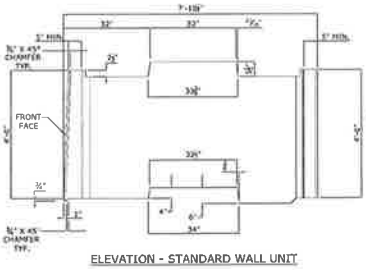


SECTION A-A

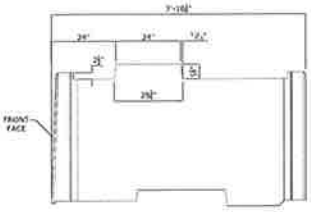


DOUBLEWAL MODULE

N.T.S.



ELEVATION - STANDARD WALL UNIT



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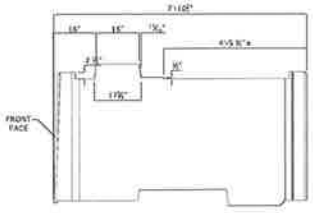
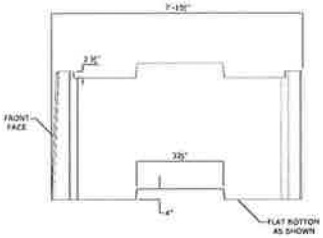


ELEVATION - DOUBLE TRANSITION WALL UNIT



ELEVATION - BOTTOM WALL UNIT

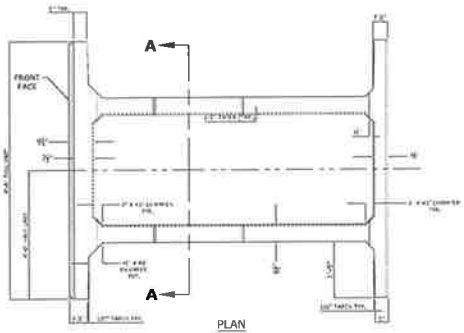
UNITED
CONCRETE PRODUCTS, INC.
675 CHURCH STREET
VALESVILLE, CT 06492
TEL: (203) 269-3419
FAX: (203) 315-4941
WWW.UNITEDCONCRETE.COM

DOUBLEWAL
RETAINING WALL SYSTEM

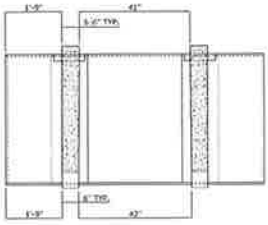
EVERSOURCE ENERGY
CUMBERLAND SUBSTATION 22B
GREENFIELD, MASSACHUSETTS

DIMENSIONAL PROPERTIES
8 FOOT WIDE
DOUBLEWAL MODULES

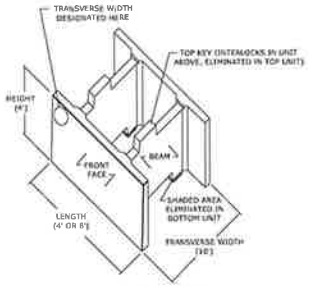
DATE	7-12-23	SCALE	3/4"=1'-0"
BY	MMB		
CHKD	DCM	22086	D3 of 6



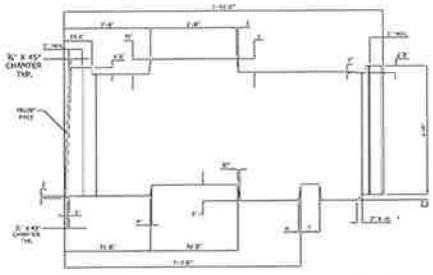
PLAN



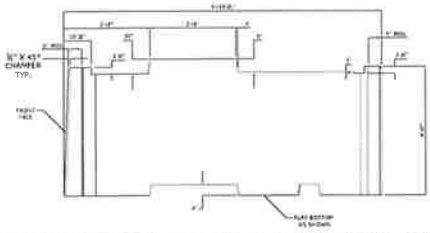
SECTION A-A



DOUBLEWAL MODULE
N.T.S.



ELEVATION - STANDARD/TRANSITION WALL UNIT - 4' HIGH



ELEVATION - BOTTOM STANDARD/BOTTOM TRANSITION WALL UNIT - 4' HIGH

UNITED
CONCRETE PRODUCTS, INC.
173 CHURCH STREET
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FAX: (203) 265-4941
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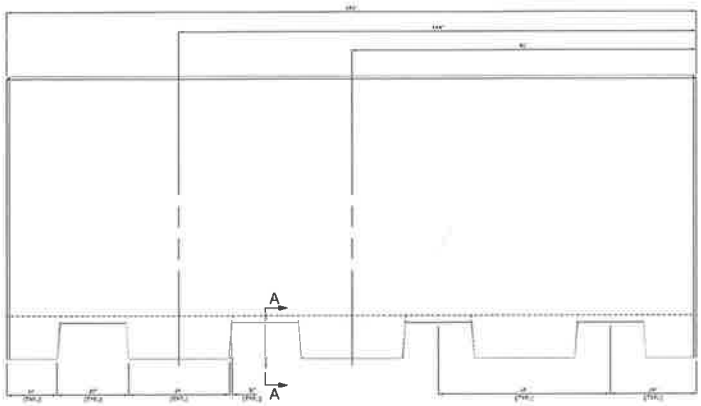
DOUBLEWAL
RETAINING WALL SYSTEM

PROJECT: EVERSOURCE ENERGY
CUMBERLAND SUBSTATION 22B
GREENFIELD, MASSACHUSETTS

SUBJECT: DIMENSIONAL PROPERTIES
10 FOOT WIDE
DOUBLEWAL MODULES

DATE	7-12-23	SCALE	¾"=1'-0"
DRAWN BY	MMB	JOB NO.	22086
CHECKED	DCM	SHEET NO.	D4 of 6



REAR ELEVATION
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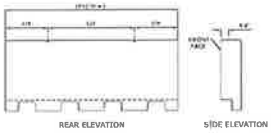

LIFTING INSERT LOCATION
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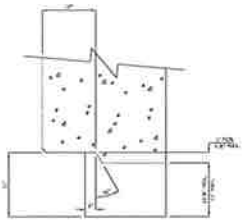
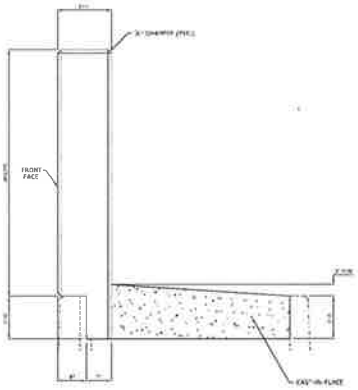


SECTION A-A
N.T.S.



SIDE ELEVATION
SCALE: 1"=1'-0"

UNITED
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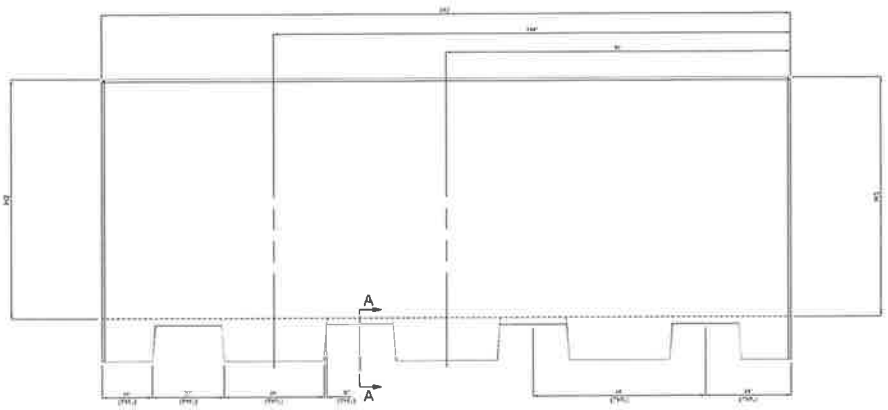
DOUBLEWAL
RETAINING WALL SYSTEM

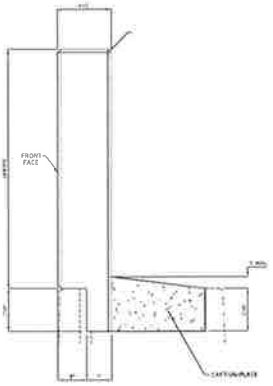
EVERSOURCE ENERGY
CUMBERLAND SUBSTATION 228
GREENFIELD, MASSACHUSETTS

PRECAST TRAFFIC BARRIER TYPE II-C
DIMENSIONAL PROPERTIES

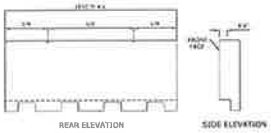
DATE	7-12-23	SCALE	AS SHOWN
DRAWN BY	MMB	CHECKED	
CHECKED	DCM	22086	D5 of 6



REAR ELEVATION
SCALE: 1"=1'-0"



SIDE ELEVATION
SCALE: 1"=1'-0"



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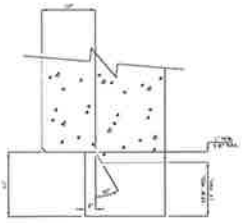


SECTION A-A
N.T.S.

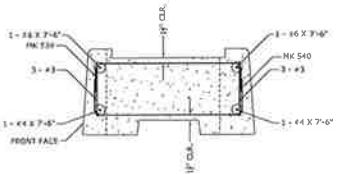
UNITED
CONCRETE PRODUCTS, INC.
173 CHURCH STREET
YALESVILLE, CT 06492
TEL: (203) 269-3119
FAX: (203) 265-4941
WWW.UNITEDCONCRETE.COM

DOUBLEWAL
RETAINING WALL SYSTEM

EVERSOURCE ENERGY
CUMBERLAND SUBSTATION 228
GREENFIELD, MASSACHUSETTS

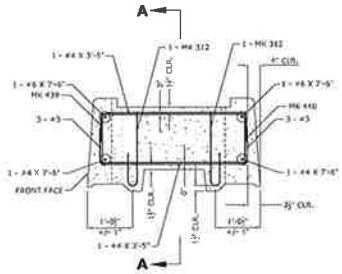
PRECAST COPING TYPE II-B
DIMENSIONAL PROPERTIES

DATE	7-12-23	SCALE	AS SHOWN
DRAWN BY	MMB	JOB NO.	
CHK'D BY	DCM		22086



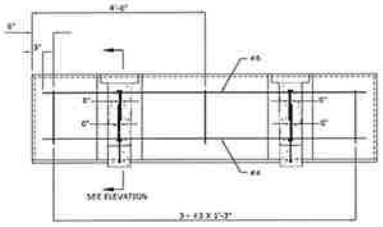
ELEVATION

TOP / BOTTOM WALL MODULE



ELEVATION

TOP WALL MODULE



SECTION A-A

MARK	SIZE	
312	#3	
439	#4	
539	#5	
440	#4	
540	#5	

REBAR SCHEDULE

SIZE	MARK	LENGTH	NUMBER REQUIRED	
			TOP	BOTTOM
#3	STRAIGHT	1'-3"	6	6
#4	STRAIGHT	3'-5"	2	2
#4	312	4'-3"	4	-
#4	439	4'-7"	2	-
#4	440	4'-11"	2	-
#5	539	4'-10"	-	2
#5	540	4'-11"	-	2
#6	STRAIGHT	3'-7"	2	-
#6	STRAIGHT	3'-7"	2	-
#6	STRAIGHT	3'-7"	2	2

GENERAL NOTES

CONCRETE: f'_c = 3000 PSI (MIN.).

REINFORCING: #3 BARS - ASTM A-706, GRADE 60.
#4 BARS AND LARGER - ASTM A-706, GRADE 60

CONNECTIONS: BARS TO BE TACK-WELDED FOR ASSEMBLY AND HANDLING PURPOSES ONLY.

UNITED CONCRETE PRODUCTS, INC.
373 CHURCH STREET
YALESVILLE, CT 06492
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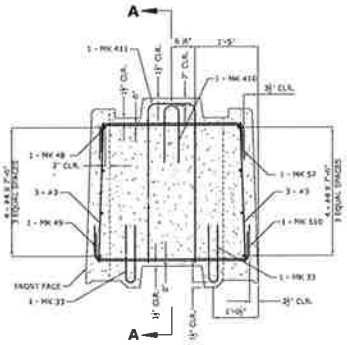
DOUBLEWAL RETAINING WALL SYSTEM

EVERSOURCE ENERGY
CUMBERLAND SUBSTATION 22B
GREENFIELD, MASSACHUSETTS

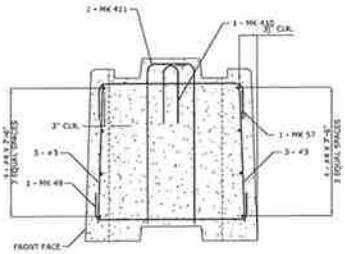
REINFORCING FOR
2' X 8' X 4'
DOUBLEWAL MODULES

DATE	7-12-23	SCALE	1" = 1'-0"
DRAWN BY	MMB	JOB NO.	EVERSOURCE ENERGY
CHK'D BY	DCM	22086	R1 of 8



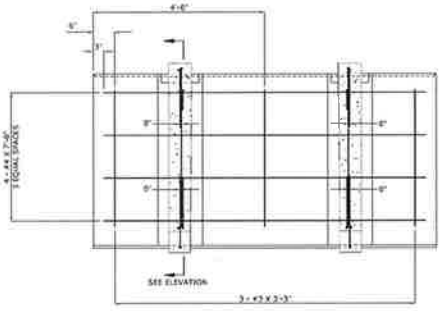
ELEVATION

STANDARD WALL MODULE

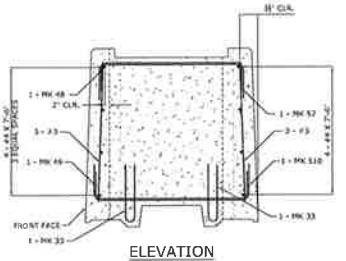


ELEVATION

BOTTOM WALL MODULE

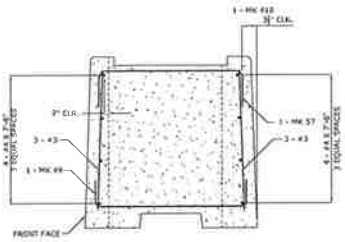


SECTION A-A



ELEVATION

TOP WALL MODULE



ELEVATION

TOP / BOTTOM WALL MODULE

MARK	SIZE
411	#4
48	#4
57	#5
410	#4
33	#3
49	#4
510	#5

REBAR SCHEDULE

SIZE	MARK	LENGTH	NUMBER REQUIRED			
#3	STRAIGHT	7'-3"	6	6	6	6
#4	STRAIGHT	7'-0"	8	8	8	8
#3	33	2'-8"	2	2	-	-
#4	49	4'-0"	2	2	-	-
#4	48	7'-0"	2	2	2	2
#3	410	2'-8"	2	-	2	-
#4	411	8'-4"	2	-	2	-
#5	57	4'-10"	2	2	2	2
#5	510	5'-10"	2	2	-	-

GENERAL NOTES

CONCRETE: f'_c = 5000 PSI (MIN.)

REINFORCING: #3 BARS - ASTM A-706, GRADE 60.
#4 BARS AND LARGER - ASTM A-706, GRADE 60

CONNECTIONS: BARS TO BE TACK-WELDED FOR ASSEMBLY AND HANDLING PURPOSES ONLY.

UNITED CONCRETE PRODUCTS, INC.
173 CHURCH STREET
YALESVILLE, CT 06492
TEL: (203) 269-3119
FAX: (203) 265-4944
WWW.UNITEDCONCRETE.COM

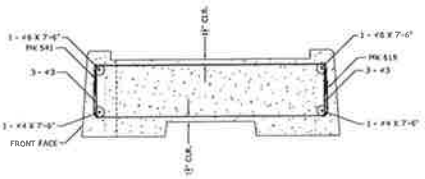
DOUBLEWAL RETAINING WALL SYSTEM

EVERSOURCE ENERGY
CUMBERLAND SUBSTATION 22B
GREENFIELD, MASSACHUSETTS

REINFORCING FOR
4' X 8' X 4'
DOUBLEWAL MODULES

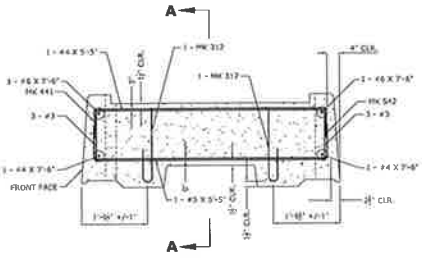
DATE	7-12-23	SCALE	1"=1'-0"
DES. BY	MMB	DWG. NO.	
CHK. BY	DCM		22086

R2 of 8



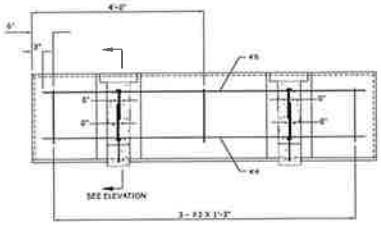
ELEVATION

TOP / BOTTOM WALL MODULE



ELEVATION

TOP WALL MODULE



SECTION A-A

MARK	SIZE	
312	#3	
441	#4	
541	#5	
542	#5	
619	#6	

REBAR SCHEDULE

SIZE	MARK	LENGTH	NUMBER REQUIRED TOP	NUMBER REQUIRED BOTTOM
#3	STRAIGHT	5'-3"	3	3
#4	STRAIGHT	7'-6"	3	3
#4	STRAIGHT	5'-5"	2	-
#4	441	6'-3"	2	-
#5	STRAIGHT	7'-6"	2	-
#5	541	8'-0"	-	2
#5	542	8'-0"	2	-
#3	312	2'-5"	4	-
#6	619	8'-0"	-	2
#4	STRAIGHT	7'-6"	2	2

GENERAL NOTES

CONCRETE: f'c = 5000 PSI (MIN.)

REINFORCING: #3 BARS - ASTM A-706, GRADE 60.
#4 BARS AND LARGER - ASTM A-706, GRADE 60

CONNECTIONS: BARS TO BE TACK-WELDED FOR ASSEMBLY AND HANDLING PURPOSES ONLY.

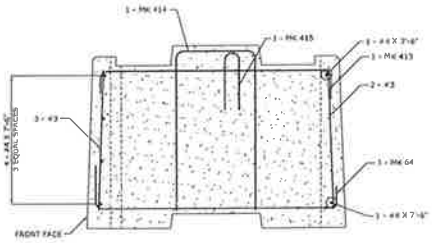
UNITED
CONCRETE PRODUCTS, INC.
173 CHURCH STREET
YALESVILLE, CT 06492
TEL: (203) 269-3139
FAX: (203) 265-4941
WWW.UNITEDCONCRETE.COM

DOUBLEWAL
RETAINING WALL SYSTEM

PROJECT: EVERSOURCE ENERGY
CUMBERLAND SUBSTATION 22B
GREENFIELD, MASSACHUSETTS

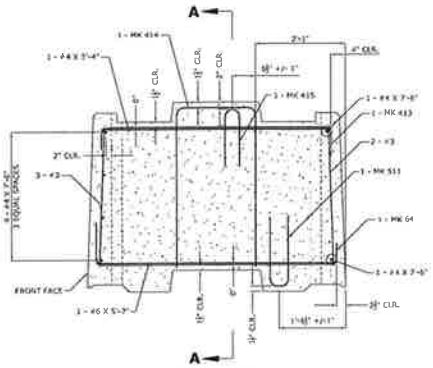
TITLE: REINFORCING FOR
2' X 8' X 6'
DOUBLEWAL MODULES

DATE	SCALE	DRAWING #
7-12-23	1"=1'-0"	
DES. BY: MMB	JOB NO. 22086	SHEET # R3 of 8
DWG BY: DCM		



ELEVATION

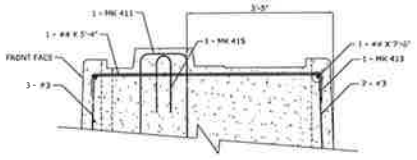
BOTTOM WALL MODULE



ELEVATION

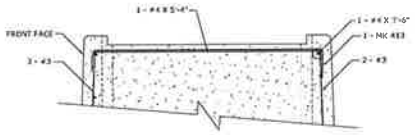
STANDARD WALL MODULE

MARK	SIZE	
411	#4	
413	#4	
414	#4	
415	#4	
511	#5	
64	#6	



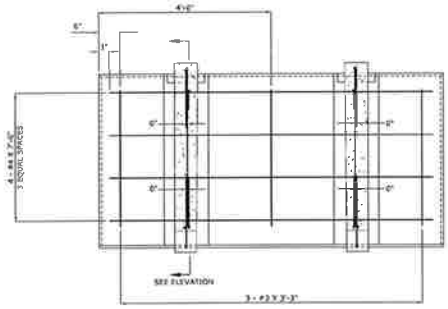
ELEVATION

TRANSITION WALL MODULE



ELEVATION

TOP WALL MODULE



SECTION A-A

REBAR SCHEDULE

SIZE	MARK	LENGTH	NUMBER REQUIRED					
#3	STRAIGHT	3'-3"	3	3	3	3	3	3
#4	STRAIGHT	7'-0"	6	6	6	6	6	6
#4	STRAIGHT	5'-4"	2	2	-	2	-	-
#4	STRAIGHT	3'-7"	2	2	-	2	-	-
#4	411	8'-4"	-	-	-	2	-	2
#4	413	5'-4"	2	2	2	2	2	2
#4	414	9'-1"	3	-	3	-	-	-
#4	415	2'-8"	2	-	2	-	-	2
#5	511	3'-3"	2	2	-	2	-	-
#6	64	6'-10"	2	2	2	2	2	2

GENERAL NOTES

CONCRETE: f'_c = 5000 PSI (MIN.)

REINFORCING: #3 BARS - ASTM A-706, GRADE 60.
#4 BARS AND LARGER - ASTM A-705, GRADE 60

CONNECTIONS: BARS TO BE TACK-WELDED FOR ASSEMBLY AND HANDLING PURPOSES ONLY.

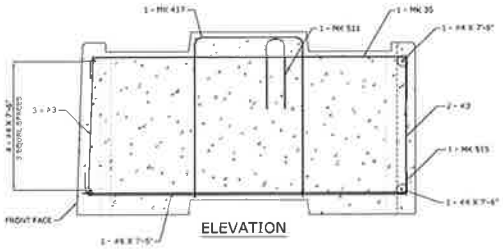
UNITED CONCRETE PRODUCTS, INC.
173 CHURCH STREET
PALESVILLE, CT 06459
TEL: (203) 269-3179
FAX: (203) 269-4941
WWW.UNITEDCONCRETE.COM

DOUBLEWAL RETAINING WALL SYSTEM

PROJECT: EVERSOURCE ENERGY
CUMBERLAND SUBSTATION 22B
GREENFIELD, MASSACHUSETTS

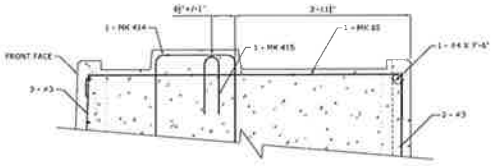
REINFORCING FOR
4' X 8' X 6'
DOUBLEWAL MODULES

DATE: 7-12-23 SCALE: 1"=1'-0"
DRAWN BY: MMB
CHK'D BY: DCM
JOB NO.: 22086
SHEET NO.: R4 of 8



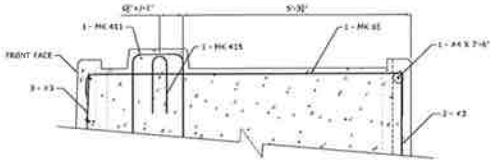
ELEVATION

BOTTOM WALL MODULE



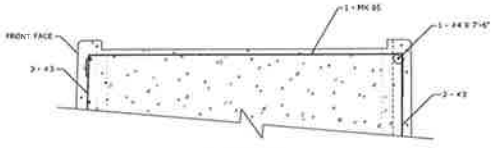
ELEVATION

TRANSITION WALL MODULE



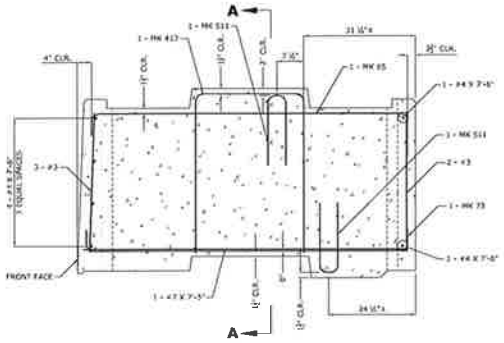
ELEVATION

DOUBLE TRANSITION WALL MODULE



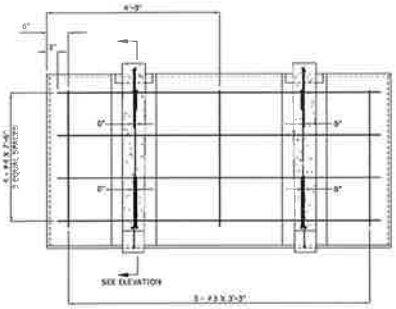
ELEVATION

TOP WALL MODULE



ELEVATION

STANDARD WALL MODULE



SECTION A-A

MARK	SIZE
35	#3
411	#4
414	#4
415	#4
417	#4
511	#5
515	#5
65	#6
73	#7

REBAR SCHEDULE

SIZE	MARK	LENGTH	NUMBER REQUIRED							
#3	STRAIGHT	3'-0"	1	1	1	1	1	1	1	1
#4	STRAIGHT	7'-6"	4	4	4	4	4	4	4	4
#5	STRAIGHT	1'-9"	-	-	2	-	-	2	2	2
#3	STRAIGHT	7'-5"	2	2	-	2	2	-	-	-
#3	35	8'-3"	-	-	2	-	-	2	2	2
#4	411	8'-4"	-	-	-	-	2	-	-	2
#4	414	9'-6"	-	-	-	2	-	-	2	-
#4	415	7'-6"	-	-	-	2	2	-	2	2
#4	417	7'-0"	2	2	2	-	-	-	-	-
#5	511	5'-5"	4	2	2	2	2	-	-	-
#5	515	8'-2"	-	-	2	-	-	2	2	2
#6	65	8'-10"	2	2	-	2	2	-	-	-
#7	73	8'-10"	2	2	-	2	2	-	-	-

GENERAL NOTES

CONCRETE: f'c = 5000 PSI (MIN.)

REINFORCING: #3 BARS - ASTM A-705, GRADE 60.
#4 BARS AND LARGER - ASTM A-706, GRADE 60

CONNECTIONS: BARS TO BE TACK-WELDED FOR ASSEMBLY AND HANDLING PURPOSES ONLY.

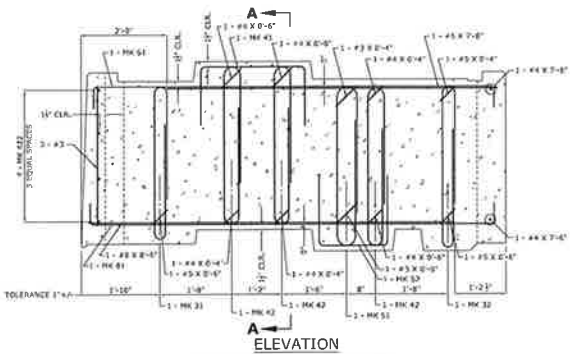
UNITED CONCRETE PRODUCTS, INC.
173 CHURCH STREET
YALESVILLE, CT 06492
TEL: (203) 269-3119
FAX: (203) 265-4941
WWW.UNITEDCONCRETE.COM

DOUBLEWAL RETAINING WALL SYSTEM

EVERSOURCE ENERGY
CUMBERLAND SUBSTATION 22B
GREENFIELD, MASSACHUSETTS

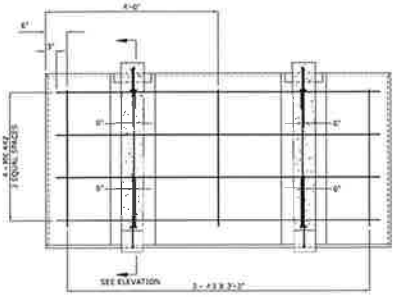
REINFORCING FOR
4' X 8' X 8'
DOUBLEWAL MODULES

DATE	7-12-23	SCALE	1"=1'-0"
DRAWN BY	MMB		
CHECKED BY	DCM	22086	R5 of 8

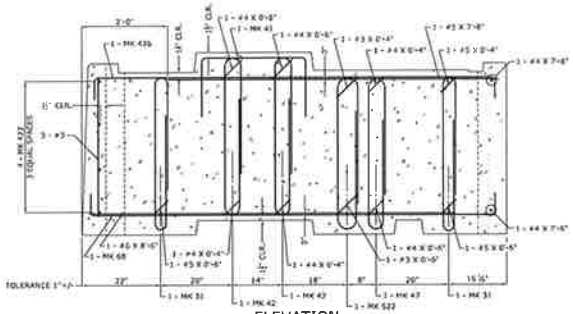


ELEVATION

STANDARD OR TRANSITION WALL MODULE

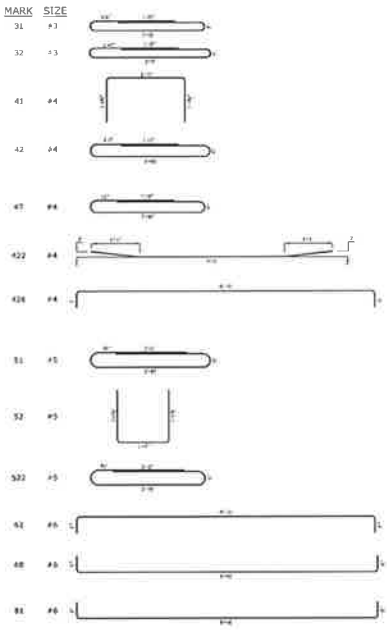


SECTION A-A



ELEVATION

STANDARD BOTTOM OR TRANSITION BOTTOM WALL MODULE



REBAR SCHEDULE

SIZE	MARK	LENGTH	NUMBER REQUIRED			
#3	STRAIGHT	6'-4"	2	2	2	2
#3	STRAIGHT	5'-4"	2	2	2	2
#3	STRAIGHT	3'-3"	3	3	3	3
#4	STRAIGHT	6'-4"	5	5	5	5
#4	STRAIGHT	5'-4"	5	5	5	5
#4	STRAIGHT	7'-5"	2	2	2	2
#4	STRAIGHT	6'-4"	2	2	2	2
#5	STRAIGHT	6'-4"	4	4	4	4
#5	STRAIGHT	7'-8"	-	-	2	2
#5	STRAIGHT	7'-8"	2	2	-	-
#5	STRAIGHT	8'-10"	-	-	2	2
#5	STRAIGHT	8'-5"	2	2	-	-
#5	51	9'-0"	2	2	4	4
#5	52	4'-6"	2	2	-	-
#5	53	5'-0"	2	2	2	2
#6	42	6'-5"	6	6	6	6
#6	47	7'-1"	-	-	2	2
#6	422	7'-0"	4	4	4	4
#6	426	10'-11"	-	-	2	2
#6	61	9'-11"	2	2	-	-
#6	68	4'-9"	2	2	2	2
#6	522	9'-7"	-	-	2	2
#6	81	10'-0"	2	2	-	-
#6	88	10'-11"	-	-	2	2
#6	82	9'-11"	2	2	-	-

GENERAL NOTES

CONCRETE: f'_c = 5000 PSI (MIN.)

REINFORCING: #3 BARS - ASTM A-706, GRADE 60.
#4 BARS AND LARGER - ASTM A-706, GRADE 60

CONNECTIONS: BARS TO BE TACK-WELDED FOR ASSEMBLY AND HANDLING PURPOSES ONLY.

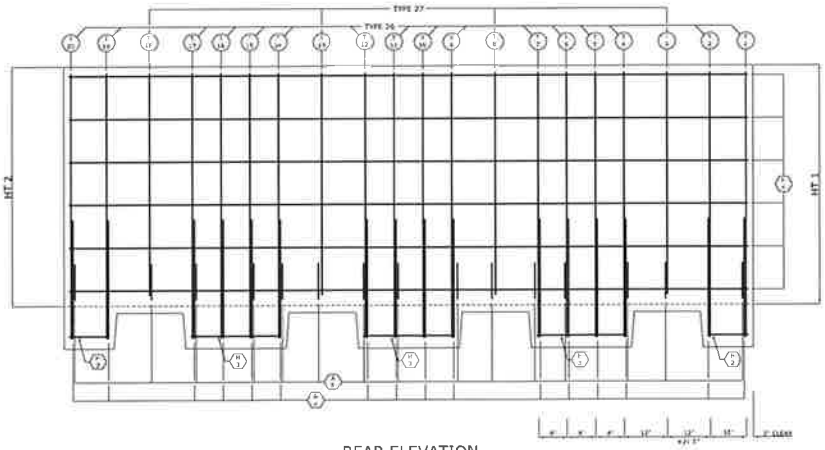
UNITED CONCRETE PRODUCTS, INC.
173 CHURCH STREET
VALLEYVILLE, CT 06489
TEL: (203) 269-3119
FAX: (203) 265-4941
WWW.UNITEDCONCRETE.COM

DOUBLEWAL RETAINING WALL SYSTEM

EVERSOURCE ENERGY
CUMBERLAND SUBSTATION 22B
GREENFIELD, MASSACHUSETTS

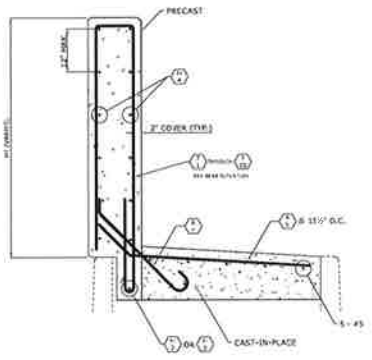
REINFORCING FOR
4' X 8' X 10'
DOUBLEWAL MODULES

DATE	SCALE	
7-12-23	1"=1'-0"	
DES. BY	PROJ. NO.	DRAWING NO.
MMB	22086	R6 of 8
DWG. BY		
DCM		

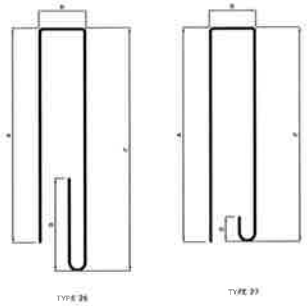


REAR ELEVATION
1" = 1'-0"

TYPICAL SPACING

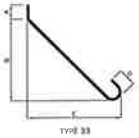


SECTION
SCALE: 1"=1'-0"



TYPE 26 TYPE 27

TYPE 47



TYPE 33

TRAFFIC BARRIER TYPE II-C REINFORCING BAR DETAILS

LABEL	TYPE	SIZE	LENGTH FT	LENGTH IN	LENGTH Q	A FT	A IN	A Q	B FT	B IN	B Q	C FT	C IN	C Q	D FT	D IN	D Q
A5	47	5	5	1	2	0	8	2	6	8	2	4	2	0			
A4	33	4	4	1	1	0	5	0	3	3	1	3	2	1	3	1	0
H4	STRAIGHT	5	RUN = 4'														
H2	STRAIGHT	4	0	10	0												
H3	STRAIGHT	4	3	8	0												
SEE REAR ELEVATION	26	5	VARIES			VARIES ①			0	11	0	VARIES ②			3	2	0
	27	5	VARIES			VARIES ①			0	11	0	VARIES ①			0	5	0

① HT + 4" ② HT + 8"

GENERAL NOTES

CONCRETE: f'c = 5000 P.S.I. (MIN.)

REINFORCING: #3 BARS - ASTM A-706, GRADE 60
#4 BARS AND LARGER - ASTM A-706, GRADE 60

CONNECTIONS: BARS TO BE TACK-WELDED FOR ASSEMBLY AND HANDLING PURPOSES ONLY.

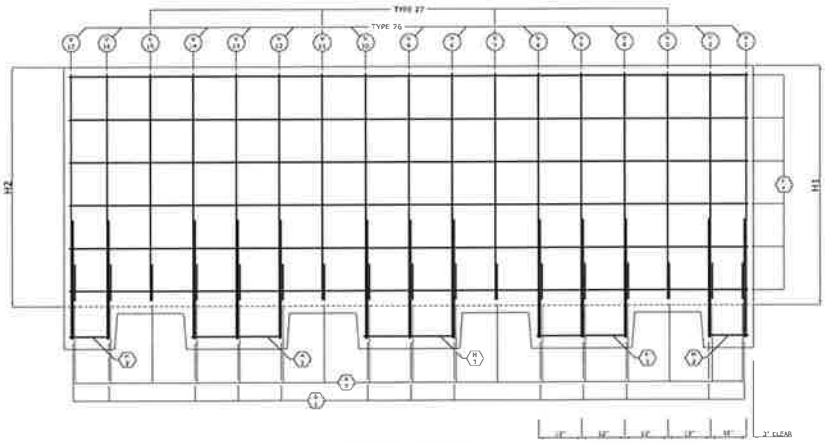
UNITED CONCRETE PRODUCTS, INC.
173 CHURCH STREET
YALESVILLE, CT 06492
TEL: (203) 269-3118
FAX: (203) 265-4941
WWW.UNITEDCONCRETE.COM

DOUBLEWAL RETAINING WALL SYSTEM

EVERSOURCE ENERGY
CUMBERLAND SUBSTATION 22B
GREENFIELD, MASSACHUSETTS

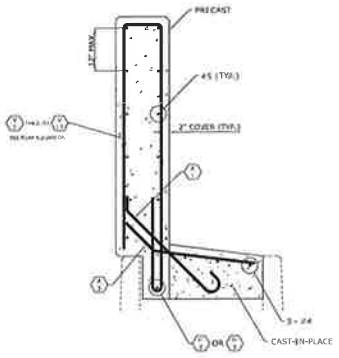
PRECAST CONCRETE TRAFFIC BARRIER
TYPE II-C
REINFORCING DETAILS

DWN:	7-12-23	SCALE: AS SHOWN	
DES. BY:	MMB	DET. BY:	
CHK. BY:	DCM	22086	R7 of 8

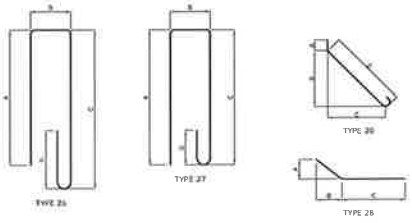


REAR ELEVATION
1" = 1'-0"

TYPICAL SPACING



SECTION
SCALE: 3/4" = 1'-0"



PRECAST COPING II-B REINFORCING BAR DETAILS

LABEL	TYPE	SIZE	LENGTH FT	LENGTH IN	LENGTH Q	A FT	A IN	A Q	B FT	B IN	B Q	C FT	C IN	C Q	D FT	D IN	D Q
A3	28	5	3	2	3	0	8	0	0	8	0	2	4	0			
A1	20	5	4	8	2	0	5	0	3	2	1	2	2	1	3	3	0
H4	STRAIGHT	5	RUN + 4"														
H2	STRAIGHT	4	5	10	0												
H3	STRAIGHT	4	2	9	0												
SEE REAR ELEVATION	26	5	VARIES			VARIES ①	2	11	0	VARIES ②	3	3	0				
	27	5	VARIES			VARIES ①	0	11	0	VARIES ①	0	5	0				

① HV + 4" ② HV + 8"

GENERAL NOTES

CONCRETE: f'_c = 5000 P.S.I. (MIN.)

REINFORCING: #3 BARS - ASTM A-706, GRADE 60
#4 BARS AND LARGER - ASTM A-706, GRADE 60

CONNECTIONS: BARS TO BE TACK-WELDED FOR ASSEMBLY AND HANDLING PURPOSES ONLY.

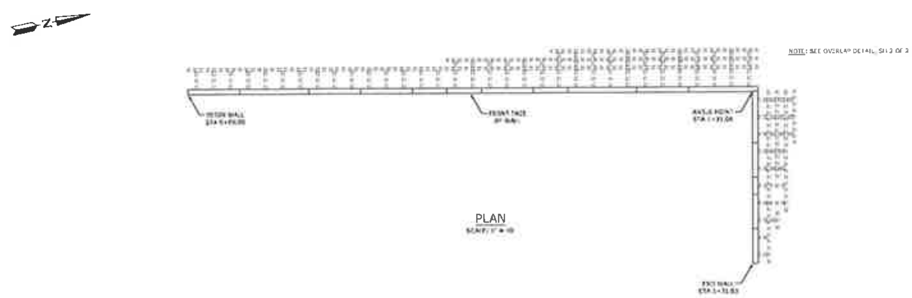
UNITED CONCRETE PRODUCTS, INC.
173 CHURCH STREET
WALLINGFORD, CT 06492
TEL: (203) 269-3119
FAX: (203) 265-4941
WWW.UNITEDCONCRETE.COM

DOUBLEWAL RETAINING WALL SYSTEM

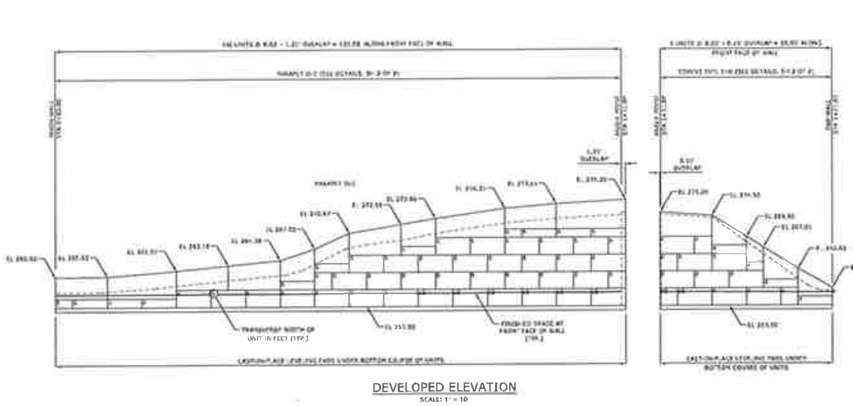
EVERSOURCE ENERGY
CUMBERLAND SUBSTATION 22B
GREENFIELD, MASSACHUSETTS

PRECAST COPING TYPE II-B
REINFORCING DETAILS

DATE:	7-12-23	SCALE: AS SHOWN	
DRN. BY:	MMB	JOB NO.:	
CHK. BY:	DCM	22086	R8 of 8



PLAN



DEVELOPED ELEVATION

SCALE: 1" = 10'

CONSTRUCTION METHODS

1. THE FOUNDATION BED FOR THE DOUBLEWAL PRECAST CONCRETE RETAINING WALL SHALL BE EXCAVATED AS REQUIRED AND SHALL BE APPROVED BY THE PROJECT ENGINEER BEFORE ERECTION IS STARTED.
2. IF UNSUITABLE MATERIAL IS ENCOUNTERED AT BOTTOM OF WALL LEVELING PADS, IT SHALL BE REMOVED AND REPLACED WITH COMPACTED MASSDOT DENSE GRADED SUBBASE.
3. LEVELING PADS SHALL BE CAST TO THE DIMENSIONS AND DETAILS INDICATED. WHEN TESTED WITH A 10' STRAIGHT EDGE, THE SURFACES SHALL NOT VARY MORE THAN ¼" IN 10' AND BE LEVEL.
4. THE PRECAST CONCRETE MODULAR UNITS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS AS SHOWN ON THE APPROVED SHOP DRAWINGS. SPECIAL CARE SHALL BE TAKEN IN SETTING THE BOTTOM COURSE OF UNITS TO TRUE LINE AND GRADE. WHILE ERECTING EACH SUBSEQUENT COURSE, LINE AND GRADE SHALL BE EXAMINED, AND DEVIATIONS SHALL BE CORRECTED TO PREVENT ACCUMULATIVE INACCURACIES IN ALIGNMENT.
5. CLOSED-CELL POLYETHYLENE FOAM ROD SHALL BE INSTALLED IN THE HORIZONTAL JOINTS OF THE FRONT FACE. PREFORMED CORK JOINT FILLER CONFORMING TO D-1752 (TYPE II) OR EQUAL, SHALL BE INSTALLED IN THE HORIZONTAL JOINTS AT LEVELING PADS.
6. ALL MODULAR UNITS ABOVE THE FIRST COURSE SHALL INTERLOCK WITH LOWER COURSES. VERTICAL JOINTS SHALL BE STAGGERED WITH EACH SUCCESSIVE COURSE. THE VERTICAL JOINT OPENING IN THE FRONT FACE OF THE WALL SHALL NOT EXCEED 3/4". A 12 INCH STRIP OF FILTER CLOTH (US FABRICS US180NW OR EQUAL) SHALL BE INSTALLED THE UNITS AT THE VERTICAL JOINTS OF THE FRONT FACE.
7. PERVIOUS STRUCTURE BACKFILL SHALL BE CLEAN SAND AND GRAVEL, BE MINUS 6 INCH SIZE, AND SHALL NOT CONTAIN MORE THAN 15% PASSING A NO. 200 SIEVE. 3/4" STONE MAY BE USED AS PERVIOUS STRUCTURE BACKFILL IF FILTER FABRIC IS PLACED BETWEEN STONE AND WALL BACKFILL.
8. DOUBLEWAL UNITS SHALL BE FILLED, ONE COURSE AT A TIME, WITH PERVIOUS STRUCTURE BACKFILL. UNITS 4 FEET OR LESS IN HEIGHT SHALL BE FILLED IN ONE LAYER AND THEN THOROUGHLY CONSOLIDATED WITH A VIBRATORY TAMPING DEVICE. UNITS WHICH ARE MORE THAN 4 FEET IN HEIGHT SHALL BE FILLED IN TWO APPROXIMATELY EQUAL LAYERS AND THEN THOROUGHLY CONSOLIDATED AFTER EACH LAYER IS PLACED.
9. PLACEMENT OF BACKFILL BEHIND THE WALL SHALL FOLLOW ERECTION AND FILLING OF THE UNITS. AT NO TIME SHALL THE DIFFERENCE IN [illegible] ELEVATION BETWEEN THE [illegible] OF THE WALL EXCEED [illegible] FEET.

BASIS OF DESIGN

THE DESIGN OF THE DOUBLEWAL PRECAST WALL IS BASED ON THE FOLLOWING ASSUMED LOADS, SOIL DATA, AND ALLOWABLE BEARING CAPACITY.

MINIMUM FACTORS OF SAFETY USED IN THE ANALYSIS ARE:

F.S. OVERTURNING = 2.0
F.S. SLIDING = 1.5

1. LATERAL EARTH PRESSURE:

THE WALL HAS BEEN DESIGNED USING THE [illegible] METHOD AND THE FOLLOWING SOIL CHARACTERISTICS:

125 PCF = UNIT WEIGHT OF BACKFILL
100 PCF = UNIT WEIGHT OF INSIDE FILL
34 DEGREES = ANGLE OF INTERNAL FRICTION
20 DEGREES = ANGLE OF FRICTION BETWEEN WALL AND BACKFILL
0 PSF = C, COHESION
0.50 = COEFFICIENT OF FRICTION (CONCRETE ON SOIL)
0.55 = COEFFICIENT OF FRICTION (SOIL ON SOIL)
0.60 = COEFFICIENT OF FRICTION (CONCRETE ON CONCRETE)

2. SURFACE LIVE LOADS:

A 0.250 KSF LIVE LOAD SURCHARGE WHERE APPLICABLE.

3. HORIZONTAL IMPACT LOAD (PARAPET ONLY):

HORIZONTAL IMPACT LOAD TO BE 10 KIPS AT TOP OF PARAPET, PER AASHTO REQUIREMENTS, WHERE APPLICABLE.

4. ALLOWABLE BEARING CAPACITY:

ALL FOUNDATIONS DESIGNED FOR A MAXIMUM BEARING CAPACITY OF 4.5 KSF. DEPARTMENT TO VERIFY BEARING CAPACITY.

DESIGN CHECK NOTES

1. [illegible]
2. [illegible]
3. [illegible] OF OTHERS.
4. THE INTEGRITY OF THE FOUNDATION IS BASED ON THE FORCES INDICATED FROM THE ANALYSIS OF THE LOADS PRODUCING OVERTURNING AND SLIDING PLUS THE ALLOWABLE BEARING PRESSURE FURNISHED BY OTHERS.
5. THE DESIGN SHOWN ON THESE DRAWINGS IS BASED ON ALIGNMENT AND TOPOGRAPHY INFORMATION PROVIDED BY OTHERS.
6. DESIGN HAS BEEN CHECKED FOR CONFORMANCE TO "BASIS OF DESIGN", FURNISHED BY OTHERS.
7. ONLY DRAWINGS WITH SIGNED SEAL ARE CERTIFIED.

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173 CHURCH STREET
YALESVILLE, CT 06492
TEL: (203) 269-3119
FAX: (203) 265-4941
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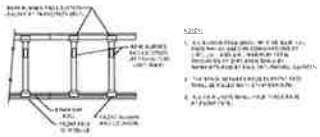
DOUBLEWAL RETAINING WALL SYSTEM

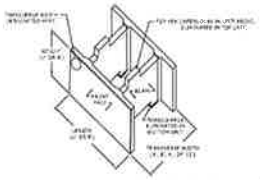
EVERSOURCE ENERGY
CUMBERLAND SUBSTATION 22B
GREENFIELD, MASSACHUSETTS

PROPOSED DOUBLEWAL
RETAINING WALL
PLAN & ELEVATION

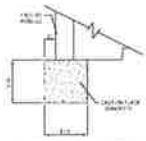
DATE: 7-12-23	SCALE: AS SHOWN		
DRAWN: MMB	PROJECT NO.: 22086		
CHECKED: DCM		SHEET: 1 of 2	



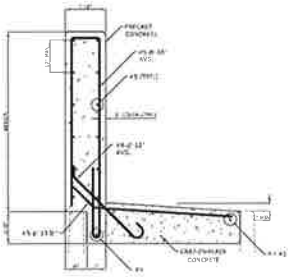
UNIT PLAN VIEW



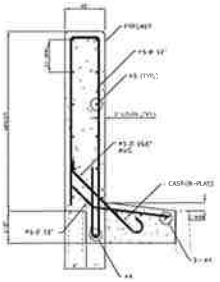
STANDARD DOUBLEWAL MODULE



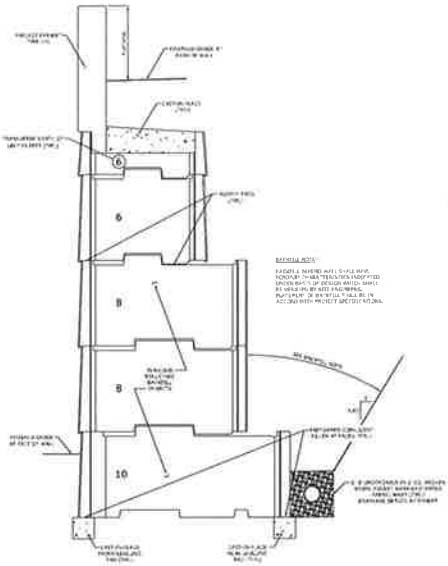
C-I-P LEVELING PAD DETAIL



PRECAST PARAPET TYPE II-C

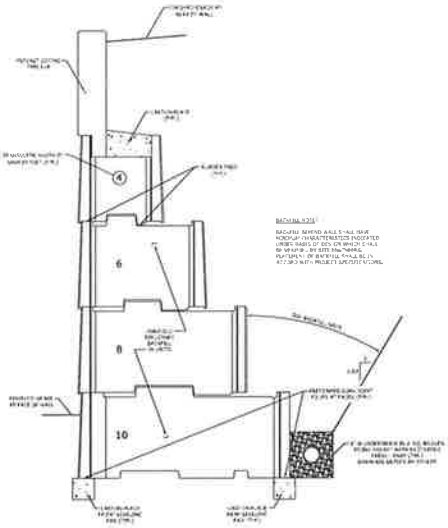


PRECAST COPING TYPE II-B



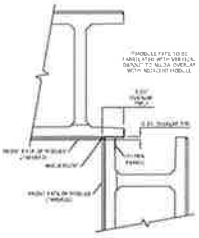
TYPICAL SECTION WITH PARAPET

SCALE: 1" = 1'

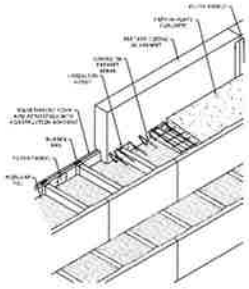


TYPICAL SECTION WITH COPING

SCALE: 1" = 1'



MODULE OVERLAP DETAIL



TYPICAL ISOMETRIC

UNITED CONCRETE PRODUCTS, INC.	DOUBLEWAL RETAINING WALL SYSTEM
173 CHURCH STREET YALESVILLE, CT 06492 TEL: (203) 259-3119 FAX: (203) 265-4941 WWW.UNITEDCONCRETE.COM	EVERSOURCE ENERGY CUMBERLAND SUBSTATION 22B GREENFIELD, MASSACHUSETTS
	PROPOSED DOUBLEWAL RETAINING WALL TYPICAL SECTIONS & DETAILS
DATE: 7-12-23	SCALE: AS SHOWN
DRAWN: MMB	JOB NO.
CHECKED: DCM	22086

EVERSOURCE ENERGY

2 of 2

EXHIBIT 7

CONSTRUCTION & MAINTENANCE ENVIRONMENTAL REQUIREMENTS

Best Management Practices Manual for Massachusetts and Connecticut

APRIL 2022

Prepared for:
Eversource Energy Environmental Licensing and Permitting Group

EVERSOURCE

TABLE OF CONTENTS

Section 1 Introduction

Section 2 Project Planning

Section 3 Construction Considerations

Appendices

A BMP Typical Details

SECTION 1

Section 1
Introduction

1.1 Purpose

As a matter of Eversource Energy (herein, "Eversource") policy with regard to environmental stewardship and in accordance with local, state, and federal regulations, all construction and maintenance projects shall use environmentally sound best management practices (BMPs) to minimize or eliminate environmental impacts that may result from construction activities. Regardless of whether a specific permit is needed for the work, construction and maintenance projects must follow internal environmental performance standards, which is the purpose of these BMPs.

In many cases, maintenance activities are exempt from regulatory authorization. Permits are usually required for new work. Contractors will be provided with copies of any project-specific permits and will be required to adhere to any and all conditions of the permit(s). Project-specific permit conditions may supersede the BMPs outlined in this manual. However, where certain construction elements are not addressed by permit conditions, or where permitting is not required, or for emergency situations where obtaining a permit before the work occurs may not be feasible, these BMPs shall be considered as Eversource's standards. In some cases, and at the discretion of the Eversource Environmental Licensing and Permitting staff, the BMPs presented herein may be modified to be more appropriate for site-specific conditions.

1.2 Scope and Applicability

These BMPs primarily address the disturbance of soil, water, and vegetation incidental to construction within on- and off-road utility corridors, substations, including the establishment of access roads and work areas, within rights of way (ROWs) and on private property, in and near wetlands, watercourses, or other sensitive natural areas (such as protected species), including storm drain systems (e.g., catch basins). Types of construction include, but are not limited to, installation or maintenance of underground and overhead utilities, access road repair/improvement or construction, and upgrades or maintenance of substations and other facilities. Other common construction issues such as noise, air pollution, oil spill procedures, handling of contaminated soils, and work safety rules are addressed in the Eversource Energy Contractor Work Rules and related appendices.

1.3 Definitions

The following definitions are provided to clarify use of common terms throughout this document.

Best Management Practice (BMP): A means to reduce and minimize impact to natural resources.

Casing: A galvanized steel corrugated pipe that serves as the form for a utility structure foundation.

Emergency Projects: Actions needed to maintain the operational integrity of the system or activities necessary to restore the system and affected facilities in response to a sudden and unexpected loss of electric or gas service or events that affect public health and safety.

Embedded Culvert: A culvert that is installed in such a way that the bottom of the structure is below the stream bed and there is substrate in the culvert.

Environmentally Sensitive Areas: An area containing natural features, cultural resources, or ecological functions of such significance to warrant protection. Some examples are rivers, streams, ponds, lakes, wetlands, rare species habitat, water supply protection areas, archaeological sites, parks, and agricultural land.

Erosion Control: A measure to prevent soil from detachment and transportation by water, wind, or gravity.

Existing Access Roads: Previously permitted or grandfathered access roads that are used to access structures that are clearly visible or can be found by mowing or by the presence of road materials in soil cores.

Grubbing: A site preparation method that is used to clear the ground of roots and stumps.

Intermittent Watercourse: An intermittent watercourse, or stream, is broadly defined as a channel that a flowing body of water follows at irregular intervals and does not have continuous or steady flow. Regulatory definitions for intermittent watercourses are:

- **Connecticut** – Per the Connecticut Inland Wetland and Watercourses Act, intermittent watercourses are delineated by a defined permanent channel and bank and the occurrence of two or more of the following characteristics: (A) Evidence of scour or deposits of recent alluvium or detritus, (B) the presence of standing or flowing water for a duration longer than a particular storm incident, and (C) the presence of hydrophytic vegetation.
- **Massachusetts** – Under the Massachusetts Wetlands Protection Act (MAWPA), a jurisdictional intermittent watercourse is defined as a body of running water which moves in a definite channel in the ground due to a hydraulic gradient, does not flow throughout the year, and which flows within, into or out of an area subject to protection under the MAWPA. Intermittent watercourses upgradient of any Bordering Vegetated Wetlands or Ponds are not jurisdictional under the MAWPA. A watercourse can be determined to be intermittent if it meets MAWPA criteria with regard to its depiction on the most current USGS topographic map of the area (i.e., shown as intermittent or not shown), and watershed size and predicted flow rates as determined by the USGS StreamStats method or documented observations of no flow at least once per day over the course of four days in any consecutive 12-month period barring drought conditions, withdrawals, or other human-made flow reductions or diversions (subject to conservation commission and/or MassDEP review and approval).

Limit of Work/Disturbance: The boundaries of the approved project within regulated areas. All project related activities in regulated areas must be conducted within the approved limit of work/disturbance. The limit of work/disturbance should be depicted on the approved permit site plans, which may require the limits to be survey located and identified in the field by flagging, construction fencing, and/or perimeter erosion controls.

Low Ground Pressure Vehicle: Vehicles that have a lesser impact on an environmentally sensitive area due to the vehicle being smaller, lighter, or different in another way than a vehicle which would have a greater impact. Low ground pressure is

measured in pounds per square inch (psi) when loaded and as defined by the US Army Corps of Engineers (ACOE).

CT = < 3 psi

MA = < 3 psi

Low impact vehicles could include off-road vehicles (ORVs) or all-terrain vehicles/ utility vehicles (ATVs/UTVs), tracked vehicles with low ground pressure, or vehicles with oversized balloon-type tires.

Maintenance Projects: Typically consist of activities limited to the repair and/or replacement of existing and lawfully located utility structures and/or facilities where no substantial change in the original structure or footprint is proposed. Maintenance activities also include vegetation management.

Minimization: Causing as little disturbance to an area as practicable during construction.

New Construction: Construction of new transmission or distribution facilities that previously did not exist or construction that substantially modifies existing facilities. All new (and existing) construction projects are required to go through a full permit review by Eversource Environmental Licensing and Permitting.

Pre-Construction Notification (PCN): Project activities that do not qualify for Self-Verification (SV) or where otherwise required by the terms of the Massachusetts (MA) and Connecticut (CT) General Permits (GPs) must submit a PCN and obtain written verification before starting work in ACOE jurisdiction. Refer to MA and CT GPs for PCN thresholds. Projects that cannot be completed under a PCN must file for an Individual Permit with the ACOE. In CT, for coastal projects, notification is provided to ACOE by the CT Department of Energy and Environmental Protection (CT DEEP), Office of Long Island Sound Programs (OLISP) or by applicants as necessary. Written approval from ACOE is required.

Protected Species: Species named and protected under the Massachusetts Endangered Species Act (MESA) regulations and/or the Connecticut Endangered Species Act (C.G.S. §§ 26-303 through 26-315).

Rare Species: *See Protected Species.*

Restoration: To return a disturbed area to its former, original or unimpaired condition. A site is considered fully restored when it has returned (as closely as practicable) to its original state. Restoration of disturbed areas should occur as soon as practicable following the completion of activities at that location.

Revegetation: Establishment of plant material for temporary or permanent soil stabilization.

Right of Way (ROW): A pathway, road, or corridor of land where Eversource has legal rights (either fee ownership, lease, or easement) to construct, operate, and maintain an electric power line and/or natural gas pipeline.

Sediment Control: The practice of managing the erosion of soil materials mobilized by water, typically stormwater runoff, on-site for the purpose of protecting nearby wetland and water resources.

Self-Verification (SV): Activities that are eligible for SV are authorized under the MA and CT GPs and may commence without written verification from the ACOE provided the prospective permittee has:

i. Confirmed that the activity will meet the terms and conditions of applicable MA and CT GPs.

ii. Submitted the Self-Verification Notification Form (SVNF) to the ACOE.

In CT, coastal projects do not require filing of a SVNF. ACOE relies on CT DEEP submittals.

Sensitive Environmental Area: For the purposes of this BMP Manual, this term shall be inclusive of all wetlands, streams, waterways, waterbodies, buffer zones, rare species habitat, and historical/cultural resources.

Stabilization: A system of permanent or temporary measures used alone or in combination to minimize erosion from disturbed areas.

Work: For the purposes of this BMP Manual, any form of temporary or permanent draining, dumping, damming, discharging, excavating, filling or grading; the erection, reconstruction, replacement or expansion of any buildings or structures; the driving of piles; the construction or improvement of roads and other ways; the changing of run-off characteristics; the intercepting or diverging of ground or surface water; the installation of storm drain systems (e.g., catch basins); the discharging of pollutants; the destruction of plant life; and any other changing of the physical characteristics of land including, but not limited to: on- and off-road utility corridors and substations. Types of work include but are not limited to the installation or maintenance of underground and overhead utilities, substations and other facilities.

1.4 Acronyms and Abbreviations

The following acronyms and abbreviated are provided to clarify use of common terms throughout this document.

All-terrain Vehicle	ATV
Best Management Practice	BMP
Certified Vernal Pool	CVP
Connecticut	CT
Connecticut Department of Energy & Environmental Protection	CT DEEP
Connecticut Department of Transportation	ConnDOT
Connecticut General Statute	Conn. Gen. Stat.
Cross-Linked Polyethylene	XLPE
Eastern Box Turtle	EBT
Environmental Affairs Department	EAD
Eversource Energy	Eversource
General Permits	GPs
Geographic Information System	GIS
High-Pressure Fluid-Filled	HPFF
Horizontal Directional Drilling	HDD
Kilovolt	kV
Massachusetts	MA
Massachusetts Department of Agriculture	MA DAR
Massachusetts Department of Conservation and Recreation	MA DCR

Massachusetts Department of Environmental Protection	MassDEP
Massachusetts Endangered Species Act	MESA
Massachusetts Wetlands Protection Act	MAWPA
Massachusetts General Law	M.G.L.
Natural Diversity Database	NDDB
Natural Heritage and Endangered Species Program	NHESP
New England Cottontail	NEC
Off-Road Vehicle	ORV
Outstanding Resource Water	ORW
Pounds per Square Inch	psi
Pre-Construction Notification	PCN
Right of Way	ROW
Self-Verification	SV
Self-Verification Notification Form	SVNF
Species	spp.
Time of Year	TOY
United States	U.S.
United States Army Corps of Engineers	ACOE
United States Department of Agriculture	USDA
United States Geologic Survey	USGS
Utility Vehicle	UTV
Vegetation Management Plan	VMP

1.5 BMP References

The following table lists the public guidance documents utilized during the preparation of this BMP manual. Refer to these documents for additional information.

BMP References
General
Best Management Practices (BMPs) Manual for Access Road Crossings of Wetlands and Waterbodies, EPRI, Palo Alto, CA (2002) 1005188.
Gas Research Institute. Horizontal Directional Drilling Best Management Practices Manual (2002) ENSR Corporation, Westford, MA and Trenchless Engineering Corp., Houston, TX.
Connecticut
Connecticut Department of Transportation (ConnDOT). ConnDOT Drainage Manual (October 2000) http://www.ct.gov/dot/cwp/view.asp?a=1385&Q=260116

BMP References

Connecticut Standard Specifications for Roads, Bridges and Incidental Construction, FORM 816 (2004) http://www.ct.gov/dot/cwp/view.asp?a=3609&q=430362

Connecticut Department of Energy & Environmental Protection. Connecticut Guidelines for Erosion and Sediment Control. (2002) http://www.ct.gov/deep/cwp/view.asp?a=2720&q=325660&deepNav_GID=1654%20

Connecticut Department of Energy & Environmental Protection, Bureau of Natural Resources, Division of Forestry. Best Management Practices for Water Quality While Harvesting Forest Products (2012) https://portal.ct.gov/-/media/DEEP/forestry/best_management_practices/BestPracticesManualpdf.pdf

Regulations of Connecticut State Agencies (RCSA). Control of Particulate Matter and Visible Emissions. Section 22a-174-18. https://eregulations.ct.gov/eRegsPortal/Browse/RCSA/Title_22aSubtitle_22a-174Section_22a-174-18/

Massachusetts

Commonwealth of Massachusetts Department of Public Works Standard Specifications for Highways and Bridges (2020) https://www.mass.gov/doc/2020-standard-specifications-for-highways-and-bridges/download

Massachusetts River and Stream Crossing Standards (Revised March 1, 2011) https://www.nae.usace.army.mil/Portals/74/docs/regulatory/StreamRiverContinuity/MA_RiverStreamCrossingStandards.pdf

Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas. Original Print: March 1997. *Reprint: May 2003*. https://www.mass.gov/doc/complete-erosion-and-sedimentation-control-guidelines-a-guide-for-planners-designers-and/download

The Massachusetts Unpaved Roads BMP Manual (Winter 2001) https://www.mass.gov/doc/unpaved-roads-bmp-manual/download

The Massachusetts Anti-Idling Law. M.G.L. Chapter 90, Section 16A and 310 CMR 7.11. https://www.mass.gov/doc/massdep-faq-the-massachusetts-anti-idling-law/download

SECTION 2

Section 2
Project Planning

After undergoing an initial screening review by the department conducting the proposed project, if sensitive environmental areas are identified, the project is required to go through a permit review by Eversource Environmental Licensing and Permitting. The permit review process is supported by Geographic Information Systems (GIS) or a similar program that references the most current spatial data for the project areas in question. Through the GIS review process various geo-processing tools are used to compose maps and provide a spatial reference to environmentally sensitive areas. In consultation with Eversource Environmental Licensing and Permitting, the Project Engineer, permitting specialist, or other project planner should determine regulatory jurisdiction and which (if any) environmental permits or approvals are required before starting any project. Questions regarding which activities may be conducted in regulated areas or within environmentally sensitive areas should be referred to Eversource Environmental Licensing and Permitting. Summaries of potentially applicable laws and regulations are provided in Appendices B and C of this document.

Eversource employs a best practice mitigation hierarchy to 1) avoid environmental impacts wherever possible, followed by 2) minimization of environmental impacts where they cannot be avoided, and 3) mitigating and restoring any environmental impacts where necessary.

2.1 Regulated Areas

2.1.1 Types of Wetlands

Wetland areas common to New England and common to both Connecticut and Massachusetts include, but are not limited to, the following:

Forested Wetlands

Forested wetlands are wetlands that are dominated by trees that are 20 feet or taller. These wetlands are typically drier with standing water typically occurring during periods of high precipitation, seasonally high groundwater, snowmelt, and runoff (e.g., early spring through mid-summer). Tree species typical of this type of wetland include red maple (*Acer rubrum*) and eastern hemlock (*Tsuga canadensis*). "Pit and mound" topography is common in forested wetlands, where mature trees grow on the higher and drier mounds and obligate wetland species are found in the lower pits.

Scrub-Shrub Wetlands

Scrub-shrub wetlands are dominated by woody vegetation less than 20 feet tall and may include peat bogs. Typical bog species include leatherleaf (*Chamaedaphne calyculata*), cotton grasses (*Eriophorum* sp.), cranberry (*Vaccinium macrocarpon, V. oxycoccus*), and black spruce (*Picea mariana*). Other non-bog scrub-shrub wetlands are characterized by buttonbush (*Cephalanthus occidentalis*), alders (*Alnus* spp.), dogwoods (*Swida* spp.), and arrowwoods (*Viburnum* spp.).

Marshes

Marshes are dominated by erect, herbaceous vegetation and appear as grasslands or stands of reedy growth. These wetlands are commonly referred to by a host of terms, including marsh, wet meadow, or fen. These areas are flooded all or most of the year and, in New England, tend to be dominated by cattails (*Typha* spp.).

Wet Meadows

Typical wet meadow species include grasses such as bluejoint (*Calamagrostis canadensis*) and reed canary grass (*Phalaris arundinacea*), sedges (*Carex* spp.) and rushes (*Juncus* spp.), and various other forbs such as Joe-Pye-weeds (*Eutrochium* spp.) and asters (*Aster* spp.).

Floodplains

A floodplain is generally defined as an area of low-lying ground adjacent to a stream or river that is formed mainly of river sediments and is subject to inundation from floodwaters. State-specific regulatory definitions vary and are described as follows:

- In Connecticut, areas that contain alluvial or floodplain soils are regulated as wetlands. These areas may flood so infrequently or be so freely drained that hydrophytic vegetation and hydric soils are not present. Soils in these areas must be examined carefully to determine whether well drained alluvial or floodplain soils are present.
- In Massachusetts, a floodplain is a type of wetland resource area that floods following storms, prolonged rainfall, or snowmelt. There are three types of floodplain areas protected under the MAWPA: coastal areas, areas bordering rivers and streams, and isolated depressions that flood at least once a year.

Streams

A stream is any natural flowing body of water that empties to any ocean, lake, pond or other river. Perennial streams, or rivers, have flows throughout the year. Intermittent streams do not have surface flows throughout the year, though surface water may remain in isolated pockets.

Vernal Pools

Vernal pools are typically contained basin depressions lacking permanent aboveground outlets. These areas fill with water with the rising water table of fall and winter and/or with the meltwater and runoff of winter and spring snow and rain. The pools contain water for a few months in the spring and early summer. Due to periodic drying cycles, vernal pools do not support breeding fish populations and can thus serve as breeding grounds for a variety of organisms, including some rare and/or protected species of frogs and salamanders.

2.1.2 Rare Species

Utility ROWs within Connecticut and Massachusetts overlap with, and in some circumstances create or enhance, habitat of rare/protected species of plants, vertebrate and invertebrate animals. Special requirements may need to be evaluated as part of new construction and/or some maintenance activities.

2.1.3 Historical/Cultural

Other regulated factors taken into consideration during the project planning process include the presence of protected (i.e., threatened or endangered) species, non- native, invasive plant species and/or historical/cultural resources. Special requirements may need to be evaluated as part of new construction and/or some maintenance activities.

2.2 Meetings

A pre-construction meeting is typically held prior to the commencement of all work with the purpose to appoint responsible parties, discuss timing of work, and further consider options to avoid and/or minimize disturbance to sensitive areas. The meeting confirms that there is consensus on work methods and responsibilities and ensures that tasks will be fulfilled with as little disturbance to the environment as practicable. These meetings can occur on or off-site and should include all the applicable stakeholders (i.e., Eversource, contractors, consultants, inspectors and/or monitors, and regulatory agency personnel). A short and less formal briefing should suffice for smaller maintenance projects.

2.3 Site Staging and Parking

During the project planning and permitting process, locations should be identified for designated crew parking areas, material storage, and staging areas. Where possible, these areas should be located outside of buffer zones, watershed protection areas, and other environmentally sensitive areas. Any proposed locations should be evaluated for all sensitive receptors and for new projects requiring permitting, should be incorporated onto permitting and access plans.

2.4 Construction Monitoring

Construction projects require environmental monitoring, which can be conducted either internally or by consultants. Some permitted projects require oversight by designated and pre-approved compliance monitors. Environmental monitoring is a way to keep a chronological record of pre-construction site conditions, progress, and changes that are made, as well as to document issues and authorized solutions.

If work will occur in a sensitive environmental area, permit conditions may dictate that construction be monitored by a qualified and pre-approved wetland or wildlife specialist.

2.5 Signage/Limit of Boundaries

Where appropriate, wetland delineation flagging or signage shall be installed that makes clear where critical boundaries (i.e., the limits of jurisdictional wetland resource areas, rare species habitat, and/or historical/cultural resources) and setbacks occur. Appropriate signage shall also be installed to indicate regulatory authorization by agencies and to prohibit certain uses on ROWs, such as ORV traffic.

Where appropriate, signage shall be installed along sediment and erosion control barriers at appropriate intervals, heights, and sizes to ensure that the presence and location of said barriers is clear to construction personnel during deep snow or other low visibility conditions. Inspection and maintenance of this signage shall be conducted on a regular basis to ensure effectiveness.

Examples of signage at wetlands

SECTION 3

Section 3
Construction Considerations

This section addresses BMPs specific to construction of new access roads, repair of existing access roads, the installation of work pads, structure-related work, and soil stockpile management. Information regarding recommended erosion and sedimentation controls or stormwater controls is also discussed. Please refer to Appendix A for typical details and representative photographs of BMPs used for erosion and sedimentation control and water diversion during construction.

During all project activities (e.g., maintenance, new construction), federal, state, and local regulatory authorities require steps be taken to avoid, minimize, and/or mitigate disturbance to the environment. Sensitive environmental areas should be avoided whenever practicable. However, some projects may require entrance into these areas in order to perform work. This section discusses measures that should be taken to minimize disturbance to if work must occur within sensitive environmental areas.

BMPs were developed to aid in this process and should be carefully selected and implemented based on the proposed activities and the nature of sensitive area(s) encountered at each site. Proper selection of BMPs should take into consideration the project goals, permit requirements, and site-specific information. Once an assessment of the area is made and requirements of the project are established, all BMPs should be considered and implemented as appropriate.

3.1 Avoidance and Minimization

Avoidance and minimization should always be considered before beginning any construction or maintenance project. Eversource and their contractors should utilize appropriate measures to avoid construction impacts to sensitive environmental areas including, but not limited to: wetlands, waterways, rare species habitats, known below and above ground historical/archeological resources, and other environmentally sensitive areas. Use existing ROW access whenever practicable. Keep to approved routes and roads and do not widen or deviate from them. Consult with the Eversource Environmental Licensing and Permitting Group, when avoidance is not practicable, to determine measures to minimize the extent of construction impacts. Alternate access routes and/or staging areas that will minimize construction impacts to the natural environment may be considered.

3.2 Rare Species Habitat

Eversource Environmental Licensing and Permitting coordinates with state and local agencies when work is within areas designated as rare and/or sensitive species habitat.

In order to protect these resources in Connecticut, the following must be reviewed:

- Natural Diversity Database (NDDB) area mapping.
- Critical Habitat mapping.
- Eversource's New England Cottontail (NEC) BMP map.
- Prior NDDB Determinations.

The NDDB mapping is updated approximately every six months and is posted on the State's GIS data download webpage. The Critical Habitat mapping is less frequently updated and also on the State's GIS data download page. Eversource's NEC BMP map and mapping which depicts prior NDDB Determinations shall be provided through Eversource Environmental Licensing and Permitting.

In Massachusetts, Eversource has an annual Operations and Management Plan (OMP) which is updated and renewed at the start of each calendar year with the Natural Heritage Endangered Species Program (NHESP) which designates Priority Habitat (PH) in the State. All work in PH requires review of and compliance with the OMP which may include consultation with NHESP. The OMP establishes guidelines for work within known rare species habitat based on the type of species presence. These guidelines may include time of year (TOY) restrictions or similar measures to avoid impacts to rare species.

Regardless of the State in which construction is taking place, the following shall be employed in all mapped, State-listed species and designated Critical Habitat areas:

- Make every effort to avoid impacts to known populations of State-listed plants and other stationary resources.
- Limit permanent impact through the use of temporary construction matting as opposed to gravel for access road and work pad construction.
- If State-listed resources cannot be avoided, mitigation planning shall be discussed with Environmental Licensing and Permitting.
- Consider time-of-year (TOY) restrictions to avoid impact to sensitive resources during critical life stages including but not limited to nesting season for ground and shrub nesting birds, pup rearing season for bats (if tree removal is necessary), flowering and seeding times for State-listed plants.

Certain species, including the timber rattlesnake (*Crotalus horridus*), are one of the few venomous species in New England which can be a threat to worker safety. Protection measures provided by the respective State agency shall be followed and may require snake sweeps by a qualified herpetologist, contractor education, and field demarcation of hibernacula/known rattlesnake dens.

3.3 Hiking Trails

The following practices shall be implemented in the event project areas intersect or overlap with recreational hiking trails.

- Avoid using hiking trails as access roads or access routes for vehicles and equipment.
- If a hiking trail must be used for vehicle or equipment access coordination with Eversource Vegetation Management Compliance or Oversight staff and/or Eversource Environmental Licensing and Permitting staff is required prior to use.
- Utilize existing access roads to cross hiking trails to the maximum extent practicable.
- If no existing access roads exist and a hiking trail must be crossed, minimize trail crossings by designating one location for use by equipment.
- Signs, barriers, spotters or other means to alert the public to the work shall be

implemented.

- Stockpiling logs and other cut material within 25 feet of hiking trails is not allowed unless approved by Eversource Vegetation Management Compliance or Oversight staff.
- Spreading wood chips on hiking trails is not allowed unless approved by Eversource Vegetation Management Compliance or Oversight staff.
- At the end of each workday all cut material must be removed from hiking trails.
- As soon as possible after work is complete disturbed portions of hiking trails shall be returned as close to pre-construction condition as possible. This may include hand raking, hand cutting of stumps and/or hand removal of cut vegetation.
- If any trees that are marked for trail navigation must be cut, the property manager or trail maintainer must be notified.
- Posts or other markers that are used for trail navigation shall be protected at all times. Replacement in kind shall be completed by the contractor if disturbed or damaged during completion of the work.

3.4 Work on State-owned land in Connecticut

For all work on State of Connecticut-owned land as depicted on the "DEEP Property" data layer available through the State's GIS data download page, matting shall be employed to the greatest extent possible. Gravel access roads and work pads shall only be installed when terrain prohibits the installation of matting. All work must be coordinated through Eversource Environmental Licensing and Permitting for acquisition of necessary authorization prior to the start of construction on State-owned properties.

3.5 Historic/Cultural Resources

Historic and cultural resources are diverse and include, but are not limited to, archaeological sites, historic structures, historic districts, stone walls, and ceremonial stone landscapes. Construction activities near or within significant resources are subject to restrictions outlined in any site or project-specific avoidance/protection plans. The locations of archaeological sites and other sensitive resources such as ceremonial stone landscapes and burials are considered confidential and may only be disclosed on a need-to-know basis.

3.5.1 Stone Walls

Stone walls can be considered significant resources for a number of reasons including unique construction methods, their function as a property boundary, their association with other historic resources such as archaeological sites or farmsteads, and/or their importance to the underlying landowner(s). Non-impact methods of managing work and access near stone walls should always be prioritized and removal, dismantlement, or other alterations to stone walls should be avoided, when possible. Non-impact methods of managing work near stone walls include:

- Avoiding the stone wall altogether - This may involve re-routing an access road or selecting a new access point. Care should be taken not to incur additional impacts to other sensitive environmental areas (e.g., wetlands or rare species habitat).
- Traversing the wall through an existing breach - In this scenario, the breach is

used as-is and the breach is not widened or expanded in any way.

- Traversing the wall using timber matting to temporarily bridge over the wall (e.g., "air bridge") - Although the construction of individual air bridges will vary depending on the surrounding topography, the height of the wall, and the individual operator, the timber mats should not touch the stone wall on any side, and a sufficient air gap between the top of the stone wall and the timber matting directly above should be left to ensure the stone wall is not damaged during the passage of heavy machinery. Before and after photographs of the portion of the stone wall to be crossed should be taken and provided to Eversource Environmental Licensing and Permitting.
- Elevating work pads near stone walls using timber matting - If work pads cannot be reduced in size to avoid stone walls, timber matting may be used to elevate the work pad, or portions thereof, above the stone wall to avoid impacts. None of the timber mats should be in contact with the stone wall and before and after photographs of the stone wall should be taken.

If implementation of the four non-impact measures noted above is not feasible and either temporary or permanent alterations to a stone wall are necessary, Eversource Environmental Licensing and Permitting must be contacted prior to any alterations occurring to secure the appropriate permissions. These permissions may take several weeks to secure and may require input from the cultural resources consultant or Eversource Real Estate and/or Legal Departments.

Prior to alteration, proper documentation of the wall should be obtained and provided to Eversource Environmental Licensing and Permitting. At a minimum, this effort should include recording the following:

- Wall dimensions (total length, width, average height)
- Any existing breaches
- Wall location and general orientation on project maps

Photographs (including a scale, if possible) should also be taken of the entire wall clearly showing all sides, with increased attention on any areas of the wall that will be modified (e.g., expanded breaches) or will need to be rebuilt. The removal of dense vegetation along the stone wall prior to photography is highly recommended.

Once permissions to alter a stone wall and appropriate documentation have been secured, the following BMPs should be followed during alteration and rebuilding:

- While it is preferred that alterations be conducted by hand following traditional dry stone construction methods, construction machinery may be used when appropriate to the level of effort required and taking care not to unreasonably scratch or mar the stones or to begin excavating into soils underneath the wall.
- Any removed stones should be stockpiled nearby, outside any identified sensitive environmental areas such as wetlands or rare species habitat.
- When rebuilding, the wall should be reconstructed in the same location as the original and should match the original wall as closely as possible; if present, it is preferred that weathered/moss-covered surfaces are exposed.
- When alterations/rebuilding is complete, additional photographs from all sides should be taken and provided to Eversource Environmental Licensing and

Permitting.

3.5.2 Unanticipated Discoveries

During construction activities, most notably ground disturbing activities such as excavation, trenching, or grading, it is possible to discover previously unknown archaeological resources. Any specific procedures outlined in project-specific documents such as Post-Review Discoveries or Unanticipated Discoveries Plans should be followed. If such documents do not exist and a contractor encounters an unanticipated discovery, the contractor shall immediately notify the Eversource Construction Representative/Supervisor, secure the site, and not restart work in the area of the discovery until after the Eversource Senior Cultural Resources Program Administrator has granted clearance.

3.6 Human Remains

In the event human remains are encountered, the contractor must immediately stop work and notify the Eversource Construction Representative/Supervisor, secure the site, and ensure that the remains are treated with the utmost dignity and respect. The remains should be covered and left undisturbed along with any associated artifacts. No photography of the remains is allowed and work will not resume in the area of the discovery until after the Eversource Senior Cultural Resources Program Administrator has granted clearance. In addition to these preliminary guidelines, all relevant state laws and guidelines, including, but not limited to, the Massachusetts Unmarked Burial Law (M.G.L. Chapter 38, Section 6) and the Connecticut Human Burials Law (Conn. Gen. State. Sec 10-388) must be adhered to.

3.7 Vernal Pools

Construction within and across wetlands and in proximity to vernal pools should be limited to the extent practicable to avoid working in the periods between April 1st and June 1st. This will allow for obligate vernal pool species to emigrate to the breeding areas, deposit egg masses, and allow for hatching and development of juveniles. Silt fence should be installed at the limits of the construction to prevent individual reptiles and amphibians from entering the workspace, but in a manner that does not impede movement to and from pools from adjacent forested uplands. Consider installing syncopated silt fencing.

Protection Measures

When performing construction activities in proximity to vernal pools, a number of protection measures should be implemented.

Vegetation Removal

- Maintain existing scrub-shrub vegetation (consistent with ROW vegetation management requirements) within 25 feet of vernal pools, except in areas where access roads and work pads must be installed.
- Minimize removal of low growing (scrub-shrub) vegetation surrounding vernal pools by utilizing construction matting where access is needed. If vegetation must be cut adjacent to vernal pools, the cut vegetation (slash) should be left in place to serve as recruitment for leaf litter and coarse woody debris.

Erosion and Sedimentation Control

- Where the potential for sediment intrusion and runoff into a vernal pool exists, sedimentation and erosion controls shall be installed.
- Promptly remove erosion and sedimentation control devices upon final revegetation and stabilization of the ROW.

Access Roads

- Use construction mats, corduroy roads, or clean materials (i.e., clean riprap, gravel, stone or equivalent and rock fords) in locations where existing on-ROW access roads must be improved and are adjacent to vernal pools.
- Man-made depressions along existing on-ROW access roads provide low-quality vernal pool breeding habitat (due to an insufficient hydroperiod). Access roads must be graded and/or improved to accommodate project construction vehicles which may eliminate these depressions and the associated potential for amphibian breeding habitat. Perform improvements to on-ROW access roads outside of the breeding and migration seasons of vernal pool species to avoid direct impacts to amphibians that may breed in the man-made depressions along existing on-ROW access roads.

Scheduling and Site-Specific Considerations

- To the extent practicable (and in consideration of circuit outages and other construction timing constraints), schedule access road and work pad installation in and around vernal pool habitats to minimize interference with amphibian breeding and migration seasons.
- For project activities that must occur adjacent to vernal pools during amphibian migration periods, implement measures on a site-specific basis to facilitate unencumbered amphibian access to and from vernal pools. Consider the site-specific conditions including the type of construction activity that will occur in proximity to a vernal pool, the amphibian species known to occur in the vernal pool, and seasonal conditions. Identify appropriate mitigation measures. Options to be evaluated to allow amphibian access to vernal pools may include, but not be limited to: syncopated silt fencing in the immediate vicinity of vernal pools; elevated construction matting; and aligning erosion and sedimentation controls to avoid bifurcating vernal pool habitat.

3.7.1 Certified Vernal Pools (MA)

Encroachment upon Certified Vernal Pools (CVP) in Massachusetts should be avoided to the maximum extent practicable. CVPs are considered Outstanding Resource Waters (ORWs) in Massachusetts and are regulated under the 401 Water Quality Certification program. Consult with Eversource Environmental Licensing and Permitting.

3.8 Access Roads

Existing construction access roads are unpaved roadways that work crews use to access a site within a ROW. These access roads were generally either permitted previously or

constructed prior to the promulgation of regulations and are previously authorized under past general permits.

3.8.1 New Access Roads

New access roads are generally associated with new or large-scale projects that have separate permitting requirements. Construction of new access roads will be based on plans that are reviewed and approved by applicable federal, state, and local agencies. If a new access road is needed and not associated with a large project, notify Eversource Environmental Licensing and Permitting to make a decision on best access routes and identification of the necessary permits and approvals required to construct the new road. **Permit requirements must be followed**.

3.8.2 Existing Access Roads

The travel surface width of access roads in upland areas is not to exceed 16 feet. This does not include side slopes. Maintenance of existing access roads includes mowing of vegetation, grading, placement/replacement of stone, and the installation/maintenance of erosion control features (e.g., water bars, swales, sedimentation basins).

When access roads are in wetlands, measures should be taken to avoid disturbance to wetlands, waterways, and other sensitive environmental areas. If avoidance is not practicable, then measures should be taken to minimize the extent of disturbance. Alternate access routes should always be considered. Below is a list of methods that should be considered where disturbance is necessary:

- Minimize the width of typical access roads through wetlands. If an existing access road is evident in the wetland based on the presence of previously imported road-building materials (e.g., crushed stone), the existing width of the access road must be maintained. If unable to ascertain the original width of the access, then do not make the road wider than 16 feet (including side slopes).
- To the extent practicable, use low-impact vehicles and/or vehicles with low ground pressure when driving through wetlands.
- Coordinate the timing of work to minimize impacts during the regulatory low-flow period under normal conditions, when water/ground is frozen, after the spring songbird nesting season, and outside of the anticipated amphibian migration window (mid- February to mid-June). The ACOE defines the low-flow periods for streams as follows:
    - Connecticut streams—July 1 through September 30
    - Massachusetts non-tidal streams—July 1 through February 28
    - Massachusetts tidal streams—November 16 to February 15
- Use construction mats in wetlands to minimize soil disturbance and rutting when work needs to occur during non-frozen ground conditions.
- If practicable, conduct work manually if warranted (decision to be made by the Eversource Project Team).

Existing access roads are characterized by a clear dominance of imported fill material to a depth of at least three inches. When determining the presence and extent of an existing access road, soil probes shall be advanced as necessary to establish the boundary between fill and native soil. In some cases, hydrophytic vegetation may have become established or ponding may occur within the limits of imported fill. In these cases, the clear and

consistent presence of fill along a distinguished route is considered a previously authorized fill. Where the existing access road is not evident, Eversource Environmental Licensing and Permitting must be consulted to make a determination whether stone can be placed in the wetland. If stone is not evident, through soil cores, hand digging or other methods, construction mats must be used. If permanent access is warranted through the wetland, the new access road will need to have a permitting review and will likely require permits.

The access road in the wetland should not exceed 16 feet in width (unless there is evidence that the road was originally wider than 16 feet).

Over time, existing access roads require maintenance and repair. Travel by construction equipment and general traffic to reach a particular portion of the ROW must be via the designated access road and route. Changes in the location of the access road or the use of alternate roads must be reviewed and approved by the Eversource Project Team prior to their construction or use. Access road routes were selected to prevent degradation of the utility corridor, and must be constructed, used, and maintained in accordance with this BMP Manual, as well as federal, state, and local requirements, and other project plans.

In some situations, it may be necessary to construct redundant access roads, this practice should be avoided to the extent practicable. Some appropriate reasons for suggesting alternate routes are:

- Poor site conditions along preferred route because of weather or season.
- Property rights constraints, or property owner's preference.
- Equipment requirements.
- Unanticipated off-site access limitations along existing roads.

Unanticipated access opportunities (e.g., ice, snow, other developments) which may avoid environmental disturbance and/or reduce cost.

General Design: New and Existing Access Roads

Construction access roads that require new grading and/or filling or are to be heavily used require the creation of a stable, load-bearing surface resistant to erosion. If the existing soil and subsoil are not well drained, it may be necessary to import an aggregate road base (i.e., gravel borrow) such as that meeting the requirements of aggregate found in the:

- *Commonwealth of Massachusetts Department of Public Works Standard Specifications for Highways and Bridges*, Section 400
- Connecticut *Standard Specifications for Roads, Bridges and Incidental Construction*, Section M1.02

When the construction access road follows the same route as the permanent design road, establishing the grades and subgrade for the permanent roadway early in the construction sequence is recommended.

The travel surface of construction access roads shall typically not exceed 16 feet in width except for passing points, where necessary. Subgrading shall not extend beyond the space required for the finished road and normal side slopes.

Where practicable, construction access roads should conform to the contours of the land,

avoiding grades steeper than 10 percent and creating side slopes no steeper than a ratio of 2:1. If the side slopes are steeper than 2:1, then use of engineered slope stabilization methods may be necessary. Consider the volume and type of construction traffic as well as the extent that natural ground must be altered to accommodate the traffic. If no grading is required and traffic is sporadic (i.e., access roads used to maintain utility lines) the measures used may be limited to water bars, or some top dressing with gravel or stone in areas where the vegetation over soft soil is destroyed by traffic.

During wet weather, these roadways can generate significant quantities of sediment if not constructed with adequate stormwater management and erosion control measures. During active construction or maintenance activities, inspection of the construction access road and associated erosion and sedimentation measures should be conducted by the person(s) designated at the pre-construction meeting, should occur regularly while the activity is occurring, and repairs to controls should be made in a timely matter. Repairs may include re-grading and/or top dressing the traveled surface with additional aggregate to eliminate ruts, as well as those repairs required by each erosion and sedimentation measure used. When the roadway is no longer needed on a regular basis, the access road should be reviewed to ensure that the road is left in a condition that prevents future erosion and sedimentation (e.g., installation of water bars, gravel). In some cases, permit conditions may require that the access road be removed and that the disturbed area be restored (e.g., seeded and mulched) in accordance with applicable permits as required to match the pre-construction conditions.

Erosion and Sedimentation Controls

Construction personnel are reminded to control erosion and flow conditions during access road construction or maintenance activities by utilizing the following erosion and sedimentation measures which are described and illustrated further in Appendix A:

- **Outlet protection**, a **level spreader**, a **trench breaker**, a **sediment trap or basin**, or a **stone check dam** may be used to de-energize concentrated flows from diversions and in temporary channels.
- **Geotextile silt fencing**, **compost filter berms**, **straw wattles** and **straw bale barriers** may be utilized to provide protection at the toe of fill slopes and discharges from water bars.
- Side slopes can be protected by installing **erosion control blankets** and **seeding** the area with a fast-growing native or annual grass mix.
- **Dust control** should be employed when construction access road conditions create airborne dust.
- **Geotextile fabric** shall be used beneath all new fill and construction entrances, where needed.

The use of hay and/or hay products is strictly prohibited.

The use of nylon and/or plastic netting is strictly prohibited.

3.8.3 Best Management Practices – New Access Roads

The following are BMPs that are applicable to new access roads in uplands and are described at the following tabs:

Construction Entrance Track Pad (see Figure A01 in Appendix A)

Stormwater Management BMPs (includes Water Bars [Figure A02], Drainage Swales [Figure A03], and Sedimentation Basins [Figures A38-A41] in Appendix A)

Construction Entrance Track Pad

Applications: Erosion and sedimentation control, roadway protection

Limitations:

- Maintenance is required if the pad becomes clogged with soil.
- Muddy conditions may warrant the use of a tire wash station.

Overview:

Where access roads or construction areas connect to paved roads, a stone track pad must be installed at the construction entrance to prevent construction machinery from tracking soil onto paved roadways. Materials appropriate to construction site soil conditions should be employed and/or replenished, as necessary.

Installation:

- Use 3- to 6-inch washed stone to install stone tracking pads at a minimum length of 50 feet and a minimum depth of 12 inches.
- On sites with clayey soils, underlay stone tracking pads with a geotextile liner to prevent the stone from sinking into the soil.

Maintenance:

- Periodically inspect the stone in the entrance track pad. If the pad becomes clogged with soil, remove and refresh and/or clean stone.

Additional Comments:

If muddy conditions warrant the use of a tire wash station, procedures should be established to ensure soils are not tracked off site.

Where appropriate and when safety and environmental conditions are considered, vehicle tires or tracks may be spun quickly ("burn out") on the track pad to further facilitate the removal of soil.

Water Bar

Applications: Erosion and sedimentation control

Limitations:

- Should never be used to direct a watercourse into another waterbody or to divert unfiltered runoff to a wetland.
- Can impede vehicular movement.
- Damage from vehicle traffic and stormwater flow may require water bars to be reinstalled/reworked at the beginning and end of each construction season.

Overview:

Water bars are linear features built diagonally across access roads or ROWs to redirect stormwater runoff away from the road surface at non-erosive intervals. In general, they consist of a trench dug at least 6 inches below grade followed by an earthen mound at least 6 inches above grade. Use water bars to prevent erosion on sloping roadways less than 100 feet wide. Water bars must be designed to be stable throughout their useful life and meet the criteria in the table below. The maximum capacity should be the peak runoff from a 10-year storm.

Installation:

- Set water bar direction to utilize stable outlets and do not allow upslope water bar runoff to converge with down slope water bars. Water bars should be directed into well vegetated upland areas, sediment basins, or other erosion and sedimentation controls (e.g., straw bales, silt fence) as needed.
- Construct the bar immediately after vegetation has been cleared on constant or slightly increasing grades, not exceeding 2%. Avoid reverse grades.
- Mark the location and width of the ridge and disk the entire length.
- Fill ridge to above the design height and compact with wheeled equipment to the design cross section.
- Construct sediment traps or outlet stabilization measures, as needed.
- After the area has been permanently stabilized, remove the ridge and channel to blend with the natural ground level.
- Seed and mulch diversions that are intended for use for more than 30 days.

Minimum Cross Section

Top Width (ft)	Height (ft)	Side Slopes
0	1.5	4:1
4	1.5	2:1

Maximum Recommended Spacing[1]	
Land Slope (%)	**Diversion Spacing (ft)**
< 5	125
5 to 10	100
10 to 20	75
20 to 30	50
> 35	25

[1] Recommendations for ROW widths less than 100 feet as per the Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas (MassDEP, March 1997).

Maintenance:

- Inspect each week and after rain events of 0.25 inches (MA) or 0.50 inches (CT) or greater, or more frequently per permit conditions or Eversource Environmental Licensing and Permitting. Repair damage caused by construction traffic or erosion.
- Remove accumulated sediment and debris from the trench and stabilize outlets.
- If necessary, repair ridge to a positive grade and cross section, and add gravel at crossing areas.
- Use routine inspections to determine if the original spacing is adequate or if additional water bars need to be constructed.

Drainage Swales

Applications: Convey stormwater away from work area and/or improve water quality and reduce peak runoff.

Limitations:

- Vegetated swales need to have adequately established vegetation before flow is diverted to them.
- Need to have adequate bottom stabilization to prevent scouring.

Overview:

Drainage swales usually consist of a ditch that is either vegetated or lined with riprap, erosion control blankets, or other materials. They are natural or constructed waterways/outlets that intercept, redirect, and convey stormwater away from the work area to a stable location and are used in areas where concentrated runoff would otherwise cause erosion/flooding. Swales can be used to reduce erosion in uplands and/or prior to discharge of stormwater flows to natural receiving waters (e.g., wetlands or streams). They also help to reduce surface flow velocity and turbidity.

Grass Lined Channels (Stabilized with vegetation)

- Use where vegetative lining will provide sufficient stability, slopes are less than 5%, and space is available for a wide cross section.

Installation:

- Remove trees, brush, and stumps.

- Excavate and shape channel to dimensions on plans. Overcut 0.2 ft for vegetative growth.
- Install temporary liner or riprap at inflows and stabilize outlets.
- Vegetate immediately after construction and divert water until grass establishes. Install matting if flow cannot be diverted.
- Install sod rather than seeding where slopes approach 5%.
- Spread topsoil to a minimum of 4 inches where soil conditions are unfavorable. Seeded channels should be mulched.

Vegetated Swales (Stabilized with dense vegetation)

- Use for water quality improvement and peak runoff reduction. Applicable for small drainage areas with relatively small amount of impervious cover. The grassed waterway is used to convey runoff at a non-erosive velocity. Dense vegetation can be established and a stable outlet constructed.

Installation:

- General design parameters are as follows: minimum capacity 10-year, 24-hour storm; design slopes to prevent erosion during the 2-year storm event; maximum side slopes 3:1; bottom width 2 to 8 feet.
- Vegetate with a native erosion control seed mix for use at moist sites and divert flow until established.

Riprap Lined Channels (Contains lining of riprap or stone)

- Use on sites where channel flow velocities exceed those acceptable for grass lined swales. Applicable where vegetative establishment is not possible or there are steep grades, wetness, highly erodible soils, seepage or prolonged base flow.

Installation:

- Remove trees, brush, and vegetation from channel area.
- Stabilize inlets and install outlet protection.
- Construct channel and install filter and lining as shown on plan.
- Use the maximum stone size for riprap plus thickness of filter.

Maintenance:

- Swales need to be routinely maintained to prevent brush/sediment buildup. Inspect swale regularly and after every rain event (0.25 inches (MA) or 0.50 inches (CT), or greater). Repair and/or re-seed rill or gully erosion. Remove accumulated sediments and brush before it reaches a depth of 6 inches.

Additional Comments:

- Depth and spacing of swales should be dependent on runoff conditions of the specific site.
- If required, install check dams constructed of riprap or other materials to slow flows along certain reaches of a swale.

- Remove temporary swales once construction is complete or areas are stabilized. If leaving swales in place will provide long-term benefits and be compatible with the ultimate use of the site, then they may remain in place.

Sedimentation Basins

Applications: Erosion and sedimentation control

Limitations:

- Traps and basins need to be adequately sized based on expected rain events and the contributing drainage area.

Overview:

Sediment traps and basins are used to filter and settle out suspended solids in stormwater runoff before water is released into a wetland or other unprotected and/or sensitive environmental area. A sediment trap is a temporary measure installed during construction to detain runoff, while a basin is a more permanent measure. Basins are also used where other erosion control measures are not adequate to prevent off-site sedimentation.

Sediment traps and basins should have three components: a forebay, a check dam, and a basin. Debris and some sediments begin to settle out of the water in the forebay. The stone or straw bale check dam filters more suspended solids as water flows through. The actual basin is a low-velocity pool where suspended solids settle out of the water column before the water is released at the outlet.

Based on the size of the project area, a qualified engineer may be required to calculate the appropriate size of the basin. State-specific guidance for basin sizing can be found in the following locations:

- Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas (Page 140); http://www.mass.gov/eea/docs/dep/water/esfull.pdf
- 2002 Connecticut Guidelines for Soil Erosion and Sediment Control (Section 5-11-1); http://www.ct.gov/dep/cwp/view.asp?A=2720&Q=325660.

Installation:

Drainage area of 5 acres or less:

- Install to direct stormwater runoff to the sedimentation trap or basin. Form basin by excavating a depression similar to a small pond or by placing an earthen embankment across an existing drainage swale or naturally low area.
- The ratio between the basin length and width should be greater than 3:1 (L:W). A ratio of 9:1 is recommended.
- Clear, grub, and strip all vegetation and root material from area of embankment and place embankment fill in lifts (<9"/lift, max). Compact fill and construct side slopes 2:1 or flatter. Excavate rectangular outlet section from compacted embankment.
- Filter fabric may be installed on bottom and sides of basin and covered by riprap.
- Extend outlet apron/spillway below toe of dam on level grade until stable conditions are reached (5 feet minimum). Cover inside face of stone outlet section with a 1-

foot layer of ½- to ¼-inch washed stone.

- Use permanent or temporary seeding to vegetate embankments, spillways, and disturbed areas downgradient of the basin.

Drainage area of 10 acres or less:

- Locate the basin in an easily accessible upland area, not a wetland area.
- Install the basin so that it intercepts the largest possible amount of runoff from the disturbed area.
- Divert sediment-laden water to the upper end of the sediment pool to improve trapping effectiveness.
- Basin should have a minimum volume based on ½-inch of storage for each acre of drainage area.
- Size basin to provide a minimum detention of 12 to 24 hours at the maximum runoff quantity expected for the duration of the basin's use.

Maintenance:

- Monitor the amount of sedimentation in the trap/basin. Install a stake with a marking at half the design depth. Remove sediment when it reaches this mark.
- Inspect after every rain event.
- Clean or replace the spillway gravel and re-seed/plant vegetation, as needed.
- Monitor embankment, spillway, and outlet for erosion. Repair erosion problems immediately.

Additional Comments:

Construction of sediment traps and/or basins should occur before primary construction on a project begins. They are often a critical stormwater management component for larger construction sites and/or those with poorly drained upland soils. If compatible with the post-construction site use, it may be appropriate to leave sediment basins in place indefinitely.

3.8.4 Construction in Wetlands

Access roads that are constructed in or across wetlands require the following considerations in addition to the considerations for access roads in uplands:

- Construction of new access roads in wetlands, whether temporary or permanent, that do not utilize construction mats (e.g., earthen and/or rock fill roads, corduroy roads) requires considerable project specific permitting and design. These types of projects should comply with project specific permits and plans, while only using this BMP manual as a general reference source. Permits often also require wetlands replication when permanent new access roads are constructed in wetlands.
- Avoid putting the construction access road in a wetland whenever practicable. Explore all feasible and prudent alternatives before determining that a wetland crossing is necessary. When avoidance is not practicable, consider crossings that will result in the least amount of disturbance. This may involve locating the construction access road so that it crosses the wetland at its narrowest width or uses areas previously disturbed for access or other purposes.

- Minimize the width of the temporary construction access road through the wetlands (generally no wider than 16 feet when using construction mats). It is preferable to have a passing point created before and after the wetland crossing, but internal passing points may be needed if the crossing is long or critical sight line restrictions exist.
- Construct access roads so that wildlife is able to pass under or go through the road. In areas where the road is only one construction mat thick, allow for passageways or "gaps" between construction mats. In locations where the access road is greater than one mat thick, install elevated construction mat road crossings or "bridges." Gaps and/or bridges are to be placed along the access road at intervals no less than 50 feet.
- Consider the soil conditions. Expect deep organic wetland soils to require geotextiles, construction mats, or other materials during use to keep imported road materials separated from wetland soils. In shallow organic or saturated soils, thick plywood sheets or AlturnaMATS® may be sufficient to support a stable travel surface for small, lightweight vehicles. In addition, in areas which are inundated or have deep organic wetland soils, it may be necessary to use more than one layer of construction mats.
- Prevent obstructions to surface and subsurface flow across and through the construction access road. Provide adequate drainage. This may require the use of crushed stone, a layer of log corduroy, construction mat bridges, or multiple cross culverts, particularly if the wetland does not contain a well-defined watercourse channel and/or the wetland crossing is long. If the wetland soils are susceptible to seasonal high groundwater tables or flooding, then give additional consideration for maintaining flows across and/or over the construction access road without causing erosion or siltation during such times.
- Plan in advance how the construction access road will be removed and the wetland restored. A road stabilization geotextile can facilitate the segregation of imported soils and crushed stone and/or log corduroy from the native wetland soils and make wetland restoration easier. However, after the end of an extensive project and a highly traveled crossing, stone removal from the wetland surface will still usually have to occur, even when placed in conjunction with geotextile.

In some cases, access roads may not need to be constructed in a wetland to gain access into or through a wetland if the work can be designed such that disturbances to the wetland are avoided or negligible. Options to be considered are presented below.

Equipment Selection and Usage:

- **Low ground pressure equipment -** Using equipment that reduces the pressure it exerts on the ground can minimize disturbance to sensitive areas. Employing the use of equipment with wide tires, rubberized tracks, and low ground pressure (<3 psi when loaded) can help minimize soil compaction.
- **Wide tires -** Increasing the width of tires will increase traveling surface area and therefore reduce the amount of ground compaction that the equipment will cause. Ultimately, this will reduce rutting, and allow for easier maneuvering of the vehicle. However, wide tires may be costly and will require a wider travel area.
- **Rubberized tracks -** Equipment with rubberized tracks spreads the weight of the vehicle over a much larger surface, reducing ground pressure and enabling the vehicle to move more freely through wet substrates. Each track can be between

1.5 and 3 feet wide, length depending on the width of the vehicle. This can greatly reduce rutting and allow the vehicle to move with less difficulty through wet substrates.

- **Lightweight equipment -** Disturbance in a wetland area can be lessened by reducing the size of equipment (e.g., ORVs, Gator™) used in sensitive environmental areas. This reduces the amount of pressure to the travel surface as well as the necessary width of access ways.

Timing of Work:

- **Work during frozen conditions**. Activities conducted once wetland areas are frozen can minimize rutting and other disturbance to the surrounding environment. Work during this time also generally reduces disturbance of aquatic and terrestrial wildlife movement by avoiding sensitive breeding and nesting seasons.
- **Work during the "low flow" period**. Conducting work during the low flow period can reduce disturbance to surface water and generally avoids spawning and breeding seasons of aquatic organisms. The ACOE defines the low-flow periods for streams as follows:
    - Connecticut streams—July 1 through September 30
    - Massachusetts non-tidal streams— July 1 through September 30
    - Massachusetts tidal streams—November 16 through February 15

Alternate Access:

- **Manual access** – Consider accessing work areas on foot through terrestrial areas and/or by boat through open water or ponded areas. Smaller projects (e.g., repairs to individual structures or parts of structures) do not categorically require the use of heavy machinery and should be accessed manually to the extent practicable.
- **Limit trips –** Multiple trips through a wetland have shown to increase the potential for damage and requirement for matting. Try to limit trip to one in and one out.

Use of overhead/aerial access (e.g., helicopters):

- Using overhead or aerial equipment can be expensive and is not always feasible, but it may be appropriate in some situations to get vehicles and other equipment to a site that may be otherwise very difficult to access. The use of overhead and/or aerial equipment may be beneficial for work in areas where large water bodies, deep crevices, or mountainous areas hinder ground access.

Erosion and Sedimentation Controls:

Construction personnel are reminded to control erosion and flow conditions during new access road construction by utilizing the following erosion and sedimentation measures which are described and illustrated further in Appendix A:

- **Straw wattles** [Figure A26 in Appendix A]**, geotextile silt fencing** [Figure A22 in Appendix A]**,** and **straw bale barriers** [Figure A21 in Appendix A] may be installed at the edges of earthen roads or construction mat roads to prevent erosion of soil into wetlands from the road fill or tracked soil on construction mats.
- In areas where silt fencing is required for more than one activity season, **syncopated silt fencing** [Figure A23 in Appendix A] may be installed to permit animal crossings.

- Side slopes of earthen roads can be protected by installing **erosion control blankets** [Figure A25 in Appendix A] and **seeding** [Figure A32 in Appendix A] the area with a fast-growing native or annual grass mix.
- **Dust control** should be employed as necessary when construction access road conditions create airborne dust when necessary. Refer to Section 3.16 of this BMP Manual.

Best Management Practices – Construction in Wetlands

The following are BMPs that are applicable to new access roads in wetlands and are described at the following tab:

Construction Mats (includes Elevated Construction Mats and AlturnaMATs®; see Figures A04 – A06 in Appendix A)

Permeable Road (see Figure A08 in Appendix A)

Dewatering (see Figures A39 – A41 in Appendix A)

Construction Mats (i.e., timber or swamp mats)

Applications: Wetland crossings, rut minimization

- Used for access where the ground surface is unstable due to shallow, standing water, saturated soils, or other substrates not suitable for heavy vehicles.

Limitations:

- Only for temporary use. Generally, mats should be removed upon construction completion.
- May float away in high water conditions.
- Need to be installed with heavy machinery.
- AlturnaMATs® limited to smaller vehicles and equipment.
- Equipment operators should remain cautious so as not to drive off or slip off the side of the mats.
- In winter, mats must be plowed and sanded or heated to prevent equipment from sliding off mats. Use of a deicing agent requires approval by Eversource Environmental Licensing and Permitting. Snow removal must be conducted in accordance with the Eversource Snow Removal BMP (refer to Section 3.15).

Installation:

- Place mats along the travel area without any gaps and so that each board is positioned perpendicular to the direction of traffic. Position mats so that they are offset far enough from the resource area so that ruts are not created when equipment enters and exits a sensitive area.
- Remove mats by "backing" out of the site and removing mats one at a time. Regrade soils to pre-existing contours while taking care not to compact soils.
- Clean mats after use to remove any invasive plant species seed stock. Cleaning methods may include, but are not limited to, shaking or dropping mats in a controlled manner with a piece of machinery to knock off attached soil and debris,

spraying with water or air, sweeping, or exposing the mats to high temperatures.

- Clean mats that were used in wetlands dominated by invasive species using brooms, shovels, and compressed air, if needed.

Additional Comments:

Construction mats installed in wetlands categorized as ORWs in Massachusetts must be underlain by non-woven geotextile, which can be placed directly on the ground surface beneath the first layer of matting or atop the first layer of matting if additional layers of mats are to be installed.

Lightweight, easy to maneuver alternatives to traditional mats are available. For example, AlturnaMATS® are half-inch thick polyethylene slip-resistant ground protection mats available in dimensions up to 4 feet by 8 feet and weigh between 21.5 and 86 pounds.

Mat anchoring may be required for matting installed in areas prone to flooding, such as stream crossings, shorelines of lakes and ponds, floodplains where known base flood elevations are 2 feet or greater above the ground surface, and tidal areas, and when mats will be in place in these areas for more than two weeks during hurricane season. The need for, and type of, anchoring should be coordinated with Eversource Environmental Licensing and Permitting. Examples of mat anchoring include:

- Linear ropes anchored using helical screws, manta ray anchors, or posts.
- Cable or report in chain pockets and run linearly.

Construction mat anchoring methods are illustrated in Figure A07 in Appendix A of this BMP Manual. Additional methods may be necessary depending on site and/or weather conditions.

Permeable Road (i.e., rock sandwich, French Mattress, or road with continuous cross-drainage)

Applications: Temporary wetland crossings, rut minimization

Limitations:

- Must be removed entirely at the end of construction unless project-specific permits have been obtained to allow for permanent wetland fill.
- Not appropriate for areas where concentrated, high volume and/or velocity water flow will intersect the road (i.e., stream crossings).
- Need to be installed with heavy machinery.
- Equipment operators should remain cautious so as not to drive or slip off the side of the road.

Overview:

Permeable roads are used for access in situations not suitable for heavy vehicle use often due to unstable ground surfaces with shallow standing water, saturated soils, or other unstable substrate. Installation of a permeable road can also help reduce the potential for frost action and pothole creation by preventing groundwater from wicking up into the road fill material.

Installation:

- Cover existing soil with a geotextile fabric prior to road construction. Excavation of existing soil is generally not recommended in order to minimize impacts to the resource area. Construct road on top of the soil surface, as shown on the typical on the next page. Drainage layer materials include 3- to 6-inch rock (12-inch minimum depth) or log corduroy (2-inch minimum diameter).
- Install the road so that it is offset far enough from the resource area so that ruts are not created when equipment enters and exits a sensitive area.
- Remove road by "backing" out of the site and removing road one section at a time. Regrade soils to pre-existing contours while taking care not to compact soils.

Maintenance:

- Regularly inspect and clean edges of cross-drainage layer along the sides of the road to prevent clogging by debris, leaf litter, sediment, etc.

3.8.5 Watercourse Crossings

There are a number of BMPs that can be used to minimize disturbance to streams. For each application, consider the site and project needs to select a method that is cost effective and will incur the fewest secondary disturbances. Additional erosion and sedimentation controls (e.g., straw bales) may be required in conjunction with the stream crossing BMPs to protect sensitive areas. The stream crossing methodology chosen will depend largely on the equipment required for a particular task, the existing environmental conditions, and the duration of the crossing. In constructing any stream crossing, care should be taken to limit disturbance to the extent practicable within 100 to 200 feet of the stream banks (the riparian area). The riparian area provides habitat to a number of species and provides protection and shading to the stream.

Erosion and Sedimentation Controls

Construction personnel are reminded to control erosion and flow conditions during new watercourse crossings by utilizing the following erosion and sedimentation measures which are described and illustrated further in Appendix A:

- **Straw wattles** [see Figure A26 in Appendix A], **geotextile silt fencing** [see Figure A22 in Appendix A] and/or **straw bale barriers** [see Figure A21 in Appendix A] may be installed at the edges of earthen roads or construction mat roads to prevent erosion of soil into watercourses from the road fill or tracked soil on construction mats. These controls however should generally not be placed within a watercourse.
- Side slopes of earthen roads can be protected by installing **erosion control blankets** [see Figure A25 in Appendix A] and **seeding** [see Figure A32 in Appendix A] the area with a fast-growing native or annual grass mix.

Best Management Practices – Watercourse Crossings

The following are BMPs that are applicable to new access roads watercourse crossings and are described at the following tabs:

Stream Crossings without Bridges (includes limiting turbidity and stone crossing; see Figures A05, A06, and A12 in Appendix A)

Bridged Crossings (includes construction mat bridges and rail car frame bridges; see Appendix A)

Dewatering (see Figures A39 – A41 in Appendix A)

Stream Crossings Without Bridges: Limiting Turbidity

Applications: Stream crossing, turbidity control

Limitations:

- Limited to areas where stream banks and bottoms will not be significantly damaged by the crossing.

Overview/Use:

- In some situations, such as routine or emergency maintenance with small ORVs, pickup trucks or tracked equipment, it may be acceptable for equipment to simply travel (perpendicularly) through a stream.
- Crossings are generally considered acceptable in situations where there is an existing or historic access road, a stable rock or sand/gravel stream bottom, and/or the crossing is at a relatively narrow reach of the stream and any adjacent wetlands.
- Cross streams slowly to minimize in-stream turbidity.

Stream Crossings Without Bridges: Stone Crossings

Applications: Stream crossing, turbidity control

Limitations:

- Only use in small (less than 2 feet wide or braided) intermittent streams which do not appear on USGS topographic maps and have a downstream section with a gradient greater than 20%.
- Not suitable in areas where there could be a potential for fish passage.
- Stone size should be sufficient to allow for macroinvertebrate passage.
- Not preferred for new access road crossings; generally more suitable for existing access road crossings.
- Project-specific permitting may be required to allow for installation of stone within a stream bed. Consult with Eversource Environmental Licensing and Permitting prior to using this crossing method.

Overview/Use:

- Use to cross small streams with stable stream bottoms.
- Carefully place 6-inch to 8-inch clean angular stone within stream at crossing. Limit width of stone to that needed for widest vehicle/equipment to crossing the stream.
- Drive over stone slowly.
- Leave riprap in intermittent streams for future use. More damage will occur by removing stone.

Bridged Crossings: Construction Mats as Temporary Bridge

Applications: Watercourse crossings

Limitations:

- Installation requires machinery.
- May become unstable under high flows.

Overview/Use:

- Untreated wooden construction mats may be used as a temporary bridge over a stream to allow construction vehicles access to the work site. Construction mat bridging is suitable for crossing intermittent and perennial streams. Before constructing a stream crossing, confirm that the construction mats are capable of supporting the equipment to be used.
- Place small sections of matting on either side of the stream parallel to the flow of water at top of banks to act as supports. Then place mats perpendicular to the stream and resting on top of the initial construction mat supports.
- Install non-woven geotextile between the first and second layers of matting; install erosion control barriers (e.g., straw bales, straw wattles, silt socks) along edges of timber matting to minimize potential for soil to discharge to the stream.
- Use of non-woven geotextile fabric at ORW crossings (MA) is required.

Bridged Crossings: Rail Car Frame as Temporary Bridge

Applications: Watercourse crossings

Limitations:

- Requires heavy equipment for transport and installation.
- Expensive.
- Banks must be stable to support heavy loads.

Overview/Use:

- Used rail car frames can be used for crossing larger and deeply incised streams where construction mats are unsuitable.
- Place the rail car frame perpendicular to the stream flow and between opposing banks. Use timber frame footings, if necessary. Next, place construction matting
- Install non-woven geotextile between the first and second layers of matting; install erosion control barriers (e.g., straw bales, straw wattles, silt socks) along edges of timber matting to minimize potential for soil to discharge to the stream. Use of non-woven geotextile fabric at ORW crossings (MA) is required.

Culvert Installation/Repair/Replacement

Contact Eversource Environmental Licensing and Permitting prior to performing any culvert installations, repairs and/or replacements

Applications: Stream and wetland crossings

Limitations:

- Permitting and design are required for new culvert installation or expansion of existing culverts over streams and wetlands. Significant regulatory requirements must be followed. Permitting restrictions on time of year use.
- Installation may require in-stream work; dewatering and sedimentation concerns.
- Culverts are susceptible to washouts, sedimentation, erosion, and failure during heavy wet-weather events and flooding.
- Culverts require routine and long-term maintenance because they often become clogged with debris or other obstructions.

Overview:

Culverts are installed to maintain wetlands or streams at road crossings. Hydraulic calculations are required at all crossings to determine the area that will drain to the culvert.

General Design Guidelines:

- Size culverts to handle the maximum expected flow of the wetland or watercourse. It is preferable to have one large culvert rather than multiple culverts. Corrugated culverts are favored because they slow the water velocity. HDPE corrugated pipes are preferred to metal.
- Design culverts to withstand and accommodate high flows while maintaining existing low flows and not impeding on the movement of indigenous aquatic life. Culverts must be sized to accommodate flows from at least the 100-year storm and preferably 500-year storm.
- The maximum velocity at the culvert outlet should be consistent with the velocity of the natural channel. To mitigate higher velocities, use outlet protection measures, energy dissipation, and channel stabilization, if necessary.
- Refer to state specific stream crossing guidance documents for additional design requirements:
    - Connecticut: Stream Crossing Guidelines, CT DEEP, Inland Fisheries Division Habitat Conservation and Enhancement Program, February 26, 2008 (www.ct.gov/deep/lib/deep/fishing/restoration/streamcrossingguidelines.pdf)
    - Massachusetts: Massachusetts River and Stream Crossing Standards, River and Stream Continuity Partnership, March 1, 2006, Revised March 1, 2011 (https://www.nae.usace.army.mil/Portals/74/docs/regulatory/StreamRiverContinuity/MA_RiverStreamCrossingStandards.pdf)

Installation:

- Construction mats may be placed over culverts to provide structural protection from heavy loads.

- Backfill culverts with natural substrate matching the upstream and downstream streambed substrate, even when fish passage is not a concern. Other aquatic organisms rely on natural streambed sediment to aid their movement.
- Strive to install culverts with minimal disruption to the watercourse and riparian buffer zone.
- Culvert length should be as short in length as practicable. Cut culverts to size if they are protruding into the natural streambed.

Maintenance:

- Remove debris and sediment from culverts to maintain an open channel for flow. A clogged culvert could result in flooding and washout.

Pole Fords

Applications: Stream Crossings

Limitations:

- Limited to streams with gently sloping adjacent land.

Overview/Use:

- Poled fords are used in remote locations where a stream crossing requires a functional BMP, but it is impractical to bring in larger materials. Sufficiently sized wood poles or saw logs of may be laid in the streambed parallel to the flow.
- Gently slope the road to and from the streambed at a maximum ratio of 1:5 (V:H). To limit disturbance to the riparian area, install engineering fabric and cover with an aggregate bed at the approach and exit.
- Use poles with a minimum length of ten feet.
- Remove poles immediately after use.

3.9 Slope Excavation

Engineering designs may be required for any changes in upland areas that could potentially direct or channel water across the face of slopes, particularly terrace escarpments or other highly erodible soils. No snow or soil piles, construction materials, or equipment should be stored in the immediate vicinity at the top of the terrace escarpment or other highly erodible soils.

3.10 Vegetation Removal and Preservation

Care should be taken to limit disturbance to the extent practicable when removing vegetation. Grubbing is not preferred as it results in considerable ground disturbance that could result in erosion and should be avoided to the extent feasible. Utilize grubbing only when all other methods cannot be used to prepare stable and safe work areas. If grubbing is necessary, the area must be seeded and mulched to protect it prior to the end of the workday. During mowing and trimming, woody debris greater than two (2) inches in diameter should not be placed in wetlands, and no woody debris should be placed in standing water. Permit conditions may mandate all woody debris to be removed from sensitive environmental areas. Mowing must be kept to a minimum, particularly at road crossings.

3.10.1 ROW Vegetation and Eastern Box Turtle (EBT) – MA only

Eastern box turtles (EBT) are often found near small streams and ponds and inhabit old fields, deciduous forests, and logged woodlands. Adults are completely terrestrial, while the young may be semiaquatic. EBTs hibernate on land by digging down in the soil between October and April. They have an extremely small home range and can usually be found in the same area year after year. EBT populations have been negatively impacted by the loss of suitable habitat. Some turtles may be killed directly by construction activities, but many more are lost when important habitat areas for shelter, feeding, hibernation, or nesting are destroyed. As remaining habitat is fragmented into smaller pieces, turtle populations can become small and isolated. Turtles are long-lived and the loss of even a single adult turtle can negatively impact the persistence of a local population. Therefore, vegetation removal in ROWs should be performed in a manner that minimizes impacts to turtle populations.

Cleared and Maintained ROW—EBTs have been found to use existing ROWs for foraging and nesting. Whenever feasible, perform maintenance mowing in identified habitat during inactive periods (November 1st to March 31st). Turtle BMPs are not required for work performed during the inactive period.

If mowing during the active turtle season (April 1st to October 31st) is required, turtle sweeps should be conducted by trained personnel prior to mowing activities; mow vegetation to no lower than seven (7) inches. Use Brontosaurus or Fecon mower heads to minimize the impact to identified habitat areas. Do not used Flail-type mowers during the active season. Additionally:

- **Avoid direct harm to turtles.** Visual inspections ("turtle sweeps") of the work area must be conducted by trained personnel prior to the commencement of work. If turtles are encountered, they should be removed from the work area and reported to NHESP.

Use extra care when using heavy machinery or traveling in vehicles through areas mapped as turtle habitat.

Any silt fencing used in these areas should be removed as soon as site stabilization has occurred; fencing can be a barrier to turtle movements. Alternatively, install silt fencing in accordance with the Syncopated Silt Fence detail (see Appendix A).

If required, excavation should be completed within one (1) day and/or open excavations should be backfilled daily to prevent turtles from becoming trapped.

Uncleared ROW—When project work requires vegetation removal in an uncleared ROW, cut and mow uncleared portions of EBT habitat during the active season (April 1st to November 1st). If clearing must be conducted during hibernation periods, pre-planning will involve conducting a turtle survey and the possible use of telemetry. Consult Eversource Environmental Licensing and Permitting before performing work because this activity may not be covered under the OMP and may require a permit.

3.10.2 ROW Vegetation and Other Protected Turtles

In addition to EBTs, some ROWs overlap with known habitat of other protected species of turtles. In Massachusetts, these species include Blanding's Turtle, Bog Turtle and Northern Red-bellied Cooter. If any work, including but not limited to vegetation

management, is scheduled to occur in the habitats of these turtles at any time of the year, **avoid wetland work**.

If unavoidable, operation and maintenance work in wetlands should be minimized to the greatest extent practicable. If work must occur in wetlands, the following guidelines apply:

- Any work should be reported to NHESP
- Work within wetlands mapped as habitat for the Bog Turtle or Northern Red-bellied Cooter must be reviewed on an individual basis by NHESP.

		Recommended Maintenance Activity if the Existing ROW is:	
Time Period	Turtle Status	Cleared and Maintained	Uncleared
April 1 to November 1	Active	*Perform only if required*—Mow vegetation no lower than seven (7) inches and use recommended mower heads	*Recommended*—Cut and mow uncleared areas
November 1 to April 1	Inactive	*Recommended*—Perform maintenance mowing	*Not recommended*—Requires turtle survey at minimum before removing vegetation

General Construction Recommendations –The following are general construction guidelines for protecting turtles:

- Install silt fencing around the work area prior to construction activity. Consider using syncopated silt fencing (see Figure A23 in Appendix A).
- Turtle training is required for all contractors. Apprise workers of the possible presence of turtles and provided a description of the species. Include a turtle sweep reminder on the Daily Tailboard.
- Conduct a turtle sweep after installing silt fencing and before conducting work.
- Perform daily turtle sweeps in work areas before performing any work.
- Carefully move any turtles that are discovered to an area immediately outside of the fenced area. Position turtle in the same direction that it was walking.
- Perform work with caution during early morning and evening hours. Take special care not to harm basking or foraging individuals.
- Remove silt fencing after work is completed and soils are stable so that reptile and amphibian movement between uplands and wetlands is not restricted.
- Return temporary cross-country access routes to pre-construction grade, seed if adequate root and seed stock are absent, and mulch. Do not seed pre-existing sandy soils that are within mapped rare turtle habitats unless directed by Eversource Environmental Licensing and Permitting in order to avoid altering nesting habitat.

3.10.3 Preservation of Existing Vegetation

Preserve the existing vegetation (i.e., groundcovers, vines, shrubs, trees) when practicable to improve soil stability and decrease the runoff volume and velocity. Identify and protect specified trees for erosion and sediment control benefits and/or aesthetic purposes. Consider saving trees that provide shading or screening benefits, particularly in residential areas. Preserve existing vegetation by reducing the width of a cleared ROW at stream crossings.

3.10.4 Invasive Plant Species

Invasive plant species are non-native species that invade natural communities and develop self-sustaining populations. The start of many infestations is often tied to a disturbance, and once established, the invasive species spread into undisturbed landscapes. They out-compete native species, disrupting ecological processes, and cause a loss of economic value or output. **It is illegal to transport, to introduce, and/or propagate state-listed invasive species**. Cleaning, draining and drying equipment between sites is mandated for aquatic invasives, and recommended for terrestrial equipment. Power washing of equipment and gear between sites is recommended, where feasible. At a minimum, visual inspection and hand removal of any plants, seeds, propagules, insects, mud, etc. is encouraged to maintain compliance with state laws and rules.

The linear nature of utility maintenance activities in vegetated corridors entails that a range of vegetative communities may be encountered by equipment, vehicles and personnel during the course of a single maintenance project or when mobilizing from one project site to another. It is especially important to follow best management practices when mobilizing equipment, vehicles and personnel from an area infested with invasive species to an un-infested area.

3.10.4.1 Project Planning – Invasive Plant Species

Prior to starting utility maintenance work, the project area should be evaluated to determine:

- Do invasive plant species exist in the project area?
- Do project activities have the potential to contact invasive plants or disturb soils in a manner that could potentially spread live plant parts or viable seeds?
- If invasive species are not present, or if it is not possible or not feasible to identify invasive plant species within the project area, follow best management practices to minimize the disturbance and spread of soil and/or plant matter.

3.10.4.2 Species Identification

It is imperative that workers who will be working or operating equipment in areas that may contain invasive plant species be trained in the identification and modes of dispersal of common, highly-prolific aquatic and terrestrial invasive plant species commonly found along road sides and in utility ROWs. See tables below for identification of the common invasive plants in Connecticut and Massachusetts.

Invasive Species in Massachusetts[1]

Botanical Name	Common name
Aegopodium podagraria	Bishop's goutweed; bishop's weed
Acer platanoides	Norway maple
Acer pseudoplatanus	Sycamore maple
Ailanthus altissima	Tree of heaven
Alliaria petiolata	Garlic mustard
Berberis thunbergii	Japanese barberry
Cabomba caroliniana	Carolina fanwort; fanwort
Celastrus orbiculatus	Oriental bittersweet; Asian or Asiatic bittersweet
Cynanchum louiseae	Black swallow-wort; Louise's swallow-wort
Cynanchum nigrum – see Cynanchum louiseae	Black swallow-wort; Louise's swallow-wort
Elaeagnus umbellata	Autumn olive
Euonymus alatus	Winged euonymus; burning bush
Euphorbia esula	Leafy spurge; wolf's milk
Fallopia japonica - see Polygonum cuspidatum	Japanese knotweed; Japanese or Mexican bamboo
Ficaria verna - see Ranunculus ficaria	Lesser celandine; fig buttercup
Frangula alnus	European buckthorn; glossy buckthorn
Glaucium flavum	Sea or horned poppy; yellow hornpoppy
Hesperis matronalis	Dame's rocket
Iris pseudacorus	Yellow iris
Lepidium latifolium	Broad-leaved pepperweed; tall pepperweed
Lonicera japonica	Japanese honeysuckle
Lonicera morrowii	Morrow's honeysuckle
Lonicera x bella [morrowii x tatarica]	Bell's honeysuckle
Lysimachia nummularia	Creeping jenny; moneywort
Lythrum salicaria	Purple loosestrife
Myriophyllum heterophyllum	Variable water-milfoil; two-leaved water-milfoil
Myriophyllum spicatum	Eurasian or European water-milfoil; spike water-milfoil
Nasturtium amphibium - see Rorripa amphibia	Water yellowcress; great yellowcress
Nasturtium officinale - see Rorripa nasturtium-aquaticum	
Phalaris arundinacea	Reed canary-grass
Phragmites australis	Common reed

Invasive Species in Massachusetts[1]

Botanical Name	Common name
Polygonum cuspidatum	Japanese knotweed; Japanese or Mexican bamboo
Polygonum perfoliatum	Mile-a-minute vine or weed; Asiatic tearthumb
Potamogeton crispus	Crisped pondweed; curly pondweed
Ranunculus ficaria	Lesser celandine; fig buttercup
Reynoutria japonica – see Polygonum cuspidatum	Japanese knotweed; Japanese or Mexican bamboo
Rhamnus cathartica	Common buckthorn
Rhamnus frangula – see Frangula alnus	European buckthorn; glossy buckthorn
Robinia pseudoacacia	Black locust
Rorippa amphibia	Water yellowcress; great yellowcress
Rosa multiflora	Multiflora rose
Salix atrocinerea/Salix cinerea	Rusty Willow/Large Gray Willow complex
Sisymbrium amphibium - see Rorripa amphibia	Water yellowcress; great yellowcress
Trapa natans	Water-chestnut
Vincetoxicum nigrum – see Cynanchum nigrum	Black swallow-wort; Louise's swallow-wort

[1] Based on the Massachusetts Invasive Plants Advisory Group (MIPAG); Last Updated 6/2021

Invasive Species in Connecticut[1]

Botanical Name	Common name
Acer platanoides	Norway maple
Aegopodium podagraria	Goutweed/Bishops Weed
Ailanthus altissima	Tree of heaven
Alliaria petiolata	Garlic mustard
Ampelopsis brevipedunculata	Porcelainberry
Artemisia vulgaris	Mugwort
Berberis thunbergii	Japanese barberry
Berberis vulgaris	Common barberry
Cabomba caroliniana	Fanwort
Cardamine impatiens	Narrowleaf bittercress
Celastrus orbiculatus	Asiatic bittersweet
Centaurea stoebe	Spotted knapweed
Cynanchum louiseae	Black swallow-wort

Invasive Species in Connecticut[1]

Botanical Name	Common name
Cynanchum rossicum	Pale swallow-wort
Elaeagnus umbellata	Autumn olive
Euonymus alatus	Winged euonymus
Euphorbia esula	Leafy spurge
Frangula alnus	Glossy Buckthorn
Froelichia gracilis	Slender snake cotton
Hesperis matronalis	Dame's rocket
Hydrilla verticillata	Hydrilla
Iris pseudacorus	Yellow iris
Lepidium latifolium	Perennial pepperweed
Lonicera japonica	Japanese honeysuckle
Lonicera maackii	Amur honeysuckle
Lonicera morrowii	Morrow's honeysuckle
Lonicera x bella	Belle honeysuckle
Lythrum salicaria	Purple loosestrife
Microstegium vimineum	Japanese stiltgrass
Myosotis scorpioides	Forget-me-not
Myriophyllum heterophyllum	Variable-leaf watermilfoil
Myriophyllum spicatum	Eurasian watermilfoil
Phalaris arundinacea	Reed canary grass
Phragmites australis	Common reed
Polygonum caespitosum	Bristled knotweed
Polygonum perfoliatum	Mile-a-minute vine
Potamogeton crispus	Curly-leafed pondweed
Ranunculus ficaria	Fig buttercup
Rhamnus cathartica	Common buckthorn
Robinia pseudoacacia	Black locust
Rosa multiflora	Multiflora rose
Rubus phoenicolasius	Wineberry
Trapa natans	Water chestnut
Tussilago farfara	Coltsfoot

[1] Based on the Connecticut Invasive Plants Council in accordance with Connecticut General Statutes §22a-381a through §22a-381d. The list was most recently re-printed in October 2018.

Avoidance and Minimization

- If possible, avoid or minimize contact with invasive species by physically avoiding locations with invasive plant infestations.
- In locations where invasive infestations exist, design the project to minimize contact with invasive species by choosing access routes and staging areas that are outside areas of infestation.
- Sequence work to the extent possible such that work using clean equipment and materials proceeds in un-infested areas prior to moving into infested areas and not vice versa.
- If it is unknown whether invasive species exist, design the project to limit travel across vegetated areas to the extent possible.
- When possible, time work under conditions that minimize the risk of spread, (frozen ground, snow cover, absence of seeds or propagules).

Vegetation Management

- Control of invasive plants by chemical means should be performed by a licensed applicator in accordance with the requirements of the CT DEEP Pesticide Management Program, the Massachusetts Pesticide Control Act (MPCA; M.G.L. Chapter 132B) and 333 CMR 2.00, ROW Vegetation Management regulations (333 CMR 11.00), and the MAWPA.
- Mechanical mowing of vegetation should adhere to principals of avoidance and minimization. Where possible avoid mowing invasive plants, especially plants that have the ability to sprout from stem and root fragments. For other invasive species, mowing should occur prior to seed set if possible.
- If woody vegetation is removed from a project site, transport it in compliance with invasive pest or disease quarantine zones established by the United States Department of Agriculture (USDA), the Connecticut Agricultural Experiment Station, MA DCR, and MA DAR.
- Any restoration seed mixes used should be free of any species identified as invasive by the Connecticut Invasive Plants Council in accordance with Connecticut General Statutes §22a-381a through §22a-381d (in Connecticut) or the Massachusetts Invasive Plants Advisory Group (in Massachusetts).

Soil Disturbance and Management

- Where possible, avoid soil disturbance as it may increase the chances of colonization by invasive seeds or propagules.
- Stabilize disturbed soils as soon as possible by seeding and/or using mulch, straw or gravel that is free of invasive plant material.
- Where possible, when excavating soils, top layers of soil containing plant material and roots should be segregated from sub soils and left on site.
- Cover soil and other material containing invasive plant material during transport.
- Do not transport fill and material containing invasive plant material onto a project site.
- If fill and materials containing invasive species must be transported off site, do not reuse, stockpile or dispose of these materials in such a manner that could promote

the spread of invasive plants.

Decontamination Procedures

- When utility maintenance activities require work in areas infested with invasive species, implement decontamination procedures per NHDOT's Best Management Practices for Roadside Invasive Plants manual.
- In order to minimize the spread of invasive plant seeds and material:
    - Clean vehicles, equipment, materials, gear, footwear or clothing of all visible soil and plant material on site in the infested area, or as near as practical to the infested area, prior to leaving the project site.
    - Do not decontaminate equipment next to streams or water bodies that could potentially transport seeds or propagules.
    - Decontaminate equipment and materials that may be contaminated by aquatic plant materials adjacent to the surface water they were exposed to prior to use in another surface water body.
    - Do not transport water withdrawn from a surface water body and discharge it to another water body.

Methods of Cleaning

- Use a brush, broom or hand tools to manually clean.
- Clean debris off equipment such as construction matting by shaking or dropping mats in a controlled manner to dislodge attached soil and debris.
- Compressed air.
- Containment must be in compliance with wastewater discharge regulations when using low-or high-pressure wash stations.

3.11 Work Pads

3.11.1 De-Energized and Energized

Applications: Work in wetlands

- Reconnaissance of each work pad area in or adjacent to wetlands should be performed to determine if the construction mat work pad areas could be located outside of wetland resource areas. Wetland disturbances should be avoided or minimized where practicable. Coordinate work pad locations and/or configurations with Eversource Environmental Licensing and Permitting.

Limitations:

- Requires heavy machinery for installation.
- Significant amount of time required for installation and removal.
- Pads for live line work require a considerably larger footprint.
- Several layers of matting may be needed in deep, construction areas.
- Animals may be injured or killed when attempting to cross work pads.

- May not be suitable in deep/open water wetlands.
- Must be underlain with non-woven geotextile if within an ORW (MA only).

How to Use:

- Work at structures may require placement of construction mats to provide safe and stable work pad areas for employees and contractors.
- Live line work, which is work that is done while the line is energized, requires a much larger work pad area. Efforts should be avoid or minimize impacts to wetlands to the extent practicable.
- Sizes of work pads vary based on the type of work being proposed.
- Work pad areas may extend into wetlands where structures that require maintenance either fall within or are in proximity to wetlands. In these cases, untreated wooden construction mats shall be used to limit disturbance.
- Install silt fencing around work pads in identified amphibian and reptile priority habitat and where matting is greater than one mat thick. The exclusionary silt fencing will deter animals from moving across work pads and reduce the likelihood of being crushed by heavy equipment.
- Following construction activities all mats at each work pad and vehicle access locations must be removed.
- Remove mats by "backing" out of the site and removing mats one at a time. Regrade soils to pre-existing contours while taking care not to compact soils, if necessary.
- In areas with invasive species, plant material should be removed from mats following removal from the infested area to prevent the spread of invasive species. Refer to the tables in this section for additional details regarding invasive plant species.

3.11.1.1 Best Management Practices – Work Pads

De-energized work requires smaller work pad areas, while live line work (i.e., work that is done while the line is energized) requires a much larger work pad areas.

De-energized construction mat work pads (see Figure A14 Appendix A)

3.12 Structure-Related Work

3.12.1 Wetland

Structure-related activities that may occur in wetlands include structure replacement/ installation (including casing installation), guy wire anchor installation, counterpoise installation, and pole butt removal. Access to these areas and completion of the activities can cause disturbance to wetland vegetation and soils. Therefore, structure-related activities in wetlands should entail use of adequately sized work pads and proper dewatering methods if/as needed. Inspection of the construction access and associated dewatering measures should occur daily during construction to ensure that controls are in working order and repairs to damaged/deteriorating controls are made in a timely matter. Repairs may include re-grading the traveled surface to eliminate ruts as well as those repairs required by each erosion and sedimentation measure used.

Structure Replacement/Installation

Replacement structures will often be replaced within a few feet of the original structure to maintain the required distances and line sags between other existing structures. Therefore, options for relocating proposed replacement structures are limited. Pole replacement will also require placement of construction mats in wetlands to provide a safe work pad for the required structure replacement activities. Usually, there are no alternatives that allow for this work to be conducted from nearby upland areas or to install the replacement structures in upland areas. Each structure replacement area should be assessed to determine the required footprint needed for construction mat work pads. Typical installation is as follows:

- At each pole location, remove wetland topsoil with an excavator and stockpile. Segregate wetland soils as necessary.
- If a borehole is drilled, collect and dispose of drilling spoils in an upland area.
- A galvanized steel casing is then driven into place at least 12 inches below the ground surface. The new pole is installed within the casing with a crane. The casing is then backfilled with crushed rock and compacted.
- Stockpiled wetland topsoil is placed above the casing to the ground surface. No net fill in wetlands occur, as the original poles are removed.
- Following installation of the new structures, the old structures are removed. Each pole is cut with a chainsaw and allowed to fall to the ground, which in wetland areas is protected by construction mats. If the pole is to be bucked into sections, conduct sawing activities in uplands when feasible. Pole butts will remain in place; if removing the pole butt will cause more damage than if left in place.
- Remove the pole and all appurtenant accessories (e.g., cross-arms, insulators) and properly dispose off-site. Remove each pole butt by pulling with an excavator positioned on a construction mat. If it is apparent that pole removal will compromise the integrity of the new pole installation, or that removal will result in additional disturbance to wetland areas, cut off the old pole at least 12 inches below ground level and backfill to match adjacent grades.

Guy Wire Anchor Installation

Guy wire anchors supporting the structures may also require replacing. There are two types of anchors: 1) helical and 2) plate type. Helical anchors are preferred over plate anchor because the installation of the helical anchor results in less disturbance to the wetland.

- Load test the existing anchor to determine whether it will support the pole structure. Consult with Eversource Engineering to determine load testing requirements. In the event the existing anchor cannot be re-used, remove it and install a new anchor.
- Screw in place a special triple helix ("screw type") anchor with an anchor installation rig operated from the matting area. Add rod sections as needed until proper holding capacity of the anchor is achieved. Consult with Eversource Engineering to determine anchor installation requirements.
    - Helical anchors are turned into the ground with only the rods protruding. Disturbance to the wetland from the helical anchor is minimal.

- Plate anchors are used in wetlands when proper holding cannot be achieved with screw anchors. To install a plate anchor, a pit is excavated to a sufficient depth and if necessary, a concrete footing would be installed several feet below surface grade. Consult with Eversource Engineering to determine plate anchor installation requirements.
    - When excavating to install plate anchors, segregate the top 12 inches of wetland topsoil from the underlying material. When the plate anchor has been set, backfill the excavation with underlying material. Utilize segregated wetland topsoil to restore pre-construction grades.

Counterpoise Installation/Grounding

To install grounding equipment in wetlands, use hand digging or minimally invasive methods to dig around the structure and restore soil to previous grades. In some cases, grounding rods can be driven directly into the ground with hand tools. Where work is occurring in the vicinity of wetland areas, sedimentation and erosion controls will be used to limit disturbance to wetlands.

Underground Facility Repair/Replacement

Underground facilities such as cables and conduits may be present beneath wetland areas. In the event underground facilities require repair, BMPs are required for both access and construction. Construction mats are used for access where warranted, and sedimentation and erosion controls are used to isolate the work area. During excavation activities, excavate wetland topsoil and stockpile separately from subsurface soils. Dewatering is often required during excavation and repair activities.

An alternative to repairing a subsurface line by excavation is to install a new line via trenching or horizontal directional drilling (HDD). The decision to use one of these alternatives is made on a case by case basis. Consult with Eversource Environmental Licensing and Permitting to determine if any permits will be needed.

Pole Butt Removal

When transmission poles are decommissioned or otherwise taken out of service, in most cases the entire pole shall be removed. Treated wood pole butts shall be removed completely from the ground and properly disposed at an off-site location. Locations where the removal of pole butts may cause significant disturbance to wetlands or other sensitive environmental areas will be considered for exception to this practice on a site-by-site basis. The Transmission Line Construction and Maintenance Manager, in consultation with Eversource Environmental Licensing and Permitting, will be responsible for determining if a pole butt can be removed if located in a sensitive environmental area.

All pole butt holes must be backfilled and compacted (every 3 feet) with appropriate fill material. Existing material on-site can be reused if it does not include materials that can rot (e.g., vegetation) and cause settling.

Disposal

Treated and non-treated wood products owned by the Transmission Group shall be stored in an area(s) designated by the Transmission Line Construction/Contract Field Services Supervisor until collected by an approved disposal vendor.

Concrete Wash Outs

Concrete wash outs shall be used for the management of concrete waste. Concrete and concrete wash out water shall not be deposited or discharged directly on the ground, in sensitive environmental areas, or in catch basins or other drainage structures. Where possible, concrete wash outs shall be located away from sensitive environmental areas, including buffer zones. Consult with Eversource Environmental Licensing and Permitting to determine concrete wash out locations prior to their use. Following the completion of concrete pouring operations, the wash outs shall be properly disposed of off-site with other construction debris.

3.13 Underground Cable and Gas Piping-Related Work

Gas piping-related activities will typically occur within roadways or along roadway shoulders. There may be some instances where wetland permitting is required when wetlands are located adjacent to or in the vicinity of roadways. However, when work is performed within the roadway/shoulder, permitting is typically not required. Verify permitting requirements with Eversource Environmental Licensing and Permitting. In all cases, BMPs should be followed to ensure environmental compliance.

Typical examples of underground cable and conduits include:

High-Pressure, Fluid-Filled Pipe-Type Cable: A high-pressure, fluid-filled (**HPFF**) pipe-type of underground transmission line, consists of a steel pipe that contains three high-voltage conductors. The fluid also transfers heat away from the conductors. The fluid is usually static and removes heat by conduction.

XLPE Cable (cross-linked polyethylene): Hydronic tubing that is manufactured from polyethylene plastic with a three-dimensional molecular bond that is created within the structure of the plastic. The cross-linked polyethylene (XLPE) underground transmission line is often called solid dielectic cable. The solid dielectric material replaces the pressurized liquid or gas of the pipe-type cables. XLPE cable has become the national standard for underground electric transmission lines less than 200 kV.

Roadways and Shoulders

When working in roadways, particularly in residential areas, the following activities should be performed in addition to standard construction BMPs:

- Repave disturbed paved areas and return to original elevations on the same day that construction is performed.
- Restore all non-paved areas to pre-existing (or improved) conditions. Replace any sod or other plantings in kind or with an acceptable alternative.
- Employ dust control as necessary to minimize airborne dust.
- Streets should be swept daily or as necessary to remove dirt and debris from resulting from construction from the roadway surface. Dirt and debris swept from the roadway surface should be collected and properly disposed of as construction waste. Under no circumstances should dirt and debris be swept off of the roadway surface to the road shoulder or deposited in any catch basins.
- Discharge trench dewatering volumes to an appropriate dewatering structure setup on adjacent undeveloped, unimproved uplands away from wetlands (refer to Appendix A). Consult with Eversource Environmental Licensing and Permitting staff

to determine appropriate locations for placement of dewatering structures.

- Trench dewatering may also be discharged to areas of open trench to allow for infiltration.
- For minor volumes or short-term duration dewatering needs, trench dewatering may be pumped to frac tanks for transport off-site and discharge to an appropriate dewatering structure located at a contractor yard or similar location.
- Trench dewatering may only be discharged to stormwater catch basins after all necessary federal, state and local permits have been obtained to do so (this typically requires design and implementation of an effective treatment system to remove all potential contaminants, such as suspended solids or other chemical contaminants). Consult with Eversource Environmental Licensing and Permitting if discharge to catch basins is required.

Under certain circumstances, gas piping must be installed beneath existing culverts within roadways. Take care to ensure that any saturated material excavated from the trench be properly stored and disposed as to not cause sedimentation issues. Implement dewatering methodologies, as required.

There may be cases where a drainage ditch or swale must be crossed to gain construction access from paved roads onto ROWs along the roadway shoulder. Install construction mats, mat bridges, or temporary culverts, as necessary, to facilitate access. Culverts should be for temporary use, sized for peak flow, and removed after construction is complete. Consult with Eversource Environmental Licensing and Permitting prior to installation.

Bridges and Culverts

Attachment of gas piping to bridges or culverts is the environmentally preferable method for crossing a wetland or watercourse. Consult with the appropriate people (engineers, the Department of Transportation (DOT), etc.) to determine if attachment to a bridge or culvert is a technically feasible option at the desired crossing location. Eversource Environmental Licensing and Permitting should also evaluate the impacts to FEMA flood storage quantities and potential Coast Guard permitting requirements. Ensure that proper erosion and sedimentation controls are in place on either side of the bridge or culvert throughout construction.

Rivers and Streams

There are two primary approaches for crossing a river or stream with a gas pipeline: direct bury (open trenching) and trenchless methods (e.g., HDD, standard bore/pipe jacking).

Direct bury methods involve erecting a coffer dam to isolate the work area and redirecting water flow using gravity or pumping to move water from one side of the work area to the other. Direct bury methods have larger direct environmental impacts than trenchless methods. Typical coffer dam examples are included in Figures A42 and A43 in Appendix A.

Trenchless methods use specialized equipment to install piping beneath a waterbody (or a major roadway, railroad, etc.). The most common method used for gas piping is HDD which uses remote controlled, steerable drilling equipment to install pipe along a long arc alignment. The drilling process can be divided into three steps: pilot, reaming, and pull-in. The first step is to drill a pilot bore-hole. Next, a larger diameter fly cutter is used to

enlarge the opening. A specialized bentonite slurry drilling fluid is injected into the bore-hole to stabilize the surrounding soil and to lubricate and cool the drill bit. For the final step, a barrel reamer is used to further enlarge the bore-hole and to pull the pipe into place.

A notable environmental concern with HDD is called "frac-out." This occurs when drilling fluid breaks through the soil surface and into the waterbody. Regulatory agencies may require a "frac-out plan" which details preventative controls and response measures should frac-out occur. A typical frac out plan is included in Appendix D; however, HDD contractors should be required to provide a detailed frac-out plan specific to the project and their practices. These plans may be subject to environmental regulatory agency review. Consult with Eversource Environmental Licensing and Permitting for permit requirements.

3.14 Construction Material along the ROW

Once a site is prepared by clearing and/or installing erosion and sediment controls, materials may be stored along the ROW prior to the start of construction. Such materials may include the following: piping, poles, cross-arms, cable, insulators, stone, and other engineered backfill materials. In general, the stockpiling of stone and other unconsolidated material on construction mats should be avoided. If it is determined necessary due to access and work pad constraints, the material should be placed on a geotextile fabric and be properly contained with a sedimentation barrier such as straw wattle or bales. No construction materials should be placed in wetlands or other sensitive resource areas.

3.15 Winter Construction

3.15.1 Snow Management

Snow should not be stockpiled or disposed in any waterbody or near water supply sources. These include wetlands, rivers/streams, the ocean, reservoirs, ponds, stormwater catch basins, wellhead protection area, in high or medium yield aquifer, or within 200 feet of a private well. In addition to water quality impacts and flooding, snow disposed in surface water can cause navigational hazards when it freezes into ice blocks. Maintain a minimum buffer of 25 feet between any snow disposal area and the high water mark of any surface water. A silt fence or equivalent barrier should be installed between the snow storage area and the high water mark of rivers, streams, ponds, or the ocean. Consult with Eversource Environmental Licensing and Permitting regarding any specific state and local snow management requirements.

Avoid disposing of snow on top of storm drain catch basins or in storm water drainage swales or ditches. Snow combined with sand and debris may block a storm drainage system and cause localized flooding. A high volume of sand, sediment, and litter released from melting snow also may be quickly transported through the system into surface water and could also result in fines or a violation.

All debris in a snow storage area should be cleared from the site and properly disposed of no later than May 15 of each year. Care shall be taken not to plow road materials away when removing snow.

3.15.2 De-Icing

Where permitted, calcium chloride is the preferred de-icing agent when applied according to manufacturer's guidelines in upland areas. Sand should be used on construction mats through wetland areas. Consult with Eversource Environmental Licensing and Permitting on de-icing agents when working in a facility or substation near resource areas. Many municipalities have specific de-icing agent requirements for work within 100 feet of wetlands and other sensitive environmental areas.

3.15.3 Snow and Ice Management on Construction Mats

Promptly and properly remove snow from construction mats to avoid ice formation. Remove snow from construction mats before applying sand to avoid forming ice. A round street sweeping brush mounted on the front of a truck may be an effective way to remove snow from construction mats. Propane heaters may also be suitable solutions for snow removal and/or de-icing of construction mats. Sand should be collected from the construction mats and disposed of in an upland area prior to removing construction mats from wetlands. Once construction mats are removed, wetlands shall be inspected for sand buildup that may have fallen through construction mats. Sand deposited in wetlands or other sensitive environmental areas shall be completely removed by the contractor. Consult with Eversource Environmental Licensing and Permitting prior to commencing work in wetlands or other sensitive environmental areas.

3.16 Dust Control

Dust control measures are used to reduce surface and air movement of dust from exposed soil surfaces during land disturbance, demolition, and construction activities. These practices reduce the amount of dust in the air and decrease the potential for accidents, respiratory problems, and airborne sedimentation. Construction activities should be scheduled appropriately to minimize the amount of site surface exposed at one time in order to reduce the amount of areas requiring dust control. Use dust control measures on disturbed soil surfaces and exposed soil surfaces, especially during hot or dry weather periods and in areas with excessively well-drained soils. Repetitive treatments should be used as needed, or required by permits, and until the surface is permanently stabilized.

Type	Description/Use
Vegetative Cover	• Most effective and practical method. • Use in disturbed areas not subject to traffic. • Follow seeding requirements as directed by local guidelines or permit requirements.
Stone	• Cover soil surface with crushed stone/coarse gravel.
Water/Sprinkling	• Sprinkle exposed soils until wet (Water trucks may be used depending on size of the site). • Do not excessively wet the soil as this causes run-off and also wastes water.

Barriers	• Board fences, wind fences, and sediment fences control air currents and blowing soil. • Wind barriers protect soil downgradient for a distance of ten times the barrier height. • Perennial grasses and stands of existing trees also serve as wind barriers, stressing the importance of planning work phasing properly and minimizing the amount of exposed soil.
Plastic Covering	• Cover soil piles with sheets of plastic/tarp to minimize dust.
Calcium Chloride	• Loose, dry granules of calcium chloride may be applied with a mechanical spreader. • Apply at a rate that keeps the surface moist but not high enough to cause water pollution or plant damage. This method should be done under consultation with an expert in order to maintain this balance and to determine if the site is applicable.

3.16.1 Soil Stockpile Management

Some projects may involve excavation and stockpiling of soil. Stockpiles should be located outside sensitive areas to the extent practicable and managed to prevent erosion and sedimentation of adjacent areas. Typical measures include the installation of protective measures (e.g., siltation fence and/or straw bales) around the perimeter of the stockpile. The stockpile must be seeded if left in place for more than 30 days. No snow or soil piles, construction materials, or equipment should be stored in the immediate vicinity at the top of a terrace escarpment slope.

3.16.2 Stockpiles on Construction Mats

When soil (or gravel) stockpiles must be staged on construction mat work pads in wetlands, stockpiles should be placed atop areas of matting underlain with non-woven geotextile (either directly atop the mats or between layers of matting) to minimize the potential for material to filter through gaps in matting and deposit in wetlands. Use of construction mat stringers as physical barriers at the edge of the work pad should also be considered. These barriers are recommended to minimize the potential for stockpiled material to get pushed off the work pad into wetlands. Consult with Eversource Environmental Licensing and Permitting for site-specific guidance.

3.16.3 Regulated Soils Management

When polluted/contaminated soil is encountered, it must be handled in accordance with the appropriate regulatory requirements. In addition to the measures discussed above, contaminated soils should be stockpiled on and covered by polyethylene sheeting. Sheeting used to cover the stockpile should be weighted down to prevent the wind migration of contaminated dust.

For soil stockpiles in substations, contact Eversource Environmental Licensing and Permitting. If soil/water must be stored and/or disposed, comply with existing soil and groundwater management guidelines. Coordinate with the Environmental Affairs Department (EAD) to ensure appropriate procedures are followed.

3.16.4 Best Management Practices – Soil Stockpile Management

The following BMP is applicable to soil stockpile management and is described at:

Soil Stockpile Management (see Figure A19 in Appendix A)

3.17 Anti-Idling Laws

Connecticut and Massachusetts have promulgated anti-idling laws for the purpose of improving air quality by reducing unnecessary air pollution from idling vehicles.

State	Idling Time Limit (in minutes)
Connecticut	3
Massachusetts	5

Details of these laws and the statutory exceptions to the limits noted above are presented in the following sections.

3.17.1 Connecticut

The Regulations of Connecticut State Agencies (RCSA) section 22a-174-18(b)(3) states: a mobile source shall not operate for more than three (3) consecutive minutes when such mobile source is not in motion except if the vehicle is operating for one of the conditions exempted in the regulation.

These exemptions for mobile sources not in motion include:

- When a mobile source is forced to remain motionless because of traffic conditions or mechanical difficulties over which the operator has no control.
- When it is necessary to operate defrosting, heating or cooling equipment to ensure the safety or health of the driver or passengers.
- When it is necessary to operate auxiliary equipment that is located in or on the mobile source to accomplish the intended use of the mobile source.
- To bring the mobile source to the manufacturer's recommended operating temperature.
- When the outdoor temperature is below 20 degrees Fahrenheit.
- When the mobile source is undergoing maintenance that requires such mobile source be operated for more than three (3) consecutive minutes.
- When a mobile source is in queue to be inspected by U.S. military personnel prior to gaining access to a U.S. military installation.

3.17.2 Massachusetts

The Massachusetts Anti-Idling Law (M.G.L. Chapter 90, Section 16A and its implementing regulations set forth at 310 CMR 7.11 applies to all vehicles and limits unnecessary engine idling of stopped vehicles to five (5) minutes.

This law shall not apply to:

- Vehicles being serviced, provided that operation of the engine is essential to the proper repair thereof.

- Vehicles engaged in the delivery or acceptance of goods, wares, or merchandise for which engine assisted power is necessary and substitute alternate means cannot be made available.
- Vehicles engaged in an operation for which the engine power is necessary for an associate power need other than movement, and substitute alternate power means cannot be made available provided that such operation does not cause or contribute to a condition of air pollution.

SECTION 4

Section 4
Inspection and Maintenance

A pre-construction meeting will be held to discuss how often and who is responsible for monitoring erosion and sediment controls to document their condition and recommend maintenance or other corrective actions, as necessary. All BMPs will be inspected at least once per week during active construction and until disturbed areas have stabilized following post-construction site restoration. Construction sites will be inspected after major storm events (rainfall events greater than 0.25 inches (MA) or 0.50 inches (CT)), or as directed by Eversource Environmental Licensing and Permitting.

4.1 During Construction

Construction sites, construction access roads, and the associated erosion and sediment controls should be inspected by the person(s) designated at the pre-construction meeting, as required by permit conditions. Any damage observed must be repaired in a timely manner, at least within 48 hours of observation. Repairs may include re-grading and/or top dressing the surface with additional aggregate to eliminate ruts as well as those repairs required by each erosion and sediment measure used.

All inspections will be documented in a written report submitted to Eversource Environmental Licensing and Permitting and saved to the project folder. Copies will be distributed to the relevant contractors if/as directed by Eversource Environmental Licensing and Permitting.

4.1.1 Maintenance of Erosion and Sedimentation Controls

Spare erosion and sedimentation control materials such as straw wattles, straw bales and silt fencing should be kept on site or be readily available so they may be replaced if they become non-functional due to deterioration or damaged during a storm, extreme water or wind, or other unexpected events.

4.1.2 Rapid Wetland Response Restoration

In the event of unintended discharges of sediment into wetlands, Eversource Environmental Licensing and Permitting will direct the contractor(s) to quickly control, contain and remove sediment using non- or marginally invasive methods. Responding quickly to unintended discharges minimizes the difficulty and cost of restoration if the sediment is left in place for an extended period of time. Eversource Environmental Licensing and Permitting will direct sediment removal activities at the time of discharge and will notify the appropriate regulators of the discharge and the recommended corrective actions.

4.1.3 Vehicle Storage and Refueling

All storage and refueling of vehicles and other equipment must occur outside of and as far away as practical from sensitive environmental areas such as wetlands, unless specifically authorized by Eversource Environmental Licensing and Permitting and an alternate protocol is developed and approved internally.

The recommended minimum distance from wetlands for storage of fuel and refueling is 100 feet. Additionally, equipment should be checked regularly for evidence of leaks. Construction material storage should also be located at least 100 feet from wetlands.

Storage of larger, less mobile equipment such as drill rigs or large cranes, may be permitting within wetlands subject to prior approval from Eversource Environmental Licensing and Permitting. Secondary containment shall be in place at each piece of equipment during non-working hours.

Refueling of larger, less mobile equipment such as drill rigs or large cranes, may be allowed within wetlands only with prior approval from Eversource Environmental Licensing and Permitting and if specified precautions and protocols are followed. A proper location for refueling should be identified and designated before site work begins. At a minimum, if refueling must be conducted in wetlands, the contractor shall provide adequate secondary containment during refueling operations and shall maintain a spill kit on-site at all times.

4.1.4 Spills

Spill kits consist of emergency cleanup and spill containment materials that can be used in the event of a fuel or other chemical spill. Spill kits must be kept on site and accessible at all times in case of an emergency spill. Such kits should generally contain multiple absorbent socks and/or pillows and wipes and temporary disposal bags. Follow the applicable Eversource Contractor Work Rules.

4.1.5 Post-Construction

Post-construction inspections of restored areas will be conducted at regular intervals throughout the growing season, as required by any applicable permits, and/or after major storm events. Sites should be inspected for success or failure of revegetation, invasive species colonization, and erosion and sedimentation. In the event additional measures are required to achieve site restoration and stabilization, corrective actions shall be identified and implemented.

All information collected during inspections, regular maintenance, and repair procedures should be documented in project folders. In addition, photographic or diagrammatic logs may be kept to record certain events and for documentation of project progress and any noteworthy observations.

The construction work is not complete until all areas are restored.

SECTION 5

Section 5
Rehabilitation and Restoration

5.1 Restoration

All areas disturbed by construction, repair, and maintenance activities shall be substantially restored to pre-construction conditions. Please refer to Appendix A for photos and typical details for loaming, seeding, and mulching. Prompt restoration minimizes the extent and duration of soil exposure and protects disturbed areas from erosion due to stormwater runoff, ice, wind and gravity. Stabilization should be conducted as soon as practicable. Where appropriate, it is preferable to allow sensitive environmental areas, such as wetlands and rare species habitat to revegetate naturally.

Consult Eversource Environmental Licensing and Permitting for project-specific restoration requirements.

5.1.1 Seed Mixes

Several different seed mixes are available for upland and wetland restoration. State-specific comprehensive summaries of seed mixes for both temporary and permanent seeding of disturbed sites can be found within the following documents:

- Massachusetts: Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas, page 157: https://www.mass.gov/doc/complete-erosion-and-sedimentation-control-guidelines-a-guide-for-planners-designers-and/download
- Connecticut: 2002 Connecticut Guidelines for Soil and Erosion Sediment Control, page 5-3-8: https://portal.ct.gov/DEEP/Water/Soil-Erosion-and-Sediment-Control-Guidelines/Guidelines-for-Soil-Erosion-and-Sediment-Control

Upland Seed Mix: If significant grading or upland alteration has occurred, annual rye grass seed shall be placed for temporary stabilization following manufacturer's recommendations after re-grading activities.

Wetland Seed Mix: If significant grading or wetland alteration has occurred, a wetland seed mix shall be placed following manufacture's recommendations after re-grading activities.

5.1.2 Upland

The following restoration techniques apply to restoration projects in upland areas.

- Soil excavated during construction and not used as backfill must be evenly spread across disturbed areas to restore grades. Topsoil shall be stripped and separated to the extent practicable for re-use. Permanent soil protection shall be provided for all areas disturbed by construction activities. All areas will be seeded either by hydroseeding or broadcast seeding. Interim stabilization measures are required if areas cannot be seeded due to the time of year. Interim measures may include the application of mulch.
- Topsoil removed during construction activities will be replaced, seeded, and mulched.
- All areas that are broadcast seeded shall be treated with a layer of mulch, such as

straw, up to one (1) inch thick to enhance moisture retention, dissipate disturbance from precipitation, and detract birds foraging on broadcast seed.

- Rehabilitation of access routes and other areas must be performed as soon as practicable after construction is completed, including reestablishment of water bars or other BMPs to control erosion of the access road, and the removal and restoration of temporary wetland or waterway crossings.
    - Temporary breaks in construction activities may warrant seeding and mulching of disturbed areas as interim erosion control measures. Consult with Eversource Environmental Licensing and Permitting to determine project-specific requirements.
- Erosion control measures shall remain in place until soils are adequately stabilized, as confirmed by Eversource Environmental Licensing and Permitting. Once soils are stable, erosion controls – especially silt fence, which presents an obstacle to movement of small animals, shall be removed and properly disposed off-site. Stakes should be removed from straw bales and spread as mulch to remove barriers to wildlife movement.
- The use of hay and/or hay products is strictly prohibited to prevent the spread of invasive plant species seed stock.
- If a grading operation at a site is suspended for a period of more than twenty-nine (29) consecutive days, the disturbed area shall be stabilized by seeding, mulching, and/or other appropriate means within the first seven (7) days of the suspension of grading.
- Within seven (7) days after a final grade is established in any grading operation, the disturbed area shall be stabilized by seeding, loaming, and/or other appropriate means.

5.1.3 Wetland/Watercourses

Re-grading of Ruts: Upon removal of construction mats, or other BMPs, the wetland/watercourse should be inspected for rutting or disturbance from eroded upland soils. Any rutting should be re-graded to pre-existing contours and upland soils removed from wetland areas while taking care not to compact soils.

The following restoration techniques apply to restoration projects in wetlands:

Maintenance, Repair, and Emergency Projects (When No Permit is Required)

- Remove mats by "backing" out of the site and removing mats one at a time. Re-grade soils to pre-existing contours while taking care not to compact soils.
- Soils excavated from wetland areas shall be segregated and stockpiled separately (i.e., topsoil/muck apart from mineral subsoil) in a dry/upland area at least 100 feet from wetland boundaries unless other provisions have been made to facilitate restoration activities.
- Excavated wetland soils that have been stockpiled during underground utility installations within wetlands shall be replaced in the same order (i.e., mineral subsoil beneath organic topsoil/muck) to the extent practicable and restored to pre-disturbance grades.
    - Grading activities should include the elimination of ruts within the

area to be restored.

- If replacement of soil associated with temporary wetland or watercourse crossings for access roads is necessary, disturbed areas must be restored to pre-disturbance grades, either seeded and mulched, or allowed to revegetate from the natural seed bank.
- Disturbed wetland areas shall generally be allowed to revegetate from the natural seed bank. Measures to discourage the establishment or spread of plant species identified as non-native, invasive species by federal or state agencies shall be utilized. Consult with Eversource Environmental Licensing and Permitting to evaluate means and methods of wetland vegetate re-establishment.
- Any restoration plantings or seed mixes used in restoration shall consist of species native to the project area and, if feasible, from local nursery stock.
- Any stream banks and beds damaged shall be restored through use of 100 percent natural fiber geotextile erosion control blankets and/or coir logs. The use of erosion control products containing plastic and/or nylon is strictly prohibited.
- All seeded areas shall be treated with a layer of mulch (i.e., straw; the use of hay and/or hay products is strictly prohibited) up to one (1) inch thick to enhance moisture retention, dissipate disturbance from precipitation, and detract songbirds foraging on broadcast seed.

5.2 Private Property

5.2.1 Improved Areas

If access is over an off-ROW property, then it is the responsibility of a construction representative to determine if legal access rights are available to cross the property.

Access to and along the ROW over private property must be improved to the extent necessary to ensure suitable passage for construction equipment, provide erosion control, and maintain proper drainage. Upon completion of construction activities, altered yards, lawns, agricultural areas, and other improved areas must be restored to a condition equal to or better than before their use for the construction project.

5.2.2 Overall Work Site

Construction personnel should remove all work-related trailers, buildings, rubbish, waste soil, temporary structures, and unused materials upon satisfactory completion of work. All areas should be left clean, without any litter or equipment (e.g., wire, pole butts, anchors, insulators, cross-arms, cardboard, coffee cups, water bottles) and stabilized to match pre-construction conditions to the maximum extent practicable. Debris and spent equipment should be returned to the operating facility or contractor staging area for disposal or recycling as appropriate.

5.2.3 Material Storage/Staging and Parking Areas

Upon completion of all work, all material storage yards, staging areas, and parking areas shall be completely cleared of all waste and debris. Unless otherwise directed or unless other arrangements have been made with an off-ROW or off-property owner, material storage yards and staging areas shall be returned to the condition that existed prior to the installation of the material storage yard or staging area. Regardless of arrangements

made with a landowner, all areas shall be restored to their pre-construction condition or better. Any temporary structures erected by the contractor, including fences, shall be removed by the contractor and the area restored as near as possible to its original condition, including seeding and mulching as needed.

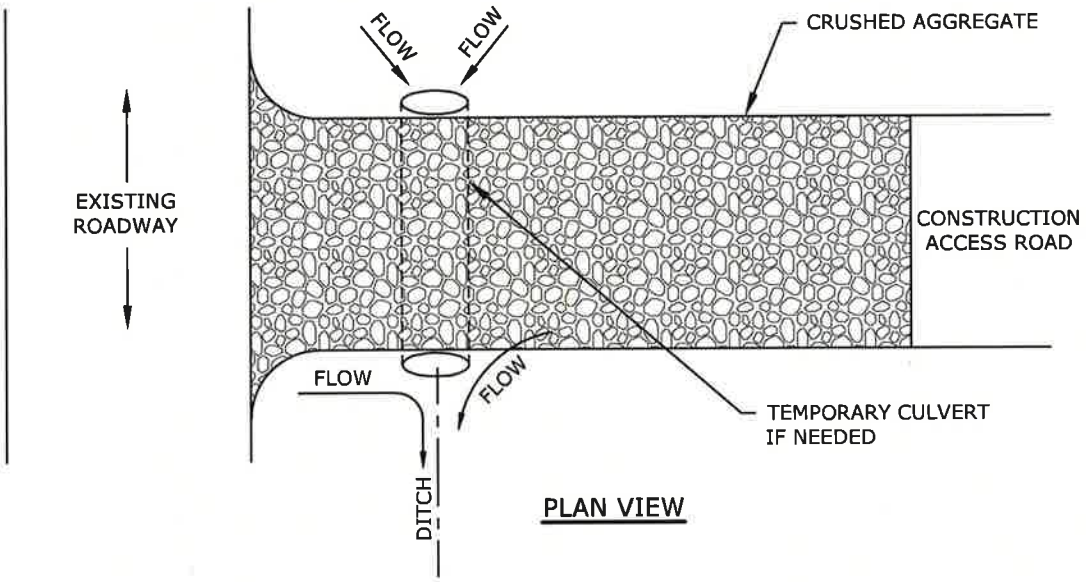
5.3 Work in Agricultural Lands

Transmission lines often cross agricultural lands. In some instances, this may affect ongoing agricultural activities in and around the ROWs. If a construction or maintenance project occurs within agricultural lands, Eversource will work closely with landowners, licensees and stakeholders to minimize agricultural impacts. Whenever practical, Eversource will make reasonable efforts to coordinate the schedule of construction-related activities around the growing and harvest seasons to minimize the impacts on agricultural operations. When this is not practical, Eversource will pursue reasonable measures to mitigate any impacts.

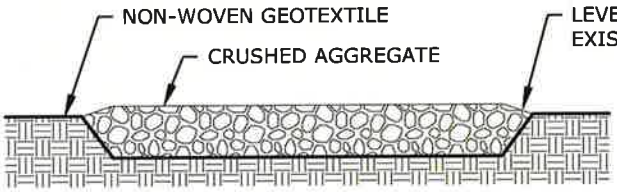
Eversource recognizes that disturbed soils, or soils compacted by heavy construction equipment, may affect the soil's ability to support certain agricultural activities. Eversource will take reasonable steps to avoid or minimize soil compaction and will restore soils that are compacted by construction equipment. Typical measures to avoid or minimize soil compaction include the use of construction mats for access to, and work pads at, structures within the project scope.

Eversource will also work with affected landowners to determine the appropriate method for restoring the soils and is open to discussing and implementing the landowners' alternative restoration suggestions. After the transmission improvement is complete, Eversource will remove all construction-related equipment and debris from the ROW.

APPENDIX A



PLAN VIEW



ELEVATION VIEW

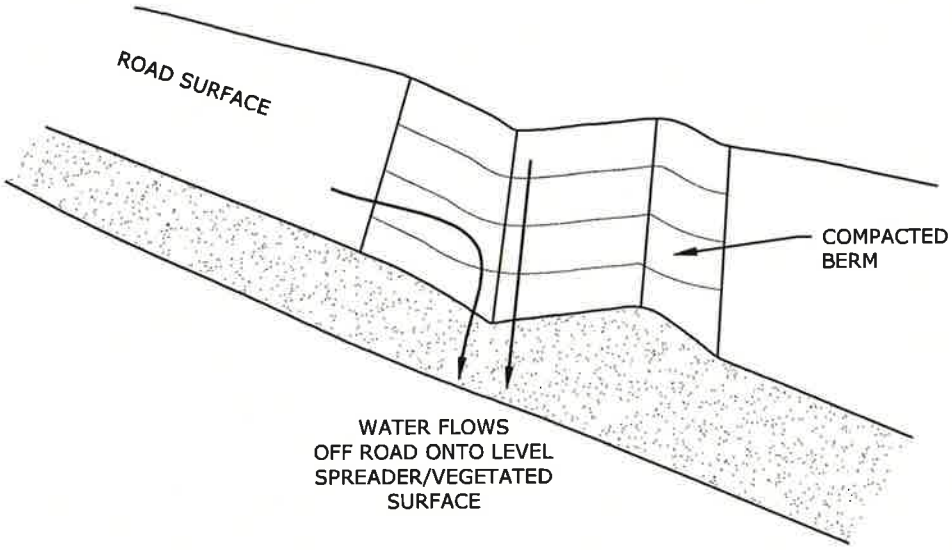
NOTES:

1. CRUSHED AGGREGATE TO CONSIST OF 3-INCH TO 6-INCH STONE.
2. AGGREGATE TO BE UNDERLAIN WITH NON-WOVEN GEOTEXTILE FABRIC.

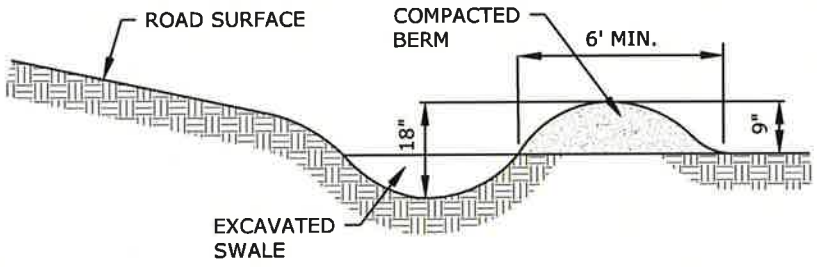
CONSTRUCTION ENTRANCE TRACK PAD

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A01

EVERSOURCE



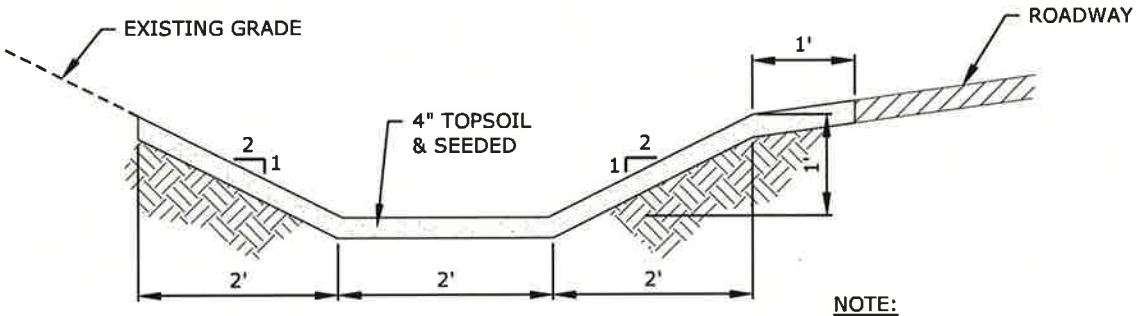
NOTE:
FILL FOR BERMS SHALL BE A COMBINATION OF GRAVEL, SAND AND SILT TO ENSURE WATER TIGHTNESS AND STABILITY.



ELEVATION VIEW

WATER BARS	
DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A02

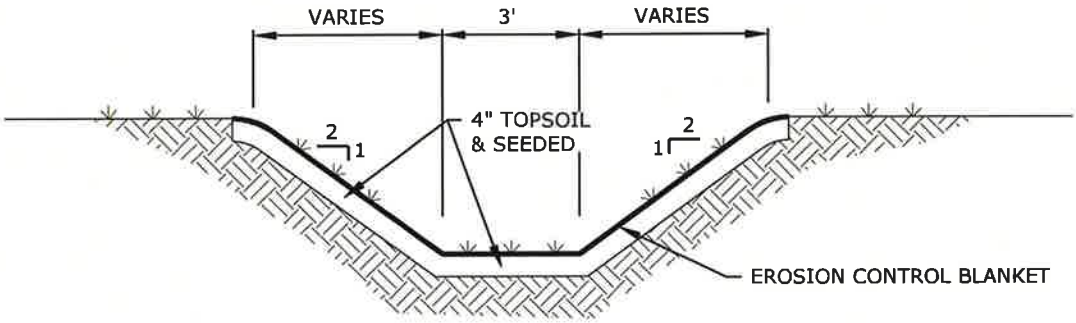
EVERSOURCE



DRAINAGE SWALE AT ROADWAY

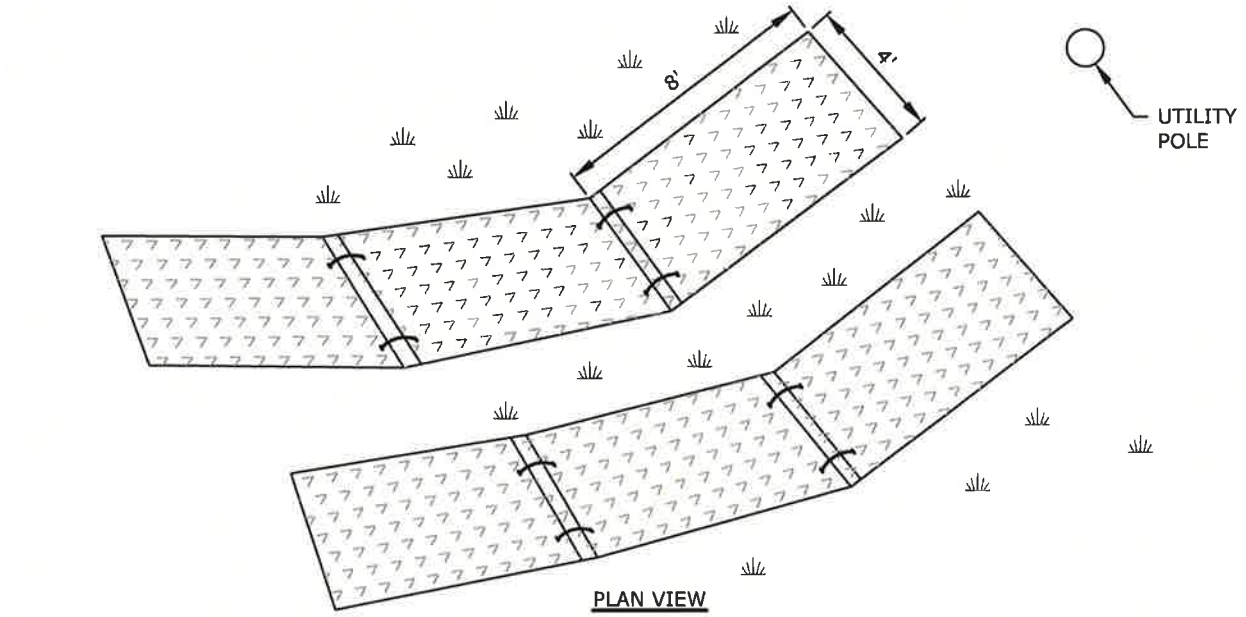
NOTE:

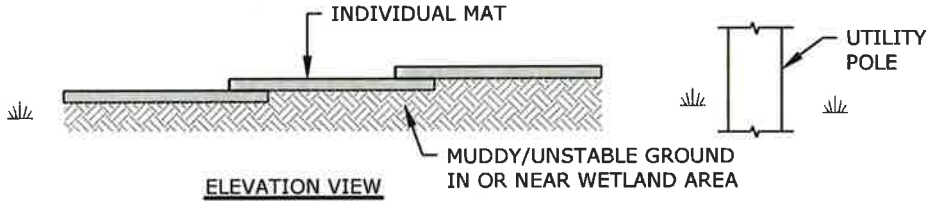
1. USE OF PRODUCTS WITH PLASTIC AND/OR NYLON NETTING IS PROHIBITED.



GRASS-LINED CHANNEL

VEGETATED SWALES	
DATE: 12/2021	EVERSOURCE
SCALE: NO SCALE	
FIGURE: A03	

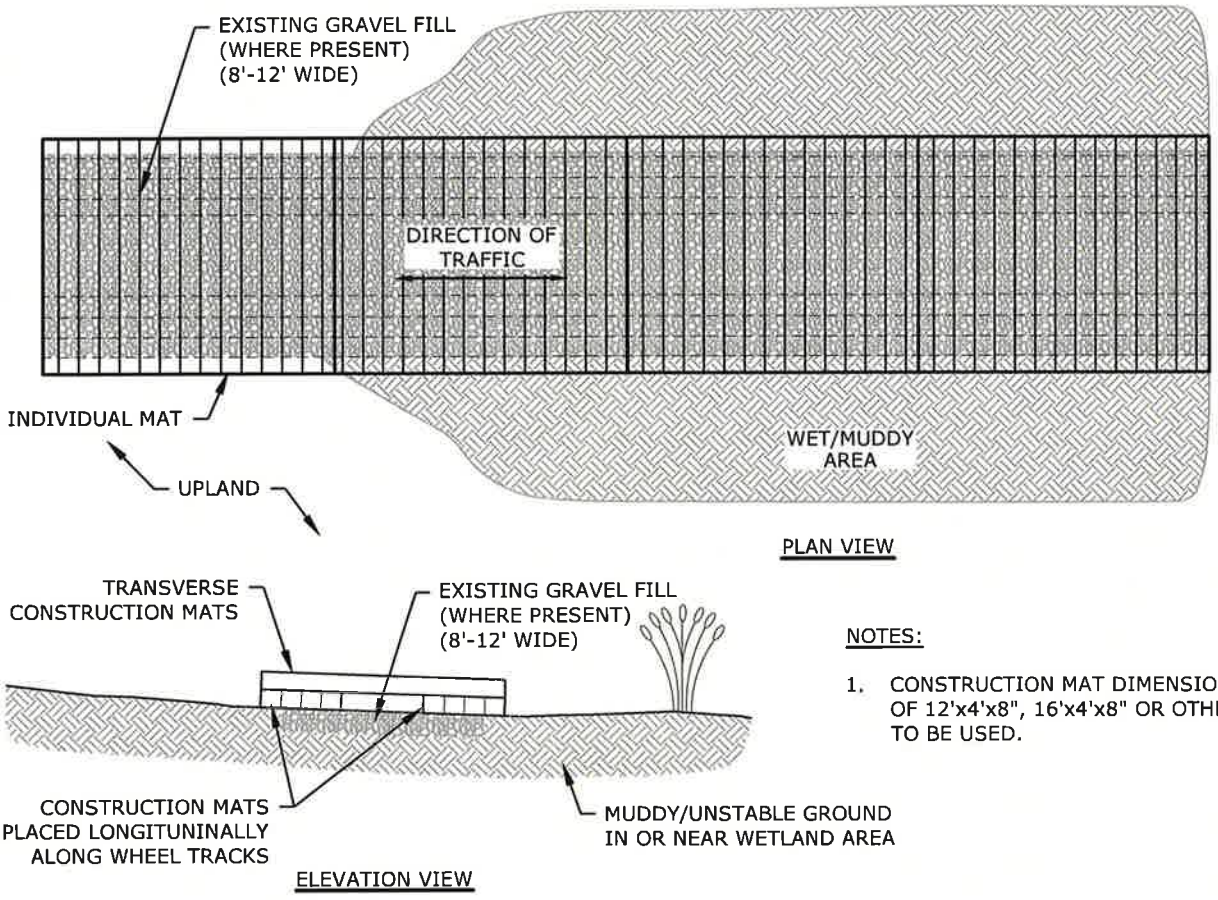




ALTURNAMAT®

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A04

EVERSOURCE



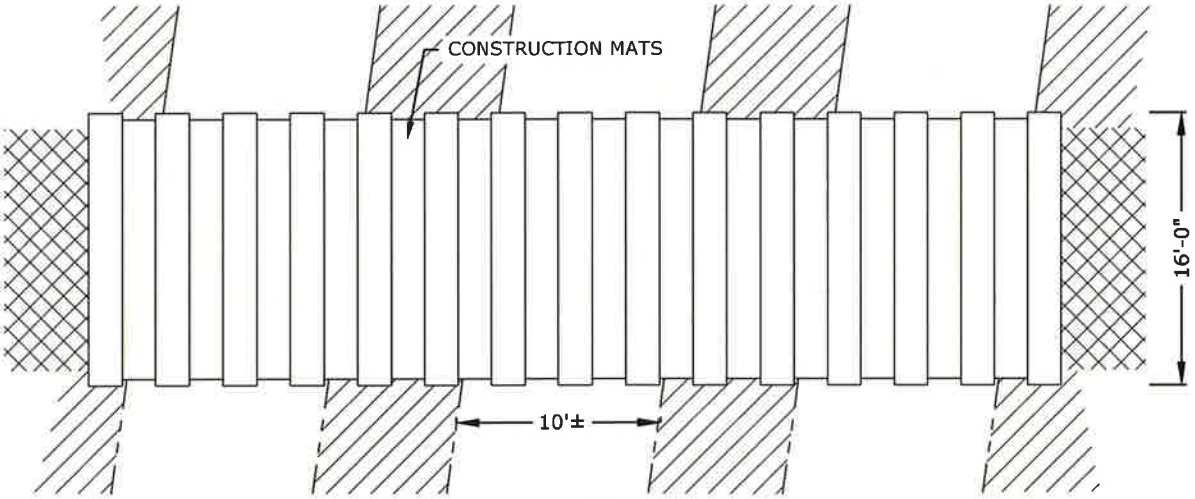
NOTES:

1. CONSTRUCTION MAT DIMENSIONS OF 12'x4'x8", 16'x4'x8" OR OTHER TO BE USED.

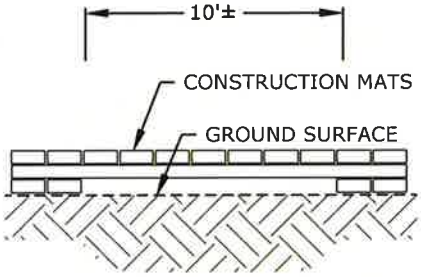
CONSTRUCTION MAT
(WETLAND CROSSING)

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A05

EVERSOURCE



PLAN VIEW



ELEVATION VIEW

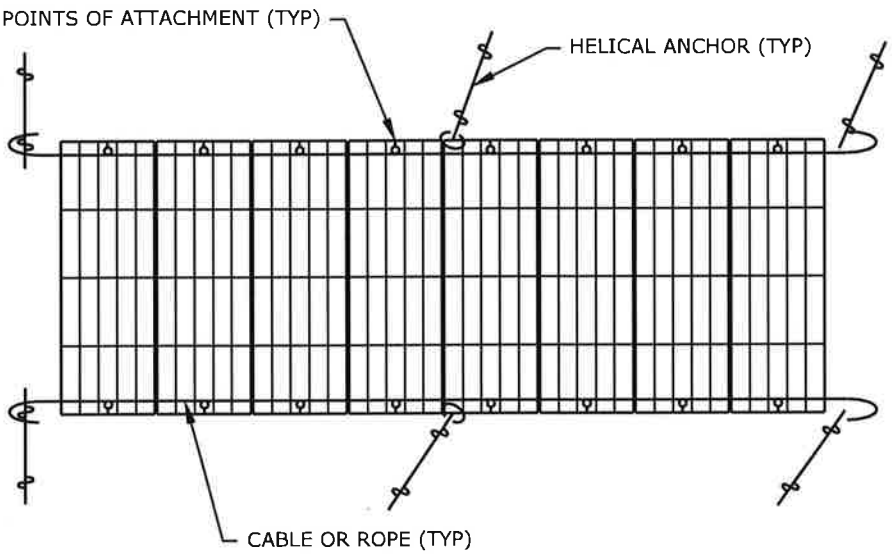
NOTES

1. CONSTRUCTION MATS SHOULD BE PLACED CLOSELY TOGETHER SO THERE ARE NO GAPS BETWEEN EACH MAT SECTION.
2. CONSTRUCTION MAT DIMENSIONS OF 12'x4'x8", 16'x4'x8" OR OTHER TO BE USED.
3. AIR BRIDGING MAY ALSO BE USED TO AVOID IMPACTS TO UNDERGROUND UTILITIES, STONE WALLS, RARE PLANTS OR OTHER SENSITIVE FEATURES. CONSULT WITH EVERSOURCE ENVIRONMENTAL.
4. ADDITIONAL MEASURES MAY BE REQUIRED.

CONSTRUCTION MAT
(AIR BRIDGE)

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A06

EVERSOURCE



PLAN VIEW

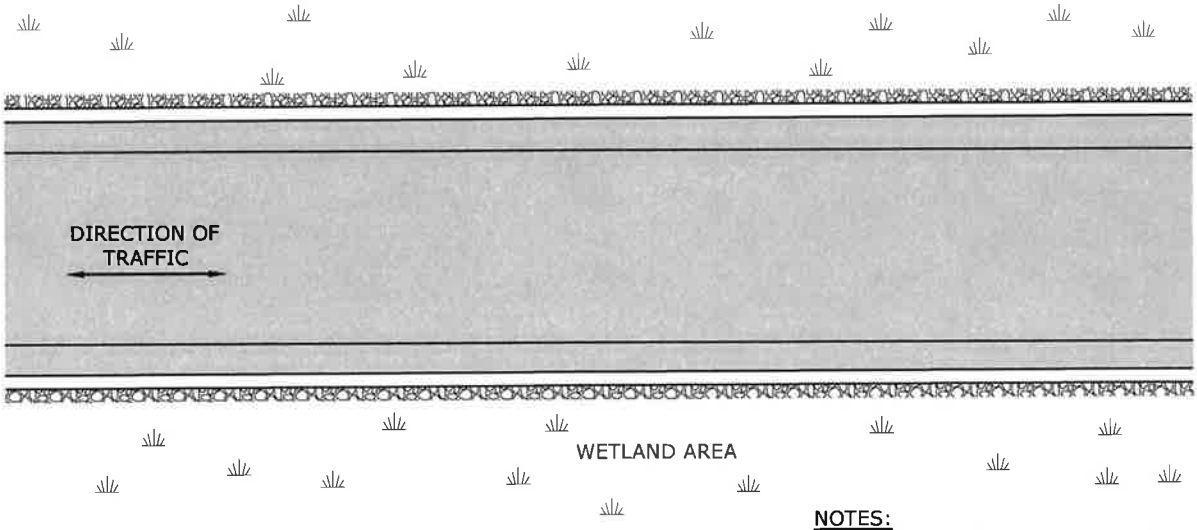
NOTES:

1. TYPICAL HELICAL ANCHOR AND CABLE CONFIGURATION FOR MAT CONTAINMENT IN FLOODPLAINS/LAND SUBJECT TO FLOODING.
2. TYPICAL POINT OF ATTACHMENT HEAVY STAPLES, EYEBOLTS OR OTHER SUITABLE HARDWARE TO SECURE ATTACHMENT OF MAT TO LINEAR CABLE. IF CHAIN POCKETS ARE PRESENT IN THE MATS CABLE OR ROPE CAN BE LOOPED THROUGH RODS.

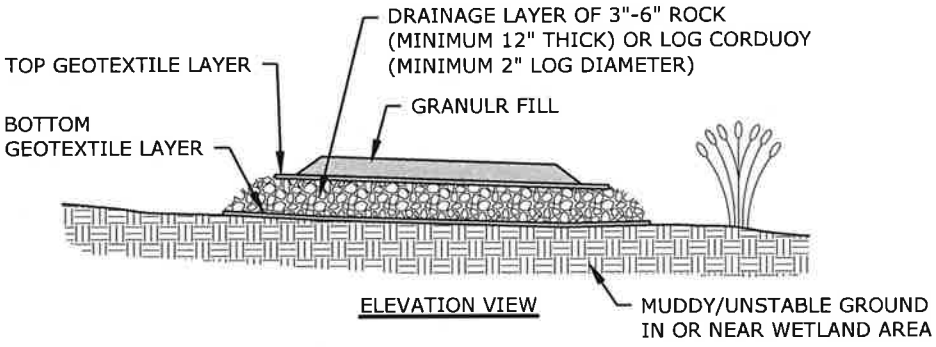
CONSTRUCTION MAT ANCHORING

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A07

EVERSOURCE



PLAN VIEW



ELEVATION VIEW

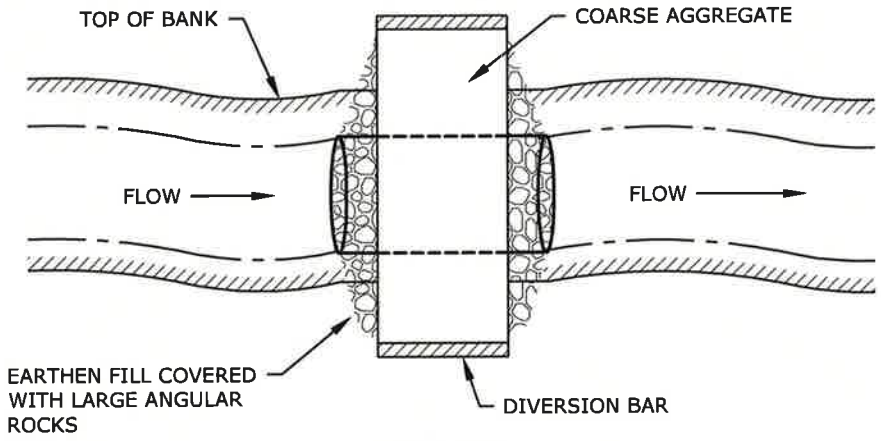
NOTES:

1. DRAINAGE LAYERS MAY BE USED AS AN ALTERNATIVE TO CULVERTS, OR IN COMBINATION WITH CULVERTS, TO PROVIDE ADEQUATE CROSS-DRAINAGE.
2. FILTER FABRIC "JOINTS" SHOULD OVERLAP AT LEAST 18" (WHERE ONE PIECE OF FILTER FABRIC ENDS AND A NEW PIECE OF FABRIC IS ADDED TO CONTINUE THE ROAD).
3. EROSION AND SEDIMENTATION CONTROLS MAY BE INSTALLED ADJACENT TO THE SIDES OF THE ROAD WHEN CONDITIONS WARRANT.

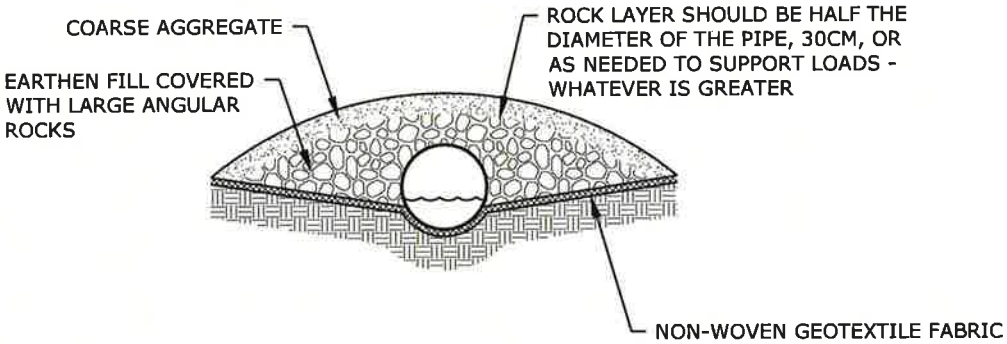
PERMEABLE ROAD

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A08

EVERSOURCE



PLAN VIEW



ELEVATION VIEW

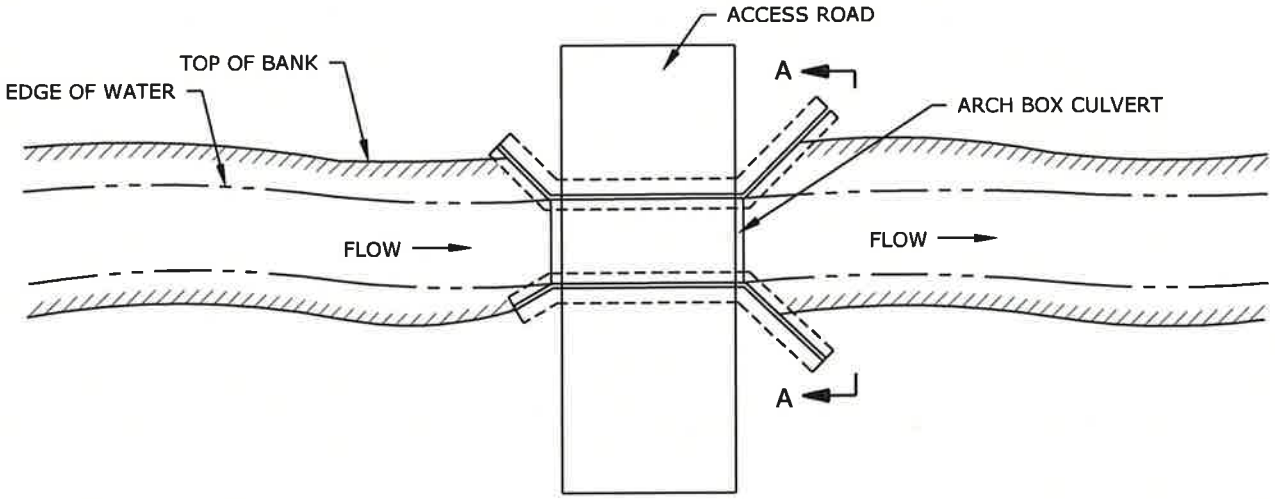
NOTES:

1. CAPACITY OF PIPES COMBINED SHOULD ACCOUNT FOR SIGNIFICANT STORM EVENTS.
2. INSTALLATION OF NEW CULVERTS MAY REQUIRE PERMITS. CONSULT WITH EVERSOURCE ENVIRONMENTAL LICENSING AND PERMITTING PRIOR TO CONSTRUCTION.

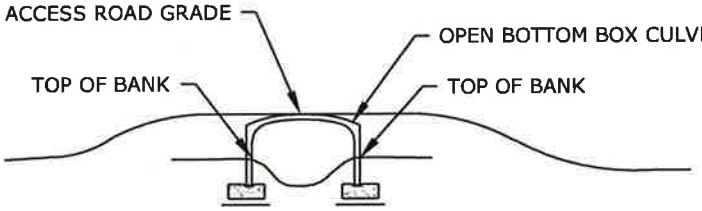
TEMPORARY CONSTRUCTION CULVERT

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A09

EVERSOURCE



PLAN VIEW



SECTION A-A

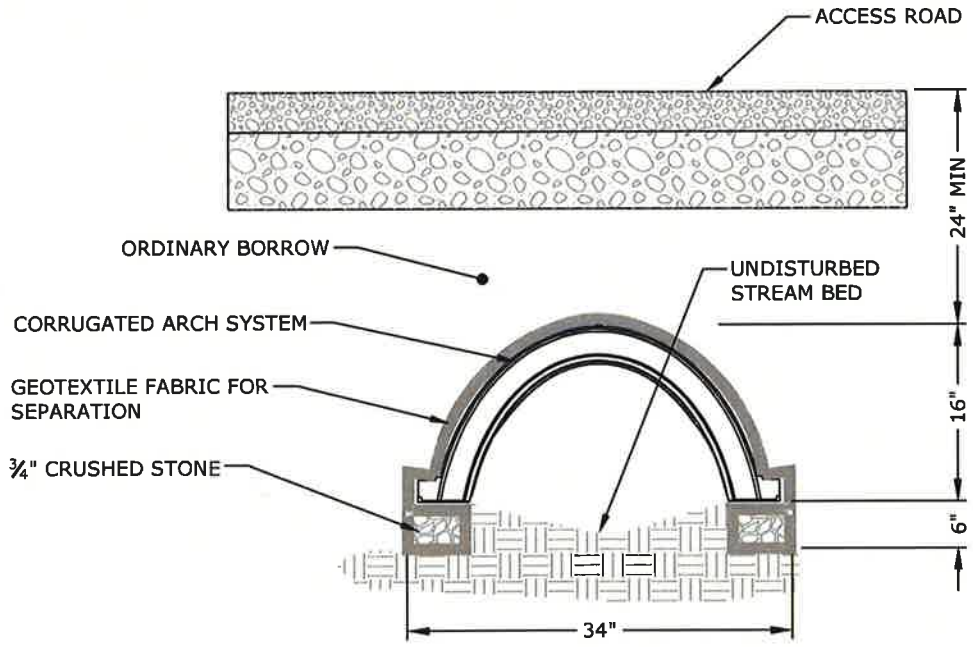
NOTE:

1. INSTALLATION OF NEW OR REPLACEMENT STREAM CROSSINGS, INCLUDING BOX CULVERTS, IS SUBJECT TO ENVIRONMENTAL PERMITTING. CONSULT WITH EVERSOURCE ENVIRONMENTAL LICENSING AND PERMITTING.

PERMANENT OPEN BOTTOM BOX CULVERT

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A10

EVERSOURCE



NOTES:

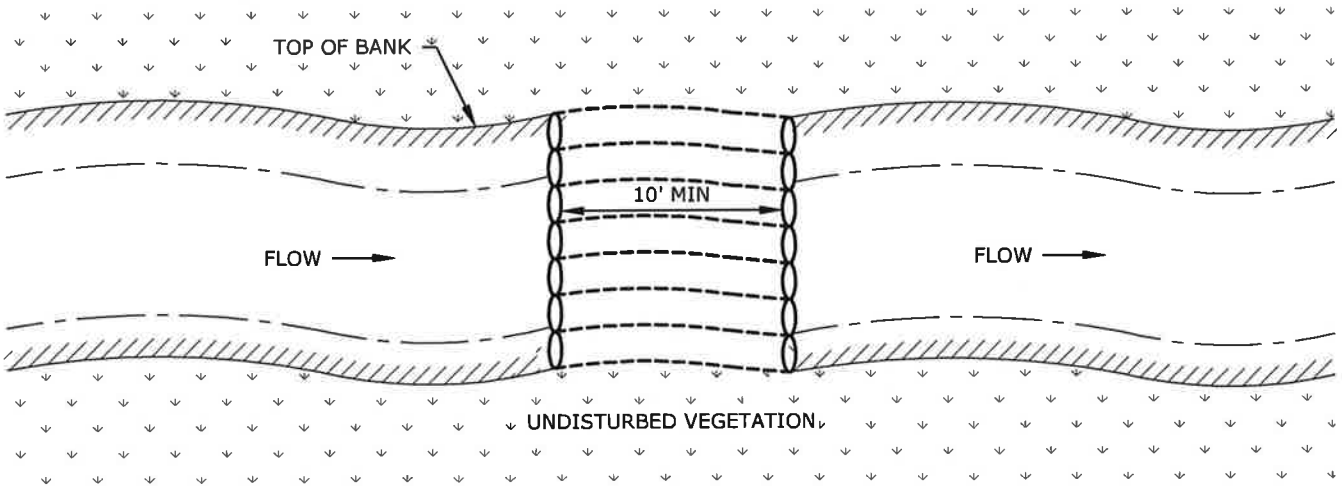
1. CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS", OR ASTM F2922 "STANDARD SPECIFICATION FOR POLYETHYLENE (PE) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".

2. CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".

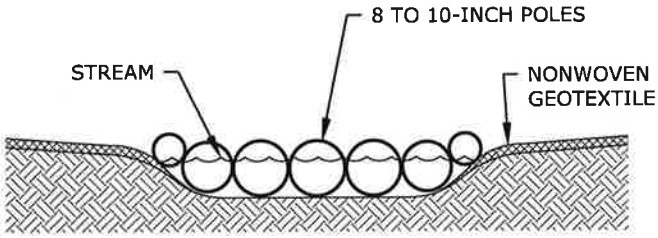
ARCH CULVERT

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A11

EVERSOURCE



PLAN VIEW

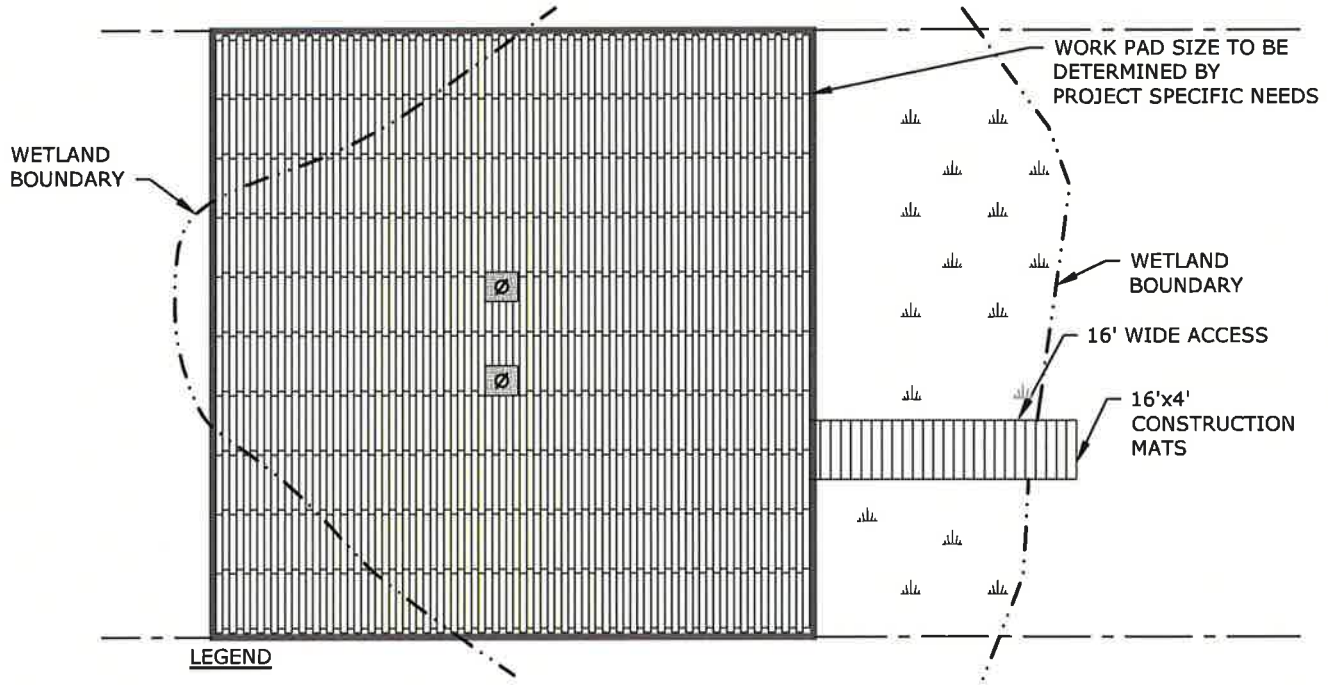


ELEVATION VIEW

NOTES:

1. POLES AND NONWOVEN GEOTEXTILE MUST BE REMOVED IMMEDIATELY AFTER USE.
2. LENGTH OF POLES SHALL BE AT LEAST 10 FEET.
3. USE OF HARDWOODS PROHIBITED.
4. CONSULT WITH EVERSOURCE ENVIRONMENTAL LICENSING AND PERMITTING PRIOR TO INSTALLATION OF POLED FORDS.

POLE FORD	
DATE: 12/2021	EVERSOURCE
SCALE: NO SCALE	
FIGURE: A12	



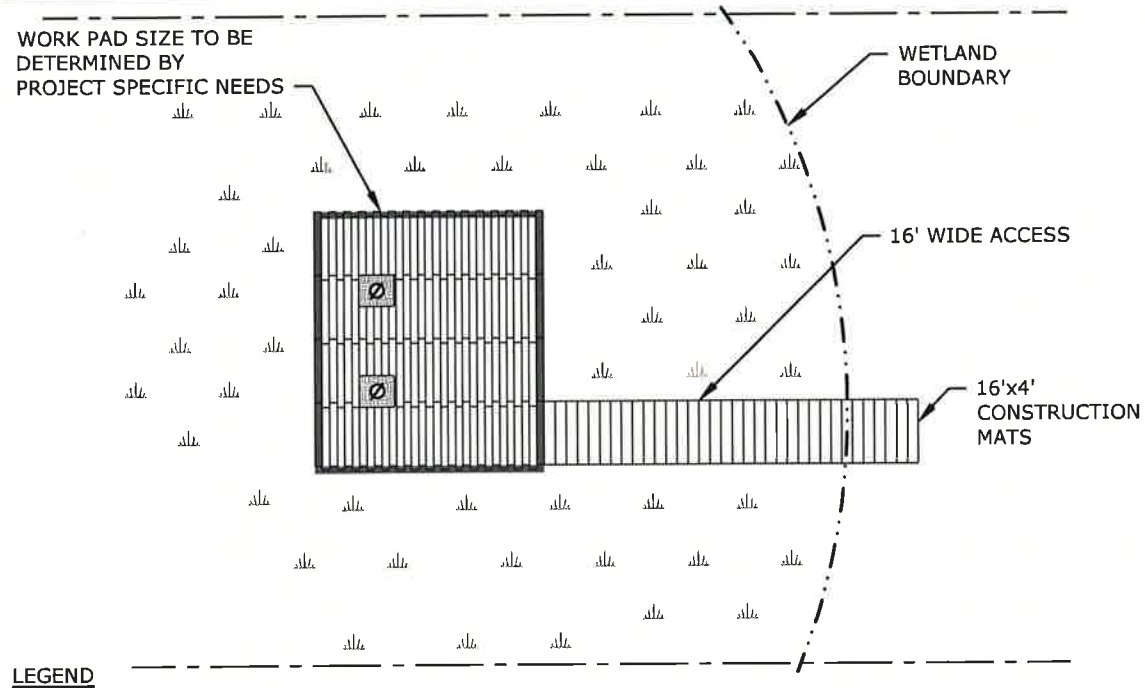
LEGEND

ø	REPLACEMENT POLE LOCATION
▭	CONSTRUCTION MAT - 16'x4'x 8" TYPICAL SIZE. 12'x4'x8" OR OTHER SIZE ACCEPTABLE.
▬	WORK SPACE REQUIREMENTS - LIVE LINE WORK (DETERMINED BASED ON PROJECT SPECIFIC NEEDS)
— - —	LIMIT OF RIGHT-OF-WAY
ılı	WETLAND AREA

CONSTRUCTION MAT LAYOUT
(LIVE LINE WORK)

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A13

EVERSOURCE



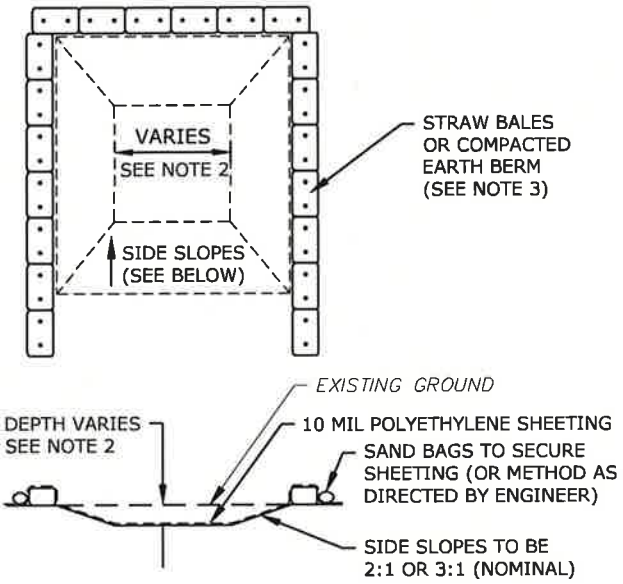
LEGEND

- Ø — REPLACEMENT POLE LOCATION
- CONSTRUCTION MAT - 16'x4'x 8" TYPICAL SIZE. 12'x4'x8" OR OTHER SIZE ACCEPTABLE.
- WORK SPACE REQUIREMENTS - DE-ENERGIZED WORK (DETERMINED BASED ON PROJECT SPECIFIC NEEDS)
- LIMIT OF RIGHT-OF-WAY
- WETLAND AREA

CONSTRUCTION MAT LAYOUT
(DE-ENERGIZED LINE WORK)

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A14

EVERSOURCE



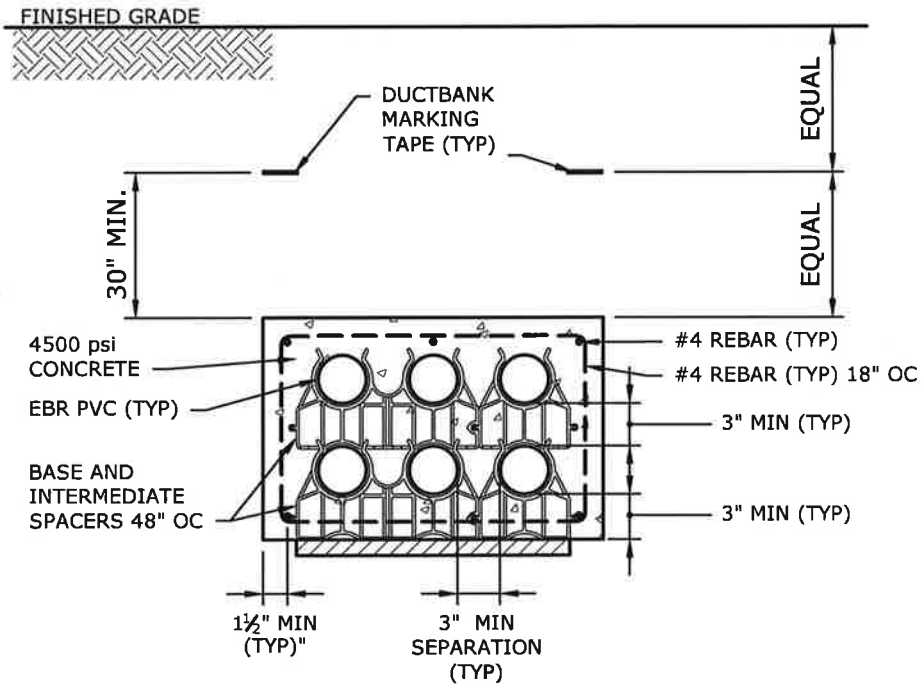
NOTES:

1. CONCRETE WASHOUT AREA(S) SHALL BE INSTALLED PRIOR TO CONCRETE PLACEMENT ON SITE. THE CONCRETE WASHOUT AREA SHALL BE ENTIRELY SELF-CONTAINED.
2. THE CONTRACTOR SHALL SUBMIT THE DESIGN, LOCATION AND SIZING OF THE CONCRETE WASHOUT AREA(S) WITH THE PROJECTS'S EROSION AND SEDIMENTATION CONTROL PLAN.
3. LOCATION: WASHOUT AREA(S) ARE TO BE LOCATED AT LEAST 50 FEET FROM ANY STREAM, WETLAND, STORM DRAINS, OR OTHER SENSITIVE RESOURCE. THE FLOOD CONTINGENCY PLAN MUST ADDRESS THE CONCRETE WASHOUT IF THE WASHOUT IS TO BE LOCATED WITHIN THE FLOODPLAIN.
   SIZE: THE WASHOUT MUST HAVE SUFFICIENT VOLUME TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED BY WASHOUT OPERATIONS INCLUDING, BUT NOT LIMITED TO, OPERATIONS ASSOCIATED WITH GROUT AND MORTAR.
4. SURFACE DISCHARGE IS UNACCEPTABLE. THEREFORE, STRAW BALES OR OTHER CONTROL MEASURES, SHOULD BE USED AROUND THE PERIMETER OF THE CONCRETE WASHOUT AREA FOR CONTAINMENT.
5. SIGNS SHOULD BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE CONCRETE AREA(S) AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CONCRETE WASHOUT TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS. WASHOUT AREA(S) SHOULD BE FLAGGED WITH SAFETY FENCING OR OTHER APPROVED METHOD.
6. WASHOUT AREA(S) ARE TO BE INSPECTED AT LEAST ONCE A WEEK FOR STRUCTURAL INTEGRITY, ADEQUATE HOLDING CAPACITY AND CHECKED FOR LEAKS, TEARS OR OVERFLOWS. (AS REQUIRED BY THE CONSTRUCTION SITE ENVIRONMENTAL INSPECTION REPORT) WASHOUT AREA(S) SHOULD BE CHECKED AFTER HEAVY RAINS.
7. HARDENED CONCRETE WASTE SHOULD BE REMOVED AND DISPOSED OF WHEN THE WASTE HAS ACCUMULATED TO HALF OF THE CONCRETE WASHOUT'S HEIGHT. THE WASTE CAN BE STORED AT AN UPLAND LOCATION. ALL CONCRETE WASTE SHALL BE DISPOSED OF IN A MANNER CONSISTENT WITH ALL APPLICABLE LAWS, REGULATIONS, AND GUIDELINES.

CONCRETE WASH OUT

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A15

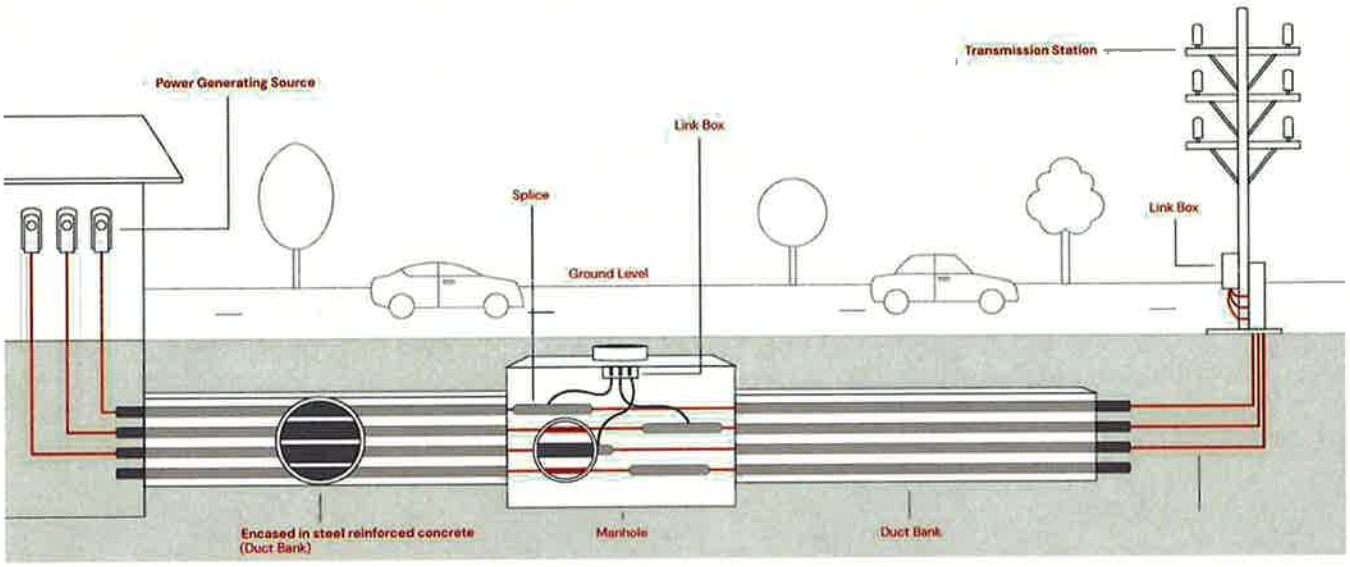
EVERSOURCE



NOTES:

1. GEOTECH TEST, IN ACCORD WITH ASTM D608, THE BOTTOM OF EXCAVATION TO ACHIEVE 85% OF MAXIMUM DRY DENSITY, PRIOR TO CONCRETE PLACEMENT.

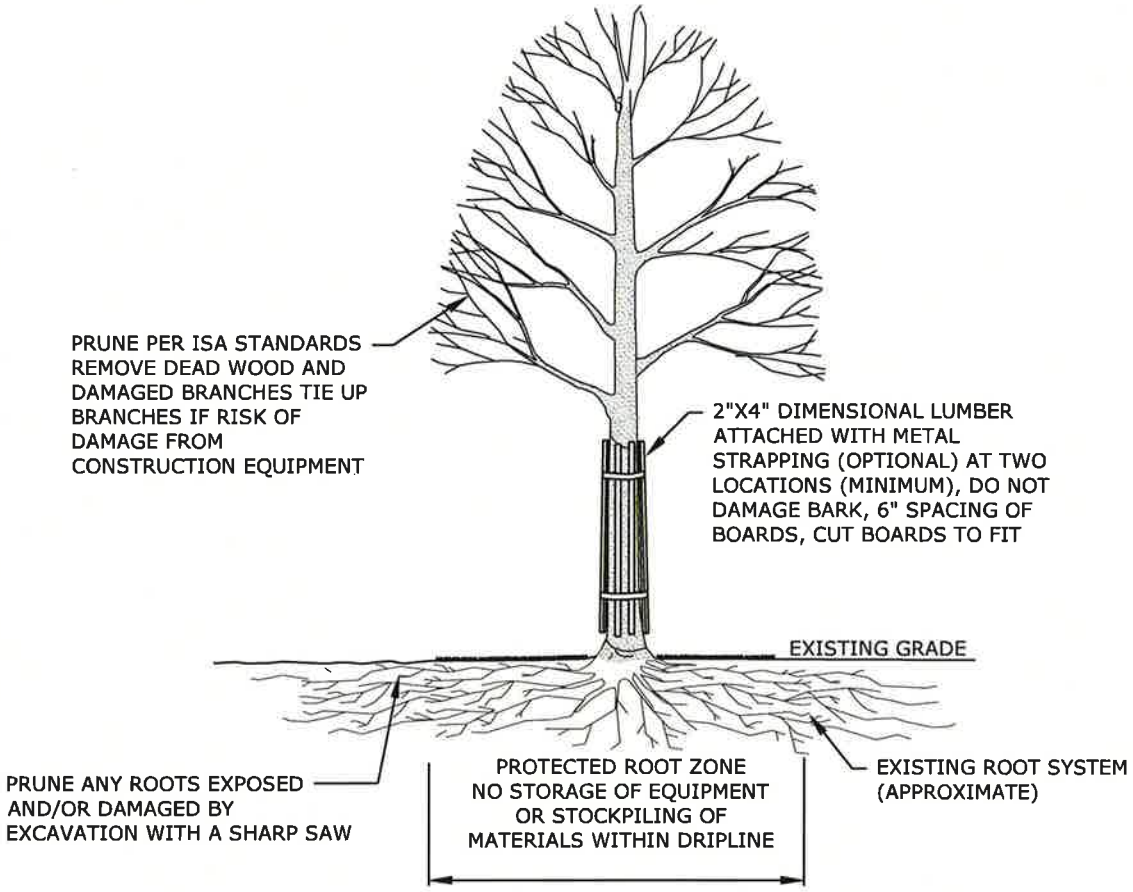
ROAD TRENCH (DUCT BANK)	
DATE: 12/2021	EVERSOURCE
SCALE: NO SCALE	
FIGURE: A16	



ROAD TRENCH
(6-WAY DUCT BANK)

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A17

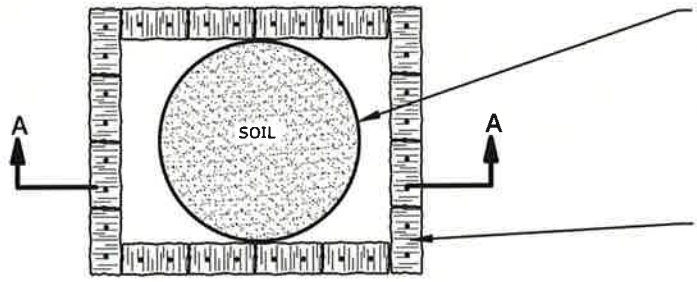
EVERSOURCE



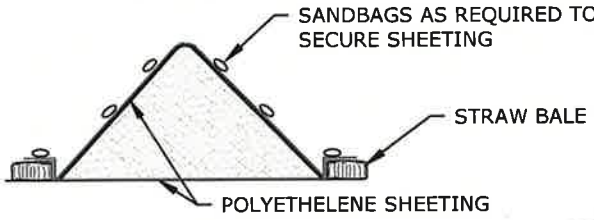
TREE PROTECTION

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A18

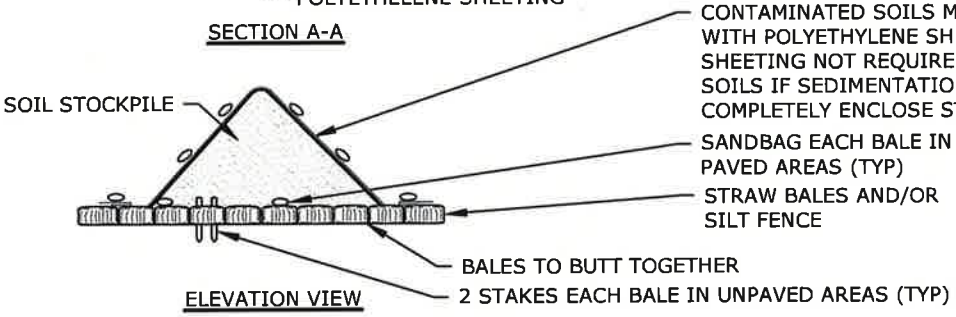
EVERSOURCE



PLAN VIEW



SECTION A-A



ELEVATION VIEW

NOTE:

1. SANDBAGS (OR SIMILAR) MAY BE USED TO SECURE POLYETHYLENE SHEETING ON TOP OF THE STOCKPILE.
2. STRAW PRODUCTS ONLY; THE USE OF HAY OR HAY PRODUCTS IS STRICTLY PROHIBITED.

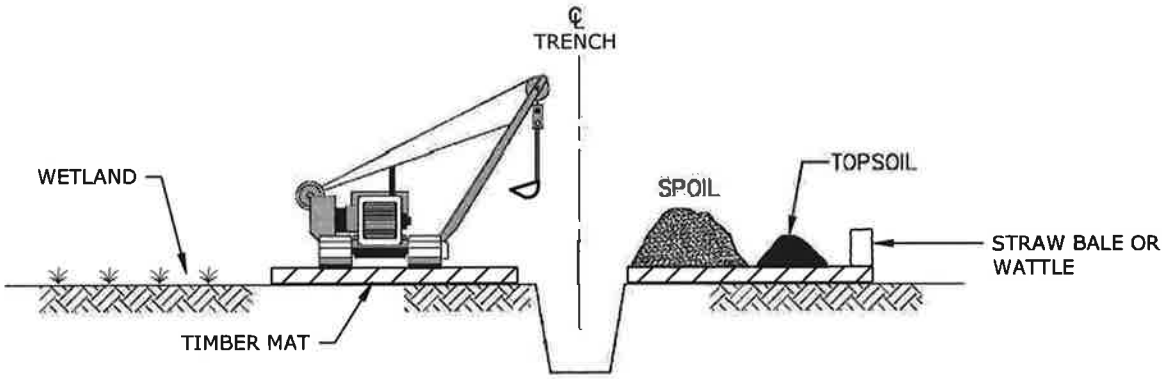
SOIL STOCKPILE MANAGEMENT

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A19

EVERSOURCE

NOTES:

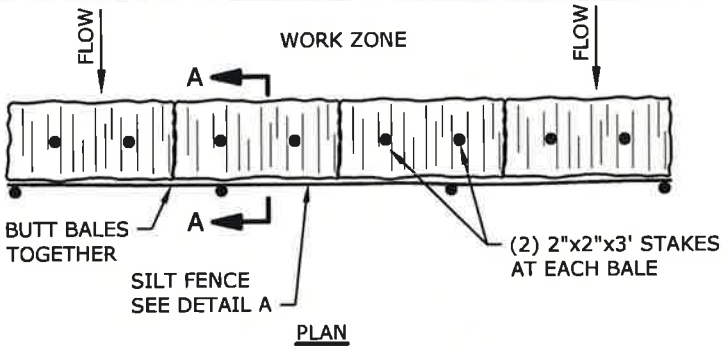
1. TOPSOIL SEGREGATION TO BE USED IN WETLANDS AND AGRICULTURAL LAND.
2. IF WORKING WITHIN WETLANDS, MATTING BENEATH STOCKPILES MUST BE LINED OR UNDERLAIN BY GEOTEXTILE FABRIC.
3. STOCKPILES SHOULD BE ENCLOSED BY STRAW BALES OR WATTLES.



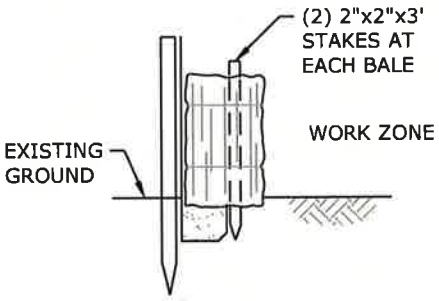
TOPSOIL SEGREGATION

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A20

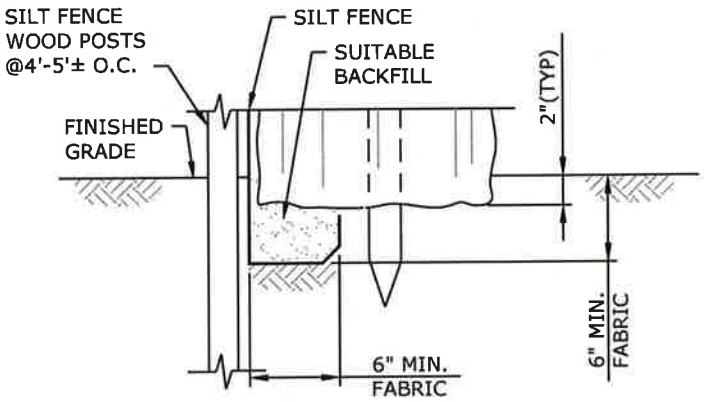
EVERSOURCE



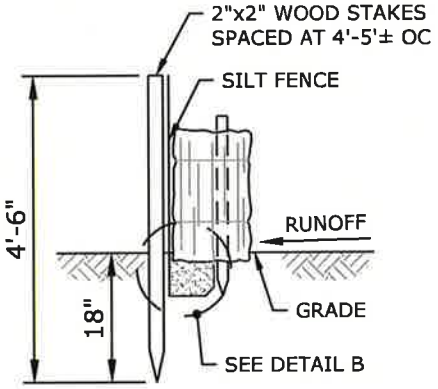
PLAN



SECTION A-A



DETAIL B



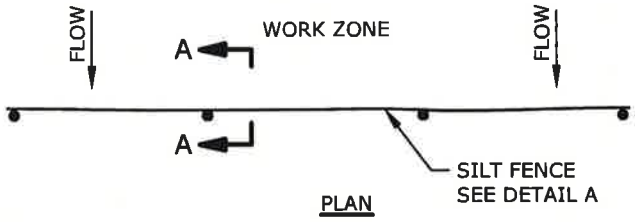
DETAIL A

NOTE:
USE OF HAY AND/OR PRODUCTS CONTAINING WEED SEED IS PROHIBITED.

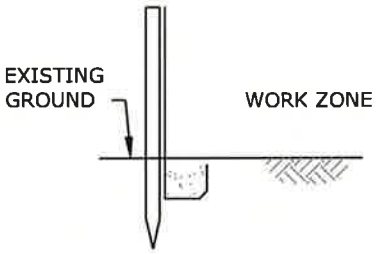
STRAW BALE BARRIER

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A21

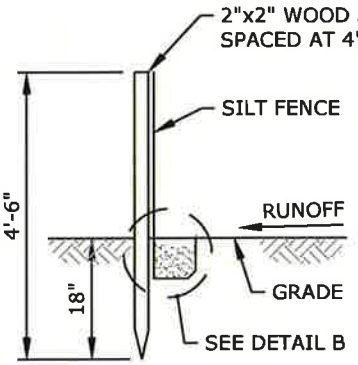
EVERSOURCE



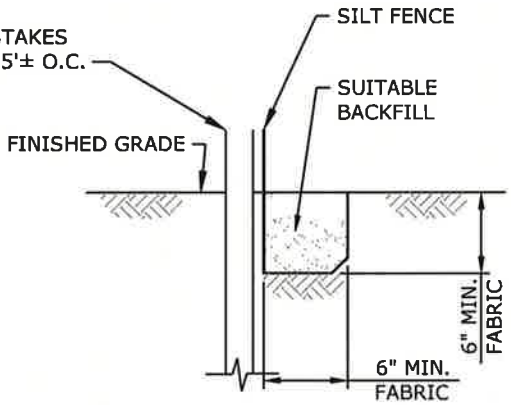
PLAN



SECTION A-A



DETAIL A

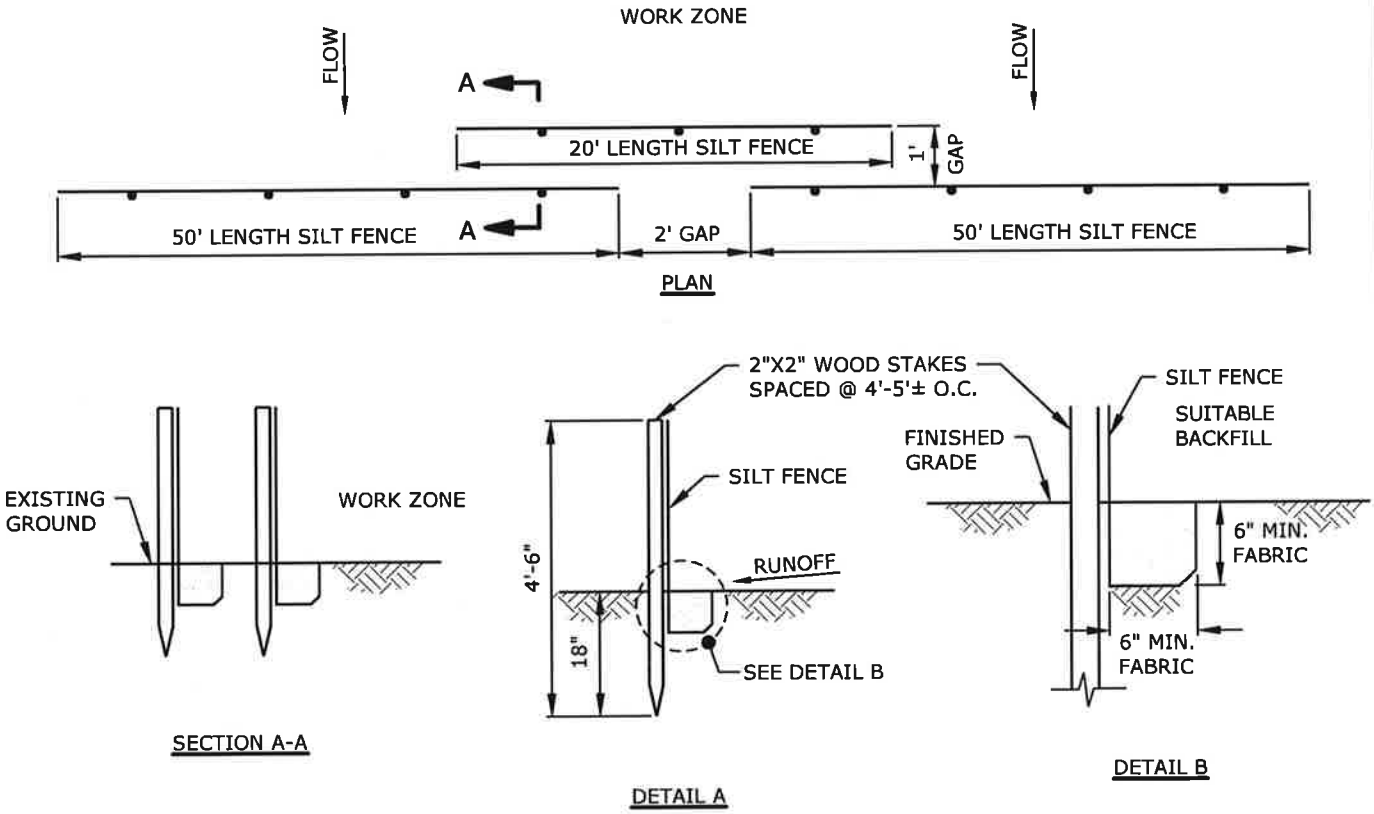


DETAIL B

SILT FENCE

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A22

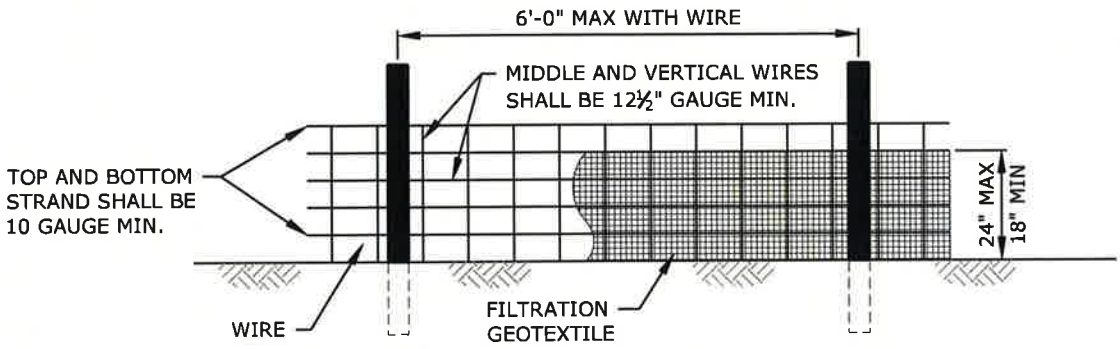
EVERSOURCE



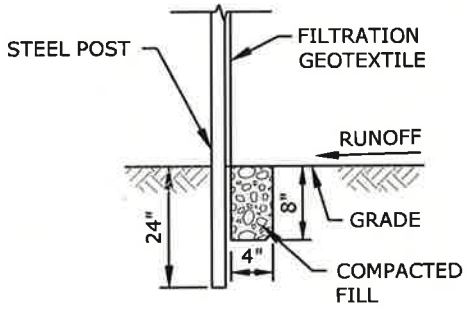
SYNCOPATED SILT FENCE

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A23

EVERSOURCE



ELEVATION



SECTION

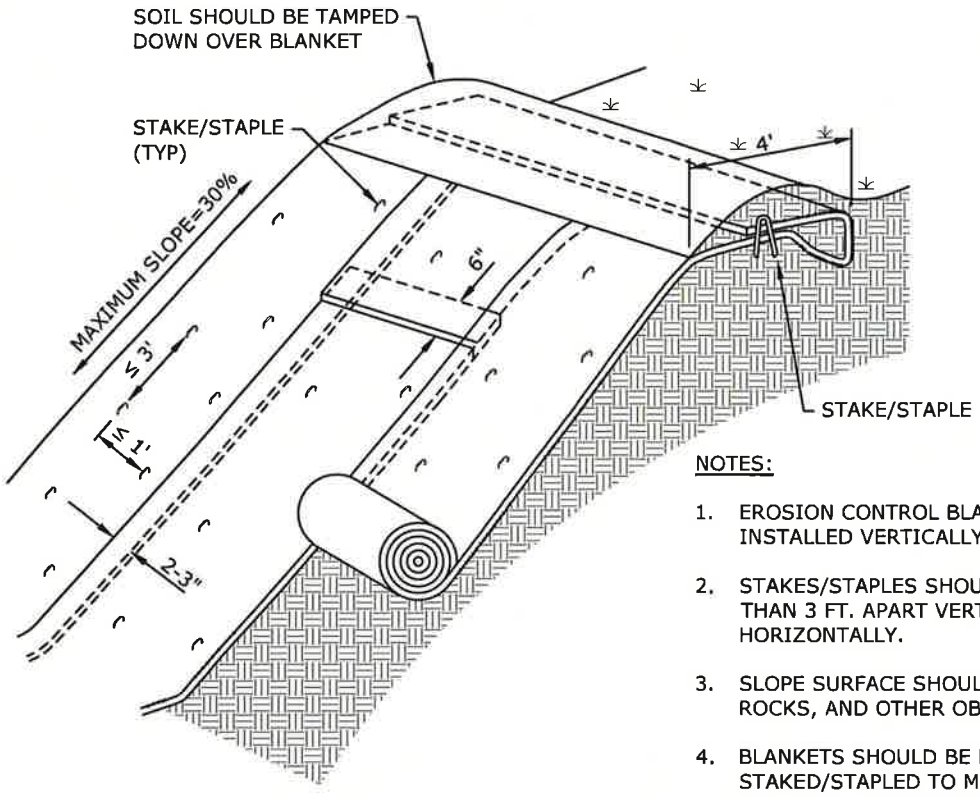
NOTES:

1. USE FILTRATION GEOTEXTILE A MINIMUM OF 36" IN WIDTH AND FASTEN ADEQUATELY TO THE POSTS AND WIRES AS DIRECTED.
2. USE A WIRE A MINIMUM OF 32" IN WIDTH AND WITH A MINIMUM OF 6 LINE WIRES WITH 12" STAY SPACING.
3. PROVIDE 5'-0" STEEL POST OF THE SELF-FASTENER ANGLE STEEL TYPE.
4. FOR MECHANICAL SLICING METHOD INSTALLATION, GEOTEXTILE SHALL BE A MAXIMUM OF 18" ABOVE GROUND SURFACE.
5. EXTEND GEOTEXTILE AND WIRE INTO TRENCH.

REINFORCED SILT FENCE

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A24

EVERSOURCE



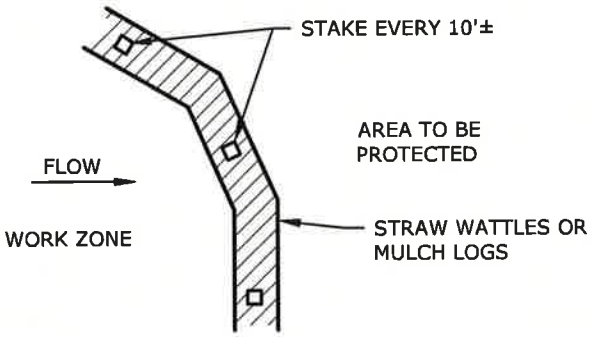
NOTES:

1. EROSION CONTROL BLANKET SHOULD BE INSTALLED VERTICALLY DOWNSLOPE.
2. STAKES/STAPLES SHOULD BE PLACED NO MORE THAN 3 FT. APART VERTICALLY, AND 1 FT. APART HORIZONTALLY.
3. SLOPE SURFACE SHOULD BE FREE OF STICKS, ROCKS, AND OTHER OBSTRUCTIONS.
4. BLANKETS SHOULD BE ROLLED OUT LOOSELY AND STAKED/STAPLED TO MAINTAIN DIRECT SOIL CONTACT. DO NOT STRETCH THE BLANKETS.
5. USE OF PRODUCTS WITH PLASTIC AND/OR NYLON NETTING IS PROHIBITED.

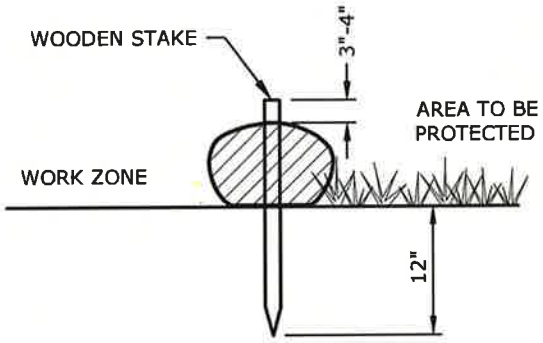
EROSION CONTROL BLANKETS

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A25

EVERSOURCE



PLAN

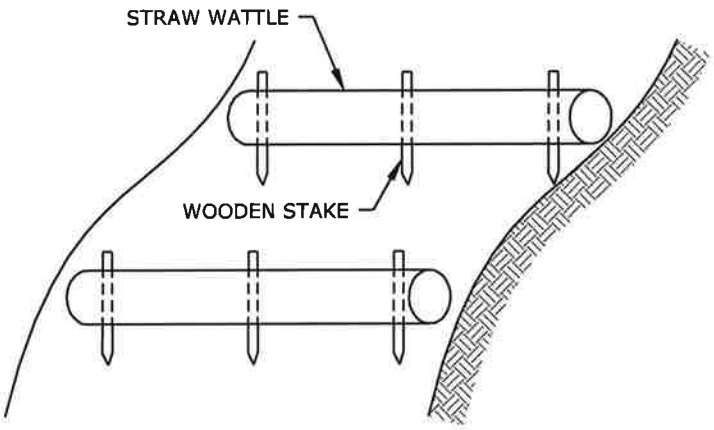


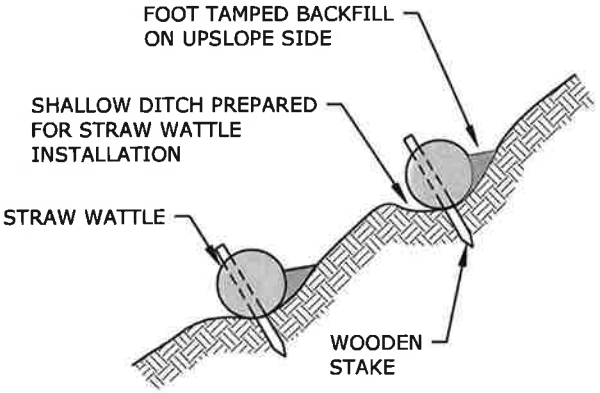
SECTION

NOTE:

1. USE OF PRODUCTS WITH PLASTIC AND/OR NYLON NETTING IS PROHIBITED.

STRAW WATTLE/MULCH LOG		
DATE:	12/2021	EVERSOURCE
SCALE:	NO SCALE	
FIGURE:	A26	



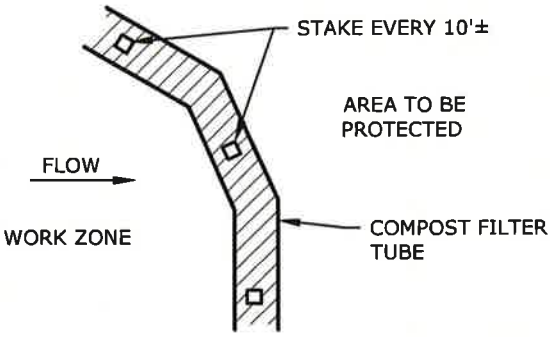


ELEVATION VIEW

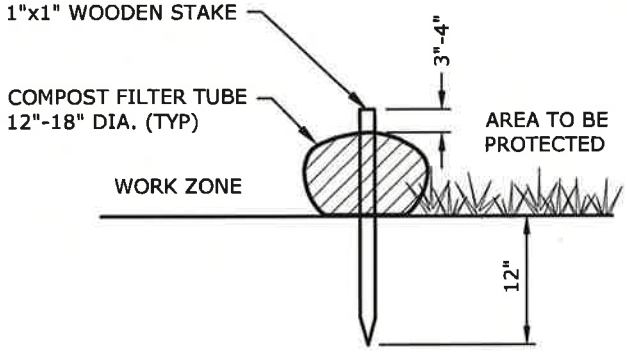
NOTES:

1. USE OF PRODUCTS WITH PLASTIC AND/OR NYLON NETTING IS PROHIBITED.
2. VERTICAL SPACING FOR SLOPE INSTALLATIONS TO BE DETERMINED BY SITE CONDITIONS: SLOPE GRADIENT AND SOIL TYPE. CONFIRM SPACING PER MANUFACTURER'S SPECIFICATIONS. SEE BELOW FOR TYPICAL REQUIREMENTS. COORDINATE SPACING AND LOCATION WITH EVERSOURCE ENVIRONMENTAL LICENSING AND PERMITTING.
    - 1:1 SLOPES = 10 FEET APART
    - 2:1 SLOPES = 20 FEET APART
    - 3:1 SLOPES = 30 FEET APART
3. MINIMUM 12" DIAMETER WATTLES SHOULD BE USED FOR HIGHLY DISTURBED AREAS (E.G. HEAVILY USED ACCESS ROADS WITH ADJACENT WETLANDS). MINIMUM 8" DIAMETER WATTLES SHOULD BE USED FOR LESS DISTURBED SOILS.

STRAW WATTLE (ON SLOPE)	
DATE: 12/2021	EVERSOURCE
SCALE: NO SCALE	
FIGURE: A27	



PLAN



SECTION

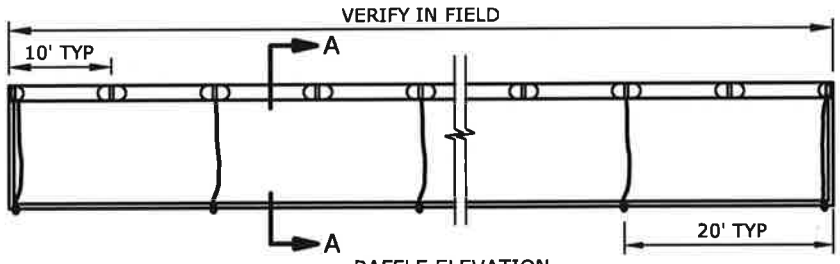
NOTES:

1. TUBES FOR COMPOST FILTERS SHALL BE JUTE MESH OR APPROVED BIODEGRADABLE MATERIAL.
2. TAMP TUBES IN PLACE TO ENSURE GOOD CONTACT WITH SOIL SURFACE.
3. PROVIDE 3' MINIMUM OVERLAP AT ENDS OF TUBES TO JOIN IN A CONTINUOUS BARRIER AND MINIMIZE UNIMPEDED FLOW.
4. COMPOST MATERIAL SHALL BE DISPERSED ON SITE WITHIN LIMITS OF WORK, AS DIRECTED.
5. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
6. DO NOT INSTALL IN PERENNIAL, EPHEMERAL, OR INTERMITTENT STREAMS.
7. CONFIGURE TUBES AROUND EXISTING SITE FEATURES TO MINIMIZE SITE DISTURBANCE AND MAXIMIZE CAPTURE AREA OF STORMWATER RUN-OFF.

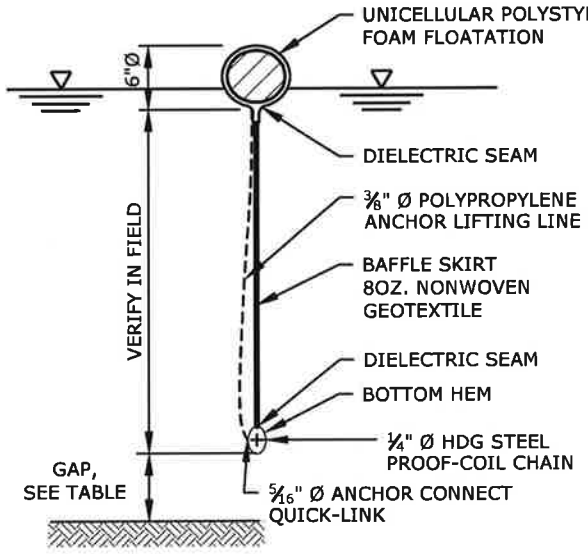
COMPOST FILTER TUBE

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A28

EVERSOURCE



BAFFLE ELEVATION



SECTION A-A

NOTES:

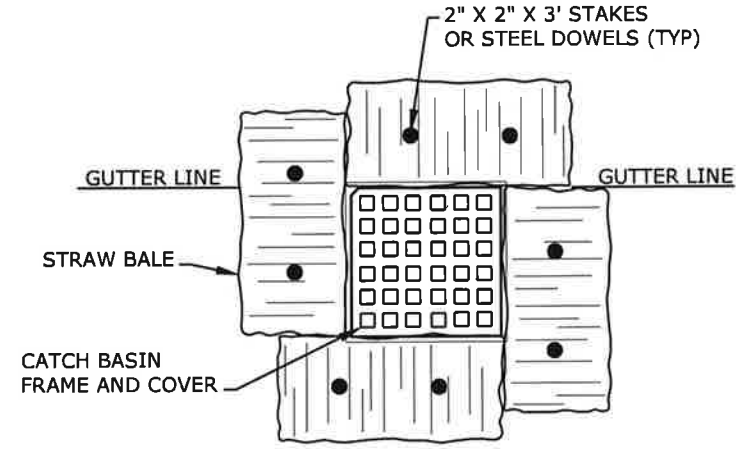
1. TURBIDITY CURTAIN BY ENVIRONETICS, INC. OR APPROVED EQUAL.
2. TURBIDITY CURTAIN SHALL NOT BE EXTENDED ACROSS CHANNEL FLOWS.
3. TURBIDITY CURTAIN MATERIAL SHALL BE ULTRAVIOLET LIGHT RESISTANT.

TYPE	DESCRIPTION	CONDITIONS	GAP (IN.)
I	FLATWATER	CALM AND PROTECTED	0
II	LIGHTWEIGHT	SEMI-PROTECTED AREA, CURRENTS UP TO 2 FT/S	12
III	MIDDLEWEIGHT	EXPOSED AREA, CURRENTS UP TO 5 FT/S	12
IV	HEAVYWEIGHT	EXPOSED TO WIND, CURRENT, AND TIDES	0

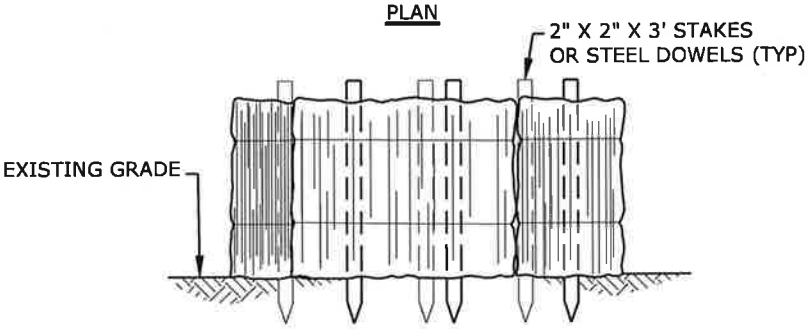
TURBIDITY CURTAIN

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A29

EVERSOURCE



PLAN



ELEVATION

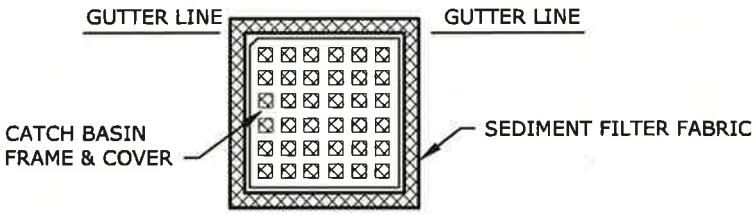
NOTES:

1. A MINIMUM OF TWO WOOD STAKES ARE REQUIRED PER STRAW BALE.
2. STEEL DOWELS MAY BE USED WHERE WOOD STAKES CANNOT BE DRIVEN INTO THE GROUND.
3. "SILT SACKS", "DANDY BAG II" OR OTHER SIMILAR SILT RETENTION DEVICES SHALL BE INSTALLED IN LIEU OF STRAW BALES FOR CATCH BASINS LOCATED IN EXISTING PAVED AREAS.
4. STRAW PRODUCTS ONLY; THE USE OF HAY OR HAY PRODUCTS IS STRICTLY PROHIBITED.

CATCH BASIN INLET PROTECTION
(STRAW BALES)

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A30

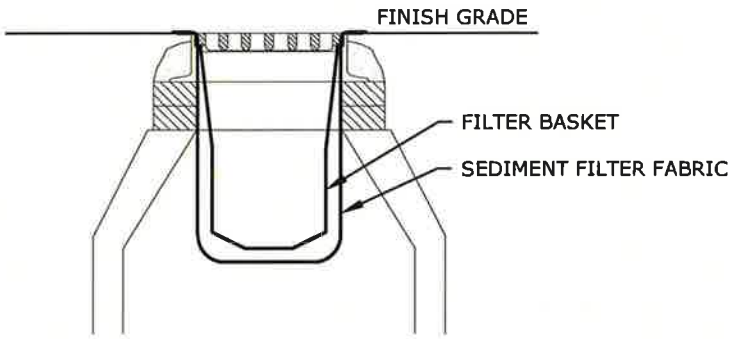
EVERSOURCE



PLAN VIEW

NOTES:

1. FILTER BASKET SHALL BE "SILT SAK" BY JENNIAN, MELROSE, MA; "DANDY BAG" BY DANDY PRODUCTS (1-800-591-2284); DRAIN PAC (91-800-272-2832); OR APPROVED EQUIVALENT SUBJECT TO CONSULTATION WITH EVERSOURCE ENVIRONMENTAL LICENSING AND PERMITTING.
2. FILTER BASKETS SHOULD BE USED IN COMBINATION WITH ANOTHER INLET PROTECTION MEASURE SUCH AS SEDIMENT FILTER FABRIC IF DRAINAGE AREA IS SMALL WITH SHALLOW FLOWS.



ELEVATION VIEW

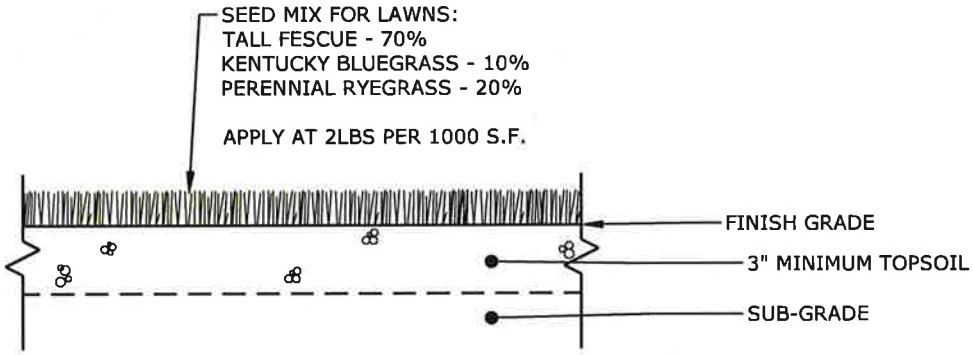
CATCH BASIN INLET PROTECTION
(SILT SACK)

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A31

EVERSOURCE

NOTE:

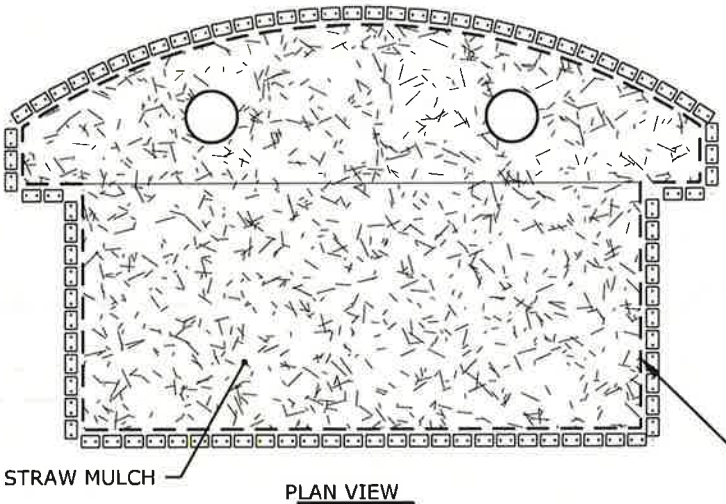
THE SEED MIX UTILIZED SHALL CONSIST OF QUICK GROWING, DROUGHT TOLERANT, NATIVE GRASSES, SUCH AS RYES. THE SEED MIX UTILIZED WITHIN THE BUFFER ZONE TO WETLAND RESOURCE AREAS MAY CONSIST OF QUICK GROWING, DROUGHT TOLERANT, NATIVE GRASSES BUT MUST CONTAIN AT LEAST 50% OF A NATIVE SEED MIX WITH HIGH HABITAT VALUE, SUCH AS ONES WHICH CONTAIN PERENNIAL SHRUBS, WILDFLOWERS. CONSULT WITH EVERSOURCE ENVIRONMENTAL LICENSING AND PERMITTING FOR PROJECT SPECIFIC REQUIREMENTS.



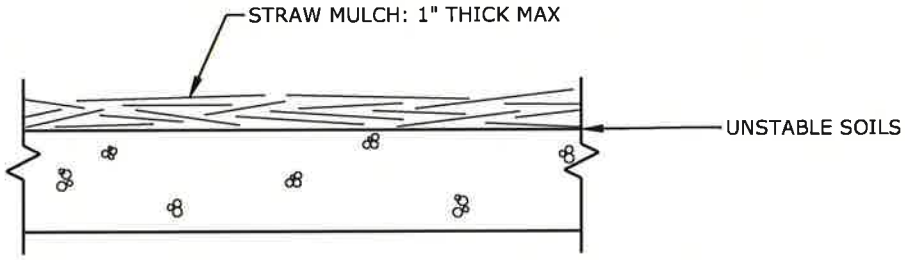
LOAM AND SEED

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A32

EVERSOURCE



PLAN VIEW



ELEVATION VIEW

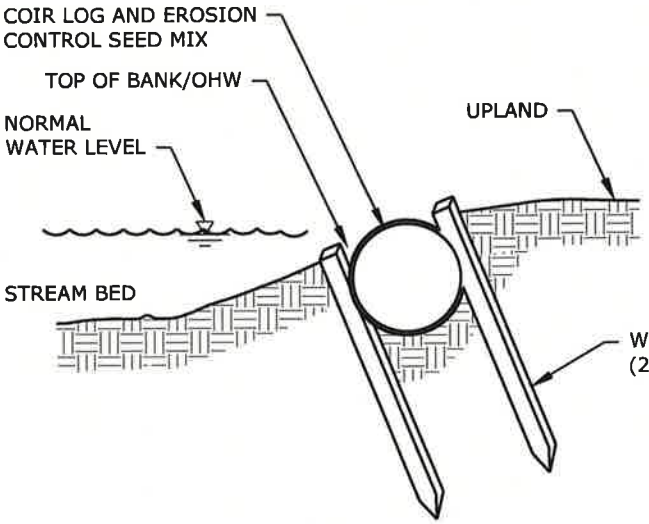
NOTES:

1. STRAW PRODUCTS ONLY; THE USE OF HAY OR HAY PRODUCTS IS STRICTLY PROHIBITED.
2. MULCH APPLICATION SHALL NOT EXCEED 1" IN THICKNESS.
3. WOOD CHIPS MAY BE SUBSTITUTED FOR STRAW MULCH SUBJECT TO EVERSOURCE ENVIRONMENTAL LICENSING AND PERMITTING APPROVAL.
4. CONSULT WITH EVERSOURCE ENVIRONMENTAL LICENSING AND PERMITTING FOR PROJECT SPECIFIC REQUIREMENTS.

STRAW MULCH

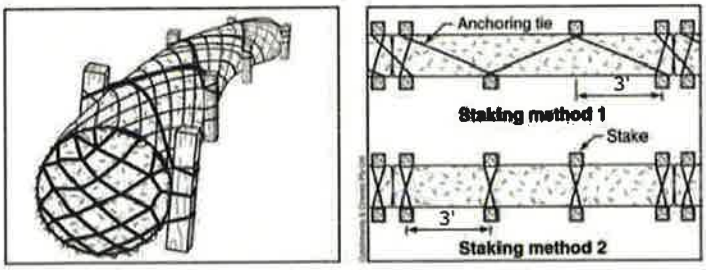
DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A33

EVERSOURCE



NOTES:

1. USE OF PRODUCTS WITH PLASTIC AND/OR NYLON NETTING IS PROHIBITED.
2. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
3. INSTALLATION MAY INCLUDE SEEDING AND/OR OTHER NATIVE PLANT INSTALLATION. CONSULT EVERSOURCE ENVIRONMENTAL LICENSING AND PERMITTING.

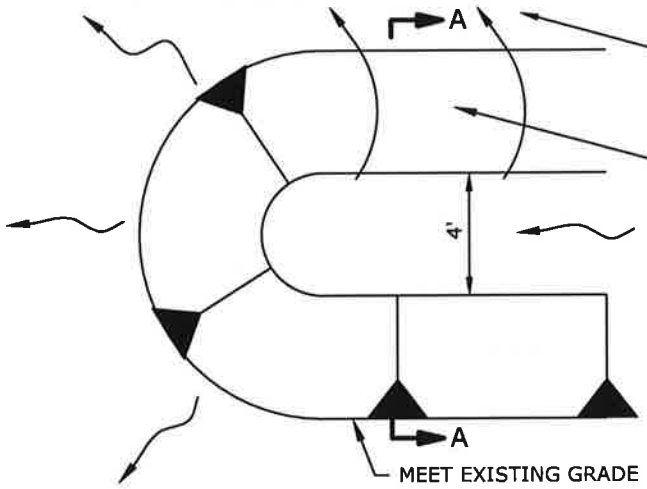


TYPICAL STAKING

COIR LOG

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A34

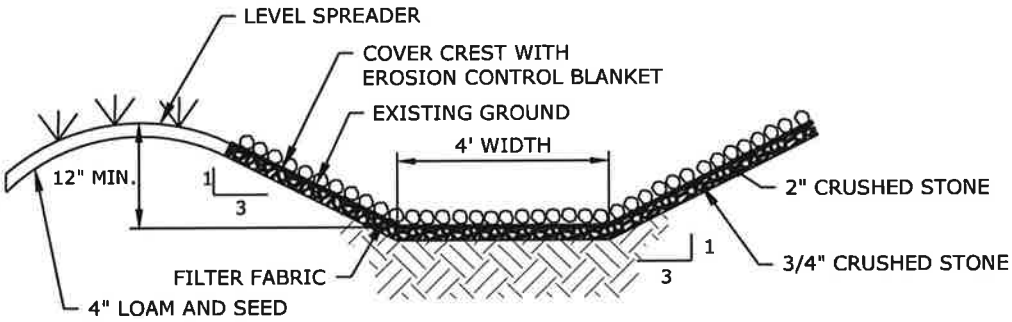
EVERSOURCE



NOTE:
WHERE GROUND DOWNSTREAM OF LEVEL SPREADER HAS BEEN DISTURBED, VEGETATIVE COVER SHALL BE ESTABLISHED.

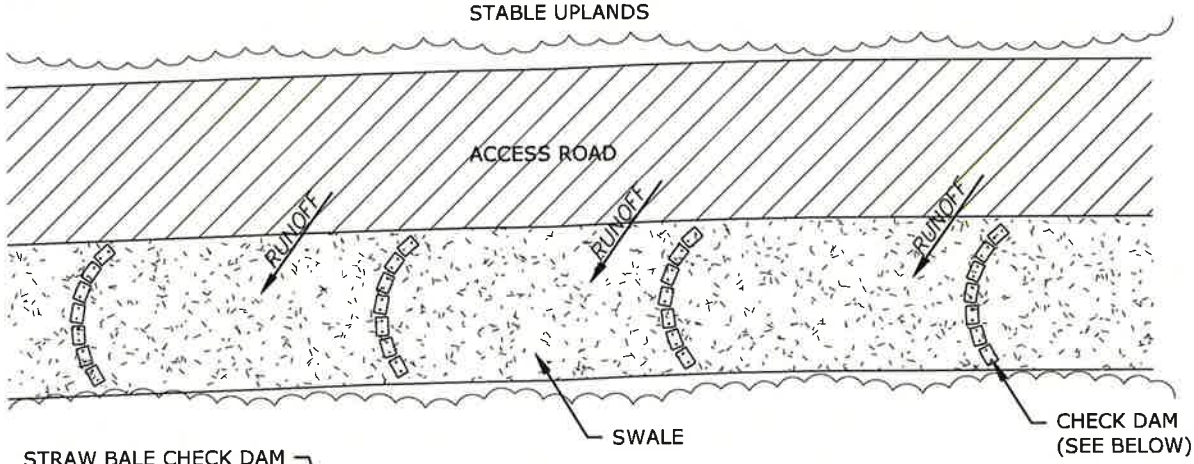
LEVEL SPREADER

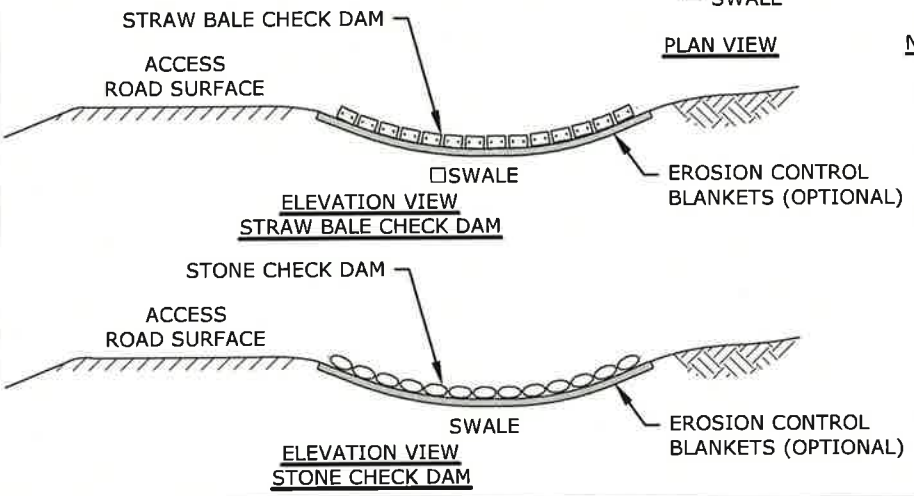
PLAN VIEW



SECTION A-A

LEVEL SPREADER	
DATE: 12/2021	EVERSOURCE
SCALE: NO SCALE	
FIGURE: A35	





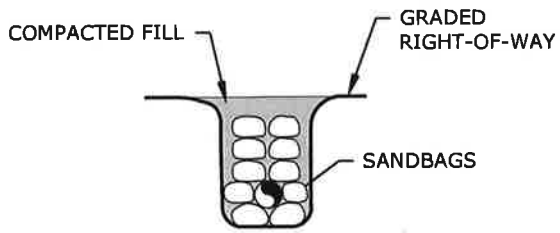
NOTES:

1. CHECK DAMS SHALL BE CONSTRUCTED OF STONE OR STRAW PRODUCTS ONLY; THE USE OF HAY OR HAY PRODUCTS IS STRICTLY PROHIBITED.
2. HEIGHT AND SPACING OF CHECK DAMS IS DEPENDENT ON SLOPES AND RUNOFF CONDITIONS. CONSULT WITH EVERSOURCE ENVIRONMENTAL LICENSING AND PERMITTING PRIOR TO INSTALLATION FOR PROJECT SPECIFIC REQUIREMENTS.
3. REMOVE TEMPORARY CHECK DAMS UPON SWALE STABILIZATION AND/OR COMPLETION OF CONSTRUCTION.

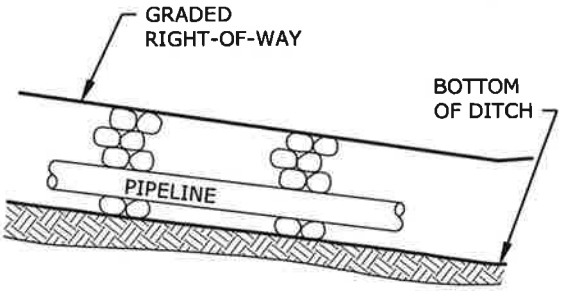
CHECK DAMS

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A36

EVERSOURCE

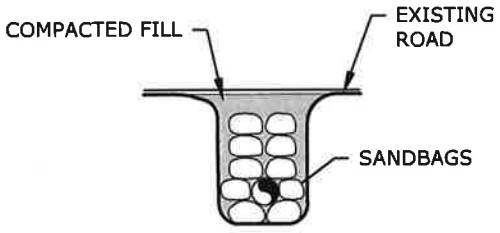


SECTION

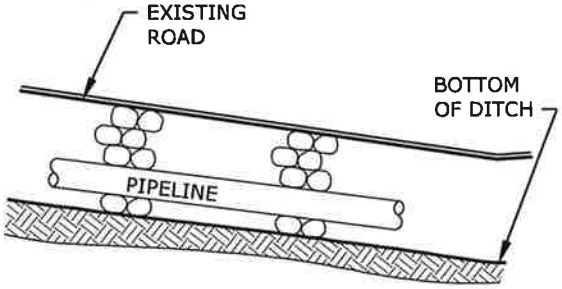


ELEVATION

CROSS-COUNTRY BURIED PIPELINE



SECTION



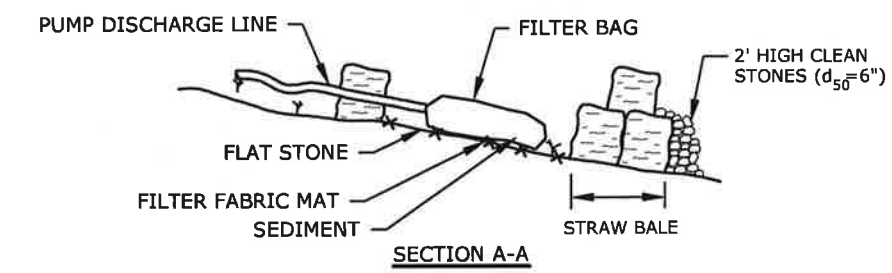
ELEVATION

IN-ROAD BURIED PIPELINE

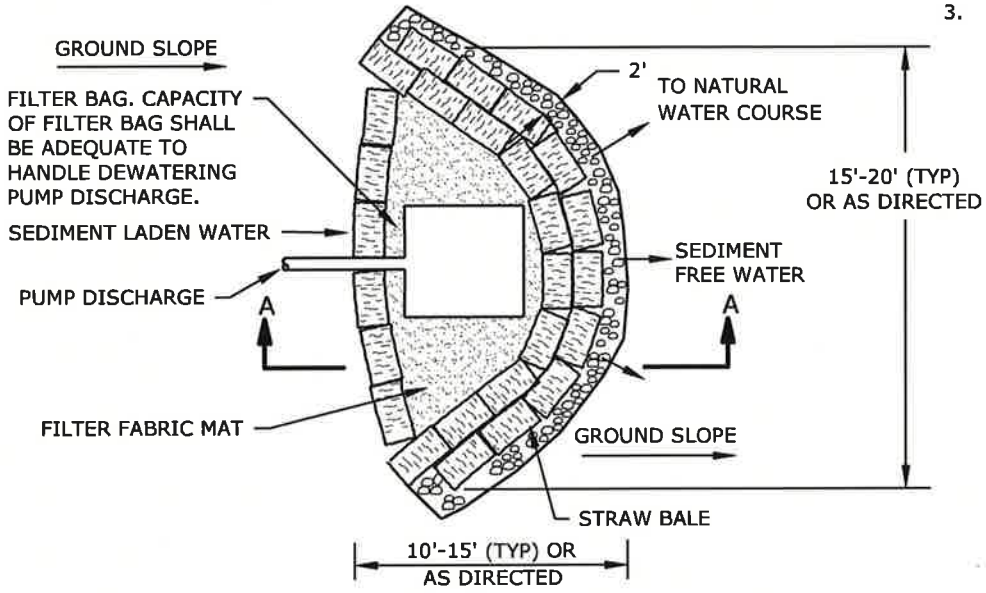
TRENCH BREAKER

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A37

EVERSOURCE



SECTION A-A



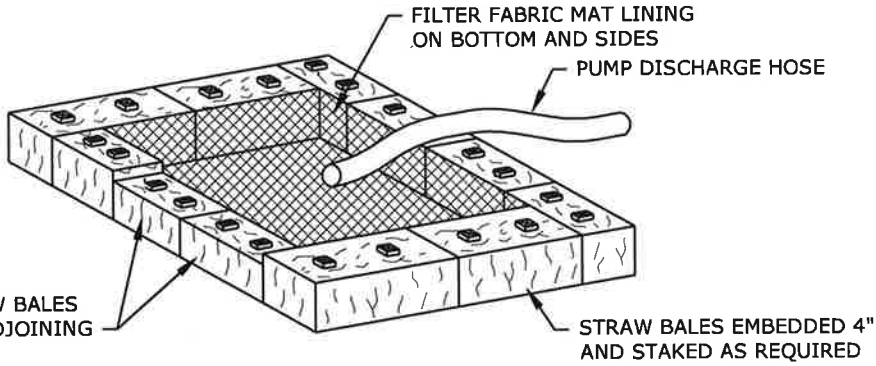
NOTES:

1. LOCATION OF SEDIMENT TRAP SUBJECT TO CONSULTATION WITH EVERSOURCE ENVIRONMENTAL LICENSING AND PERMITTING.
2. SEDIMENT TRAPS OR SETTLING BASINS SHALL BE USED FOR CONSTRUCTION DEWATERING.
3. DISCHARGE AWAY FROM WORK AREA/DEWATERING AREA.

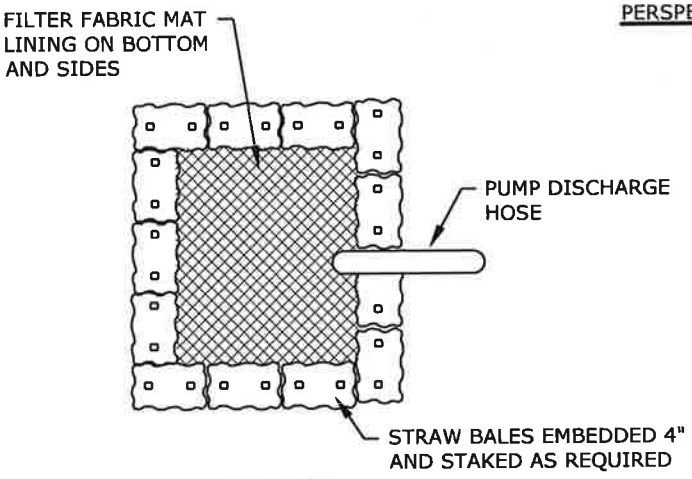
SEDIMENT TRAP

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A38

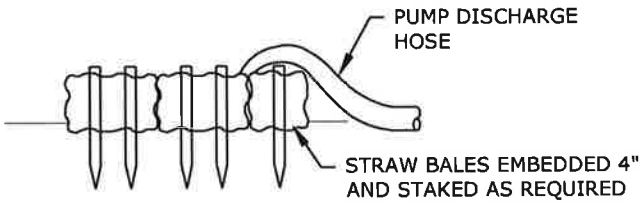
EVERSOURCE



PERSPECTIVE



PLAN VIEW



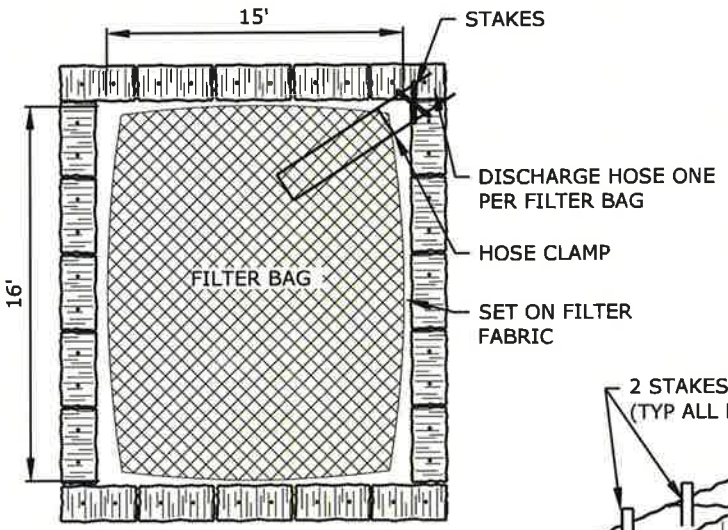
SECTION

NOTE:
PLACE DEWATERING/PUMPING SETTLING BASINS IN A WELL-VEGETATED AREA, OUTSIDE OF WETLANDS WHENEVER PRACTICABLE.

DEWATERING BASIN

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A39

EVERSOURCE

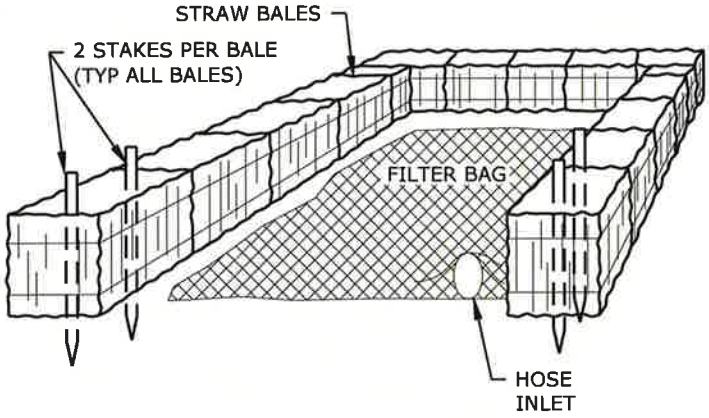


PLAN

SECTION

NOTE:

PLACE FILTER BASINS IN A WELL-VEGETATED AREA, OUTSIDE OF WETLANDS WHENEVER PRACTICABLE.

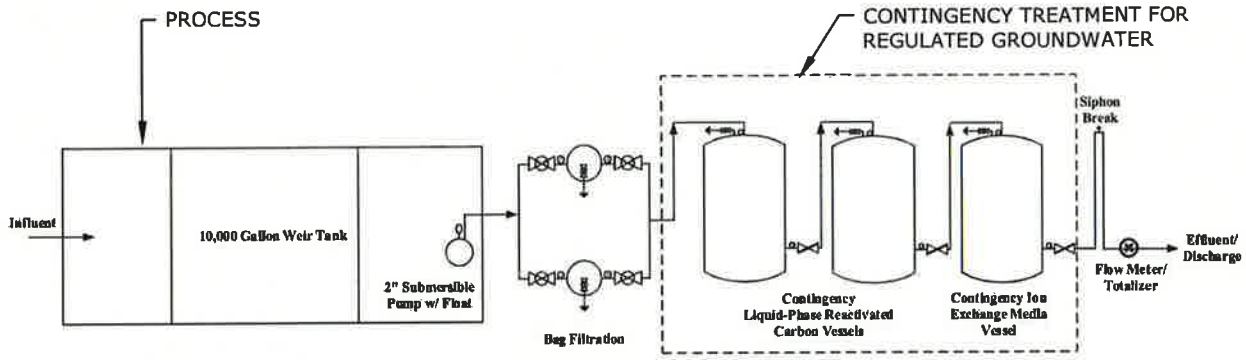


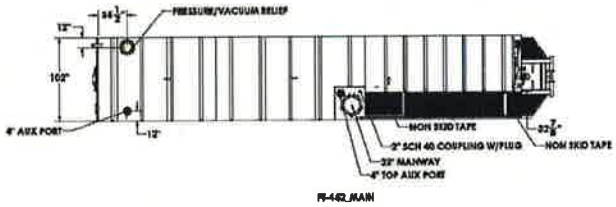
PERSPECTIVE

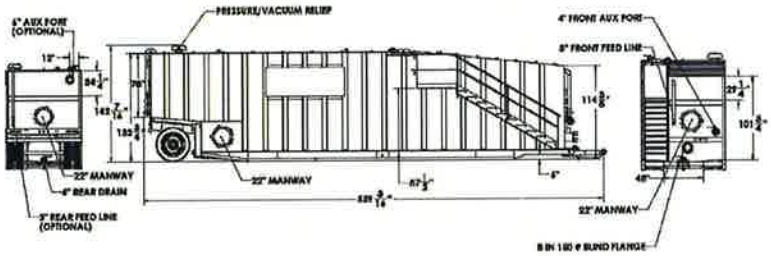
DEWATERING BASIN
(FILTER BAG)

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A40

EVERSOURCE



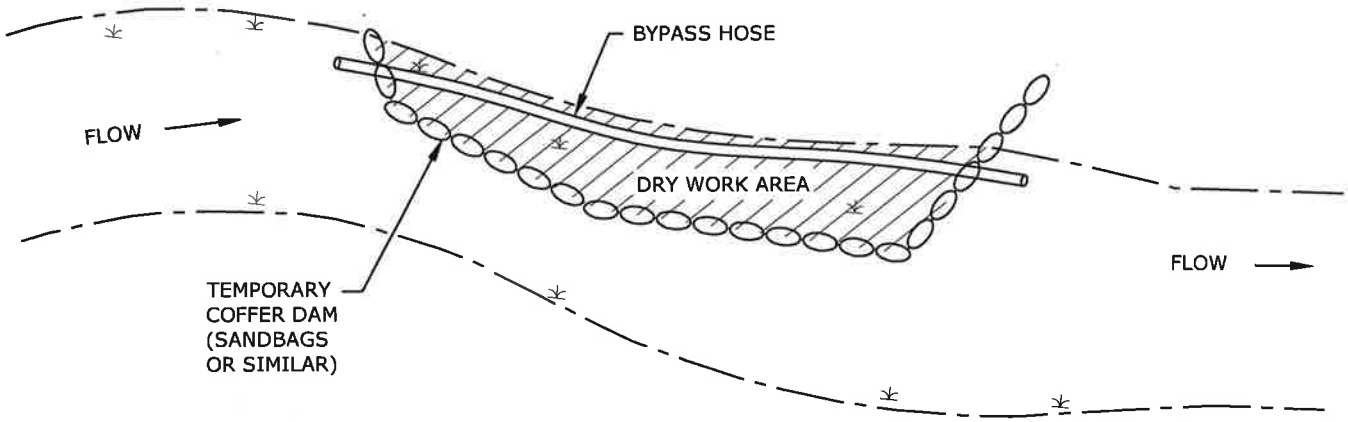




DEWATERING BASIN
(FRAC TANK)

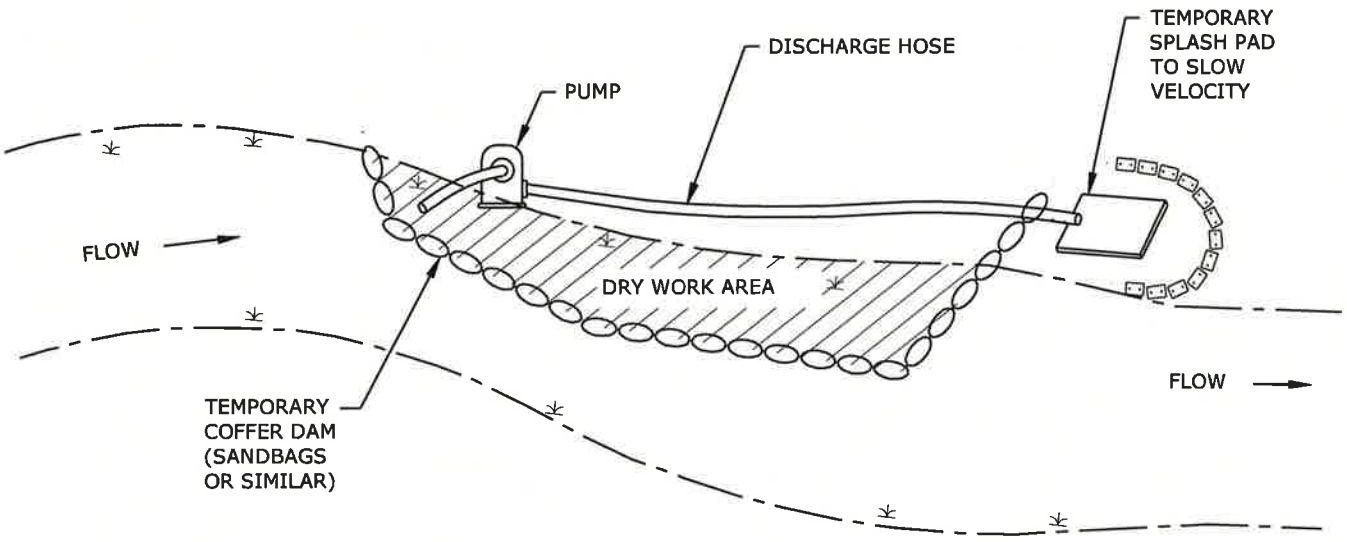
DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A41

EVERSOURCE



PLAN VIEW - GRAVITY COFFER DAM

COFFER DAM AND STREAM FLOW BYPASS (GRAVITY)	
DATE: 12/2021	EVERSOURCE
SCALE: NO SCALE	
FIGURE: A42	



PLAN VIEW - PUMP COFFER DAM

COFFER DAM AND STREAM
FLOW BYPASS (PUMPING)

DATE:	12/2021
SCALE:	NO SCALE
FIGURE:	A43

EVERSOURCE

APPENDIX B

Appendix B

Appendix B

B.1 Applicable Laws/Regulations

In Connecticut, there are no fewer than eight potentially pertinent regulatory programs associated with activities proposed in environmentally sensitive areas. The following list of laws and regulations are most likely to apply to electrical utility projects in the State.

- Connecticut Inland Wetlands and Watercourses Act (C.G.S. §§ 22a-36 through 22a-45a)
- Municipal inland wetland and zoning regulations
- Connecticut General Permit for Water Resource Construction Activities (C.G.S. §§ 22a-6, 22a-45a and 22a-378a)
- Connecticut Environmental Policy Act (C.G.S. §§ 22a-1a through 22a-1h)
- Connecticut Coastal Management Act (C.G.S. §§ 22a-359 through 22a-363; 22a-28 through 22a-35; 22a-90 through 22a-112; 33 U.S.C. § 1314)
- Connecticut Water Diversion Policy Act (C.G.S. §§ 22a-365 through 22a-379)
- Connecticut Endangered Species Act (C.G.S. §§ 26-303 through 26-315)
- Section 10 of the Rivers and Harbors Act of 1899 (C.G.S. §§ 22a-426; 33 U.S.C. § 403)
- Section 401 of the Clean Water Act (33 U.S.C. § 1251)
- Section 404 of the Clean Water Act (33 U.S.C. § 1344)

B.2 Geographic Areas Subject to Jurisdiction

The following areas are subject to regulatory jurisdiction by at least one of the regulatory programs discussed in this section: It is important to note that more than one jurisdictional resource type may be present at any given location.

- Inland wetlands, watercourses (rivers, streams, lakes, ponds), and floodplains
- Areas subject to municipal wetlands bylaws or ordinances (these vary by town)
- Coastal Resource Areas (beaches, dunes, bluffs, escarpments, coastal hazard areas, coastal waters, nearshore waters, offshore waters, estuarine embayments, developed shorefront, intertidal flats, islands, rocky shorefronts, shellfish concentration areas, shorelands, and tidal wetlands)
- Navigable waters
- Essential Fish Habitat (EFH)
- Rare species habitat as mapped by the Connecticut Natural Diversity Database (NDDB)
- Historic/cultural Resources including archaeological resources and above-ground historic resources

B.3 Applicable Regulatory Agencies

Activities subject to jurisdiction under the above-referenced programs will generally be subject to review by one or more regulatory agencies (refer to list below). Most stream and wetland crossings will require notification or consultation with municipal Inland Wetland and Watercourses Agencies, and may require permitting with the U.S. Army Corps of Engineers (ACOE) and Connecticut Department of Energy & Environmental Protection (CT DEEP) under Sections 404 and 401 of the Clean Water Act. Coordination with CT DEEP may also be required for projects located within areas mapped by the Connecticut Natural Diversity Database.

- Municipal Conservation Commissions
- Connecticut Department of Energy & Environmental Protection (CT DEEP) Land and Water Resources Division (LWRD)
- CT DEEP Wildlife Division
- CT DEEP Office of Environmental Review
- United States Army Corps of Engineers (ACOE) New England District
- CT State Historic Preservation Office (CT SHPO)

The State of Connecticut and the Federal Government define wetlands differently. According to the Inland Wetlands and Watercourses Act, inland wetlands are defined as "land, including submerged land, not regulated pursuant to Sections 22a-28 through 22a-35 of the Connecticut General Statutes, as amended, which consists of any of the soil types designated as poorly drained, very poorly drained, alluvial, and floodplain by the National Cooperative Soil Survey, as it may be amended from time to time by the United States Department of Agriculture Natural Resource Conservation Service. Such areas may include filled, graded, or excavated sites which possess an aquic (saturated) soil moisture regime as defined by the National Cooperative Soil Survey." State wetland identification is based solely on the presence of these soil types.

"Watercourses" means rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs and all other bodies of water, natural or artificial, vernal or intermittent, public or private, which are contained within, flow through or border upon this state or any portion thereof. Intermittent watercourses shall be delineated by a defined permanent channel and bank and the occurrence of two or more of the following characteristics: (A) Evidence of scour or deposits of recent alluvium or detritus, (B) the presence of standing or flowing water for a duration longer than a particular storm incident, and (C) the presence of hydrophytic vegetation.

The Federal Government defines wetlands as "Those areas 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." Federal wetland identification is based on a three-parameter approach, where a prevalence of hydrophytic vegetation, hydric soils, and wetland hydrology is used to make a wetland determination.

B.4 Maintenance, Repair, or Emergency Projects

Most regulatory programs contain provisions that allow normal maintenance of existing structures and/or response to emergency situations that require immediate attention.

Prior to commencement of new construction, all jurisdictional wetland areas within the work corridor should be delineated by a qualified wetland and soil scientist. The specialist shall delineate areas in accordance with the General Statutes of Connecticut (revised January 1, 2007) as set forth at Title 22a Chapter 440 "Inland Wetlands and Watercourses Act", the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual, and any local inland wetland regulations, ordinances or bylaws that may exist. Refer to each set of regulations regarding applicable wetland definitions. Wetland areas shall be clearly demarcated using appropriate flagging tape or similar means. It is important to note that certain jurisdictional wetland areas in Connecticut can actually occur in uplands, such as floodplains. In addition, Upland Review Areas generally apply to work activities and vary in each community. This makes consultation with a wetland specialist particularly important.

B.4.1 Maintain, Repair and/or Replace

Exemptions or considerations for maintenance, repair, and/or replacement of existing electrical utility structures exist in some environmental regulations, but not all. The exemptions are limited to work related to existing and lawfully located structures where no change in the original structure or footprint is proposed. It is not for the selected contractor of a particular project to make a determination as to whether an activity is exempt. This determination will be made prior to work by the Eversource project manager, in consultation with Eversource environmental staff.

These exemptions/considerations are afforded at:

- CT Inland Wetlands & Watercourses Act (RCSA § 22a-39-4)
- CT General Permit (Section 3)
- CT Coastal Management Act (RCSA § 22a-363b)
- CT GP [33 CFR 323.4(a)(2)]
- CT Water Diversion Policy Act (RCSA § 22a-377(b)1)

B.4.2 Emergency Projects

Emergency provisions are generally afforded to activities that need to abate conditions that pose a threat to public health or safety. These provisions generally do not allow work beyond what is necessary to abate the emergency condition and will generally require an after-the-fact permit. It is not for the selected contractor of a particular project to make a determination as to whether an activity is an emergency. This determination will be made prior to work by the Eversource project manager, in consultation with Eversource Environmental Licensing and Permitting.

It is important to note that invocation of an emergency provision does not release the project proponent from reporting requirements.

Emergency provisions are afforded at:

- CEPA (RCSA § 22a-1a-3)
- CT Coastal Management Act (RCSA § 22a-29)
- CT GP [33 CFR Part 323.4(a)(2)]

B.5 Municipal Permitting

Work within wetlands, watercourses and designated Upland Review Areas typically requires notification to municipal staff, (Department of Public Works and/or the Inland Wetland and Watercourse Agency staff). In October 1996 the Connecticut Department of Public Utility Control opened a docket (Docket Number 95-08-34) to conduct a generic investigation on the allocation of siting jurisdiction over utility plant facilities. This included an investigation as to whether local authorities (including local Inland Wetlands and Watercourses Agencies) have jurisdiction over public utility projects.

The investigation resulted in several orders which provide guidance on how public utility companies should coordinate with municipalities on the construction of new facilities, upgrades, significant maintenance activities, and routine maintenance activities.

- For the construction of new facilities, alterations to existing facilities (including upgrades) or significant maintenance involving substantial disturbance of soil, water or vegetation which would regularly fall under the review requirements of certain local authorities (ie. Planning and Zoning Authority; Inland Wetlands Commission; Public Works Department; Historic District Commission), the utility shall at least notify and consult with such local authority, or its designated agent or staff, toward the development of mutually agreeable schedules and procedures for the proposed activity.
- For routine maintenance activities or alterations to existing facilities (including upgrades) involving minor disturbance of soil, water or vegetation which would regularly fall under the review and approval requirements of certain local authorities, the utility shall make local authorities or their designated agent or staff aware of such ongoing activities.

B.6 CT Department of Energy & Environmental Protection

If the project requires formal permitting with the ACOE (Pre-Construction Notification (PCN) or Individual Permit), copies of the application should be forwarded to CT DEEP for review under Section 401 of the Clean Water Act. The CT DEEP requires that a GP Addendum form be completed and submitted along with the ACOE application. If the project qualifies for Self-Verification Notification (SVNF) under the ACOE GP, the project also is granted authorization (Water Quality Certification, WQC) with no formal application under Section 401 of the Clean Water Act, provided the project meets the additional WQC general conditions. The general conditions commonly applicable to utility projects include:

- Prohibiting dumping of any quantity of oil, chemicals, or other deleterious material on the ground;
- Immediately informing the CT DEEP Oil and Chemical Spill Response Division at (860) 424-3338 (24 hours) of any adverse impact or hazard to the environment including any discharge or spillage of oil or chemical liquids or solids;
- Separating staging areas at the site from the regulated areas by silt fences or stray/hay bales at all times;
- Prohibiting storage of any fuel and refueling of equipment within 25 feet from any wetland or watercourse;
- Following the document "Connecticut Guidelines for Soil and Erosion Control," inspecting employed controls at least once per week, after each rainfall, and at least daily during prolonged rainfall, and correcting any deficiencies within 48 hours of being found.

- Prohibiting the storage of any materials at the site which are buoyant, hazardous, flammable, explosive, soluble, expansive, radioactive, or which could in the event of a flood be injurious to human, animal or plant life, below the elevation of the
- 500 year flood. Any other material or equipment stored at the site below this elevation must be firmly anchored, restrained or enclosed to prevent flotation. The quantity of fuel for equipment at the site stored below such elevation shall not exceed the quantity of fuel that is expected to be used by such equipment in one day.
- Immediately informing CT DEEP at (860) 424-3019 and the ACOE at (617) 647-8674 of the occurrence of pollution or other environmental damage in violation of the WQC, and within 48 hours support a written report including information specified in the general conditions.

If the project falls within areas mapped by the Connecticut Natural Diversity Database, or is less than 0.50 miles upstream or downstream of a mapped area, a data request and possible coordination will be required with the Natural Diversity Database.

If a project is located within tidal, coastal or navigable waters of the state or in tidal wetlands, permitting may be required with the CT DEEP LWRD. For the routine maintenance of previously permitted structures or structures that were in place prior to June 24, 1939, no permitting is required. For significant maintenance of previously permitted structures or structures that were in place prior to June 24, 1939, a Certificate of Permission is required. For new projects a Structures, Dredging and Fill Permit and/or a Tidal Wetlands Permit may be required. The CT DEEP LWRD should be consulted prior to preparing permits to conduct a pre-application meeting and determine the appropriate permitting route.

B.7 U.S. Army Corps of Engineers

Work within wetlands and waters of the United States is subject to jurisdiction under Section 404 of the Clean Water Act, which is administered by the ACOE. Work within navigable waters is also administered by the ACOE under Section 10 of the Rivers and Harbors Act of 1899. The ACOE has issued Department of the Army General Permits for the State of Connecticut and Land Located within the Boundaries of an Indian Reservation (CT GPs) which establishes categories for projects based on their nature of impacts. The current permit was issued on December 15, 2021, and expires on December 15, 2026.

Applications are not required for Self-Verification (SV) projects, but submittal of a Self-Verification Notification Form (SVNF) before the work occurs and submittal of a Compliance Certification Form within one month after the work is completed is required. The SVNF and Compliance Certification Form entail self-certification by applicants that their project complies with the terms and conditions of SV under the CT GPs. Pre-Construction Notification (PCN) projects require the submittal of an application to the ACOE, followed by a screening of the application by the ACOE, the U.S. Fish and Wildlife Service (USFWS), U.S. Environmental Protection Agency (US EPA), National Marine Fisheries Service (NMFS) and CT DEEP, and consultation with the Connecticut Commission on Culture and Tourism and Tribal Historic Preservation Officers (THPOs). PCN projects may not proceed until written approval from the ACOE is received. Written approval is generally provided within 45 days of the multi-agency screening. After written approval is received, a Work-Start Notification Form must be submitted before the work occurs, and a Compliance Certification Form must be submitted within one month after the work is completed.

For work proposed within a FEMA floodway or floodplain, the ACOE recommends that the applicant apply for and receive a Flood Management Certification (if required), prior to applying to the ACOE. Additionally, applications for PCN inland projects that propose fill in ACOE jurisdiction must include an Invasive Species Control Plan (ISCP), unless otherwise directed by the ACOE.

An Individual Permit (IP) requires a formal permit application to be submitted to the ACOE. The application is reviewed in detail by both state and federal agencies, and a Public Notice is released for public comment. Projects which trigger an IP generally result in significant impacts to wetlands and/or watercourses.

Stream and wetland crossings are only subject to jurisdiction under the ACOE if there is **a discharge of dredge or fill material into wetlands or waters of the United States**. Equipment access through a stream or wetland with no structural BMP is not regulated by the ACOE if there is no discharge of dredge or fill material (note that equipment rutting as a result of not using an appropriate BMP can be considered a "discharge of dredge material"). Similarly, the use of a timber or rail car bridge that extends from bank to bank with no stream impacts is not regulated by the ACOE. Additionally, the use of timber mats and stone is considered "fill material" by the ACOE, and must be calculated to determine overall impacts. Temporary mats are not counted towards the 1-acre PCN threshold if they are adequately cleaned after previous use, removed immediately after completion of construction and disposed of at an upland site.

Maintenance, including emergency reconstruction of currently serviceable structures, is exempt from ACOE jurisdiction and does not require formal permitting. Maintenance does not include any modification that changes the character, scope, or size of the original fill design. Emergency reconstruction must occur within a reasonable period of time after damage occurs to qualify for this exemption.

Stream and wetland crossings that involve the discharge of dredge and fill material may be conducted under SV if the work complies with the general conditions and SV criteria of the CT GPs. The following are SV criteria that are commonly applicable to stream and wetland crossings in utility rights of way. See Section 1.8 for additional criteria for culvert crossings:

- The work results in less than 5,000 square feet of impacts to wetlands or Waters of the United States. Replacement of utility line projects with impacts solely within wetlands greater than 5,000 square feet may be eligible for SV Authorization after consultation with the ACOE about the specific project;
- Temporary fill, with the exceptions of swamp and timber mats, discharged to wetlands shall be placed on geotextile fabric laid on the pre-construction wetland grade. Unconfined temporary fill discharged into flowing water (rivers and streams) shall consist only of clean stone. All temporary fill shall be removed as soon as it is no longer needed, and disposed of at an appropriate upland site.
- Any unconfined in-stream work, including construction, installation or removal of sheet pile cofferdam structures, is conducted during the low-flow period between July 1 and September 30. However, installation of coffer dams, other than sheet pile cofferdams, is not restricted to the low-flow period and must be installed between July 1 and March 31 and must not encroach > 25% of the stream width measured from OHW during the prohibited work window;
- No work will occur in the main stem or tributary streams of the Connecticut River watershed that are being managed for Atlantic salmon (*Salmo salar*). (Work of this

nature requires screening for potential impacts to designated Essential Fish Habitat.);

- The work does not result in direct or secondary impacts to Special Wetlands, Threatened, Endangered or Special Concern Species, or Significant Natural Communities identified by the Connecticut Natural Diversity Database. Work within 750 feet of vernal pools shall be minimized;
- The project does not require an ACOE permit with associated construction activities within 100 feet of Special Wetlands;
- The project does not result in fill placed within a FEMA established floodway, unless the applicant has a State of Connecticut Flood Management Certification pursuant to Section 25-68d of the Connecticut General Statutes;
- The project does not result in fill placed within a FEMA established floodplain that would adversely affect the hydraulic characteristics of the floodplain;
- The project does not entail stormwater detention or retention in inland waters or wetlands;
- The project is not located in a segment of a National Wild and Scenic River System (includes rivers officially designated by Congress as active study status rivers for possible inclusion) or within 0.25 miles upstream or downstream of the main stem or tributaries to such a system;
- The project has no potential for an effect on a historic property which is listed or eligible for listing in the National Register of Historic Places;
- The project does not impinge upon the value of any National Wildlife Refuge, National Forest, or any other area administered by the U.S. Fish and Wildlife Service, U.S. Forest Service or National Park Service;
- Section 106 needs to be taken into account for all work that requires federal permitting – including SV;
- The project does not use slip lining, plastic pipes, or High Density Polyethylene Pipes (HDPP).
- Appropriate BMPs are employed in regard to heavy equipment in wetlands (General Condition 16) and sedimentation and erosion controls (General Condition 20).
- Disturbed inland wetland areas are restored in accordance with General Condition 18.

Stream and wetland crossings that involve the discharge of dredge and fill material may be conducted under PCN if the work complies with the general conditions and PCN criteria of the CT GPs. The following are PCN criteria that are commonly applicable to stream and wetland crossings in utility ROWs. See Section 1.8 for additional criteria for culvert crossings:

- The work results in less than one acre of impacts to wetlands or Waters of the United States;
- The project does not result in fill placed within a FEMA established floodplain that would adversely affect the hydraulic characteristics of the floodplain;
- The project does not entail stormwater detention or retention in inland waters or wetlands.
- Temporary fill, with the exceptions of swamp and timber mats, discharged to

wetlands shall be placed on geotextile fabric laid on the pre-construction wetland grade. Unconfined temporary fill discharged into flowing water (rivers and streams) shall consist only of clean stone. All temporary fill shall be removed as soon as it is no longer needed, and disposed of at an appropriate upland site.

- Appropriate BMPs are employed in regard to heavy equipment in wetlands (General Condition 16) and sedimentation and erosion controls (General Condition 20).
- Disturbed inland wetland areas are restored in accordance with General Condition 18.

Stream and wetland crossings that cannot meet SV or PCN criteria may require review under an IP. The ACOE should be consulted before assuming an IP will be required, as exceptions can be made under certain circumstances.

GP1. Aids to navigation & temporary recreational structures (Coastal only)
GP2. Repair or maintenance of existing currently serviceable, authorized or grandfathered structures/fills and removal of structures *(Coastal and Inland)*
GP3. Moorings *(Coastal only)*
GP4. Pile-supported structures & floats, including boat lifts/hoists & other miscellaneous structures & work *(Coastal only)*
GP5. Boat ramps and marine railways *(Coastal and Inland)*
GP6. Utilities including lines, outfall and intake structures and appurtenant structures *(Coastal and Inland)*
GP7. Dredging, transport & disposal of dredged material, beach nourishment & rock removal and rock relocation *(Coastal only)*
GP8. Discharges of dredged or fill material incidental to the construction of bridges *(Coastal only)*
GP9. New shoreline and bank stabilization projects and Living Shorelines *(Coastal and Inland)*
GP10. Aquatic habitat restoration, establishment and enhancement activities *(Coastal and Inland)*
GP11. Fish and wildlife harvesting activities *(Coastal and Inland)*
GP12. Oil spill and hazardous material response operations *(Coastal and Inland)*
GP13. Cleanup of hazardous and toxic waste and removal of contaminated soil *(Coastal and Inland)*
GP14. Scientific measurement and monitoring devices *(Coastal and Inland)*
GP15. Survey and exploratory survey activities *(Coastal and Inland)*
GP16. Aquaculture & Mariculture Activities *(Coastal only)*
GP17. New and expansion of recreational, residential, institutional, and commercial developments *(Inland only)*
GP18. Wetland crossings for linear transportation projects (Inland only)
GP19. Stream, river and brook crossings (not including wetland crossings) *(Coastal and Inland)*
GP20. Energy generation and renewable energy generation facilities and hydropower projects *(Coastal and Inland)*
GP21. Temporary fill not associated with a regulated General Permit activity *(Inland only)*

GP22. Modification and Improvement of Existing Minor drainage features and Mosquito Control *(Coastal only)*

GP23. Agricultural Activities *(Inland only)*

B.8 Culvert Installation

New culvert installation or existing culvert replacements will require notification or consultation with municipal staffers which might include the Department of Public Works and/or the inland wetlands officer, and may require permitting with the ACOE under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act of 1899, and the CT DEEP under Section 401 of the Clean Water Act. Coordination with CT DEEP may also be required for projects located within areas mapped by the Connecticut Natural Diversity Database. For work within tidal, coastal or navigable waters or in tidal wetlands, permitting will be required with the CT DEEP LWRD.

B.8.1 Municipal Permitting

See Section 1.5 for general local permitting guidance.

- For the installation of new culverts and the replacement of culverts that involve substantial disturbance of soil, water or vegetation which would regularly fall under the review and approval requirements of certain local authorities (i.e., Planning and Zoning Authority; Inland Wetlands Commission; Public Works Department; Historic District Commission), the utility shall at least notify and consult with such local authority, or its designated agent or staff, toward the development of mutually agreeable schedules and procedures for the proposed activity.
- For the replacement of culverts involving only minor disturbance of soil, water or vegetation which would regularly fall under the review and approval requirements of certain local authorities, the utility shall make local authorities or their designated agent or staff aware of such ongoing activities.

B.8.2 CT Department of Energy & Environmental Protection

If the project requires formal permitting with the ACOE, copies of the application should be forwarded to CT DEEP for review under Section 401 of the Clean Water Act. CT DEEP requires that a PGP Addendum form be completed and submitted along with the ACOE application.

If a culvert project falls within areas mapped by the Connecticut Natural Diversity Database or falls within 0.50 miles upstream or downstream of a mapped area, a data request and possible coordination will be required with the Natural Diversity Database.

If a culvert project is located within tidal, coastal or navigable waters of the state or in tidal wetlands, permitting will be required with the CT DEEP LWRD. For new projects a Structures, Dredging and Fill Permit and/or a Tidal Wetlands Permit will be required. For replacement structures which were previously permitted, or which were in place prior to June 24, 1939, a Certificate of Permission may only be required, which entails a shorter permitting process.

B.8.3 U.S. Army Corps of Engineers

See Section 1.7 for general ACOE permitting requirements. Open bottom arches, bridge spans or embedded culverts are preferred over traditional culverts and are required for SV projects. However, where site constraints make these approaches impractical, the ACOE should be consulted.

New bridge or open-bottom structure crossings may be conducted under SV or PCN if the following criteria are met in addition to meeting any applicable general criteria listed in section 1.7 of this manual:

- The work spans at least 1.2 times the watercourse bank full width;

- The structure has an openness ratio equal to or greater than 0.25 meters;
- The structure allows for continuous flow of the 50-year frequency storm flows.

New culvert installations may be conducted under SV if the work complies with the general conditions and SV criteria of the CT GPs. The following are SV criteria that are commonly applicable to new culvert installations in utility right of ways:

- Work is conducted in accordance with the design requirements listed in Section 3.1.3 of the BMP Manual; Plastic and High Density Polyethylene Pipes (HDPE) are not used;
- The work results in less than 5,000 square feet of impacts to wetlands or Waters of the United States;
- Any unconfined in-stream work, including construction, installation or removal of sheet pile coffer dam structures, is conducted during the low-flow period between July 1 and September 30, except in instances where a specific written exception has been issued by the Connecticut Department of Energy & Environmental Protection. However, installation of coffer dams, other than sheet pile coffer dams, is not restricted to the low-flow period;
- No open trench excavation is conducted within flowing waters. Work within flowing waters can be avoided by using temporary flume pipes, culverts, coffer dams, etc. to isolate work areas and maintain normal flows;
- The tributary watershed to the culvert does not exceed 1.0 square mile (640 acres);
- The culvert gradient (slope) is not steeper than the streambed gradient immediately upstream or downstream of the culvert;
- For a single box or pipe arch culvert crossing, the inverts are set not less than 12 inches below the streambed elevation;
- For a multiple box or pipe arch culvert crossing, the inverts of one of the boxes or pipe arch culverts are set not less than 12 inches below the elevation of the streambed;
- For a pipe culvert crossing, the inverts are set such that not less than 25% of the pipe diameter or 12 inches, whichever is less, is set below the streambed elevation;
- The culvert is backfilled with natural substrate material matching upstream and downstream streambed substrate;
- The structure does not otherwise impede the passage of fish and other aquatic organisms;
- The structure allows for continuous flow of the 50-year frequency storm flows;
- The work does not result in direct or secondary impacts to Special Wetlands, Threatened, Endangered or Special Concern Species, or Significant Natural Communities identified by the Connecticut Natural Diversity Database. Work within 750 feet of vernal pools shall be minimized;
- The project does not require an ACOE permit with associated construction activities within 100 feet of Special Wetlands;
- The project does not result in fill placed within a FEMA established floodway, unless the applicant has a State of Connecticut Flood Management Certification pursuant to section 25-68d of the Connecticut General Statutes;

- The project does not result in fill placed within a FEMA established floodplain that would adversely affect the hydraulic characteristics of the floodplain;
- The project does not entail stormwater detention or retention in inland waters or wetlands;
- The project is not located in a segment of a National Wild and Scenic River System (includes rivers officially designated by Congress as active study status rivers for possible inclusion) or within 0.25 miles upstream or downstream of the main stem or tributaries to such a system;
- The project has no potential for an effect on a historic property which is listed or eligible for listing in the National Register of Historic Places;
- The project does not impinge upon the value of any National Wildlife Refuge, National Forest, or any other area administered by the U.S. Fish and Wildlife Service, U.S. Forest Service or National Park Service.
- Appropriate BMPs are employed with regard to sedimentation and erosion controls (General Condition 20).

New culvert installations may be conducted under PCN if the work complies with the general conditions and PCN criteria of the GP. The following are PCN criteria that are commonly applicable to new culvert installations in utility right of ways:

- Work is conducted in accordance with the design requirements listed in Section 3.1.3 of the BMP Manual;
- The work results in less than one acre of impacts to wetlands or Waters of the United States;
- The project does not result in fill placed within a FEMA established floodplain that would adversely affect the hydraulic characteristics of the floodplain;
- There is no practicable alternative location for the crossing that would have less environmental impacts;
- The use of a bridge or open-bottom structure is determined to be not practicable;
- For a single box or pipe arch culvert crossing, the inverts are set not less than 12 inches below the streambed elevation;
- For a multiple box or pipe arch culvert crossing, the inverts of one of the boxes or pipe arch culverts are set not less than 12 inches below the elevation of the streambed;
- For a pipe culvert crossing, the inverts are set such that not less than the pipe diameter or 12 inches, whichever is less, is set below the streambed elevation;
- The culvert is backfilled with natural substrate material matching upstream and downstream streambed substrate;
- The culvert has an openness ratio equal to or greater than 0.25 meters;
- The structure does not result in a change in the normal water surface elevation of the upstream waters or wetlands;
- The structure allows for continuous flow of the 50-year frequency storm flows;
- Appropriate BMPs are employed with regard to sedimentation and erosion controls (General Condition 20).

New culvert installations that cannot meet SV or PCN criteria may require review under an IP. The ACOE should be consulted before assuming an IP will be required, as exceptions can be made under certain circumstances.

In-kind replacement of culverts using the same materials is exempt from Section 404 of the Clean Water Act, and does not require permitting with the ACOE. The ACOE, however, should be consulted before assuming an activity is exempt from their jurisdiction. Consult with Eversource Environmental Licensing and Permitting.

Bridge or open-bottom structure replacements may be conducted under SV if the conditions for a new bridge or open-bottom structure replacement have been met. In addition, bridge or open-bottom structure replacements should not result in a change in the normal surface elevation of the upstream waters or wetland, and the replacement structure should have a riparian bank on one or both sides for wildlife passage. Culvert replacements may be conducted under SV if the conditions for new culvert installation are met.

Bridge or open-bottom structure replacements may be conducted under PCN if the conditions for a new bridge or open-bottom structure replacement have been met. Culvert replacements may be conducted under PCN if the following conditions are met:

- The work results in 5,000 square feet to less than one acre of impacts to wetlands or Waters of the United States;
- The use of a bridge or open-bottom structure is determined to be not practicable;
- For a single box or pipe arch culvert crossing, the inverts are set not less than 12 inches below the streambed elevation;
- For a multiple box or pipe arch culvert crossing, the inverts of one of the boxes or pipe arch culverts are set not less than 12 inches below the elevation of the streambed;
- For a pipe culvert crossing, the inverts are set such that not less than the pipe diameter or 12 inches, whichever is less, is set below the streambed elevation;
- The culvert is backfilled with natural substrate material matching upstream and downstream streambed substrate;
- The culvert has an openness ratio equal to or greater than 0.25 meters;
- The structure does not result in a change in the normal water surface elevation of the upstream waters or wetlands;
- The structure allows for continuous flow of the 50-year frequency storm flows;
- Appropriate BMPs are employed with regard to sedimentation and erosion controls (General Condition 20).

APPENDIX C

Appendix C

Appendix C – Massachusetts Environmental Regulations

C.1 Applicable Laws/Regulations

In Massachusetts, there are no fewer than nine potentially pertinent regulatory programs associated with activities proposed in environmentally sensitive areas. The following list of laws and regulations are most likely to apply to electrical utility projects in the Commonwealth.

- Massachusetts Wetlands Protection Act (M.G.L. 131 § 40) (MA WPA)
- Municipal wetland bylaws/ordinances (varies by municipality)
- Massachusetts Endangered Species Act (M.G.L. 131A) (MESA)
- "Chapter 91" Public Waterfront Act (M.G.L. c. 91 §§ 1 through 63)
- Massachusetts Environmental Policy Act (M.G.L. c. 30 §§ 61 through 62H) (MEPA)
- Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403)
- Section 401 of the Clean Water Act (33 U.S.C. § 1251; 314 CMR 9.00)
    - Administrative Consent Order (ACO)
- Section 404 of the Clean Water Act (33 U.S.C. § 1344)
- Massachusetts Watershed Protection Act (M.G.L. 92A §1/2) (MA WsPA)

C.2 Geographic Areas Subject to Jurisdiction

The following areas are subject to regulatory jurisdiction by at least one of the regulatory programs discussed in this section: It is important to note that more than one jurisdictional resource area type may be present at any given location.

- Massachusetts Wetlands Protection Act Resource Areas:
    - (Coastal) Land Under the Ocean; Designated Port Areas; Coastal Beaches; Coastal Dunes; Barrier Beaches; Coastal Banks; Rocky Intertidal Shores; Salt Marshes; Land Under Salt Ponds; Land Containing Shellfish; Banks of or Land Under the Ocean, Ponds, Streams, Rivers, Lakes or Creeks that Underlie Anadromous/Catadromous ("Fish Run"); Land Subject to Coastal Storm Flowage
    - (Inland). Bank; Bordering Vegetated Wetland; Land Under Water Bodies and Waterways; Land Subject to Flooding; 200-foot Riverfront Area; and the 100-foot Buffer Zone to Bank and BVW
- Areas subject to municipal wetlands bylaws or ordinances (note: varies by community)
- Estimated and/or Priority Habitat of State-listed Rare Species
- Outstanding Resource Waters (ORWs; include Certified Vernal Pools, public surface water drinking supplies, tributaries to drinking water supplies and vegetated wetlands adjacent thereto)
- Essential Fish Habitat (EFH)
- Areas of Critical Environmental Concern (ACECs)
- Great Ponds

- Navigable waterways
- Wild and Scenic Rivers
- Quabbin Reservoir, Ware River and Wachusett Reservoir watersheds

C.2.1 Endangered Species

The Massachusetts Natural Heritage and Endangered Species Program (NHESP), a department of the Massachusetts Division of Fisheries and Wildlife (MassWidlife) maintains the current list of rare and endangered species and species of special concern in Massachusetts. Publicly available data only allows for identification of designated Priority Habitats of Rare Species and Estimated Habitats of Rare Wildlife, not specific species information. Priority and Estimated Habitat locations are available online via the Massachusetts Geographic Information System (MassGIS) viewer.

Species specific information is provided for planned linear transmission maintenance activities which are reviewed by NHESP as part of Eversource's annual Operation and Maintenance (O&M) Plan. Projects/ activities which are not covered in the O&M Plan must file an independent request for information or initiate coordination with NHESP through Eversource Environmental Licensing and Permitting.

Applicable regulations and agency are listed below:

- Massachusetts Endangered Species Act: 321 CMR 10.00 – Division of Fisheries and Wildlife – NHESP

C.2.2 Vernal Pools

NHESP maintains a database of certified and potential vernal pools in Massachusetts. These data are available on the NHESP website and MassGIS. Certified Vernal Pools (CVP) are considered Outstanding Resource Waters (ORWs).

The current version of the Department of the Army General Permits for the Commonwealth of Massachusetts (MA GPs), effective date April 16, 2018 (expiration date: April 5, 2023) includes General Conditions for protection of vernal pools, regardless of whether or not the vernal pool is certified by NHESP, and including the vernal pool depression, the vernal pool envelope (area within 100 feet of the vernal pool depression's edge), and the critical terrestrial habitat (area within 100-750 feet of the vernal pool depression's edge). Temporary impacts associated with construction mats in previously disturbed areas of existing utility projects rights-of-way are exempt from GP requirements regarding work in the vernal pool envelope or critical terrestrial habitat, provided that a Vegetation Management Plan (VMP) exists that avoids, minimizes and mitigates impacts to aquatic resources. Applicable regulations and agencies for Certified Vernal Pools (CVPs) are listed below:

- Wetlands Protection Act: 310 CMR 10.00 – Municipal Conservation Commissions (and MassDEP)
- 401 Water Quality Certification for Discharge of Dredged or Fill Material, Dredging, and Dredged Material Disposal in Waters of the U.S. within the Commonwealth: 314 CMR 9.00 – MassDEP
- Department of the Army General Permits for the Commonwealth of Massachusetts – ACOE

C.2.3 Essential Fish Habitat and Wild & Scenic River Designation

Essential Fish Habitat (EFH) is a habitat essential for spawning, breeding, feeding, or growth to maturity of federally managed species. This website provides more information: https://www.fisheries.noaa.gov/region/new-england-mid-atlantic#habitat. Consultation

with the ACO is recommended to confirm the location of Essential Fish Habitat with respect to a proposed project.

Massachusetts has approximately 8,229 miles of river, of which 147.1 miles are designated as wild & scenic, as summarized below:

- Nashua River (Main Stem from the confluence of the North and South Rivers in Lancaster, and extending north to the MA-NH border; some geographic exclusions)
- Squannacook River (from headwaters in Ash Swamp/Townsend, extending downstream to the confluence with the Nashua River in Shirley/Ayer; some geographic exclusions)
- Nissitissit River (from headwaters in Brookline (NH) to confluence with the Nashua River in Pepperell)
- Sudbury River (14.9-mile segment from Danforth Street Bridge/Framingham downstream to the Route 2 Bridge/Concord; 1.7-mile segment
- Assabet River
- Concord River
- Westfield River (Main Stem, East Branch, Middle Branch, West Branch, and named tributaries
- Taunton River (main stem from headwaters at the confluence of the Town and Matfield Rivers (Bridgewater) downstream 40 miles to confluence with the Quequechan River at the Route 195 Bridge (Fall River)

Currently, there are no river segments under study in Massachusetts for National Wild and Scenic designation (https://www.rivers.gov/study.php).

Wild and Scenic designations should be verified via the National Wild and Scenic Rivers System website (https://www.rivers.gov/massachusetts.php) during project planning and permitting. The ACOE reviews projects for impacts to both EFH and National Wild and Scenic Rivers.

- Department of the Army General Permits for the Commonwealth of Massachusetts – ACOE

C.2.4 Cold-water Fishery Resources

The Massachusetts Division of Fisheries and Wildlife (MassWildlife) maintains a list of waters that are known to have cold-water fishery resources (CFRs) which are waters in which the mean of the maximum daily temperature over a seven day period generally does not exceed 68°F (20°C) and, when other ecological factors are favorable (such as habitat), are capable of supporting a year round population of cold-water stenothermal aquatic life. CFRs are not currently regulated in and of themselves in Massachusetts. However, MassDEP is particularly concerned with water quality impacts to CFRs due to erosion and sedimentation as a result of construction projects.

C.2.5 Outstanding Resource Waters

Outstanding Resource Waters (ORWs) include Certified Vernal Pools (CVPs), surface drinking water supplies, tributaries to surface drinking water supplies and vegetated wetlands adjacent thereto.

CVPs are designated by NHESP and locations are available through MassGIS. Locations of surface drinking water supplies and other ORWs, typically identified as Zone A, are also available through MassGIS. The applicable regulations and agency are listed below:

- 401 Water Quality Certification for Discharge of Dredged or Fill Material, Dredging, and Dredged Material Disposal in Waters of the U.S. within the Commonwealth: 314 CMR 9.00 – MassDEP

C.2.6 Historic/Cultural Resources

The Massachusetts Historical Commission (MHC) is the State Historical Preservation Office (SHPO) and, along with the Board of Underwater Archaeological Resources (BUAR), are the state agencies responsible for protecting the Commonwealth's historic and cultural resources. Additional stakeholders for cultural resources include the Massachusetts Commission on Indian Affairs, Native American tribes with interests in the state, and local historical commissions.

C.3 Applicable Regulatory Agencies

Activities subject to jurisdiction under the above-referenced programs will generally be subject to review by one or more regulatory agencies (refer to list below). New stream and wetland crossings not related to maintenance will require permitting with municipal Conservation Commissions, and may require permitting with the U.S. Army Corps of Engineers (ACOE) and Massachusetts Department of Environmental Protection (MassDEP) under Sections 404 and 401 of the Clean Water Act. Any non-maintenance work within Land Under Water will require permitting with the MassDEP Division of Wetlands and Waterways. Coordination with NHESP may also be required for projects located within areas mapped as Priority and/or Estimated Habitat for state-listed rare species. For work within navigable waters, consultation may be required with the Massachusetts Office of Coastal Zone Management (MA CZM).

- Municipal Conservation Commissions
- Massachusetts Department of Environmental Protection (MassDEP) Division of Wetlands and Waterways
- Massachusetts Division of Fisheries and Wildlife: Natural Heritage and Endangered Species Program (NHESP)
- Massachusetts Executive Office of Energy and Environmental Affairs (EEA)
- United States Army Corps of Engineers (ACOE) New England District
- Massachusetts Office of Coastal Zone Management (MA CZM)
- Massachusetts Division of Conservation and Recreation (MA DCR)

C.4 Maintenance, Repair, or Emergency Projects

Most regulatory programs contain provisions that allow normal maintenance of existing structures and/or response to emergency situations that require immediate attention.

C.4.1 Maintain, Repair and/or Replace

Exemptions or considerations for maintenance, repair, and/or replacement of existing electrical utility structures exist in some environmental regulations, but not all. The exemptions are limited to work related to existing and lawfully located structures where

no change in the original structure or footprint is proposed. It is not for the selected contractor of a particular project to make a determination as to whether an activity is exempt. This determination will be made prior to the commencement of work by the Eversource project manager in consultation with Eversource Environmental Licensing and Permitting.

These exemptions/considerations are afforded at:

- MAWPA (M.G.L Chapter 131, § 40, paragraph 1)
- MAWPA regulations for Riverfront Area (310 CMR 10.58(6))
- MEPA regulations (301 CMR 11.01(2)(b)(3))
- 33 CFR Part 323.4(a)(2)
- MESA (M.G.L. Chapter 131A, § 3; 321 CMR 10.14(5-7) and (12)
- MAWPA (350 CMR 11.05(11) and (12))
- National Pollutant Discharge Elimination System (NPDES), Construction General Permit (as modified effective February 16, 2012)

Certain operation and maintenance activities that will directly impact Waters of the United States through the discharge of fill (e.g., construction mats) are subject to Sections 401 and 404 of the Clean Water Act.

C.4.2 Emergency Projects

Emergency provisions are generally afforded to activities that need to abate conditions that pose a threat to public health or safety. These provisions generally do not allow work beyond what is necessary to abate the emergency condition and will generally require an after-the-fact permit. It is not for the selected contractor of a particular project to make a determination as to whether an activity is an emergency. This determination will be made prior to work by the Eversource project manager, in consultation with Eversource environmental staff.

It is important to note that invocation of an emergency provision does not release the project proponent from reporting requirements.

Emergency provisions are afforded at:

- MAWPA regulations (310 CMR 10.06)
- MEPA (301 CMR 11.00)
- MA 401 WQC (314 CMR 9.12)
- Chapter 91 (310 CMR 9.20)
- MESA (321 CMR 10.15)

C.5 Municipal Permitting

Work within wetlands, watercourses and Buffer Zones typically requires permitting with municipal Conservation Commissions. Work that entails "maintaining, repairing or replacing, but not substantially changing or enlarging, an existing and lawfully located structure or facility used in the service of the public and used to provide electric service" is exempt under the Massachusetts Wetlands Protection Act (MAWPA) per MGL Chapter 131 Section 40. However, individual municipalities may establish their own wetlands bylaws under Home Rule authority which could require permitting for operation and maintenance activities. The following table lists communities in which Eversource operates and maintains infrastructure and which have a wetland bylaw. Appropriate municipal

permitting or notification should be completed in these towns as required prior to conducting operation and maintenance activities. Bylaws may be revised, or new bylaws enacted, at any time. Consult with Eversource Environmental Licensing and Permitting prior to the commencement of work.

TABLE C-1
Eversource Energy Communities with Municipal Wetland Bylaws[1]

Community	Date of Bylaw	Utility Maintenance Exemption	Notification Required
Acton	7/8/2003	Yes	No
Amherst	2/12/2014	Yes	Yes
Andover	5/11/1999	Yes	Yes
Aquinnah	6/23/2020	Yes	Yes
Arlington	5/15/2000	No	Yes
Ashland	5/6/2009	Yes	Yes
Attleboro	12/12/2007	No	No
Auburn	5/1/2012	Yes	Yes
Avon	5/7/2019	Yes	Yes
Barnstable	11/7/1987/rev. 7/7/2003	Yes	Yes
Bedford	1987/rev. 2016	Yes	Yes
Belchertown	6/7/2020	Yes	Yes
Bellingham	12/2015	No	Yes
Berlin	2/15/2021	Yes	Yes
Bolton	5/7/2012	Yes	No
Boston	12/11/2019	Yes	Yes
Bourne	10/26/2009	No	Yes
Brewster	1/1/2013	Yes	Yes
Bridgewater	11/13/1990	Yes	Yes
Brookline	5/28/2013	Yes	Yes
Burlington	5/2021	Yes	Yes
Canton	5/10/2017	Yes	Yes
Carlisle	2002	Yes	No
Carver	1998	Yes	Yes
Chatham	5/10/2004	Yes	Yes
Chicopee	4/3/2002	Yes	Yes
Chilmark	10/12/1993	No	Yes
Dartmouth	1990/rev. 8/25/2015	Yes	Yes
Dedham	11/182013	Yes	Yes
Deerfield	11/6/1989	Yes	Yes
Dennis	5/5/1989	Yes	Yes
Dover	5/2/1994	Yes	Yes
Duxbury		Yes	No
East Longmeadow	10/1992	Yes	Yes
Eastham	1980/rev. 1999	Yes	Yes
Edgartown	1985/rev. 6/25/1991	No	Yes
Fairhaven	5/10/1988	Yes	No
Falmouth	4/2/1979/rev. 7/16/1993	Yes	Yes

TABLE C-1
Eversource Energy Communities with Municipal Wetland Bylaws[1]

Community	Date of Bylaw	Utility Maintenance Exemption	Notification Required
Framingham	4/26/2005	Yes	Yes
Grafton	5/11/1987	Yes	Yes
Greenfield	11/23/2001	Yes	No
Hadley	5/1/2008	No	Yes
Hampden	8/5/1992	Yes	Yes
Harwich	7/1/2003/rev. 11/25/2020	No	Yes
Holden	2011	Yes	Yes
Holliston	5/2021	Yes	Yes
Hopkinton	5/2/1995/rev. 5/7/2012	Yes	Yes
Holyoke	11/2005	Yes	Yes
Kingston	2004	No	Yes
Leicester	11/2015	Yes	Yes
Lenox[3]	12/18/1985	Yes	No
Lexington	5/3/1982	No	Yes
Lincoln	3/24/2007	No	Yes
Longmeadow	10/2000	Yes	No
Ludlow	5/1/2002	Yes	No
Marshfield	1988/rev. 4/23/2018	Yes	Yes
Mashpee	2/1/1988	Yes	Yes
Maynard	12/3/2005	Yes	Yes
Medfield	1926	Yes	No
Medway	7/2014	Yes	Yes
Milford	5/2010	Yes	No
Millis	5/13/1191	Yes	No
Millville	5/13/2013	Yes	Yes
Natick	4/27/2000	Yes	No
Needham	9/1/1988	Yes	Yes
New Bedford	2017	Yes	Yes
Norfolk	11/9/2010	Yes	Yes
Northampton	8/17/1989	Yes	Yes
Northborough	5/21/1990	Yes	Yes
Northbridge	5/6/2008	Yes	Yes
Oak Bluffs	4/1983	No	Yes
Orleans	5/5/1987	Yes	Yes
Palmer	8/12/2013	Yes	Yes
Pelham	5/2/1987	Yes	Yes
Pembroke	4/22/2008	Yes	No
Plymouth	4/5/1989	Yes	Yes
Plympton	5/16/2012	Yes	Yes
Provincetown	5/2019	Yes	Yes
Richmond	5/2015	Yes	Yes
Rochester	As of 12/2015	Yes	Yes

TABLE C-1
Eversource Energy Communities with Municipal Wetland Bylaws[1]

Community	Date of Bylaw	Utility Maintenance Exemption	Notification Required
Sandwich	5/4/1992	Yes	Yes
Sharon	As of 12/2015	Yes	No
Sherborn	2013	Yes	No
Shutesbury	5/2/1987	Yes	Yes
Southampton	9/21/2021	Yes	Yes
Southborough	4/10/1995	Yes	Yes
South Hadley	12/27/2005	No	Yes
Southwick	6/6/1989	Yes	Yes
Springfield	5/5/1993	Yes	Yes
Stoneham	4/2013	Yes	Yes
Stow	5/21/2003	No	Yes
Sudbury		Yes	Yes
Sunderland	4/27/1990	Yes	Yes
Sutton	5/11/2015	Yes	Yes
Tisbury	1/1/1983	Yes	No
Truro	9/30/2010	No	Yes
Upton	2009	Yes	Yes
Walpole	2002	Yes	Yes
Wareham	4/25/2016	Yes	Yes
Watertown	10/2010	Yes	Yes
Wayland	5/1/2002	Yes	No
Wellfleet	4/20/1986/rev. 10/6/2021	Yes	Yes
Wendell	3/10/1988	Yes	Yes
West Tisbury	6/3/2004	Yes	Yes
Westborough	10/20/2008	Yes	Yes
Westfield	5/20/2003	Yes	Yes
Westport[4]	4/11/1995	No	Yes
Westwood	1989	Yes	Yes
Wilbraham	5/27/1997	Yes	Yes
Winchester		No	Yes
Woburn	6/24/1987	Yes	Yes
Worcester	7/1/2007	Partial	Yes
Yarmouth	12/1/2016	No	Yes

[1] Information based on the Massachusetts Association of Conservation Commissions website as of 2019 and municipal websites.

[2] Refer to municipal bylaws prior to conducting work in the community.

[3] Berkshire Scenic Mountain Act, as adopted by the Town of Lenox and administered by the Lenox Conservation Commission.

[4] Town of Westport Soil Conservation Bylaw, as administered by the Westport Conservation Commission.

C.6 MA Department of Environmental Protection

Review and approval under the Commonwealth's Water Quality Certification Regulations

is required for "*discharge of dredged or fill materials, dredging, and dredged material disposal activities in waters of the United States within the Commonwealth which require federal licenses or permits and which are subject to state water quality certification under 33 U.S.C. 1251, et seq. The federal agency issuing a permit initially determines the scope of geographic and activity jurisdiction*" (314 CMR 9.01(2)). An individual Water Quality Certification is required from the Massachusetts Department of Environmental Protection (MassDEP) for any activity identified at 314 CMR 9.04. In accordance with 314 9.04 (4) activities which are exempt from MGL Chapter 131 Section 40 but are subject to 33 U.S.C. 1251, *et seq.*, and will result in any discharge of dredge or fill material to bordering vegetated wetlands or land under water require an individual 401 Water Quality Certification.

Eversource entered into an Administrative Consent Order (ACO) with MassDEP in 2017. This ACO serves as a general permit under the 401 Water Quality regulations (314 CMR 9.00) and establishes general conditions for routine operation and maintenance activities within existing ROWs.

C.7 U.S. Army Corps of Engineers

Work within wetlands and waters of the United States is subject to jurisdiction under Section 404 of the Clean Water Act, which is administered by the ACOE. The General Permits for the Commonwealth of Massachusetts (MA GPs) establish categories for projects based on their nature of impacts. The MA GPs were most recently issued on April 16, 2018, and expire on April 5, 2023.

Certain minor activities are eligible for Self-Verification (SV), which requires submittal of a Self-Verification Notification Form (SVNF) prior to the commencement of work. Activities eligible for Self-Verification are authorized under the MA GPs and may proceed without written verification from the ACOE as long as the SVNF has been submitted and the activity meets the terms and conditions of the applicable MA GPs.

Activities requiring Pre-Construction Notification (PCN) require the submittal of an application to the ACOE, followed by a screening of the application by the ACOE, the U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, National Marine Fisheries Service, MassDEP, and consultation with the Massachusetts Historical Commission, Tribal Historic Preservation Officers (THPOs) and the Massachusetts Board of Underwater Archaeological Resources (BUAR). PCN projects may not proceed until written verification from the ACOE is received.

An Individual Permit (IP) requires a formal permit application to be submitted to the ACOE. The application is reviewed in detail by both state and federal agencies, and a public notice is released for public comment. Projects which trigger an Individual Permit generally result in significant impacts to wetlands and/or watercourses outside the limits of the MA GPs.

Work within, or above, Navigable Waters is also administered by the ACOE under Section 10 of the Rivers and Harbors Act of 1899.

ACOE permitting does not apply to activities that fall under the maintenance exemption set forth at 33 CFR 323.4(a)(2) – Discharges Not Requiring Permits:

"Maintenance, including emergency reconstruction of recently damaged parts, of currently serviceable structures such as dikes, dams, levees, groins, riprap, breakwaters, causeways, bridge abutments or approaches, and transportation structures. Maintenance does not include any modification that changes the character, scope, or size of the original fill design. Emergency reconstruction must occur within a reasonable period of time after damage occurs in order to qualify for this exemption."

Maintenance projects that occurred prior to the ACOE jurisdiction over fill activities, or that were properly permitted, can proceed under the maintenance exemption noted above, provided that the same temporary fill areas are used. However, it is recommended that a formal determination be requested from the ACOE to confirm these activities are exempt. The repair, rehabilitation or replacement of a previously authorized, currently serviceable structure or fill (with some minor deviations in the structure's configuration or filled area) are regulated under MA GP1 and subject to SV or PCN.

Also, operation and maintenance related activities that do not meet the above exemption may qualify for SV. In that case, it is recommended that a copy of the SVNF be submitted to MassDEP.

The MA GPs are listed below. MA GPs specifically, and typically, applicable to utility projects are emphasized by bold italic font:

GP1. Repair, Replacement and Maintenance of Authorized Structures and Fills
GP2. Moorings
GP3. Pile-Supported Structures, Floats and Lifts
GP4. Aids to Navigation, and Temporary Recreational Structures
GP5. Dredging, Disposal of Dredged Material, Beach Nourishment, and Rock Removal and Relocation
GP6. Discharges of Dredged or Fill Material Incidental to the Construction of Bridges
GP7. Bank and Shoreline Stabilization
GP8. Residential, Commercial and Institutional Developments, and Recreational Facilities
GP9. Utility Line Activities
GP10. Linear Transportation Projects Including Stream Crossings
GP11. Mining Activities
GP12. Boat Ramps and Marine Railways
GP13. Land and Water-Based Renewable Energy Generation Facilities and Hydropower Projects
GP14. Temporary Construction, Access, and Dewatering
GP15. Reshaping Existing Drainage Ditches, New Ditches, and Mosquito Management
GP16. Response Operations for Oil and Hazardous Substances
GP17. Cleanup of Hazardous and Toxic Waste
GP18. Scientific Measurement Devices
GP19. Survey Activities
GP20. Agricultural Activities
GP21. Fish and Wildlife Harvesting and Attraction Devices and Activities
GP22. Habitat Restoration, Establishment and Enhancement Activities
GP23. Previously Authorized Activities

In general, the following cumulative thresholds apply for determining the level of ACOE permitting required:

Table C-2
MA GPs Permits Limits

Resources	SV Limits (SV Eligible)	PCN Limits (PCN Eligible)	IP Limits (IP Required)
Non-tidal waters of the US	0 to 5,000 sf	5,000 sf to 1 acre	>1 acre
Tidal waters of the US	Not eligible	All discharges ≤1/2 acre	>1/2 acre
SAS in tidal waters of the US excluding vegetated shallows	Not eligible	All discharges ≤1,000 sf	>1,000 sf

SAS in tidal waters of the US consisting of vegetated shallows only	Not eligible	All discharges ≤100 sf (compensatory mitigation is required	>100 sf

*Special Aquatic Sites (SAS) consist of wetlands, mud flats, vegetated shallows, sanctuaries and refuges, coral reefs, and riffle and pool complexes. These are defined at 40 CFR 230 Subpart E.

Stream and wetland crossings are only subject to jurisdiction under the ACOE if there is **a discharge of dredge or fill material into wetlands or waters of the United States**. Equipment access through a stream or wetland with no structural BMP is not regulated by the ACOE if there is no discharge of dredge or fill material (note that equipment rutting as a result of not using an appropriate BMP can be considered a "discharge of dredge material"). Similarly, the use of a timber or rail car bridge that extends from bank to bank with no stream impacts is not regulated by the ACOE. The use of timber mats, stone, and log corduroy is considered "fill material" by the ACOE under the MA GPs, and must be calculated to determine overall impacts.

Maintenance, including emergency reconstruction of currently serviceable structures, is exempt from ACOE jurisdiction and does not require formal permitting. Maintenance does not include any modification that changes the character, scope, or size of the original fill design. Emergency reconstruction must occur within a reasonable period of time after damage occurs to qualify for this exemption.

New culvert installation or existing culvert replacements may require permitting with local Conservation Commissions under the MAWPA, and may also require permitting with the ACOE under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act of 1899, and the MassDEP under Section 401 of the Clean Water Act.

Stream and wetland crossings (including culvert installations) that involve the discharge of dredge and fill material may be conducted under SV if the following criteria are met.

- The use of construction mats of any area can be used to conduct activities that were previously authorized, authorized under Self-Verification, or not subject to regulation. Other temporary or permanent fill and associated secondary impacts must meet the SV limits.
- Authorized construction mats must be removed immediately upon work completion, and the wetlands must be restored per the General Conditions.

The project has no potential for an effect on a historic property within the permit area or any known historic property that may occur outside the permit area.

- Any in-water work controls that encroach upon more than 25 percent of the stream width are limited to a Time of Year (TOY) restriction in consideration of spawning, breeding and migration to maintain upstream fish passage. Activities within streams proposed during the TOY restrictions are generally ineligible for SV authorization.
- The work does not result in direct or secondary impacts to Special Aquatic Sites.
- No work occurs in Navigable Waters (waters subject to the ebb and flow of the tide and, in Massachusetts, the non-tidal consist of the Merrimack River, Connecticut River, and Charles River to the Watertown Dam).
- Span streams or size culverts or pipe arches such that they are at least 1.2 times the bankfull width. Spans are strongly preferred as they avoid or minimize disruption to the streambed and avoid entire streambed reconstruction and maintenance inside the culvert or pipe arch, which may be difficult in smaller structures. Footings and abutments for spans and scour protection should be landward of 1.2 times bankfull width.
- Embed culverts or pipe arches below the grade of the streambed. This is not required when ledge/bedrock prevents embedment, in which case spans are required. The following depths are recommended to prevent streambed washout, and ensure compliance and long-term success:
    - ≥ 2 feet for box culverts and pipe arches, or
    - ≥ 2 feet and at least 25% for round pipe culverts.
- Match the culvert gradient (slope) with the stream channel profile.
- Construct crossings with a natural bottom substrate within the structure matching the characteristics of the substrate in the natural stream channel and the banks (mobility, slope, stability, confinement, grain and rock size) at the time of construction and over time as the structure has had the opportunity to pass substantial high flow events.
- Construct crossings with appropriate bed forms and streambed characteristics so that water depths and velocities are comparable to those found in the natural channel at a variety of flows at the time of construction and over time. In order to provide appropriate water depths and velocities at a variety of flows and especially low flows, it is usually necessary to reconstruct the streambed (sometimes including a low flow channel) or replicate or preserve the natural channel within the structure. Otherwise, the width of the structure needed to accommodate higher flows will create conditions that are too shallow at low flows. Flows could go subsurface within the structure if only large material is used without smaller material filling the voids.
- Openness, which is the is the cross-sectional area of a structure opening divided by its crossing length when measured in consistent units, is > 0.82 feet (0.25 meters).

Banks on each side of the stream inside the crossing matching the horizontal profile of the existing stream and banks outside the crossing are recommended. To prevent failure, all constructed banks should have a height to width ratio of no greater than 1:1.5 (vertical:horizontal) unless the stream is naturally incised. Tie these banks into the up and downstream banks and configure them to be stable during expected high flows.

- The project is not located within a vernal pool depression, or vernal pool envelope, and does not individually or cumulatively impact greater than 25% of the vernal pool critical terrestrial habitat. It is feasible for some temporary impacts associated with the use of construction mats in previously disturbed ROWs to occur within the vernal pool envelope or critical terrestrial habitat if a Vegetation Management Plan demonstrates avoidance, minimization and mitigation impacts to aquatic resources.
- Culvert extensions do not qualify for SV.
- Culvert projects using slip lining do not qualify for SV, either as new work or maintenance activities.
- No open trench excavation in flowing waters. No work in riffles and pools.
- The project does not entail stream relocation.
- Work is not conducted within riffles or pools.
- Normal flows within the stream boundary's confines must be maintained, i.e., temporary flume pipes, culverts, cofferdams, etc.
- Water diversions (i.e., bypass pumping or water withdrawals) may be used immediately up and downstream of the work footprint.
- The project is (a) not located in the designated main stem of, or within 0.25 miles up or downstream of the designated main stem of, or in tributaries within 0.25 miles of the designated main stem of a National Wild and Scenic River System; (b) not in "bordering or contiguous wetlands" that are adjacent to the designated main stem of a National Wild and Scenic River; or (c) does not have the potential to alter flows within a river within the National Wild and Scenic River System.
- The project is not located within areas containing USFWS or National Marine Fisheries Service (NMFS)-listed species or critical habitat. The project is not "likely to adversely affect" listed species or habitat per the federal Endangered Species Act (ESA) or result in a "take" of any federally-listed threatened or endangered species of fish or wildlife.
- The project does not impinge upon the value of any National Wildlife Refuge, National Forest, National Marine Sanctuary, or any other area administered by the U.S. Fish and Wildlife Service, U.S. Forest Service or National Park Service.
- The project is not located on ACOE properties and ACOE-controlled easements.
- The project does not propose temporary or permanent modification or use of a federal project beyond minor modifications required for normal operation and maintenance.
- The project minimizes use of heavy construction equipment, and, where required, either has low ground pressure (typically less than 3 psi) or it must be placed on construction mats.
- Construction mats must be placed in the wetland from the upland or from equipment positioned on swamp mats if working within a wetland.
- Temporary fill must be stabilized. Unconfined, authorized temporary fill must consist of clean material that minimizes impacts to water quality. Temporary fill placed during the growing season must be removed before the beginning of the next growing season. If temporary fill is placed during the non-growing season, it may remain throughout the following growing season but must be removed before the beginning of the next growing season.

- Appropriate erosion, sedimentation and turbidity controls are used and maintained during construction.
- Appropriate measures must be taken to minimize flooding to the maximum extent practicable.

Wetland and stream crossings may be authorized under PCN if the following criteria are met:

- The work results in less than one acre of impacts to inland, non-tidal, wetlands or waters of the United States.

Stream and wetland crossings that cannot meet SV or PCN criteria may require review under an IP. The ACOE should be consulted before assuming an IP will be required, as exceptions can be made under certain circumstances.

C.8 Temporary Stream Crossings

C.8.1 U.S. Army Corps of Engineers

See Section C.7 for general ACOE permitting requirements for stream crossings. To qualify for SV, temporary stream crossings (typically culverts) that are not spans must be designed in accordance with below.

1) Installed outside of the TOY restrictions and must be removed before the beginning of the TOY restriction of that same season. Temporary crossings that must remain into the TOY restriction will require PCN review.
2) Impacts to the streambed or banks require restoration to their original condition (see "Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road-Stream Crossings," for stream simulation restoration methods). Use geotextile fabric or other appropriate bedding for stream beds and approaches where practicable to ensure restoration to the original grade. The requirements in GCs 17, 18 and 19 are particularly relevant.
3) Avoid excavating the stream or embedding crossings.
4) For Culverts:
    a. The water height should be no higher than the top of the culvert's inlet and the culvert is large enough to pass debris.
    b. Install energy dissipating devices downstream if necessary to prevent scour.
    c. The TOY restrictions in GC 18 and the restrictions in GC 17(f) are particularly relevant.
5) Removed upon the completion of work. Impacts to the streambed or banks requires restoration to their original condition using stream simulation methods.

In-kind repair, replacement and maintenance of currently serviceable, authorized fills are eligible for SV. However, the conditions of the original authorization apply, and minor deviations in fill design are allowed. In-kind repair and maintenance of culverts that includes an expansion or change in use requires PCN. Replacement of non-serviceable fills, including an expansion or change in use, also requires PCN. In-kind replacement using the same materials is exempt from Section 404 of the Clean Water Act, and does not require permitting with the ACOE. The ACOE, however, should be consulted before assuming an activity is exempt from their jurisdiction.

APPENDIX D

Horizontal directional drilling (HDD) for subsurface utility installations is considered to be the most effective and least environmentally damaging technique when compared to traditional mechanical dredging and trenching. This method ensures the placement of the pipeline at the target burial depth with no wetland or water body disturbance. HDD installation is the preferred method for crossing sensitive resources–the alternative is open cut trenching.

The HDD procedure uses bentonite slurry, a fine clay material as a drilling lubricant. Directional drilling has the small potential to release bentonite slurry into the surface environment through frac-outs. This term describes the situation caused when the drilling head and its accompanying inert clay lubricant slurry, hits a subterranean fractured substrate. When the pressurized lubricant slurry reaches the fracture it can follow the fracture up or otherwise force itself to the surface or into the water if drilling is occurring under a waterbody. If a "frac-out" occurs under these water features, the potential exists for the inert clay (a non-toxic bentonite-based substance) to be released into the water column. In large quantities, the release of drilling mud into a waterbody could affect fisheries or other aquatic organisms by settling and temporarily inundating the habitats used by these species. Properly monitoring the slurry pressures and amounts significantly decreases risk of significant quantities of drilling fluid being released into the environment.

Frac-out is most likely to occur near the bore entry and exit points where the drill head is shallow. Should a frac-out occur during HDD operations, the following measures will be taken.

- Temporarily suspend forward drilling progress.
- Monitor frac-out for 4 hours to determine if the drilling mud congeals. (Bentonite will usually harden, effectively sealing the frac-out location.)
- If drilling mud congeals, take no other action that would potentially suspend sediments in the water column.
- If drilling mud does not congeal, erect appropriate isolation/containment measures (i.e. turbidity curtains and/or 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.
- Following containment, evaluate the current drilling profile (i.e. drill pressures, pump volume rates, drilling mud consistency) to identify means to prevent further frac-out events.
- If the fracture is mitigated and controlled, forward progress of the drilling may resume.

EXHIBIT 8

Eversource Excess Soil and Groundwater Management Policy

Massachusetts and New Hampshire Specific

JANUARY 2022

Prepared for:

EVERSOURCE

Table of Contents

Section 1 Introduction

Section 2 Soil & Groundwater Pre-Characterization

Section 3 Material Management Procedures

ACRONYMS

Regulatory Acronyms

- **ABC** Asphalt, Brick, Concrete Recycling
- **AGQS** Ambient Groundwater Quality Standards
- **ATS** Alternative Treatment Standard
- **AUL** Activity and Use Limitations
- **AUR** Activity and Use Restrictions
- **BOL** Bill Of Lading
- **CGP** Construction General Permit
- **COC** Contaminant of Concern
- **CMR** Code of Massachusetts Regulations
- **CRAM** Construction Related Abatement Measure
- **DGP** Dewatering General Permit
- **GMZ** Groundwater Management Zone
- **MassDEP** Massachusetts Department of Environmental Protection
- **EAD** Eversource Environmental Affairs Department
- **LDR** Land Disposal Restrictions
- **LSP** Licensed Site Professional
- **MCP** Massachusetts Contingency Plan
- **Mg/kg** Milligram per kilogram
- **MGL21E** Massachusetts General Law Chapter 21E
- **MSR** Material Shipping Record
- **NAPL** Light Non-Aqueous Phase Liquid
- **NHDES** New Hampshire Department of Environmental Services
- **OHM** Oil & Hazardous Materials
- **PE** Professional Engineer
- **PG** Professional Geologist
- **QEP** Qualified Environmental Professional
- **RAM** Release Abatement Measure
- **RC** Reportable Concentration
- **RCRA** Resource Conservation and Recovery Act
- **RGP** Remediation General Permit
- **RSA** Revised Statutes Annotated
- **SOW** Scope of Work
- **SRS** Soil Remediation Standards
- **TSCA** Toxic Substances Control Act
- **URAM** Utility Related Abatement Measure
- **USEPA** United States Environmental Protection Agency
- **UTS** Universal Treatment Standards

Soil and Groundwater Management Acronyms

- EPH Extractable Petroleum Hydrocarbons
- VPH Volatile Petroleum Hydrocarbons
- VOC Volatile Organic Compounds
- SVOC Semi-volatile Organic Compounds
- TPH Total Petroleum Hydrocarbons
- PCB Polychlorinated Biphenyl
- PPM Parts Per Million
- PPB Parts Per Billion
- SGMP Soil and Groundwater Management Plan
- T&D Transportation and Disposal
- mg/L Milligram per Liter (PPM)
- mg/kg Milligrams per Kilogram (PPM)
- ug/L Micrograms per Litter (PPB)
- ug/kg Micrograms per Kilogram (PPB)
- TCLP Toxicity Characteristic Leaching Procedure

Applicable Regulations and Guidance Documents

- 310 CMR 40.0000, Massachusetts Contingency Plan, latest version
- MassDEP Policy, WSC-94-400, "Interim Remediation Waste Policy for Petroleum Contaminated Soil"
- 310 CMR 30.000, Massachusetts Hazardous Waste Regulations, latest version
- MassDEP, 310 CMR 19.000, Solid Waste Management Facility Regulations, latest version
- MassDEP, 310 CMR 10.00, Massachusetts Wetlands Protection Act, latest version
- MassDEP, 310 CMR 7.00, Massachusetts Air Pollution Control Regulations, latest version
- 310 CMR 16.000, Massachusetts Solid Waste Rules, latest version
- 40 CFR Part 261, Identification and Listing of Hazardous Waste
- 40 CFR Part 268, Land Disposal Restrictions
- 40 CFR Part 761, Toxic Substance Control Act
- MassDEP Policy # Comm-97-001: Massachusetts Landfill Soil Cover Policy
- MassDEP Guideline: Construction Activities In Contaminated Areas, 1994
- MassDEP Guideline: Similar Soils Provision Guidance (WSC#-13-500)
- MassDEP Interim Policy # Comm-15-01: Re-Use of Soil for Large Reclamation Projects Policy
- NHDES, Env-Or: Oil & Remediation Rules
- NHDES, Env-Hw: Hazardous Waste Rules
- NHDES, Env-Sw: Solid Waste Rules

Section 1
Introduction

This document has been prepared by the Eversource Environmental Affairs Department (EAD) to provide guidance for the management and off-site disposal of Excess Soil and Construction Groundwater[1] generated[2] during construction projects by Eversource Energy and its subsidiaries (collectively referred to as Eversource). This policy is only applicable to the Eversource Massachusetts and New Hampshire service areas. A guidance policy has been developed for excess soil and groundwater management in Eversource Connecticut service area that is provided under a separate cover.

The intent of this document is to provide a process for the planning, characterizing, handling, re-using, and disposing of excess soil and groundwater generated during Eversource construction and maintenance projects which can include, but are not limited to, the following utility improvements:

- Subsurface gas transmission and distribution lines;
- Subsurface electric power transmission lines;
- Subsurface electric distribution duct banks and vaults; and
- Various structures that support electric and natural gas distribution network (i.e., substations, transformer mounting pads and gas regulator stations).

Massachusetts and New Hampshire have a long industrial/manufacturing history that extends over 200 hundred years. During this time, the industrial/manufacturing operations evolved from mills to manufacturing and commercial operations that have historically supported each States economy. In many cases, these former operations also included the storage and handling of petroleum and hazardous wastes. Historic releases of these materials can locally impact soil and groundwater quality. In addition, intensive agricultural practices associated with apple orchards that required historic use and application of pesticides and herbicides. Historic fill materials were also used in many areas of the state during development of properties and roadways.

Many of these sites are identified in regulatory records and are available in the files of the Massachusetts Department of Environmental Protection (MassDEP), New Hampshire Department of Environmental Services (NHDES) and/or the United Stated Environmental Protection Agency (USEPA); however, many of these sites remain unidentified. As such, care must be taken to properly manage excess materials generated during construction activities to ensure Eversource does not inadvertently mismanage soil or groundwater that "may" contain regulated concentrations of Oil & Hazardous Materials (OHM).

[1] Excess Soils are defined as soils that are excavated during Eversource construction projects that are unable to be re-used within the same utility excavation or at the same property. Groundwater dewatering is periodically needed to remove groundwater for the construction of subsurface foundations, utilities or water that accumulates within an excavation are collectively referred to as Construction Groundwater.

[2] For the purposes of this plan, generate means to produce soils through excavation methods including but not limited to excavation or drilling or groundwater that is pumped from an excavation or well.

Use of this policy will minimize potential risks associated with the mismanagement and disposal of Excess Soil and discharges of Construction Groundwater, which can include regulatory actions (i.e., notice of violation (NOV) or a consent order) by MassDEP, NHDES and USEPA or other actions by local or municipal agencies. Financial costs could also be incurred for remediation to remove excess soils or mitigate discharges of construction groundwater.

If a construction activity generates soil and/or groundwater containing OHM above an MCP RC or NHDES SRS or Ambient Groundwater Quality Standard (AGQS) (Remediation Waste) that is improperly managed, the generator may be subject to enforcement actions under the MCP or New Hampshire Revised Statutes Annotated (RSAs) including violations and fines.

The generator may also be liable under Massachusetts General Law (MGL) Chapter 21E (Massachusetts OHM Release Prevention and Response Act) or NH RSAs for remedial costs at other locations that the soil and/or groundwater impacted via improper disposal or discharge. Lastly, the generator may be subject to civil and criminal actions for damages. Financial impacts resulting from improper disposal can range from minor fines to millions of dollars in liability.

1.1 Applicability

The following Excess Materials Management Policy is applicable to Eversource employees, vendors and contractors assigned construction responsibilities within Eversource's Massachusetts and New Hampshire Service Areas, where Excess Soil and Construction Groundwater will be generated and handled during construction activities. This policy is also applicable to off-site transfer of the excess soils for re-use or disposal at a landfill, soil recycling, and/or other permitted treatment/disposal facility. This policy also applies to the on-site re-use of soils.

This Policy shall be provided as part of Eversource Contractor bid packages for projects that include the generation of excess soils, handling and disposal excess soils and/or groundwater, and the re-use of soils.

1.2 Regulatory Background

Soil and groundwater management in Massachusetts is regulated by a combination of solid waste and remediation state statutes and regulations promulgated by the Massachusetts Department of Environmental Protection (MassDEP), New Hampshire Department of Environmental Protection (NHDES), and United States Environmental Protection Agency (USEPA), as summarized in the above *Applicable Regulations and Guidance Documents*.

Copies of these regulations and policies and are available at the following links:

- https://www.mass.gov/lists/waste-site-cleanup-laws-and-regulations
- https://www.des.nh.gov/organization/commissioner/legal/rules/index.htm#waste
- https://www.epa.gov/rcra
- https://www.epa.gov/pcbs

- https://www.epa.gov/npdes-permits/remediation-general-permit-rgp-massachusetts-new-hampshire

1.3 Soil & Groundwater Reuse Definitions

In general, soil management falls into two regulatory categories:

- **Natural Soil**: Soils that, following laboratory chemical testing, only contain naturally occurring substances (i.e. metals) that are present at concentrations not exceeding the background concentrations of such substance(s) occurring naturally in the environment. Reuse of natural soil would typically be unrestricted, provided Eversource EAD approves.
- **Non-Remediation Waste**: Soil and groundwater that, following laboratory chemical testing, exhibit concentrations of regulated chemicals (OHM) that do not exceed the RCs pursuant to the MCP, 310 CMR 40.000 for the applicable site standards; or SRS/AGQS for New Hampshire.
- **Remediation Waste**: Soils and groundwater that, following laboratory chemical testing, exhibit concentrations of regulated chemicals (OHM) that exceed their respective and are not associated with an exempt source pursuant to 310 CMR 40.000 or Env-Or 600:
    - *Massachusetts Remediation Waste*: Reportable Concentrations (RCs) pursuant to the MCP, 310 CMR 40.000 for the applicable site standards for Massachusetts;
    - *New Hampshire Remediation* Waste: Soil Remediation Standards (SRS) or Ambient Groundwater Quality Standards (AGQS) for New Hampshire contained in Env-Or 600, Contaminated Site Management;
- **RCRA Regulated Hazardous Waste (40 CFR 261)**
    - *Characteristic Hazardous Waste*: A material that with exceeds the threshold for corrosivity (40 CFR 261.22), ignitability (40 CFR 261.21), reactivity (40 CFR 261.23) or TCLP in excess of the (40 CFR 261.24).
    - *Listed Hazardous Waste*: Soil or groundwater that contain a chemical that meets RCRA's F Listed Waste definition (40 CFR 261.31)
- **PCB Remediation Waste (40 CFR 76.61)**:
    - Materials disposed of prior to April 18, 1978, that are currently at concentrations ≥50 ppm PCBs, regardless of the concentration of the original spill;
    - Materials which are currently at any volume or concentration where the original source was ≥500 ppm PCBs beginning on April 18, 1978, or ≥50 ppm PCBs beginning on July 2, 1979; and
    - Materials which are currently at any concentration if the PCBs are spilled or released from a source not authorized for use under this part.

1.4 Soil & Groundwater Management Overview

1.4.1 Non-Remediation Waste Management Overview

Management of Non-Remediation Waste in Massachusetts: Soil that does not meet the definition of a remediation waste is regulated under MassDEP's Guideline: Similar Soils Provision Guidance WSC#-13-500, 2014 and MassDEP's Interim Policy # Comm-15-01: Re-Use of Soil for Large Reclamation Projects Policy, 2015.

Management of Non-Remediation Waste in New Hampshire: Soil and groundwater that do not exceed the SRS/AQGS are regulated under NHDES Env-OR 611.06(d) and Env-Sw 903. Please note that soil and/or groundwater that has been impacted as a result of anthropogenic activity is considered a solid waste and must be managed at a permitted facility. Soil that contain contaminants that are solely attributed background conditions (i.e., elevated arsenic), are considered unregulated and there are no reuse restrictions. However, it is Eversource's policy to manage these soils at sites with similar contaminant concentrations, as well as obtain a hold harmless agreement from the Contractor and/or landowner where the material will be placed.

1.4.2 Remediation Waste Management Overview

Management of Remediation Waste in Massachusetts: Soil and groundwater must be managed in accordance with Massachusetts Hazardous Waste Management Rules, 310 CMR 30.000. Therefore, if an RC pursuant to the MCP, 310 CMR 40.000 is exceeded, or when a construction activity "knowingly or unknowingly" has the potential to generate OHM impacted soil or groundwater, the activity becomes regulated under the MCP.

Management of Remediation Waste in New Hampshire: Soil and groundwater must be managed must be managed in accordance with NHDES Env-OR 604.07, NHDES Env-Hw-500 and Env-Sw 903.02. Therefore, if an SRS or AGQS, or when a construction activity "knowingly or unknowingly" has the potential to generate OHM impacted soil or groundwater, the activity becomes regulated under Env-Or 600.

1.4.3 RCRA Regulated Hazardous Waste Overview

Management of a Characteristic Hazardous Waste: For soil that is considered a characteristic hazardous waste, management will generally include the two following options:

- **Option 1 Hazardous Waste:** Soil managed as a hazardous waste could be transported to a RCRA Part B Treatment Facility or RCRA Subtitle C Landfill, provided that soil meets U.S. EPA RCRA and LDR regulations. In the event that a compound does not comply with the RCRA LDRs (i.e., PAHs exceed the Alternative Treatment Standard), the soil may be managed at an Out-of-Country facility.

- **Option 2 TCLP Stabilization:** Leachable soils can be treated with a binding agent, to render the soil non-hazardous prior to generation. Pending satisfactory confirmatory soil treatment results, these soils would then be disposed of at a RCRA Subtitle D Landfill.

  Because authorized states must adopt the U.S. EPA policy that hazardous waste soil is not generated if it is treated within an AOC, it is possible that some out of

state receiving facilities would not recognize the treated soil as non-hazardous. If the proposed out of state receiving facility considers the treated TCLP soil as a generated hazardous waste, then it would be subject to LDRs. The soil management for this scenario would follow the protocol outlined in Option 1.

Management of RCRA Listed Hazardous Waste: Soil that contain a RCRA regulated listed hazardous waste, the material can be managed as a hazardous waste at a RCRA Part B Facility, RCRA Subtitle C Landfill or other facility permitted to accept RCRA regulated hazardous waste or delisted for management at a State permitted facility (i.e., Subtitle D Landfill or thermal treatment facility). Alternatively, depending on the detected concentrations, Eversource may petition MassDEP or NHDES to delist the hazardous waste. The delisting procedures for Massachusetts and New Hampshire are summarized below.

MassDEP Contained-In Determination: Soils considered a listed hazardous waste may be delisted in accordance with *MassDEP's Considerations for Managing Contaminated Soil: RCRA Land Disposal Restrictions and Contained-In Determinations Technical Update* ("MassDEP Contained-In Determination"). Under this scenario, a petition would be prepared and submitted to MassDEP that states the soil that contains hazardous constituents derived from a listed hazardous waste is not considered to be a hazardous waste if all of the following criteria are met:

- The source of the hazardous constituents is a listed hazardous waste under 310 CMR 30.130 that Massachusetts is authorized to regulate under RCRA by USEPA;
- The soil is not a characteristic hazardous waste, pursuant to 310 CMR 30.120;
- The concentrations of the hazardous constituents in the soil are less than or equal to the MCP Method 1 Category S-1 soil standards (S-1/GW-1, S-1/GW-2, and S1/GW-3) listed at 310 CMR 40.0975(6)(a);
- The soil is appropriately characterized by representative sampling; this includes the identification, segregation and sampling of "hot spots" (note: hot spots will be handled as a hazardous waste, rather than being included in a contained-in determination, if treatment does not lower the concentration of listed wastes within the hot spots to less than or equal to the MCP Method 1 Category S-1 soil standards);
- The concentrations are achieved either by removal or treatment and not by dilution;
- The activities are performed in accordance with the requirements of 310 CMR 40.0000 (the MCP); and
- Any excavated soil is managed in accordance with the requirements of 310 CMR 40.0030, Management Procedures for Remediation Wastes, including those of 310 CMR 40.0032(2) and 310 CMR 40.0032(3) and any other applicable laws and regulations.

NHDES Contained-Out Determination: The New Hampshire Department of Environmental Services (NHDES) has determined that wastes containing hazardous constituents need not be considered hazardous for disposal if the waste

is not characteristically hazardous and the total concentrations of detected constituents are below the Method 1, Risk-based S-2 Standard published in NHDES's *Contaminated Sites Risk Characterization and Management Policy* ("NHDES Contained-Out Policy"). Under this scenario, a petition would be prepared and submitted to NHDES to delist the hazardous waste.

1.4.4 TSCA Regulated PCB Remediation Waste Overview

Soil that meets the definition of a TSCA regulated PCB remediation waste can be managed via one of the three options summarized below. Typically for smaller, time sensitive projects and/or linear underground projects, Performance Based Disposals are typically utilized to manage PCB remediation waste.

However, for larger Substation related projects, the Self-implementing Cleanup and Disposal Plan (SIP) or a Risk-based Cleanup and Disposal Plan may be warranted to minimize the project's disposal related costs.

Self-Implementing Cleanup and Disposal (40 CFR section 761.61(a)): The self-implementing option links cleanup levels with the expected occupancy rates of the area or building where the contaminated materials are present. Characterization/sampling of PCB-contaminated media must follow the requirements of 40 CFR 761.61(a)(2) and is subject to review and approval by EPA, prior to cleanup. Management of soil under a Self-Implementing Cleanup is based on the results of characterization and includes the following options:

- PCB remediation waste with PCB concentrations less than 50 mg/kg (soil, trap rock and/or concrete) would be removed from the Site and disposed of at a permitted Solid Waste Landfill in accordance with §761.61((a)(5)(v)(A).
- PCB remediation waste with PCB concentrations greater than 50 mg/kg removed from the site will be disposed of in accordance with §761.61(a)(5)(i)(B)*(2)(iii)* at either a TSCA Approved or RCRA Subtitle C Landfill.

Performance Based Disposal (40 CFR section 761.61(b)): Section 761.61(b) only addresses disposal of PCB remediation waste. EPA notification and approval is not required. Under this scenario, PCB remediation waste would be disposed of in accordance with §761.61(a)(5)(i)(B)*(2)(iii)*.

Risk-based cleanup and disposal (40 CFR section 761.61(c)): The risk-based option allows for a site-specific approval to sample, cleanup, or dispose of PCB remediation waste in a manner other than the self-implementing or the performance-based disposal options. This option requires you to obtain an approval from EPA based on a finding that the proposal will not present an unreasonable risk of injury to health or the environment.

The disposal options for soil, concrete and trap rock under a Risk-based Cleanup would be the same as under the self-implementing approach.

1.4.5 MassDEP and NHDES Reporting Requirements

MassDEP Reporting: For linear projects, soil with contaminant concentrations greater than the applicable RC (typically RCS-1), constitutes a 120-day reporting condition with the MassDEP Bureau of Waste Site Cleanup (BWSC). For linear utility construction projects, this means that the construction related excavation and dewatering activities

would require the submittal of a Utility-related Abatement Measure (URAM). Under this scenario, no additional MCP response actions (i.e., remediation and reporting) would be required at the completion of construction.

However, for projects on Eversource-owned properties (i.e., substations, LNG facilities, area work centers), the detection of contaminants above the applicable RC would require the filing of a Release Notification Form (RNF) and the filing of a Permanent Solution Statement (PSS). Based on the nature and extent of the contamination, the response actions could range from assessment and a risk characterization to large scale soil and groundwater remediation.

NHDES Reporting: Linear projects with soil contaminant concentrations greater than the applicable SRS would require notification to NHDES and the preparation of a Soil and Groundwater Management Plan (SGMP).

However, for projects on Eversource-owned properties (i.e., substations, area work centers), exceedances of a soil and groundwater SRS would notification to NHDES in accordance with Env-OR 604. This would result in the need to implement response actions and reporting until a Certificate of No Further Action has been issued by NHDES pursuant to Env-OR 609.02.

1.4.6 Construction Dewatering Management Overview

Onsite Recharge: The preferred option when managing groundwater is to recharge the groundwater back into the upgradient adjacent subsurface. This can either be accomplished by discharging back within the open excavation/trench or allowing groundwater to infiltrate back into the soil. Recharge would be discharged within 100 feet of the original excavation and upgradient (if possible). If large amounts of groundwater are encountered a fractionation tank may be used to store groundwater temporarily, allowing the sediment to settle out. Stored groundwater would then be slowly discharged back into the excavation/trench either during or after working hours.

Discharges to Navigable Waterways: Groundwater discharges to navigable waters[3] under Section 509(b) of the Clean Water Act is overseen by the EPA National Pollutant Discharge Elimination System (NPDES) General Permit for Remediation Activity Discharges 40 C.F.R. Part 23. An overview for the three NPDES Dewatering Permits is provided below.

- *Construction General Permit (CGP)*: Applicable to sites greater than 1 acre and groundwater is not contaminated[4].

[3] Navigable waters of the United States are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. A determination of navigability, once made, applies laterally over the entire surface of the waterbody, and is not extinguished by later actions or events which impede or destroy navigable capacity.

[4] "Contaminated" discharges include discharges that contain pollutants besides those authorized under the CGP or DGP, unless naturally occurring. In addition, in NH contaminated dewatering discharges not covered under the CGP include all discharges within 1,000 feet of groundwater contamination.

- *Remediation General Permit*: For any site where groundwater characterization results identify a contaminant, other than TSS, greater than the applicable Technology Based or Water Quality Based Effluent Limit (TBEL/WQBEL)

The Contractor would be responsible for obtaining local approval to discharge treated groundwater to the stormwater drainage system. Permit conditions may require the treatment of the groundwater prior to discharge, as well as extensive water quality monitoring.

Discharged to POTW: For locations where onsite recharge are not feasible options due to excessive volume and slow infiltration rates, discharging into the sanitary sewerage system, either combined sewer outfall (CSO) or Publicly Owned Treatment Works (POTW) may be an option. However, this activity must be coordinated with the system owner/operator (i.e., municipality) and shall not occur without written authorization from the local municipality or sewer authority. The Contractor would be responsible for obtaining local approval to discharge treated groundwater to the CSO/POTW. Permit conditions may require the treatment of the groundwater prior to discharge, as well as extensive water quality monitoring.

Offsite Disposal/Recycle: If groundwater cannot be successfully recharged or treated and discharged under either a NPDES RGP permit or to a local POTW, then groundwater can be disposed/recycled using a water recycler (e.g., Global Cycle or Clean Harbors).

1.5 Other Project Consideration

Since the proposed construction activities can occur in multiple regulatory jurisdictions, Eversource EAD should be consulted to determine what additional environmental approvals may be required. Typical environmental permits include:

- A NPDES Construction General Permit for projects greater than 1 acre;
- Conservation Commission wetlands permitting
- NHESP Rare and Protected species/habitats permitting
- Solid Waste Permit for work at MassDEP and NHDES regulated solid waste facilities;
- Alteration of Terrain Permits for New Hampshire Projects
- Army Corp of Engineer for work within waterways
- MassDEP 401 Water Quality Certification for projects that involve excavation of greater than or equal to 100 cubic yards of sediment
- Massachusetts Environmental Policy Act (MEPA)

Section 2
Soil & Groundwater Pre-Characterization

Excess soil management should be considered during the initial project planning and cost estimating phase of Eversource construction projects and incorporated into the project specification and bid package development phases for construction projects that involve the handling soils. Eversource's EAD shall be contacted for input regarding excess soil management guidance during the project planning and cost estimation phase for all construction projects that are anticipated to generate excess soils.

Regardless of the amount of soil generated, the Eversource EAD must be contacted for excess soil management guidance for planned construction at company-owned and operated properties. For planned construction in public ROWs and private properties, bid specifications shall direct the selected contractor to include excess soil management in their scope of work (SOW).

Eversource EAD will coordinate with the Eversource Operational Team to complete a preliminary review of the proposed project information to assess the likelihood for the generation and handling of excess soils containing OHM. Information to be reviewed will include the following project information (if available):

- Property Location / Utility Corridor
- Property setting (i.e., residential, commercial, industrial or mixed uses)
- Eversource-owned, Private Property, Street ROW, Utility Corridor
- Historic use information
- Construction plan review
- Anticipated project start / end and duration
- Estimated volume of soil projected to be generated
- Estimated quantity of soil to be re-used versus estimated excess / unsuitable quantity to be transported to an off-site disposal facility
- Anticipated soil load-out and staging logistics
- Live-load vs on-site / off-site staging area
- Proposed stockpile area(s) location(s)
- Existing environmental report / study information (Eversource-owned property)

The Eversource EAD or Eversource-designated LSP/QEP for the project will assess the pre-construction information to determine if contaminated soils are anticipated as part of proposed construction. If OHM is potentially present in excess soils, then additional environmental due diligence may be recommended as follows:

- Pre-Construction Site Environmental Database Search
- Excess Soil Characterization Laboratory Analytical Testing

These due diligence activities are applicable to work within Non-Eversource Properties (public ROWs and privately-owned properties) and Eversource-owned properties. Due diligence activities require several weeks of lead time to complete, as such they should be completed within the construction planning stage and well in advance of active construction.

2.1 Pre-Construction Environmental Desktop Review

Prior to initiating any construction work on public ways or private property, EAD will evaluate current site conditions, proper compliance should include:

- A pre-construction data base review of the work area using the MassDEP website (https://eeaonline.eea.state.ma.us/portal#!/search/wastesite) or NHDES OneStop website (https://www.des.nh.gov/onestop/index.htm) and existing internal knowledge as follows:
    - Based on project location (i.e., densely developed areas), an EDR Report and historical mapping review may be warranted.
- Within 500 feet of the ROW; or
- Within the Eversource/Non-Eversource Privately owned property
- Identifying any AULs or AURs within the proposed work area, to document any special handling/construction requirements (i.e., soil cap restoration and/or management procedures)
- If necessary, regulatory agency notification;
- If necessary, the use of a Licensed Site Professional (LSP) for Massachusetts or Professional Engineer (PE) / Professional Geologist (PG) for New Hampshire;
- If necessary, the regulatory reporting with either MassDEP or NHDES;

Eversource EAD shall be notified as early in the process as possible if there is a potential that OHM impacted soil and/or groundwater will be encountered. Eversource EAD will then develop a plan of action following the steps outlined Sections 2.2 and 2.3.

2.2 Soil Pre-Characterization Sampling

If Excess Soils cannot be reused within the Project limits and the Contractor is not responsible for characterizing the soil, the Eversource EAD will request the characterization of excess soils based upon the volume of excess soil that is anticipated to be generated within the Project limits proximal to sites with environment records or documented releases. Soil characterization is required whenever it is anticipated that Excess Soils will not be re-usable within the Project limits, for any reason, and that the generated Excess Soils will require shipment off-site.

If feasible, Eversource EAD will perform pre-construction in-situ soil sampling to support and reduce overall construction cost associated with soil management. The in-situ soil samples may be collected by the advancement of soil borings and/or test pits completed prior to the start of construction. The purpose of pre-construction soil testing is to:

- Evaluate soil reuse options with the goal of supporting soil reuse within project limits;
- Minimize offsite soil reuse costs, if soil cannot be reused within the project limits; and
- Provide soil data to the construction contractors that can be used in the development of Health and Safety Plans and minimize the potential for worker exposures.

If pre-construction in-situ soil sampling is not feasible, as an option, this testing can be performed during construction from open excavations or post-construction from temporary soil stockpiles; provided that the contractor has access to a secure offsite soil staging area where samples can be obtained from a stockpile. See the temporary storage management policies in Section 3.1.1.

All disposal facilities require soil characterization laboratory analytical testing results to be representative of the excess soils that will eventually be received for disposal. If significant delays occur between soil characterization testing and actual shipment of soils to a disposal facility, the disposal facility may require re-characterization of the excess soils. As such, soil characterization should be completed as close as possible to the start of construction.

Two options exist for soil and groundwater characterization: in-situ and ex-situ.

2.2.1 In-situ Pre-Characterization

If the construction schedule permits and the Eversource Operational Team decides this is the best route for the project, in-situ pre-characterization of soils will be completed prior to commencing construction to determine the presence of OHM within soils. The pre-characterization process requires obtaining a proposal from an on-call environmental consultant/LSP based upon the proposed construction area and securing an Eversource purchase order. Implementation of pre-characterization by the environmental consultant/LEP and subsequent acceptance by the disposal facility can take three to four months, on average, to complete.

In-situ pre-characterization allows soil disposal options to be evaluated and costs associated with handling and disposal to be developed and incorporated upfront into Eversource construction project budgets. Pre-characterization of soils reduces overall construction costs associated with soil management and also allows for pre-planning to identify excess soils that can be re-used within the construction area.

The recommended sampling frequency for the in-situ pre-characterization samples are:

- **Underground Linear Projects:** Soil samples should be collected at a maximum distance as detailed below. Soil samples should be collected between 0-5/6 foot depth interval to characterize the typical duct bank trench. Deeper soil samples (i.e., 6-10 foot depth interval and/or 10-15 foot depth interval) should be collected at manhole and trenchless crossing locations, where deeper excavations are required.
    - One boring every 500 feet and at every proposed manhole or trenchless crossing location to meet the typical Massachusetts sampling frequency requirements
    - One boring every 100-200 linear feet and at every proposed manhole or trenchless crossing location to meet NHDES sampling frequency requirements.
    - One boring every 10 linear feet for hazardous waste delineation.
- **Substation/LNG Facilities/Work Centers:** One boring/sample per five-foot excavation lift for the following:

- One sample per 500 cubic yards for Massachusetts reuse facilities.
- One sample per 125 cubic yards (200 tons) for the first 1,250 cubic yards (2,000 tons) and every 300 cubic yards (500 tons) thereafter for New Hampshire reuse facilities.

- **Overhead ROWs:** Soil samples should be collected between 0.25 and 0.50 mile frequency. Soil borings should be collect between 0-5/6 feet below grade at each boring location. To characterize the deeper, native soil, one composite soil samples from the 15-30 foot depth interval should be collected at 1 mile intervals.

However, there are potential downsides to the in-situ characterization process that must be considered prior to selection and implementation of this option, such as:

- Pre-characterization samples are collected from specific representative locations within the limits of a proposed Project where the potential for the presence of impacts is identified through the site review process. It is possible that existing, localized areas of impacted soil or groundwater may not be identified during the in-situ pre-characterization sampling effort.
- Groundwater samples obtained from temporary groundwater well points installed during pre-characterization sampling can contain elevated turbidity levels, resulting in artificially elevated concentrations of some testing parameters, such as metals and PAHs.

Eversource EAD will retain an LSP (MA) or PE/PG (NH) to develop and oversee the pre-construction in-situ soil sampling program in the proposed area(s) where excess soil is anticipated to be generated. Soils will be logged by a field scientist for visual / olfactory evidence of OHM and to document physical soil conditions. Soils will be screened with a photoionization detector (PID) to assess the presence of total volatile organic compounds (TVOCs) that could be associated with a release of OHM. Eversource EAD shall be contacted if unexpected signs of contamination, OHM, asbestos or suspected hazardous wastes are encountered during in-situ sampling.

Groundwater may be assessed if the groundwater table is encountered at the depth of the proposed utility excavation and if dewatering will be needed.

Following the pre-construction in-situ sampling program, the LSP/PG/PE will prepare a Soil and Groundwater Management Plan (SGMP) for the in-situ sampling documenting the findings. The letter will include a map of sampling locations, analytical summary tables, laboratory analytical data packages, and investigation logs (i.e. soil boring logs, test pit logs, and/ or monitoring well logs).

If requested by the Eversource EAD, the Environmental Consultant will prepare the soil prequalification package for the non-hazardous soil to obtain acceptance for pre-characterized soils at the selected licensed disposal facility.

2.2.2 Ex-situ Soil Characterization During Construction

Soil characterization testing can be performed during construction if pre-construction in-situ soil sampling is not feasible. The Eversource Operational Team should assess excess soil stockpile area capacity and projected soil generation volumes. Sufficient soil stockpile

capacity will be needed to allow for completion of soil characterization. Eversource EAD must be contacted by the Eversource Operational Team as soon as possible if soil characterization sampling is required during the construction project to coordinate sampling efforts.

Soil characterization samples can be collected from open excavations, test pits, geotechnical borings, hand borings, or post-excavation directly from soil stockpiles located at approved locations as discussed in Section 3.1.1 Temporary Storage below.

Typical standard laboratory turnaround time (TAT), which is the time from the day the laboratory receives the samples to the day that the final analytical results area available, is normally 7 to 10 business days. Expedited laboratory analysis can be completed to reduce the TAT, however, the laboratory will apply additional surcharges, which can be significant, depending on how quickly the expedited results are needed.

Sampling during construction can create potential project issues, such as:

- Space constraints associated with stockpiles while waiting for sampling results and facility approvals.
- Potential to encounter hazardous are PCB remediation waste resulting in higher disposal costs and longer facility approval times.

Soils cannot be added to a stockpile once characterization samples are collected and laboratory results are pending, which could limit excess soil storage at the project site. Coordination time is required to obtain approval for shipment of soils to a licensed disposal facility and to procure an excess soil hauling contractor by the Eversource EAD.

The capacity of the selected permitted soil disposal facility to receive soils on a daily basis can be a potential issue if large volumes of soils are shipped over a short amount of time. Some facilities may limit capacity during poor weather conditions. These potential capacity issues could cause delays in the shipment of soils. Consequently, the costs for characterization during construction can vary greatly and are difficult to predict.

2.2.3 Soil Characterization Sampling

Soil sample should be collected and analyzed at a frequency that satisfies anticipated receiving facility requirements (See Section 2.2.1). Soil samples shall be submitted to a NELAC-accredited environmental laboratory for the following analyses:

- Total Petroleum Hydrocarbons (TPH)
- MCP 14 Metals[5]
- Polychlorinated Biphenyls (PCBs)[6]
- Semi-volatile Organic Compounds (SVOCs)[7]

[5] Reporting limits for selenium must be less than 5.0 mg/kg; if chromium is reporting above 100 mg/kg analyze hexavalent chromium via SW-846 7196A

[6] Reporting limits for PCBs must be less than 0.10 mg/kg

[7] Report pyridine in SVOC (8270) results

- Volatile Organic Compounds (VOCs)[8].
- Pesticides[9] and herbicides (should be analyzed if work is being conducted in substations, cross-country Right-of-Ways or other locations where pesticides and herbicides were likely applied)
- Extractable petroleum hydrocarbons (EPH) (should only be analyzed for if TPH exceeds applicable RC)
- Hazardous Waste Characteristics (pH, ignitability, reactive sulfide, reactive cyanide and TCLP if total concentrations exceed the 20x rule)
- Oxidation/Reduction Potential
- Specific Conductance
- Field screening shall also include monitoring of total volatile organic vapors (TVOVs) measured in parts per million per (PPM) using a Photoionization detector (PID). To the extent practical, soil samples should be field screened for TVOVs at a frequency of 1 sample per 50 cubic yards.
- Additional parameters may be added based on project specific compounds of concern.

Additional parameters may be added, based on project-specific compounds of concern, such as:

- Total sulfur and total sulfate as SO_4 (If the presence of coal ash is greater than 20% in the collected characterization samples);
- Total Organic Carbon (TOC); and/or
- Radioactivity (if suspected)

Soil laboratory analytical results should be compared to the RCs for Massachusetts pursuant to the MCP, 310 CMR 40.000, and the SRS for New Hampshire. If soil sampling results exceeds RCs or SRS and are not otherwise exempt from reporting in accordance with the MCP or NHDES Env-Or 600, Eversource EAD will notify applicable agencies and will prepare and coordinate state notification and reporting requirements, as applicable. This may include the notification, preparation and submittals to MassDEP or NHDES.

2.3 Groundwater Characterization Sampling

To determine groundwater quality in the project area, representative groundwater sample should be collected from monitoring wells and submitted to a NELAC accredited environmental laboratory for the parameters specified in the EPA RGP, as well as additional parameters that may be required by either a POTW or groundwater recycling vendor. The analyses include, but are not limited to the following:

- Total Suspended Solids (TSS)
- Total Residual Chloride (TRC)
- Cyanide

[8] Reporting limits for VOCs, SVOCs, Pesticides and Herbicides for the MassDEP Comm-15-01

[9] Report toxaphene in pesticide results

- Ammonia
- Chloride
- RGP Metals (antimony, arsenic, cadmium, chromium [trivalent and hexavalent], copper, lead, mercury, nickel, selenium, silver, zinc and iron)
- VOCs[10]
- SVOCs[11]
- TPH
- Ethylene Dibromide (EDB),
- 1,4-Dioxane
- Ethanol
- Total Phenols
- PCBs
- pH
- Hardness

As required by the RGP, representative surface water samples, within ¼-mile of each proposed surface water discharge locations shall be collected and submitted to a NELAC-accredited environmental laboratory for the following parameters:

- Freshwater Outfalls: pH, temperature, ammonia, metals (antimony, arsenic, cadmium, trivalent and hexavalent chromium, copper, iron, lead, mercury, nickel, selenium, silver and zinc) and hardness
- Saltwater Outfalls: pH, temperature, ammonia, metals (antimony, arsenic, cadmium, trivalent and hexavalent chromium, copper, iron, lead, mercury, nickel, selenium, silver and zinc) and salinity

For discharges to a POTW or for groundwater to be disposed/recycled offsite, the permit should be reviewed to confirm the sampling and analytical requirements.

[10] RGP required VOCs via EPA Method 624 and Global Cycle requires EPA Method 8260
[11] RGP required SVOCs via EPA Method 625 and Global Cycle requires EPA Method 8270

Section 3
Material Management Procedures

The following section summarizes the soil and groundwater management procedures to be implemented on Eversource construction projects.

3.1 Excess Soil Staging

3.1.1 Temporary Storage

During construction work on public ways and private property, excavated soil/solid waste destined for offsite disposal may not be stored on private property, within the public road right of way or within 100 feet of wetlands unless permitted and specifically approved to do so. Excess soil/debris must either be temporarily stored at a secured laydown area managed by the contractor/vendor/Eversource or shipped directly offsite for disposal or re-use. At no time can RCRA hazardous waste soil (Type E) be stockpiled on public ways or private property. Excess soil destined for "immediate" use as fill at the location of generation may be stored onsite providing it is not a public safety hazard or does not contain hazardous waste.

During construction activities on Eversource owned or operated property, excavated soil may be temporarily stored onsite within the Eversource owned lot boundaries, if feasible for future on-site re-use or offsite disposal. However, the temporary storage volume may not exceed 200-cubic yards at any one time. Once the stockpile reaches a volume of 200-cubic yards, it must be transported offsite for final disposal/re-use unless it is designated for reuse as onsite fill.

If soil is generated in Massachusetts from a URAM area, soils must be managed in accordance with 310 CMR 40.0034(8) of the MCP where soils not reused within 14 days of generation, must be transported offsite for disposal within 120 days of initial generation. Additionally, the location of temporary storage area shall be included in the URAM Notification Report.

If soil is generated in New Hampshire that exceeds the SRS, it may be temporarily stored at the site or origin for no more than 4 months in accordance with Env-Or 611.05. In all cases, the Contractor is required to provide Eversource with an approval from the Property Owner for the temporary storage of soil.

If less than 200 cubic yards of soil will be generated and no listed hazardous waste disposal sites exist along the construction route or project area, the soil may be transported to an Eversource Service Center that operates a spoils pile as per the Environmental Compliance Manual which can be found on the EAD page of Eversource intranet.

As another option, the soil can be stored or be processed for re-use by a construction vendor or a Sand and Gravel Facility who holds a Site Assignment Authorization applicable to Asphalt, Brick and Concrete Recycling Facilities (ABC Facilities). This option only applies to soil that have been characterized and that meet the Type A soil definition below.

Excess soil destined for "immediate" re-use as fill at the location of generation may be stored on-site providing it is not a public safety hazard, does not contain hazardous waste, and BMPs are employed as discussed below.

The Eversource Contractor and vendors shall segregate and isolate contaminated materials from non-contaminated soils in the stockpile staging area. Construction debris and solid waste shall be segregated at the point of excavation, prior to the movement of contaminated materials from excavation areas. Eversource EAD or designee will assess the debris during excavation to determine assess disposal options.

All soil stockpiles shall be constructed and operated in accordance with best management practices as required by State, Federal and location regulations and Eversource policies. Soil stockpiles should be constructed to limit the footprint of the stockpile and prevent soil erosion. Below are some of the BMPs for temporary stockpiles:

- Implement appropriate measures to prevent unauthorized entry onto the stockpiles, including fences, gates, or other natural or artificial barriers.
- Implement reasonable precautions at all times to control fugitive dust emissions and odors.
- Soil stockpiles shall be placed on a surface sufficiently impervious to prevent or minimize the transfer or infiltration of contaminants from the stockpile to the ground.
- Soil stockpiles shall be securely covered when the stockpiles are not in use with an impervious material such as a tarp or equivalent material to control and minimize storm water run-on and run-off with the exception of stockpiles within active electrical substations, as discussed below. Stockpile covers shall be secured with weighted materials (e.g., sandbags). Stockpiles shall be covered at the end of each operating day or whenever the stockpiles are unattended.
- **Soil stockpiles within active electrical substations shall not be covered with a tarp or polyethylene plastic sheeting as this is a fire and electrical hazard.** A filter sock/straw waddle can be used to encircle the soil stockpile at the base to limit potential runoff. The mid-point of the waddle should be situated at the entrance to the stockpile area. Activities within active substations require Eversource Station Safety Training and coordination with and oversight by Eversource substation personnel.
- Covered, sealed roll-off containers can be used for soil storage if storage in stockpiles cannot be accommodated by the project or a small volume of soil is anticipated to be generated.
- Anti-tracking measures shall be in place at all times to prevent tracking of soils onto a public roadway.
- Once sampled for waste characterization or compliance purposes, stockpiles shall be kept separate from other stockpiles by means of concrete walls, aisle space, etc.
- Transporters of contaminated soil must be made aware of BMPs for transportation of such soil (e.g., proper tarping of dump bodies, removing loose material from dump body/tires, etc.).

- The operator of the stockpile area shall maintain a Site Operating Log for the duration of the work. Refer to the General Permit for the applicable items that must be included in the log and the requirements for retention of records. The Site Operating Log must indicate the final disposition of all soil managed at the stockpile area (i.e. transportation to a soil processing/landfill facility or placement on the land).
- Soil erosion and sediment control BMPs shall be implemented to control dust, erosion, and stormwater run-on and runoff in accordance with State guidance and Eversource procedures, as applicable.
- Stockpiling and consolidation of OHM should be avoided in the vicinity of sensitive human receptors such as private or public supply wells and environmental receptors such as wetlands, surface water bodies or marine environments.
- Storage of hazardous waste should comply with MassDEP/NHDES and USEPA Hazardous Waste Regulations.

3.1.2 Offsite Soil Management

Excess soil generated in support of construction work shall be processed for disposal/re-use at the lowest possible cost based on appropriate disposal options and disposal facility acceptance criteria.

To the extent feasible, excavated soils should be re-used on-site as backfill, within the property bounds, at or in the vicinity of the point of generation.

Eversource EAD will coordinate the preparation of all required soil acceptance LSP Opinion Letters, including the completion of Material Shipping Record (MSR) and/or Bill of Ladings (BOL).

The Contractor shall assist in the prepare all LDRs and Uniform Hazardous Waste Manifests, as required. The Contractor shall be responsible for submitting all required documentation to the applicable disposal facility for approval. Unless specifically approved by Eversource EAD, excess soil generated at Eversource projects shall not be reused (beneficial reuse) as fill material at: schools; day care, play grounds, recreation areas, agricultural areas for the growing of produce for human consumption or other locations where children may come into direct contact with the soils.

Eversource EAD will evaluate the results of the characterization soil sampling and classify soil and identify soil management options. The classifications have been developed in accordance with applicable Regulation and Technical Guidance Documents. Eversource must approve of any recycling/disposal facilities proposed by the contractor or vendor before materials are transported for disposal. A priority "from first to last option" of potential off-site reuse/disposal facilities include.

3.2 Soil Management

3.2.1 Uncharacterized Soil Types

The soil categories for uncategorized excess soil generated during maintenance or other construction related activities will characterized as:

Natural Soil
Soil in which all substances naturally occurring therein are present in concentrations not exceeding the concentrations of such substance occurring naturally in the environment and in which soil no other substance is analytically detectable.

Urban Fill Soil
Soil that contain construction and demolition debris greater than 5% by volume for asphalt/brick/concrete (ABC) that is 6 inch minus in size[12]; or ash or solid wastes (Wood/Plastic/Paper/Wire/Pipe) collectively greater than less than 1% by volume.

Petroleum Contaminated Soil
Soil containing evidence staining, visible sheening, odors, or other discolorations indicative of an oil and hazardous material or PID readings greater than 5 parts-per-million (ppm).

3.2.2 MA & NH Soil Reuse Definitions

The following soil categories and potential management options applies to soil generated in both Massachusetts and New Hampshire.

Type B-1 Soil: <RCS-1 MassDEP Beneficial Reuse:
Soil containing OHM concentrations below MCP RCS-1 criteria can be used as fill material at off-site industrial/commercial locations provided that pre-existing OHM concentrations at the fill location are equal to or higher than those that exist in the construction generated soil and are not located within the Utility Related Abatement Measure (URAM). Facilities must have a MassDEP approved Administrative Consent Order (ACO) in place in accordance with MassDEP Interim Policy COMM-15-01.

Type B-2 Soil: <RCS-2 MassDEP Beneficial Reuse:
Soil containing OHM concentrations below MCP RCS-2 criteria can be used as fill material at off-site industrial/commercial locations provided that pre-existing OHM concentrations at the fill location are equal to or higher than those that exist in the construction generated soil and are not located within the URAM. Facilities must have a MassDEP approved ACO in place in accordance with MassDEP Interim Policy COMM-15-01.

Type B-3 Soil: NHDES Permitted Beneficial Reuse:

[12] Asphalt, brick and concrete that is sized greater than 6 inch minus should be segregated and managed separately.

Soil containing OHM concentrations below the SRS and can be reused as fill material at a NHDES permitted beneficial reuse facility.

Type C-1 Soil: Massachusetts Unlined Landfills:
Soil that contains OHM concentrations above MCP RCS-1 levels but below the criteria for Massachusetts Unlined landfills per MassDEP Policy COMM-97-001.

Type C-2 Soil: Massachusetts Lined Landfills:
Soil that contains OHM concentrations above MCP RCS-1 levels and Massachusetts Unlined landfills but below the criteria for Massachusetts Lined landfills per MassDEP Policy COMM-97-001.

Type D-1 Soil: Asphalt Batch Facility:
Soil that contains OHM concentrations above MCP RCS-1 levels and above the criteria for Massachusetts unlined and lined landfills per MassDEP Policy COMM-97-001 but meets acceptance criteria for a permitted asphalt batch facility can be recycled at such facilities.

Type D-2 Soil: Thermal Desorption Facility:
Soil that contains OHM concentrations above MCP RCS-1 levels and above the criteria for Massachusetts unlined and lined landfills per MassDEP Policy COMM-97-001 but meets acceptance criteria for a permitted thermal desorption facility can be recycled at such facilities.

Type D-3 Soil: Non-Hazardous Waste Non-Massachusetts RCRA Subtitle D Landfill Facility Daily Cover:
Soil that contains OHM concentrations above MCP RCS-1 levels and above the criteria for Massachusetts unlined and lined landfills per MassDEP Policy COMM-97-001 but meets acceptance criteria for a permitted non-hazardous waste out of state Subtitle D landfill facility for use as daily cover.

Type D-4 Soil: Non-Hazardous Waste Non-Massachusetts RCRA Subtitle D Landfill Facility Disposal:
Soil that contains OHM concentrations above MCP RCS-1 levels and above the criteria for Massachusetts unlined and lined landfills per MassDEP Policy COMM-97-001 but meets acceptance criteria for a permitted non-hazardous waste out of state Subtitle D landfill facility can be disposed at such facilities.

Type E-1 Soil: U.S. EPA Hazardous Waste RCRA Part B Treatment Facility or RCRA Subtitle C Landfill Facility:
Soil containing OHM concentrations that exceed reuse levels for Massachusetts landfills, asphalt batch and/or thermal desorption facilities and exceed federal TCLP limits or otherwise meets the definition of hazardous waste. Meets acceptance criteria for a permitted hazardous waste out of state RCRA Part B treatment facility of RCRA Subtitle C landfill facility.

Type E-2 Soil: U.S. EPA Hazardous Waste PCB TSCA Landfill:
Soils that either contain PCB concentrations greater than 50 PPM or are TSCA regulated and being managed under a Performance Based Cleanup can be disposed at approved TSCA facilities in accordance with 40 CFR 761.

Type E-3 Soil: TCLP Metal Soil Stabilization:
Soil stabilization treatment of soil containing OHM concentrations that exceed federal TCLP limits for metals, to render soils non-hazardous prior to generation. Treated soil will be disposed at a RCRA Subtitle D Landfill (Type D Soil Facility).

3.2.3 Massachusetts Specific Reuse Definition

Type A Soil: Reuse at Sand and Gravel facility:
Soils which do not contain oil or hazardous material (OHM) or contain OHM below levels consistent with "natural" soil per MassDEP's Similar Soils Provision Guidance (WSC-13-500) are not considered Remediation Waste; this includes soils that exhibit average concentrations of TPH less than or equal to 25 ppm. These "natural" soils may be reused at specific beneficial reuse locations on a case by case basis under the discretion of Eversource EAD and may be reused at an active sand and gravel processing facility that holds a Site Assignment Authorization with approval from the LSP-of-Record. Facilities that are reclaiming former sand and gravel pits must have a MassDEP approved ACO in place in accordance with MassDEP Interim Policy COMM-15-01: Re-Use of Soil for Large Reclamation Projects Policy.

3.2.4 New Hampshire Specific Reuse Definition

Type A Soil: Unrestricted Reuse:
Soils which do not contain oil or hazardous material (OHM) as result of a release of a regulated substance and is consistent with background conditions (i.e., not the result of anthropogenic activities such as paving or atmospheric deposition) and therefore are not subject to Waste Management Division regulation. The soil should be managed at an off-site receiving location that contains similar concentrations or managed at a soil management facility permitted to receive clean soil.

3.2.5 Hazardous Waste Management Procedures

If hazardous waste not documented in the MassDEP or NHDES site search or EAD records review is encountered during construction, Eversource EAD shall be contacted immediately for guidance. Eversource EAD will coordinate the applicable agency notifications and management of excess soil evaluated to be a hazardous waste. Detection of undocumented hazardous waste may be in the form of unusual odors or appearance, sheen/oil, buried drums or containers, or complaints by workers who experience exposure symptoms such as headaches or nausea.

Hazardous waste can also be in the form of laboratory data generated from soil laboratory analytical results that exceeds RCRA levels. If hazardous waste has been identified from soil samples collected during a soil characterization program, then additional delineation efforts should occur to define the horizontal and vertical extent of the soil that contain hazardous waste. Additional efforts should be conducted to reduce construction work in areas where hazardous waste has been identified and to reduce the volume of hazardous waste generated as part of the construction work. All work in hazardous waste areas should be conducted in accordance with a contractor or vendor submitted Hazardous Waste Management Plan and Decontamination Plan.

3.2.6 Soil Transportation and Disposal Procedures

Soil Disposal Records. The contractor shall maintain original copies of all soil disposal records including:

- Soil laboratory results;
- Facility acceptance submission and approval forms;
- Soil shipping documentation; and
- Disposal weight slips.

These records shall be maintained by the contractor at the principal place of business for a minimum of 5-years following the completion of work.

Certification Letter. Eversource may request proof of soil disposal activities for each project on occasion. If initiated, Eversource will make this request in writing. Within one (1) month of a written request by Eversource, the contractor shall provide a **certificate of completion** letter that provides the following statements and information:

- A declaration that all soil generated during the project was managed in accordance with this policy
- Total weight (tons) of all excess soil generated
- Identification of the soil disposal end point(s)
- Contractor signature and date

Note: Management of records for soil generated at URAM locations will be the responsibility of Eversource EAD. Therefore, the construction contractor/vendor shall provide the original disposal records to Eversource EAD for URAM locations.

3.3 Groundwater Management Procedures

Erosion controls and Best Management Practices (BMPs) will be implemented during construction to minimize stormwater entering the excavations and off-site migration from the construction area. Soils shall be adequately dewatered prior to transportation to the receiving facility, to prevent the liquids from spilling from the trucks onto roadways. The contractor shall also implement BMPs and follow the procedures and guidelines outlined in this SGMP and the Project Specifications to minimize potential impacts from inadvertent release of OHM (i.e. spills or leaks from refueling of construction vehicles or storage of fuel, oil and other fluids during construction) and could potentially contaminate groundwater. Spill reporting requirements will be conducted in accordance with the applicable federal, state and local regulations.

3.3.1 Groundwater Management Options

Based on project needs and subsurface conditions encountered during construction, groundwater management options that may be implemented include onsite recharge, treatment and discharge of treated groundwater to the municipal drainage system (e.g. MWRA sewer). Summaries of the groundwater management options are provided below:

Onsite Recharge: The preferred option when managing groundwater is to recharge the groundwater back into the upgradient adjacent subsurface. This can either be done by discharging back within the open excavation/trench or allowing groundwater to infiltrate back into the soil. Recharge would be discharged within 100 feet of the original excavation and upgradient (if possible). If large amounts of groundwater are encountered a fractionation tank may be used to store groundwater temporarily, allowing the sediment to settle out. Stored groundwater would then be slowly discharged back into the excavation/trench.

Offsite Discharge: For locations where onsite recharge are not feasible options due to excessive volume and slow infiltration rates, discharging into the sanitary sewerage system, either combined sewer outfall (CSO) or Publicly Owned Treatment Works (POTW) may be an option. However, this activity must be coordinated with the system owner/operator (i.e., municipality) and shall not occur without written authorization from the local municipality or sewer authority.

Fractionation tanks may be used to store water and provide pretreatment for sediment and other contaminants, allowing groundwater to be lawfully discharged via permit to either surface water (either directly or via a catch basin). Discharges of groundwater from construction projects to surface water (either directly or via a catch basin) requires compliance with a multi-sector National Pollutant Discharge Elimination System (NPDES) RGP as well as approval from the system operator (e.g. Watertown DPW). Prior to any discharges, a Notice of Intent (NOI) application must be filed with the U.S. EPA. The Contractor will be responsible for obtaining all approvals to discharge treated groundwater to either the stormwater drainage system or directly to the surface water body. Permit conditions may require the treatment of the groundwater prior to discharge as well as extensive water quality monitoring. Please note that the RGP approval process can take up to 6 months after submittal of the NOI.

Appropriate local discharge permits would be obtained by the Contractor and would be maintained onsite during dewatering activities. Groundwater discharge to either a POTW or a surface water body will require effluent compliance sampling and analysis.

Offsite Disposal/Recycle: If groundwater cannot be successfully recharged or treated and discharged under either a NPDES RGP permit or to a local POTW, then groundwater can be disposed/recycled using a water recycler (e.g., Global Cycle or Clean Harbors). Due to the potential volume of groundwater required to be managed, this option could require multiple trucks and/or fractionation tanks.

3.3.2 Offsite Groundwater Disposal and Treatment

A priority "from first to last option" of potential groundwater disposal facilities is provided below.

Type A Groundwater: **Non-Hazardous Beneficial Reuse:** Groundwater and wastewaters that are characterized as non-hazardous waste and non-TSCA regulated (PCBs<0.5 ppb) and are acceptable for beneficial reuse/recycle at a properly licensed facility.

Type B Groundwater: **Non-Hazardous Wastewater Treatment facility:** Groundwater and wastewaters that are characterized as non-hazardous waste and non-TSCA regulated (PCBs<0.5 ppb) and are acceptable for treatment and disposal at a properly licensed wastewater treatment facility.

Type C Groundwater: **Non-Hazardous Groundwater Treatment and Discharge:** Groundwater and wastewaters that are characterized as non-hazardous waste and non-TSCA regulated (PCBs<0.5 ppb or limits allowed by receiving facility permit) and are acceptable for onsite or offsite

discharge under U.S. EPA RGP or local POTW discharge permit.

Type D Groundwater: **U.S. EPA Hazardous Waste:** Groundwater and wastewaters that are characterized as a hazardous waste and are shipped to a Treatment, Storage, or Disposal Facility (TSDF).

Type E Groundwater: **PCB-Contaminated, TSCA-Regulated[13]:** Groundwater and wastewaters containing PCBs above 0.5 ppb are TSCA regulated and must be must be collected for off-site treatment at a facility permitted to receive such wastes.

3.4 Management of Other Project Materials

This Section describes the potential material which may be removed from the subsurface during soil excavation and the recommended handling approach.

3.4.1 Excess Bedrock Management

Excess bedrock can be managed at an active sand and gravel processing facility that holds the applicable State and locals. Facilities in Massachusetts that are reclaiming former sand and gravel pits must have a MassDEP approved ACO in place in accordance with MassDEP Interim Policy COMM-15-01: *Re-Use of Soil for Large Reclamation Projects Policy*. The Rampco Quarry in Dudley, Massachusetts and the Aggregate Industries Quarry in Saugus, Massachusetts can re-use bedrock as a reclamation material.

It should be noted that one test for perchlorate per 500 cubic yards may be required, unless Generator demonstrates that no perchlorate blasting agents were used. If blasting agents are utilized, the contractor is responsible for providing material Safety Data Sheets (SDSs) for all materials utilized.

Additionally, one geochemical characterization profile per 500 cubic yards including Acid Base Accounting and Net Acid Generation Potential may be required unless Generator demonstrates that the rock is not known or suspected to contain sulfide minerals.

3.4.2 Construction and Demolition Materials

Construction and demolition (C&D) materials could potentially be encountered during soil excavation work. C&D wastes include building materials such as coated brick and concrete, plastic or steel piping, drywall, scrap metal, masonry brick, carpet, wood. If encountered during excavation activities, C&D wastes shall be segregated and disposed of separately at a facility permitted to accept C&D waste.

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[13] In accordance with 40 CFR 761.79(b)(ii): TSCA regulated water may be discharged to a treatment works (as defined in § 503.9(aa) of this chapter) or to navigable waters, if the PCB concentration is <3 µg/L or a PCB discharge limit included in a permit issued under section 307(b) or 402 of the Clean Water Act.

TSCA regulated liquids may also be disposed of it in a high temperature incinerator approved under § 761.70(b), an alternate disposal method approved under § 761.60(e), a chemical waste landfill approved under § 761.75, or in a facility with a coordinated approval issued under § 761.77

3.4.3 Asphalt, Brick and Concrete

Uncoated asphalt, brick and/or concrete (ABC) removed from the subsurface, if encountered, shall be managed separately for disposal. This material shall not be combined with C&D waste as this material is regulated and recycled differently. The ABC wastes must be segregated from soil and sized appropriately (generally six-inch minus) to gain acceptance at a permitted recycling facility.

3.4.4 Management of Solid Waste

Other solid waste that may be encountered during excavation include plastic, cardboard, newspaper, glass, etc. If encountered during excavation activities, solid wastes shall be segregated and disposed of separately at either a lined landfill facility or energy from waste facility permitted to accept solid waste.

3.4.5 Management of Unexpected Soil or Groundwater Conditions

If unexpected soil and/or groundwater conditions are encountered during construction (e.g. non-aqueous phase liquid or NAPL), the contractor will notify Eversource or their Representative immediately, who will provide appropriate guidance relative to the management, characterization, staging, and recycling/disposal of such materials. If encountered, soil and/or groundwater suspected to be impacted by OHM at reportable levels will be segregated from other materials pending sampling and analysis as appropriate. Such soil and/or groundwater shall remain segregated until the impacted media has been sampled and the contractor has obtained approval for disposal of this material at an appropriate receiving facility. Upon receipt of analytical results, the soil and/or groundwater will be characterized for disposal by the LSP and transported by licensed contractors to an appropriate disposal facility under BOL or Hazardous Waste Manifest.

Section 4
Responsibilities

4.1 Eversource / Consultant Responsibilities

Eversource and/or the LSP (MA) or PE/PG (NH) shall be responsible for the following soil management activities:

- Pre-characterization of soil quality to determine OHM concentrations using sampling and analysis criteria outlined in MassDEP Policy COMM-97-001, COMM-15-01 for Massachusetts, or NHDES Env-Or 600 for New Hampshire, and/or the selected soil reuse/recycling/disposal facility acceptance criteria.
- Identifying MCP disposal sites regulated by MassDEP, or contaminated sites regulated by NHDES, along the Project Corridor.
- Preparing Soil and Groundwater Management Plans and providing LSP or PE support for unanticipated contamination discovered during construction.
- Performing, if needed, supplemental sampling and testing of soil, to support offsite disposal.
- Approving the transportation companies, soil staging areas, and reuse/recycling/disposal facilities.
- Preparing and providing MSRs and BOLs to the transport the soil generated during construction to the approved reuse/recycling/disposal facility.

4.2 Eversource Contractor Responsibilities

The contractor(s) or vendor(s) selected by Eversource to perform the construction activities shall be responsible for the following soil management activities:

- Shall keep work areas, including but not limited to, areas adjacent to excavations, roadways leading to and from excavation areas, driveways, parking areas, and public roadways free of contaminated materials. If such materials are deposited, spilled, or spread, such material shall be removed promptly, and properly disposed of to the satisfaction of LSP/PE no later than the end of each working day or as requested by LSP/PE.
- Shall not import or export excavated contaminated soils or contaminated materials without prior approval of Eversource and LSP/PE. Additionally, no contaminated soils or contaminated materials shall be imported to the site without prior approval of Eversource.
- Shall provide a list of the primary and proposed backup facility for as applicable, a minimum of 30 days prior to transporting any soils from the site.
- A minimum of 14 days prior to transport of any soils from the site, the contractor or vendor shall provide a letter stating the name and address of the transporter for each material group classification and each off-site facility as applicable.

- Within 20 days of last shipment, submit copies of completed Material Shipping Record & Log Forms and Bills-of-Lading documenting transport of excavated soils and materials from the site to approved off-site disposal, reuse, recycling, and treatment facilities. The submittal shall also include weight slips for each load transported from the site to the disposal facility.
- Shall submit a plan outlining the procedures, products, site logistics, and schedule for the on-site treatment of Type E soils, if encountered.
- Prior to handling any hazardous waste provide a Decontamination Plan that provides procedures for handling, managing, and disposal of hazardous waste, if encountered. The Decontamination Plan shall include health and safety measures for construction worker safety, mitigation measures for avoiding cross contamination between work zones/soil types, and BMPs for preventing hazardous waste contacting both paved and unpaved surfaces.
- Provide weekly soil management reporting to Eversource and the LSP/PE that includes a summary of the daily excavated volume by stationing/manhole locations, work zone, and estimated soil volume generated by soil type. The report shall include the disposition of the excavated materials including volumes, shipment, dates, number of shipments, and final tonnage of materials that were transported offsite for reuse/recycling/disposal at the facilities approved by Eversource.
- Shall employ methods necessary to isolate contaminated materials from non-contaminated soils to the degree practicable.
- Shall segregate construction debris from excavated contaminated materials at the point of excavation, prior to the movement of contaminated materials from excavation areas. LSP/PE may evaluate debris during excavation to determine if such material can be designated uncontaminated general demolition material.
- Shall implement measures to divert surface water around excavation sites to prevent water from directly entering open excavations.
- Provide, as needed, staging area(s) at location(s) in proximity to the Project Area for temporary storage of excavated soil prior to final reuse, recycling, or disposal.
- Providing in the environmental allowance unit items, as needed, any added costs for soil management work required to be performed at night (i.e. demurrage time).
- Performing, if necessary, dust suppression and odor management. The contractor or vendor shall develop and implement its own HASP. The HASP shall include worker safety and air monitoring requirements, if appropriate. The contractor or vendor shall also conduct its own due diligence review of potential HASP concerns for the Project Area including a review of the listed MassDEP sites.
- Providing a Decontamination Plan that provides procedures for handling, managing, and disposal of hazardous waste, if encountered. The Decontamination Plan shall include health and safety measures for construction worker safety, mitigation measures for avoiding cross contamination between work zones/soil types, and BMPs for preventing hazardous waste contacting both paved and unpaved surfaces.

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EXHIBIT 9

ORIGINAL DOCUMENT PRINTED ON CHEMICAL REACTIVE PAPER WITH MICROPRINTED BORDER - SEE REVERSE SIDE FOR COMPLETE SECURITY FEATURES

DATE	INVOICE	AMOUNT	

3807

MCLANE MIDDLETON, PROFESSIONAL ASSOCIATION
300 TRADE CENTER 128, SUITE 7000
WOBURN, MA 01801

54-49/114

PAY Six-Hundred Sixty-four 80/100 DOLLARS

DATE	TO THE ORDER OF	CHECK NO.	AMOUNT	DESCRIPTION
8-23-23	City of Greenfield	3807	664 80	Filing Fee

Shield

Filing Fee 126772.

Bank of America

AUTHORIZED SIGNATURE

THIS DOCUMENT CONTAINS HEAT SENSITIVE INK. TOUCH OR PRESS HERE - RED IMAGE DISAPPEARS WITH HEAT.

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