MONITORING AND MAINTENANCE PLAN
FOR UPLAND, WETLAND, AND GROUND COVER VEGETATION AND PHYSICAL CONTROLS FOR THE RESTORED AREAS OF SITE FOLLOWING US EPA REMOVAL ACTION ACTIVITIES AT THE HIGGANUM COVE SITE HIGGANUM, MIDDLESEX COUNTY, CONNECTICUT

Prepared For:
U.S. Environmental Protection Agency
Region I
Emergency Planning and Response Branch
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Boston, Massachusetts 02109-3912

CONTRACT NO. EP-S3-15-1
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TASK NO. 0004

DC NO. R-00149

Submitted By:
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CONTENTS

1. INTRODUCTION

1.1 Guidance Document Purpose

As part of a U.S. Environmental Protection Agency (EPA) Removal Action, EPA contractors performed excavation and on-site backfilling using demolished concrete, excavated rock, and certified clean soil and miscellaneous site stabilization and restoration activities. In August 2015, it is anticipated that EPA's Removal Action activities will be complete and responsibility for the Site will return to the proposed property owner, the Town of Haddam (the Town), Village of Higganum, Connecticut. The Town's responsibilities will include the long-term maintenance and monitoring of the site to ensure that site features, installed wetland and upland plants, perimeter fencing, and entrance road are properly maintained. This includes periodic inspections of the site and regular watering of plants per the agreement with EPA's Emergency and Rapid Response Services (ERRS) contract. While the site restoration was designed to require minimal site maintenance, this document provides site-specific guidance to the Town and any oversight authority of the recommended long-term maintenance and monitoring activities.

1.2 Site Background

The Higganum Cove Inc. site (the site) is located at 19 Nosal Road in Haddam, Middlesex County, Connecticut, and is adjacent to Higganum Creek, approximately 1,200 feet west of the Connecticut River, and just northeast of the intersection of Depot Road and Dublin Hill Road. The geographic coordinates, as measured from the approximate center, are 41° 30′ 0.5″ north latitude and 72° 33′ 16.0″ west longitude. The site is part of a larger property generally bounded to the north and west by Dublin Hill Road; to the south by Higganum Creek and Depot Road; and to the east by the Connecticut River and tidal wetlands.

The 12.8-acre Higganum Cove Inc. property contained the demolished remains of a 19th century mill building, a chemical storage shed, pump house, demolished dam, water tower, water supply well, septic system, and 9.9 acres of tidal wetlands. The site has been occupied by various manufacturing operations since the 1840s. Processes historically performed include the dyeing of fabrics and yarn, and the production of bridge netting, boat paints, and mimeograph paper. The Connecticut Department of Environmental Protection (CT DEP), now known as the Connecticut Department of Energy & Environmental Protection (CT DEEP), designated the site as a hazardous waste facility as defined by the Connecticut General Statutes (CGS) Section 22a-134f.

In 1983, former occupant Frismar, Inc. (Frismar), wholly-owned subsidiary of Diagraph Corporation, which used the facility for the spinning and dyeing of fabric yarn, sold the property and moved its operations to another location in Connecticut. From 1983-1988, there were several subsequent owners. From 1983 to 1986, the property was owned by Lucien P. DiFazio, Jr. a/k/a Lucien P. DiFazio; from 1986 to 1988, the property was owned by Edwin L. Baum, Trustee of the Town of Avon; and from 1988 to present, the property was owned by Higganum Cove, Inc. Between 1983 and 1989, several CT DEP and EPA site assessments/walk-throughs of the property were conducted due to reports of inappropriate handling of hazardous materials.

In September 1981, CT DEP notified EPA's Site Assessment group of the Site. In June 1985, EPA completed a Preliminary Assessment. In 1998, EPA completed a Site Inspection, and in August 2001, EPA completed a Reassessment.

On 13 August 1989, a fire destroyed the mill building. Subsequent to the fire (sometime between August and October 1989), the property owner retained a contractor to recover scrap metal and brick from the remains of the mill building. The contractor reportedly filled portions of the wetland with demolition debris, household garbage, and possible hazardous wastes. Some of the wastes reportedly were brought in from off-site sources. The disposal of the solid waste was noticed by an area resident, who notified Haddam Town Officials in October 1989.

In November 1989, a CT DEP investigation was conducted, which included sampling of stained soil, exposed pipe insulation, and the contents of an underground storage tank (UST). Analytical results of samples collected during the investigation indicated that soils were contaminated with polychlorinated biphenyls (PCBs), hydrocarbons, and chlorinated hydrocarbons; that pipe insulation contained asbestos; and that USTs contained ignitable materials.

Subsequent to the CT DEP investigation, numerous CT DEP and US EPA investigations have been conducted on site beginning in April 1997 and ending with the Weston Solutions, Inc. Region I Superfund Technical Assessment and Response Team (START) investigation in August 2013 on behalf of US EPA. The multiple investigations revealed that elevated levels of heavy metals (lead, arsenic, copper), polynuclear aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPHs), asbestos and asbestos-containing materials (ACM), and polychlorinated biphenyls (PCBs) were detected in upland, lowland, and open water portions of the property. Contaminants were detected in samples at concentrations exceeding the CT DEP Soil Remediation Standard Regulations (RSRs) criteria.

The elevated levels of contaminants on site resulted in the EPA conducting a time-critical removal action at the site.

2. PROJECT PURPOSE

The purpose of the Removal Action project was to remove ACM, arsenic, lead- and PCB-contaminated materials (primarily soils) at the site to levels that were below CT RSRs, and EPA Resource Conservation and Recovery Act (RCRA) or Toxic Substances Control Act (TSCA) levels. A Site Restoration Plan was generated with input from the Town and CT DEEP that would guide on-site restoration of the site to a stabilized condition that is conducive to intended future use and restores natural features and habitat. The Site Restoration Plan addresses grading, erosion control, surface water drainage, wetland and upland plant type and placement, vegetative cover, rural (unpaved) access road construction and security and fencing.

The Site Restoration Plan includes the following key features:

- Water Quality Monitoring
- Maintenance of the Soil Cover System
- Maintenance of Other Site Features
- Other Recommended Maintenance Activities

In addition, the key features listed above are followed by a parenthesis that designates who is responsible for the schedule or maintenance activity.

2.1 WATER QUALITY MONITORING (TOWN OF HADDAM)

Two upland and one downgradient groundwater monitoring wells were preserved during removal action activities. The wells will be sampled by the Town at intervals prescribed by CT DEEP.

2.2 MAINTENANCE OF THE SOIL COVER SYSTEM (TOWN OF HADDAM)

The soil cover for the Site consists of clean borrow material that will be covered by 6 inches of topsoil. In some areas, the clean soil materials can include a layer of stone riprap for slope stability purposes and/or granular surface materials to provide a wearing surface for pedestrian and vehicle traffic. To ensure that the soil cover components remain in place, periodic monitoring and maintenance of the soil cover may be necessary. Site management should include:

2.3 Maintenance of Vegetation (Running Brook, LLC)

Per the Site Restoration Plan, "The maintenance of the site vegetation will begin immediately after planting has been completed. All plant material including trees, shrubs, hydro-seeded meadow mix, and wetland plants shall be pruned, weeded, and soil amendments added as required to keep plant material in a healthy growing condition".

During the first two (2) watering seasons (15 May through 1 October 2016 and 15 May through 1 October 2017), the watering of upland vegetative material will be the responsibility of the Environmental Response, LLC subcontracted landscape firm.

For the first two growing seasons, planted trees and shrubs should be watered during dry periods. Dry periods are characterized by there being less than ¾-inch of rain in a 7 day period

Trees and shrubs should be irrigated by providing a deep, soaking watering to the entire area beneath the tree and shrub canopy and extending several feet beyond the plant center.

The soil should be moistened to a depth of 10 inches. To prevent rot at the trunk of the plant, don't apply water to the area directly around the trunk (3- or 4-inches from trunk).

Irrigation of the seeded areas should not be required, unless reseeding of an area due to minor erosion and restoration is performed.

Following the first two (2) watering seasons it will be the responsibility of the property owner (Town of Haddam) or its designee. The responsible party will mobilize to the site to water upland plants based on the current weather conditions and the status of the plants at the time of inspection.

During the first 5 years the control of invasive species will be performed. This will entail the use of a certified wetland scientist who will flag the invasive species for removal.

All of the vegetation species are native to the region and specifically selected to be adaptable to conditions at the Site and should thrive with little or no maintenance once they have become established. It is intended that the Site will eventually return to a natural condition with no further intervention. However, the purpose of the restored site will be for low-intensity recreation use and influences such as foot or vehicle traffic, surface water erosion, vandalism, or unusual animal activity or severe weather impact may inhibit vegetative growth or require its restoration in key areas, especially in the near term when vegetation is still becoming established. Therefore, periodic inspection and maintenance of the cover vegetation will need to be performed. Necessary maintenance may include plant replacement of lost or damaged plants and/or reseeding areas with little or no growth. Any new or replacement vegetation would require supportive care for the two planting seasons including fertilization, mulching, irrigation and protection from erosion or physical damage to optimize the conditions for long-term plant establishment. Professional nursery and landscape contractors are best suited for this type of maintenance.

Wetland Herbaceous Rooted Plant Establishment

During the establishment of the herbaceous rooted plants in the wetland no additional effort will be necessary other than to monitor whether invasive species are encroaching on the wetland. A certified wetland scientist will use flagging to mark the invasive species. This task will be conducted twice each season:

Late spring/early summer

Late summer/early fall

In addition, at the completion of year 2, Wetland Herbaceous Emergent Plants should be cut back to ground surface.

Upland Tree and Shrub Establishment

During the establishment period of newly planted trees and shrubs, areas immediately surrounding the trees and shrubs were surrounded by an area of shredded mulch with a minimum of 2 feet radius from the plant. The application of Upland Meadow Mix should not encroach on the plants within this area. If observations are made that the ground cover is encroaching on plants, the ground cover should be mown or cut so as to not rob trees and shrubs of water or nutrients.

Upland Meadow Areas

Areas vegetated with the Upland Meadow Mix will require a limited mowing regimen to stimulate growth and control woody invasive species. During the second full growing season (Fall 2016), the seeded meadow areas should be mown to a 4-6 inch height. Clippings may be left in place to decompose or reseed. In subsequent years annual mowing in the autumn should be sufficient, although as the grasses become thicker, the clippings may become too dense and may burden the plants. If so, a late spring and autumn mowing may be required to keep clippings manageable.

In areas designated for a grassed footpath, the grass will need to be mown to a 4 inch height, 2-3 times per year in addition to the overall mowing to help differentiate the path from the balance of the meadow areas. A 5-foot width is optimal but may be adjusted based on the width of the available mowing equipment. More frequent mowing will help adapt the grasses in the pathway.

2.4 Erosion Control (Running Brook, LLC)

Despite the design of surface water controls, without proper establishment and maintenance of the cover vegetation, soil erosion can occur on the surface of the covered area, especially on steeper slopes and areas where runoff may concentrate. Inspections for erosion will be made at least quarterly for the first 2 years as part of a routine inspection program (see Section 5.0 INSPECTION SCHEDULE AND CHECKLIST).

Erosion may appear as surface rills, channels, or even washouts in the cover soil that expose the subsurface materials. Any such signs will require corrective measures. The cover in the affected area will need to be reconstructed according to the original design intent including replacement of lost subsoil, compaction, placement of topsoil and revegetation during the growing season. Hay mulch or erosion control measures may be necessary to allow the vegetation to re-establish. In addition, the local conditions should be reviewed to determine whether the specific location is susceptible to concentrated runoff and other best management practices may need to be employed to avoid recurrence.

The erosion control matting that was installed to stabilize 1:1 slope areas should be inspected during the establishment period and re-pinned or secured to correct troublesome areas to hold the topsoil in place long enough to establish a good cover vegetation crop.

2.5 Maintenance of Drainage Systems (Town of Haddam)

A stone-lined swale (drainage channel), the roadway, and water bars in the roadway were designed to control excessive stormwater, reduce flow velocities of surface water on the site, and to route the water running off of the Site to areas that can accommodate the flow.

The soil cover is designed with adequate slope to provide drainage of the protective soil cover layer.

The stone-line drainage swale should be assessed at least on a yearly basis and cleared of obstructions and other stormwater management devices should be inspected periodically.

2.6 Inspection After Storms and High River Elevations (Town of Haddam)

It is recommended that the site be inspected following high water or other large precipitation events and assessed for repair.

2.7 Use of the Site by the Public (Town of Haddam)

The vegetative and soil cover, once established, will withstand foreseeable natural forces as much as practical. However, the Site will remain vulnerable to damage by human causes, both innocent and malicious. It is understood that this site was intended to be available for public access as green space that remains open, so limiting access is not an option. However, not all

public activities should be tolerated. In particular, all-terrain vehicle (ATV) and other motorized vehicle use on the Site poses the most significant hazard to the soil cover and efforts must be made to prohibit motor vehicle use on the Site. The site restoration includes a large bar gate that will be secured using locks, and large boulders that will allow pedestrian and non-motorized vehicle access to the site. Such features may also be needed elsewhere on-site if vehicles encroach on the site from other locations.

The site has permanent fencing installed in areas that are particularly precarious or pose a slip, trip and fall hazard. In addition, temporary fencing has been installed to limit pedestrian access until natural barriers such as the shrub thickets grow to be well-established. Such temporary fencing should be maintained for at least 2 years, and then removed when the plants are able to withstand encroachment by the public.

2.8 Use of Maintenance Equipment (Town of Haddam and Running Brook, LLC)

Access to the Site by maintenance equipment may be required throughout the long-term maintenance period. Inspection and maintenance of the soil cover and drainage systems will require occasional access by various types of vehicles.

The access road and access ramps are surfaced with gravel and are readily capable of supporting maintenance trucks.

The site has been planned so that access to all areas of site by maintenance vehicles will be available via road surfaces. If it is required to move across the vegetated portions of the site, the soil cover system will be capable of supporting maintenance equipment but not heavy construction equipment or aggressively treaded vehicles. Basic guidelines should be employed that include:

3. MAINTENANCE OF OTHER SITE FEATURES (TOWN OF HADDAM)

In addition to general maintenance of the soil cover to maintain its integrity, several of the site features constructed as part of the removal action require specific maintenance activities to ensure their effectiveness in isolating the contaminated soil materials and to support the overall site restoration.

3.1 Access Road and Ramps (Town of Haddam)

The access road is surfaced with compacted gravel. This material provides a tough wearing surface that remains flexible and porous. To limit erosion, the access road has a cross-slope (2%) and water bars to shed water to the adjacent stone-lined drainage swale.

Since vehicular traffic will be limited, vegetation will begin to fill in across the road and ramp surfaces. The vegetation can be allowed to remain as the root systems will reinforce the aggregate surface.

3.2 Vegetation Protection (Running Brook, LLC)

The majority of the Site’s surface has been vegetated with native grasses selected to thrive in the expected conditions with minimal maintenance. Many of these grassed areas are also planted

with wildflowers, a variety of shrub seed and acorns to stimulate to return of a diverse, natural mix of vegetation.

Wildlife exclusion fencing has been installed around the perimeter of the wetlands planting areas to limit access and browsing by wildlife to allow the wetland plants to fully establish. This fencing should be maintained and repaired if necessary for the first full year. After November 2016, the fenced area should be assessed for proper plant establishment, and if observed, the fence should be dismantled and removed.

Trunk protection has been applied to all trees planted as part of the restoration to limit browsing and potential damage from wildlife. The protective wrap and sleeves are designed to breakaway as the plant grows larger. This debris should be collected and removed from the site when the plants are sufficiently mature. Similarly, stakes and guys installed to support the plants as they become established, may be removed when they become unnecessary.

4. OTHER RECOMMENDED MAINTENANCE ACTIVITIES

In addition to the maintenance activities described above, that are necessary to maintain the integrity of the soil cover and other features provided under the removal action, there are several other maintenance activities that the Town should consider, including:

4.1 Debris Removal (Town of Haddam)

River action, especially after periods of high river level, may deposit debris along the bank. This debris may be natural consisting of vegetation or driftwood or it may be trash, litter or other man-made debris. Material that interferes with the function of the soil cover or drainage system or facilitates surface erosion should be removed as soon as practical. All man-made debris should be periodically removed to avoid the presence of debris encouraging the intentional dumping of additional debris and to maintain an aesthetically pleasing landscape. Removed material must be disposed of in an appropriate manner at authorized locations.

4.2 Production Well and Monitoring Well(s) (Town of Haddam)

The production well and three monitoring wells on site were capped and locked. The production well and monitoring wells may be sampled and analyzed by the town based on a schedule determined by the CT DEEP.

4.3 Block and Brick Wall Remnants (Town of Haddam)

There are several section on site that have brick, brownstone, or granite wall remnants protruding above ground. It will be the responsibility of the town to re-set fallen stones to their respective location.

4.4 Secondary Channel (Town of Haddam)

The Secondary Channel on site should not need any additional work conducted within it. It will be up to the discretion of the town to clear vegetation from the bermed areas adjacent to the secondary channel to improve the view of Higganum Creek.

4.5 Entrance Gate (Town of Haddam)

The entrance gate to the site should be locked at all times except for those instances where routine maintenance or watering is being performed. The entrance gate should be routinely inspected by the town or the Resident State Trooper for damage or signs of trespassing. The gate should also be locked or secured when open to avoid unexpected closure.

5. INSPECTION SCHEDULE AND CHECKLIST (TOWN OF HADDAM)

Implementation of the long-term maintenance and monitoring activities requires that periodic inspections of the Site be performed by qualified personnel. These inspections will focus on maintaining the physical integrity of the soil cover system and appurtenant structures. Inspections are to be scheduled as follows:

First two years	Quarterly
After second Year	Semi-Annually (spring and autumn)

To facilitate and standardize site inspections, the inspections should be carried out using the attached checklist. Completed checklist forms should be kept in a central file as part of the permanent record on long-term maintenance and monitoring of the facility.

HIGGANUM COVE

SITE RESTORATION CHECKLIST

Date Inspected: _____

Inspected By: _____ Signature: _____

Element	**Condition of Element**			Comment
	Good	Fair	Poor	
Front Gate				
Site Fencing and Rails				
Site Roadways				
Site Walking Paths				
Drainage Swale				
Erosion/Erosion Control				
Upland Plant Status				
Wetland Plant Status				
Invasive Species*				
Stone/Granite/Brick Walls				
Production Well				
Monitoring Wells				

NOTES:

Trees and Shrubs should be watered for the first two (2016 and 2017) years when there is less than ¾-inch of rain over a 7 day period. **See Section 2.3 Maintenance of Vegetation.**

* Invasive species should be documented and controlled for the first 5 years of plant establishment. **See Section 2.3 Maintenance of Vegetation.**

Figure 1

Site Location Map

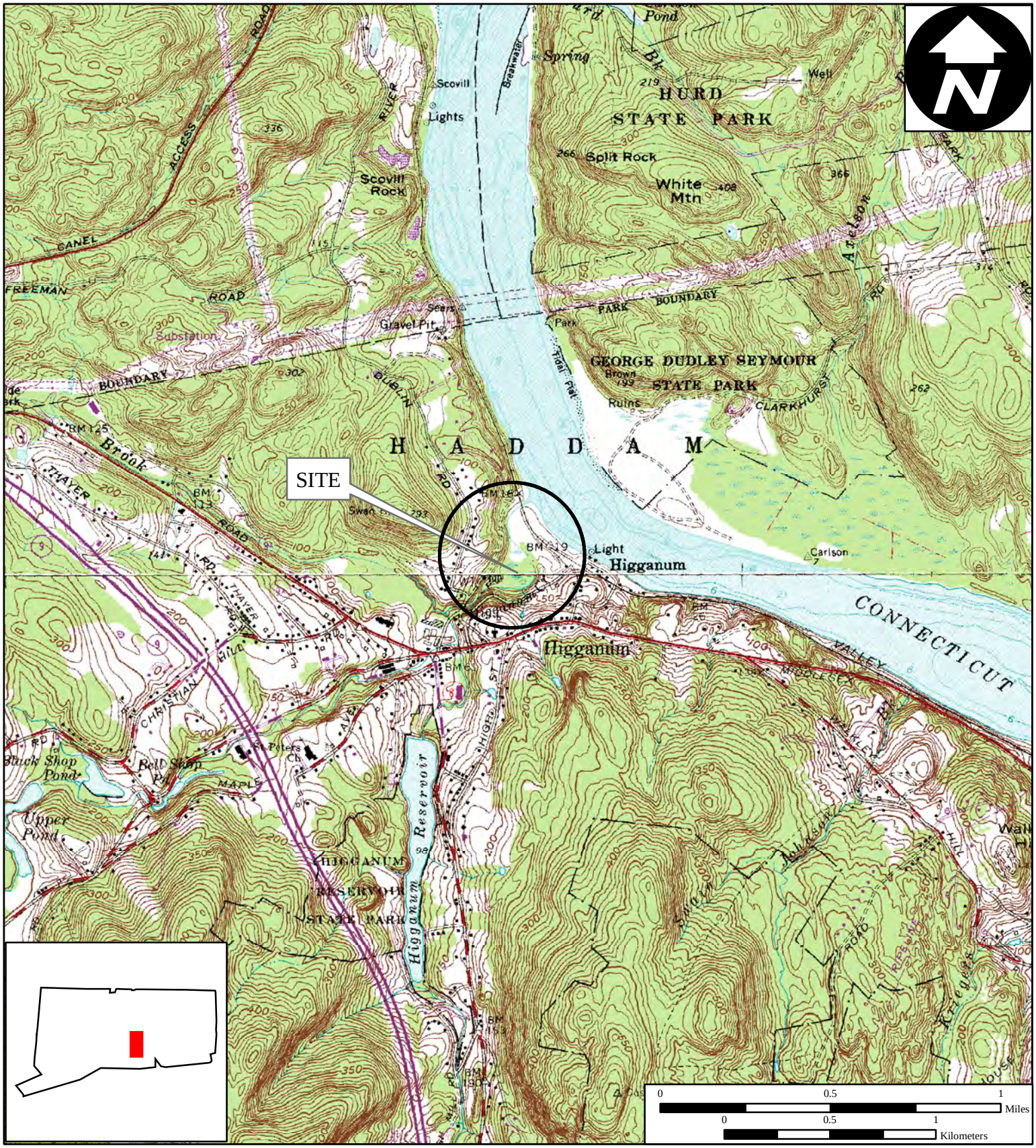

Figure 1

Site Location Map

Higganum Cove Site
19 Nosal Road
Haddam, Connecticut

EPA Region I
Superfund Technical Assessment and Response Team (START) IV
Contract No. EP-S3-15-01

TDD Number:	TO1-01-15-07-0002
Created by:	J. Saylor
Created on:	14 June 2013
Modified by:	B. Mace
Modified on:	11 July 2014

Data Sources:
Topos: MicroPath/USGS
Quadrangle Names: Haddam/Middle Haddam, CT
All other data: START

WESTON SOLUTIONS

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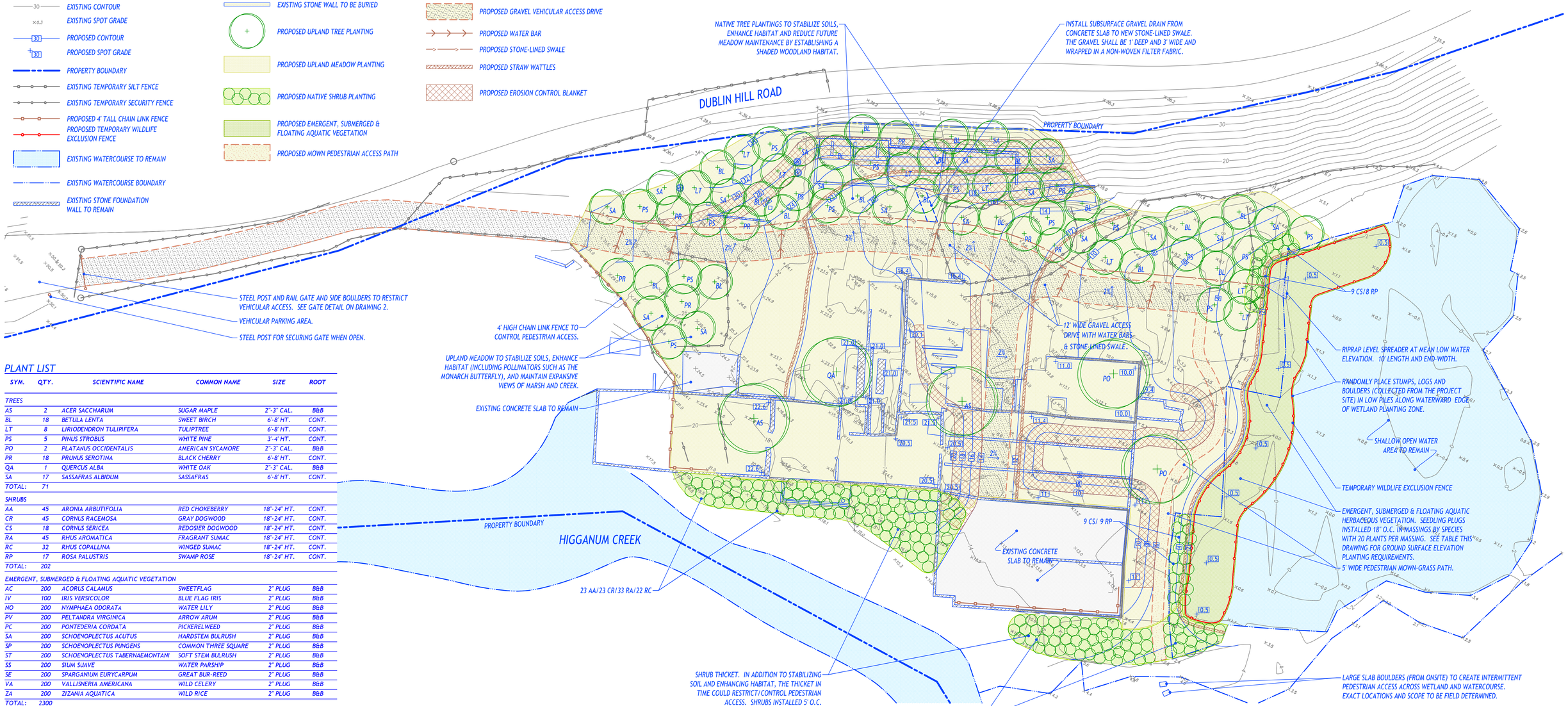
Figure 2

Site Restoration Plan

Guidance Document

LEGEND

- EXISTING CONTOUR
- EXISTING SPOT GRADE
- PROPOSED CONTOUR
- PROPOSED SPOT GRADE
- PROPERTY BOUNDARY
- EXISTING TEMPORARY SILT FENCE
- EXISTING TEMPORARY SECURITY FENCE
- PROPOSED 4' TALL CHAIN LINK FENCE
- PROPOSED TEMPORARY WILDLIFE EXCLUSION FENCE
- EXISTING WATERCOURSE TO REMAIN
- EXISTING WATERCOURSE BOUNDARY
- EXISTING STONE FOUNDATION WALL TO REMAIN
- EXISTING STONE WALL TO BE BURIED
- PROPOSED UPLAND TREE PLANTING
- PROPOSED UPLAND MEADOW PLANTING
- PROPOSED NATIVE SHRUB PLANTING
- PROPOSED EMERGENT, SUBMERGED & FLOATING AQUATIC VEGETATION
- PROPOSED MOWN PEDESTRIAN ACCESS PATH
- PROPOSED GRAVEL VEHICULAR ACCESS DRIVE
- PROPOSED WATER BAR
- PROPOSED STONE-LINED SWALE
- PROPOSED STRAW WATTLES
- PROPOSED EROSION CONTROL BLANKET



PLANT LIST

SYM.	QTY.	SCIENTIFIC NAME	COMMON NAME	SIZE	ROOT
TREES					
AS	2	ACER SACCHARUM	SUGAR MAPLE	2"-3" CAL.	B&B
BL	18	BETULA LENTA	SWEET BIRCH	6'-8' HT.	CONT.
LT	8	LIRIODENDRON TULIPIFERA	TULIPTREE	6'-8' HT.	CONT.
PS	5	PINUS STROBUS	WHITE PINE	3'-4' HT.	CONT.
PO	2	PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	2"-3" CAL.	B&B
PR	18	PRUNUS SEROTINA	BLACK CHERRY	6'-8' HT.	CONT.
QA	1	QUERCUS ALBA	WHITE OAK	2"-3" CAL.	B&B
SA	17	SASSAFRAS ALBIDUM	SASSAFRAS	6'-8' HT.	CONT.
TOTAL:	71				
SHRUBS					
AA	45	ARONIA ARBUTIFOLIA	RED CHOKEBERRY	18"-24" HT.	CONT.
CR	45	CORNUS RACEMOSA	GRAY DOGWOOD	18"-24" HT.	CONT.
CS	18	CORNUS SERICEA	REDOSIER DOGWOOD	18"-24" HT.	CONT.
RA	45	RHUS AROMATICA	FRAGRANT SUMAC	18"-24" HT.	CONT.
RC	32	RHUS COPALLINA	WINGED SUMAC	18"-24" HT.	CONT.
RP	17	ROSA PALUSTRIS	SWAMP ROSE	18"-24" HT.	CONT.
TOTAL:	202				
EMERGENT, SUBMERGED & FLOATING AQUATIC VEGETATION					
AC	200	ACORUS CALAMUS	SWEETFLAG	2" PLUG	B&B
IV	100	IRIS VERSICOLOR	BLUE FLAG IRIS	2" PLUG	B&B
NO	200	NYMPHAEA ODORATA	WATER LILY	2" PLUG	B&B
PV	200	PELTANDRA VIRGINICA	ARROW ARUM	2" PLUG	B&B
PC	200	PONTEDERIA CORDATA	PICKERELWEED	2" PLUG	B&B
SA	200	SCHOENOPLECTUS ACUTUS	HARDSTEM BULRUSH	2" PLUG	B&B
SP	200	SCHOENOPLECTUS PUNGENS	COMMON THREE SQUARE	2" PLUG	B&B
ST	200	SCHOENOPLECTUS TABERNAEMONTANI	SOFT STEM BULRUSH	2" PLUG	B&B
SS	200	SIUM SUAVE	WATER PARSHIP	2" PLUG	B&B
SE	200	SPARGANIUM EURYCARPUM	GREAT BUR-REED	2" PLUG	B&B
VA	200	VALLISNERIA AMERICANA	WILD CELERY	2" PLUG	B&B
ZA	200	ZIZANIA AQUATICA	WILD RICE	2" PLUG	B&B
TOTAL:	2300				

PROPOSED UPLAND MEADOW SEED MIX

PROPOSED MIX SHALL CONSIST OF A CORE AND NURSE MIX.

CORE MIX:"NEW ENGLAND CONSERVATION/WILDLIFE MIX" AS PRODUCED BY NEW ENGLAND WETLAND PLANTS (WWW.NEWP.COM). APPLIED AT A RATE OF 1 LB/1,750 SQAURE FEET. MUST INCLUDE COMMON MILKWEED.

NURSE MIX:"ANNUAL RYEGRASS" (LOLIUM MULTIFLORUM). APPLIED AT A RATE OF 10 LBS/1 ACRE.

GENERAL NOTES

1. UNLESS NOTED OTHERWISE, EXISTING CONDITIONS INFORMATION TAKEN FROM A DRAWING PREPARED BY KRATZERT, JONES & ASSOCIATES, INC.
2. PROPOSED SITE RESTORATION INFORMATION PROVIDED BY WILLIAM KENNY ASSOCIATES LLC.
3. PLEASE SEE DRAWING 2 OF 2 FOR SITE RESTORATION SPECIFICATIONS AND DETAILS.

GROUND SURFACE ELEVATION PLANTING REQUIREMENTS FOR EMERGENT, SUBMERGED & FLOATING AQUATIC VEGETATION

SCIENTIFIC NAME	COMMON NAME	GROUND SURFACE ELEVATION	
		HIGH	LOW
ACORUS CALAMUS	SWEETFLAG	1.5	1
IRIS VERSICOLOR	BLUE FLAG IRIS	1.5	1
NYMPHAEA ODORATA	WATER LILY	0.5	-1.5
PELTANDRA VIRGINICA	ARROW ARUM	1.5	0.5
PONTEDERIA CORDATA	PICKERELWEED	1.5	0.5
SCHOENOPLECTUS ACUTUS	HARDSTEM BULRUSH	1.5	-1.5
SCHOENOPLECTUS PUNGENS	COMMON THREE SQUARE	1.5	1
SCHOENOPLECTUS TABERNAEMONTANI	SOFT STEM BULRUSH	1.5	0.5
SIUM SUAVE	WATER PARSHIP	1.5	1
SPARGANIUM EURYCARPUM	GREAT BUR-REED	1.5	0.5
VALLISNERIA AMERICANA	WILD CELERY	1.5	-0.5
ZIZANIA AQUATICA	WILD RICE	0	-3.5

WILLIAM KENNY ASSOCIATES LLC

SOIL SCIENCE
ECOLOGICAL SERVICES
LAND USE PLANNING
LANDSCAPE ARCHITECTURE

195 TUNXIS HILL ROAD
FAIRFIELD, CT 06825
PHONE: 203 366 0588
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SITE RESTORATION PLAN

LOCATION:
HIGGANUM COVE
19 NOSAL ROAD
HADDAM, CONNECTICUT

DATE: JULY 14, 2015

SCALE: 0' 10' 20'

NORTH

DRAWING NO:
1 of 2

REF. NO. 3069

SITE RESTORATION SPECIFICATIONS

1) **WORK DESCRIPTION**
PROVIDE ALL MEANS AND MATERIALS NECESSARY FOR SUPPLYING, INSTALLING AND MAINTAINING THE TYPE AND SIZE OF THE PLANT MATERIAL AND OTHER IMPROVEMENTS INDICATED IN THE SITE RESORATION PLAN.

2) **QUALITY ASSURANCE**
a) A WETLAND SCIENTIST SHALL BE ONSITE TO MONITOR CONSTRUCTION AND MAINTENANCE OF THE SITE RESTORATION ACTIVITIES TO ENSURE COMPLIANCE WITH THE DESIGN AND SPECIFICATIONS AND TO MAKE ADJUSTMENTS WHEN APPROPRIATE TO MEET RESTORATION OBJECTIVES.
b) ALL WORK SHALL BE PERFORMED BY PERSONNEL WITH HABITAT RESTORATION AND ENHANCEMENT PROJECT EXPERIENCE, UNDER THE DIRECTION OF A SKILLED FOREMAN WITH A MINIMUM THREE YEARS EXPERIENCE.
c) ALL HEAVY EQUIPMENT STORAGE, REFUELING AND MAINTENANCE IS TO TAKE PLACE OUTSIDE OF THE WETLANDS AND WATERCOURSES.
d) LEAVE WORK AREA CLEAN AND NEAT UPON COMPLETION OF THE WORK. REPAIR ANY DAMAGE DONE TO THE EXISTING SITE IMPROVEMENT AS A RESULT OF THE WORK.
e) OFF-SITE MATERIAL SOURCES - THE EPA ON-SCENE COORDINATOR (OSC) RESERVES THE RIGHT TO INSPECT THE SOURCES OF MATERIALS BROUGHT ONTO THE SITE SUCH AS FILL, SOILS, TOPSOIL, MULCH, AND THE LIKE AND PERFORM TESTING OF THE MATERIALS. MATERIALS DETERMINED TO BE UNSUITABLE BY THE OSC WILL BE REJECTED, THE MATERIALS SHALL BE REMOVED IMMEDIATELY IF ALREADY ON-SITE, AND APPROVED REPLACEMENT MATERIAL PROVIDED AT NO ADDITIONAL COST. RECLAIMED MISCELLANEOUS AGGREGATE, RECYCLED ASPHALT PAVEMENT, AND OTHER WASTE MATERIALS NORMALLY ALLOWED BY CT DOT SPECIFICATIONS SHALL NOT BE PERMITTED IN MATERIALS USED ON THIS PROJECT.

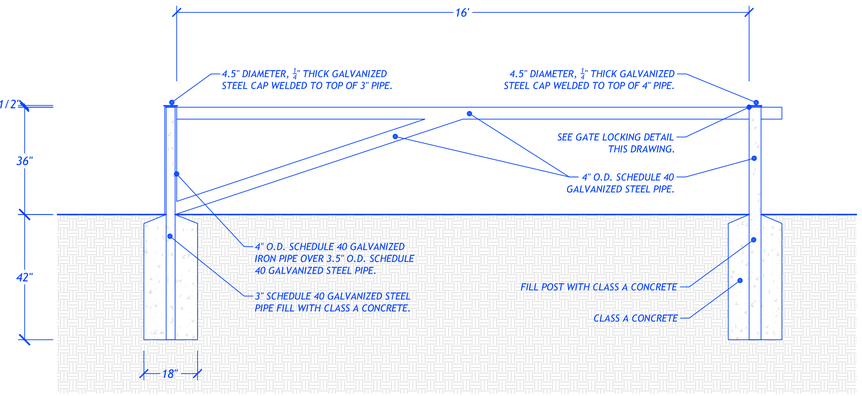
3) **PRODUCT AND EXECUTION DATA**
a) SOIL
i) TOPSOIL (UPLAND AND WETLAND) SHALL BE PER SECTION M.13.01 OF THE CONNECTICUT DEPARTMENT OF TRANSPORATION "STANDARD SPECIFICATIONS FOR ROADS, BRIDGES AND INCIDENTAL CONSTRUCTION" (DOT SPECIFICATIONS).
ii) PROVIDE DOCUMENTATION REGARDING THE SOURCE OF TOPSOIL AND THE POTENTIAL FOR THE PRESENCE OF INVASIVE SPECIES SEEDS.
iii) TESTING OF THE TOPSOIL BY AN OSC APPROVED LABORATORY PRIOR TO PLANTING WILL BE THE RESPONSIBILITY OF THE SITE CONTRACTOR.
iv) SPREAD TOPSOIL TO A DEPTH REQUIRED TO ACHIEVE THE MICROTOPOGRAPHIC VARIATION AND TO MEET THICKNESS, GRADES, AND ELEVATIONS SHOWN ON THE PLAN AND DETAILS.
b) HABITAT BOULDERS
i) NATIVE STONE BOULDERS (PREFERABLY FROM ONSITE) SHALL COVER AT LEAST 4% OF THE GROUND SURFACE THROUGHOUT THE AREA OF THE PROPOSED INSTALLATION OF EMERGENT, SUBMERGED & FLOATING AQUATIC VEGETATION. THE BOULDERS SHALL BE A MINIMUM OF 12" IN DIAMETER IN ONE DIRECTION AND 8" IN THE TWO REMAINING DIRECTIONS.
c) VEGETATION
i) GENERAL
(1) ALL VEGETATION USED FOR PERMANENT PLANTINGS SHALL BE GROWN AND PROPAGATED FROM NATIVE PLANTS GROWING NATURALLY WITHIN 200 MILES OF THE SITE.
(2) NON NATIVE, NON INVASIVE ANNUALS MAY BE USED FOR TEMPORARY PLANTINGS IF APPROVED BY OSC.
(3) PROVIDE A CERTIFICATE OR INVOICE FROM THE PLANT MATERIAL SUPPLIERS INDICATING THE PLANT SOURCE, THE BOTANICAL NAME, QUANTITY, AND SIZE OF THE PLANTS DELIVERED TO THE PROJECT SITE, IN ADDITION TO PROVIDING ALL PLANT LABELS.
(4) ALL PLANT MATERIALS SHALL BE INSPECTED FOR DEFECTS, DISEASE, DAMAGE OR INSECTS BEFORE PLANTING. ANY SUBSTANDARD PLANTS SHALL BE RETURNED TO, AND REPLACED BY THE CONTRACTOR. ACCEPTABLE PLANTINGS ARE TO BE PLANTED PER THE SPECIFICATIONS OF THE PLANTING PLAN.
(5) ALL PLANT MATERIALS ARE SUBJECT TO REPLACEMENT BY SUITABLE ALTERNATIVES PER AGREEMENT BETWEEN THE OSC AND NURSERY CONTRACTOR.
(6) ALL PLANT MATERIAL LOCATIONS ARE SUBJECT TO FIELD ADJUSTMENTS IN RESPONSE TO SITE CONDITIONS. THESES ADJUSTMENTS SHALL BE THE DISCRETION OF THE OSC. UNDER THE DIRECTION OF A QUALIFIED WETLAND SCIENTIST, UP TO 50 PERCENT OF THE PLANTS MAY BE LOCATED DIFFERENTLY THAN SHOWN ON THE DRAWINGS.
(7) SIZES SHALL CONFORM TO MEASUREMENTS SPECIFIED IN THE PLANT LIST. USE PLANTS LARGER THAN SPECIFIED IF APPROVED BY THE OSC, AND CAUSES NO INCREASE TO THE CONTRACT PRICE.
(8) MAKE ALL NECESSARY MEASUREMENTS TO PROPERLY LOCATE PLANTS AS SHOWN ON THE DRAWING. LOCATIONS OF PLANTS SHALL BE VERIFIED BY OSC PRIOR TO INSTALLATION. ANY PLANTS INSTALLED PRIOR TO THE APPROVAL OF THE OSC SHALL BE RELOCATED AT NO ADDITIONAL COST TO THE OSC.
(9) PRIOR TO PLANTING, VERIFY LOCATIONS OF ALL UNDERGROUND UTILITIES. EXERCISE CARE WHEN DIGGING IN THESE AREAS. ASSUME RESPONSIBILITY FOR ANY DAMAGE AND REPLACEMENT OR REPAIR AT THE CONTRACTOR'S EXPENSE.
(10) APPLY TO ALL NEWLY INSTALLED TREE AND SHRUB PLANTINGS 'BIOPAK PLUS' (OR APPROVED EQUAL) AS MANUFACTURED BY LEBANON SEABOARD CORP. (WWW.LEBANONTURF.COM) AND IN ACCOURDANCE WITH THE MANUFACTURE'S RECOMMENDATIONS.
ii) TREE AND SHRUB PLANTINGS
(1) PLACE THE PLANT IN THE CENTER OF THE PIT, HUMMOCK OR SPACED IN BEDS AS INDICATED ON THE DRAWINGS. SET THE PLANT PLUMB AND ADJUST ITS HEIGHT TO ACHIEVE THE ELEVATION SHOWN ON THE DRAWINGS BY PLACING PREPARED SOIL BENEATH THE ROOTBALL. BURLAP, ROPE, WIRE BASKETS OR OTHER MATERIAL SHALL BE CUT AND REMOVED FROM THE TOPS OF THE ROOTBALL AND NOT LEFT IN THE PLANTING PIT. BACKFILL AROUND THE ROOTBALL WITH PREPARED PLANTING SOIL. UNIFORMLY COMPACT AND WATER THE PREPARED PLANTING SOIL TO FILL VOIDS AND TO FIRMLY SECURE ROOTBALL.
(2) FORM A "SAUCER" AT THE SURFACE OF THE PLANTING PIT, HUMMOCK OR BED WITH TOPSOIL. SHAPE THE SAUCER TO THE DIMENSIONS INDICATED ON THE DRAWINGS. BLEND THE PERIMETER OF THE SAUCERS AND BEDS TO FORM A SMOOTH AND UNIFORM TRANSITION TO FINISH GRADE.
(3) IMMEDIATELY AFTER PLANTING, INSTALL TREE GUYING AND SHELTER.
(4) COVER ALL TREE PITS AND PLANTING BEDS WITH THE SPECIFIED MULCH DEPTH, DIMENSIONS, AND AREAS INDICATED ON THE DRAWING.
(5) PRUNE IN ACCORDANCE WITH AMERICAN ASSOCIATION OF NURSERYMEN STANDARDS TO REMOVE DEAD AND DISEASED PORTION OF THE PLANT.
(6) ALL WIRE FLAGS USED TO IDENTIFY PLANT LOCATIONS SHALL BE REMOVED AFTER PLANT INTRODUCTION AND CONFIRMATION BY THE OSC.
iii) HERB PLANTING
(1) UPLAND MEADOW SEEDING
(a) USE 'PURE LIVE SEED ONLY.
(b) SURFACE-SOW SEED AND THEN PUSH SEED INTO CONTACT WITH THE TOPSOIL.
(c) APPLY SEED AT RATES AS SPECIFIED ON THE PLANT LIST.
(d) SURFACE PREPARATION. LOOSEN SUBGRADE OF THE PLANTING BED AREAS TO A MINIMUM DEPTH OF 3".
(e) IMMEDIATELY FOLLOWING SEEDING, MULCH THE SEEDED SURFACE WITH STERILE STRAW AT A RATE OF 1.5 TO 3 TONS/ACRE. SPREAD MULCH BY HAND OR DISK HARROW SET STRAIGHT.
(f) LIMIT OF SEEDING IS SUBJECT TO FIELD ADJUSTMENT IN RESPONSE TO SITE CONDITIONS. THESE ADJUSTMENTS SHALL BE AT THE DISCRETION OF THE PROJECT WETLAND SCIENTIST.
(2) HERBACEOUS ROOTED PLANTS
(a) PRIOR TO INSTALLING THE ROOTED HERBACEOUS PLANTS, INSTALL FLAGS OR STAKES 25 FEET ON CENTER ALONG THE CONTOUR ELEVATIONS 1.5 AND 0.5.
(b) IF FEASIBLE, INSTALL PLANTS AT LOW TIDE OR DURING PERIODS OF LOW WATER LEVELS.
(c) WHEN INSTALLING THE ROOTED HERBACEOUS PLANTS, PLACE ONE 5-GM AGRIFORM (WWW.SCOTTSPRO.COM) OR APPROVED EQUAL SLOW RELEASE PLANTING TABLET IN EACH PLANT HOLE.
d) **TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES:** UNLESS NOTED OTHERWISE, THE MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL (2002 GUIDELINES).
i) STRAW WATTLES SHALL BE INSTALLED PER THE MANUFACTURER'S RECOMMENDATIONS AND SHALL BE ECWATTLE STRAW WATTLES AS SOLD BY EAST COAST EROSION BLANKETS (WWW.EASTCOASTEROSION.COM) OR APPROVED EQUAL.
ii) EROSION CONTROL BLANKETS SHALL BE INSTALLED ON ALL SLOPES WITH A GRADIENT THAT IS STEEPER THAN 3:1 AND SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. EROSION CONTROL BLANKETS SHALL CONSIST OF A MACHINE PRODUCED MAT OF CURLED WOOD EXCELSIOR OR STRAW FIBER, WITH CONSISTENT THICKNESS. THE FIBER SHALL BE EVENLY DISTRIBUTED OVER THE ENTIRE AREA OF THE MAT. BOTH SIDES OF THE MAT SHALL BE COVERED WITH A BIODEGRADABLE FIBER NET. THE BLANKET SHALL BE MADE SMOLDER RESISTANT WITHOUT THE USE OF CHEMICAL ADDITIVES. NORTH AMERICAN GREEN S150BN, EAST COAST EROSION BLANKETS ECS-2B, AMERICAN EXCELSIOR CO., OR APPROVED EQUAL.
e) **FENCING**
i) 4' TALL CHAIN LINK FENCE: THE FENCE SHALL BE PER SECTION 9.13 OF THE DOT SPECIFICATIONS.
ii) TEMPORARY WILDLIFE-EXCLUSION FENCE: THE TEMPORARY WILDLIFE EXCLUSION FENCE SHALL BE INSTALLED PER THE MANUFACTURE'S RECOMMENDATIONS AND SHALL BE POLYPROPYLENE FENCING, 42" IN HEIGHT WITH AN APERTURE SIZE OF 1.0" X .75" AS SOLD BY PINELANDS NURSERY & SUPPLY (WWW.PINELANDSNURSERY.COM) OR APPROVED EQUAL.
f) **VEHICULAR DRIVE:** THE VEHICULAR DRIVE SHALL BE INSTALLED PER SECTION 4.13 OF THE DOT SPECIFICATIONS. PROCESSED AGGREGATE SURFACES, OR AS MAY BE REQUIRED BY THE OSC SHALL BE PROCESSED GRANULAR MATERIAL CONFORMING TO CT DOT ITEM 3.04 PROCESSED AGGREGATE BASE THOROUGHLY COMPACTED TO THE GRADE AND THICKNESS AS SHOWN ON THE DRAWINGS OR AS REQUIRED BY THE OSC. ALTERNATIVE (LIGHTER) ROLLERS MAY BE USED FOR THE COMPACTION AS APPROVED BY THE OSC.
g) **STONE-LINED SWALE:** RIPRAP STONE CONFORMING TO CT DOT ITEM M.12.02(2) INTERMEDIATE RIPRAP GRADATION, PLACED TO THE GRADE AND THICKNESS AS SHOWN ON THE DRAWINGS OR AS REQUIRED BY THE OSC. GRAVEL SHALL BE BANK OR CRUSHED GRAVEL CONFORMING TO CT DOT ITEM M.02.02(1) AND MEETING GRADING "B" OF M.02.06, PLACED TO THE GRADE AND THICKNESS AS SHOWN ON THE DRAWINGS OR AS REQUIRED BY THE OSC.

4) **MAINTENANCE**
a) MAINTENANCE IS TO BEGIN IMMEDIATELY AFTER PLANTING HAS BEEN COMPLETED.
b) THE MAINTENANCE PERIOD SHALL BE EXTENDED AT NO ADDITIONAL COST TO THE OSC UNTIL PREVIOUS PUNCH LIST ITEMS HAVE BEEN CORRECTED, AT WHICH TIME THE FINAL INSPECTION WILL BE MADE.
c) ALL PLANT MATERIAL SHALL BE PRUNED, WEEDED, AND SOIL AMENDMENTS ADDED AS REQUIRED TO KEEP PLANT MATERIAL IN A HEALTHY GROWING CONDITION.
d) PROTECT ALL PLANTED AREAS AGAINST DAMAGE, INCLUDING EROSION, WILDLIFE, AND TRESPASSING BY PROVIDING AND MAINTAINING PROPER SAFEGUARDS.
e) ALL PLANT STOCK SHALL BE WATERED UPON COMPLETION OF PLANTING. ARRANGEMENTS SHALL BE MADE TO PROVIDE ADEQUATE IRRIGATION TO INTRODUCED PLANTING STOCK AND SEEDED AREAS UNTIL PLANTS ARE FIRMLY ESTABLISHED. IRRIGATION SHALL NOT TO BE USED TO PROVIDE WETLAND HYDROLOGY. IRRIGATION SHALL BE DISCONTINUED AND MEASURES SHALL BE REMOVED NO LATER THAN THE END OF THE SECOND GROWING SEASON UNLESS SPECIFIED OTHERWISE.
f) RESET SETTLED PLANTS TO PROPER GRADE AND POSITION. ADJUST OR REPLACE STAKES, GUYING MATERIALS, TO SECURELY ANCHOR AND PROTECT.
g) AT THE END OF THE GROWING SEASON, CUT THE HERBACEOUS EMERGENT PLANTS AT GROUND LEVEL.
h) AT THE END OF THE MAINTENANCE PERIOD, ALL PLANT MATERIAL SHALL BE IN A HEALTHY GROWING CONDITION AS RELATED TO CONDITIONS WITHIN THE CONTROL OF THE CONTRACTOR.
i) CONTROL INVASIVE SPECIES FOR A MINIMUM OF FIVE YEARS FOLLOWING THE CONSTRUCTION PHASE OF THE PROJECT.
i) INVASIVE SPECIES ARE THOSE SPECIES IDENTIFIED IN TABLE 4 OF THE "NEW ENGLAND DISTRICT MITIGATION PLAN CHECKLIST" DATED JANUARY 12, 2007 AND PUBLISHED BY THE US ARMY CORPS OF ENGINEERS.
ii) CONDUCT THE CONTROL ACTIVITIES UNDER THE DIRECTION OF A QUALIFIED WETLAND SCIENTIST AT LEAST TWICE EACH GROWING SEASON - IN LATE SPRING/EARLY SUMMER AND AGAIN IN LATE SUMMER/EARLY FALL. MONITORING AND MAINTENANCE WILL INCLUDE:
(2) DETERMINE THE PRESENCE AND ABUNDANCE OF INVASIVE PLANTS.
(3) FIELD MARK (VIA FLAGGING OR OTHER MEANS) DESIRABLE VEGETATION TO REMAIN AND INVASIVE (UNDESIRABLE) PLANTS TO BE CONTROLLED.
(4) CONTROL INVASIVE PLANTS VIA PHYSICAL OR CHEMICAL METHODS. THE METHOD TYPE WILL BE DETERMINED BY THE WETLAND SCIENTIST BASED ON THE TYPE AND ABUNDANCE OF INVASIVE PLANTS AND THE TYPE AND ABUNDANCE OF ADJACENT DESIRABLE PLANTS. THE PLANT CONSERVATION ALLIANCE'S ALIEN PLANT WORKING GROUP DATABASE (HTTP://WWW.NPS.GOV/PLANTS/ALIEN/FACTMAIN.HTM) WILL BE CONSULTED TO ASSIST WITH SPECIFYING AN APPROPRIATE METHODOLOGY. COMPLETE PHYSICAL PLANT CONTROL ACTIVITIES BY HAND OR VIA HAND TOOLS (E.G., WEED WRENCH, BRUSH CUTTER). CHEMICAL METHODS WILL PRIMARILY INCLUDE THE USE OF GLYPHOSPHATE-BASED HERBICIDES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND APPLICABLE LAWS.

5) **MONITORING AND REPORTING:**
MONITOR THE CONDITIONS OF THE HABITAT ENHANCEMENT IMPROVEMENTS FOR TWO YEARS. THE FIRST YEAR OF MONITORING SHALL BEGIN FOLLOWING THE FIRST FULL GROWING SEASON FOLLOWING CONSTRUCTION COMPLETION AND PLAN.

GATE DETAIL

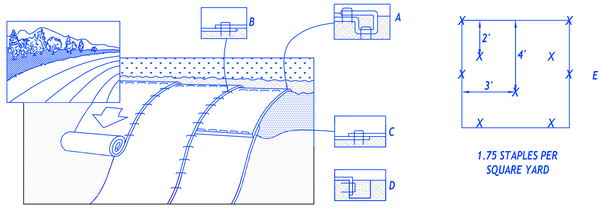
SCALE: 0' 1' 2'



NOTE: INSTALL A THIRD 4" POST 16' UPGRADE OF GATE ALONG THE SIDE OF THE ACCESS DRIVE. WHEN THE GATE IS OPEN IT CAN BE SECURED TO THE THIRD POST.

TEMPORARY EROSION CONTROL BLANKETS

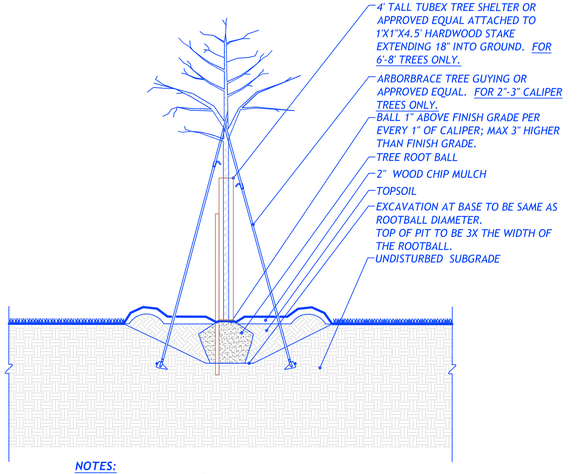
NOT TO SCALE



1. DIG A 6" BY 6" TRENCH BOTH UP-SLOPE AND DOWN-SLOPE OF THE AREA THE MATTING IS TO BE APPLIED. PREPARE THE SLOPE SOIL SURFACE (RAKING, SEEDING AND FERTILIZING).
2. BEGIN BY PLACING THE BLANKET A MINIMUM OF 12" UP-SLOPE OF THE UP-SLOPE TRENCH. SECURE THE BLANKET AT THE BOTTOM OF THE TRENCH WITH STAPLES PLACED 12" APART. BACKFILL AND COMPACT THE TRENCH. APPLY SEED, AND FOLD THE BLANKET OVER SOIL, SECURE WITH A ROW OF STAPLES PLACED 12" APART ACROSS THE WIDTH OF THE BLANKET. (DIAGRAM A)
3. ROLL THE BLANKET VERTICALLY DOWN THE SLOPE. INSTALL STAPLES IN PATTERN SHOWN ON DIAGRAM E.
4. PARALLEL BLANKETS MUST BE OVERLAPPED BY A MINIMUM OF 4", AND SECURED WITH A ROW OF STAPLES PLACED APPROXIMATELY 3'-0" APART. (DIAGRAM B)
5. ADDITIONAL VERTICAL BLANKETS CAN BE JOINED USING A MINIMUM 4" OVERLAPPING OR SHINGLE STYLE (DIAGRAM C) IN THE DIRECTION OF WATER FLOW. CONNECT THE BLANKETS BY PLACING STAPLES APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE BLANKETS.
6. PLACE A ROW OF STAPLES 4" APART ALONG THE OUTER END OF THE LAST BLANKET ON EACH SIDE. A SECOND ROW SHOULD BE PLACED 4" FROM THE FIRST ROW IN A STAGGERED PATTERN.
7. THE BOTTOM END OF BLANKET MUST BE SECURED IN A 6" X 6" TRENCH WITH A ROW OF STAPLES PLACED AT 12" INTERVALS. (DIAGRAM D)

UPLAND TREE PLANTING DETAIL

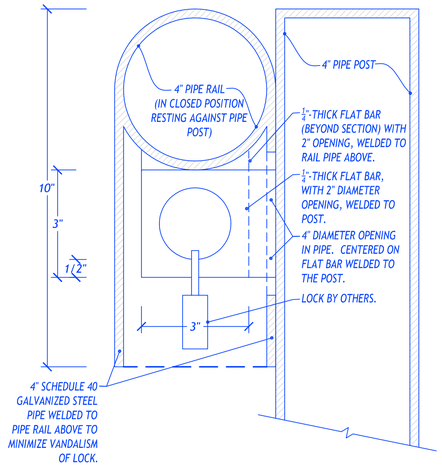
SCALE: 0' 1' 2'



NOTES:
- ARBORBRACE AVAILABLE @ WWW.CHEROKEEMFG.COM.
- TUBEX TREESHELTER AVAILABLE @ TUBEXUSA.COM

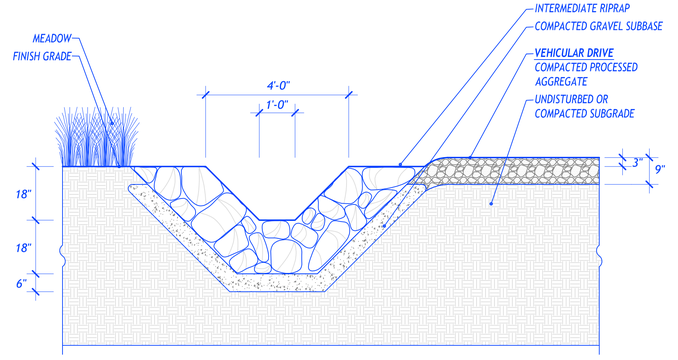
GATE LOCKING DETAIL

SCALE: 0" 1" 2"



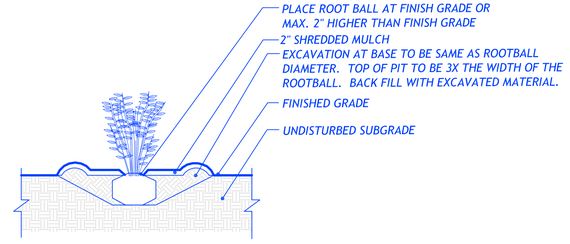
STONE-LINED SWALE & GRAVEL VEHICULAR ACCESS DRIVE

SCALE: 0' 1' 2'



UPLAND SHRUB PLANTING DETAIL

NOT TO SCALE



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SITE RESTORATION PLAN NOTES AND DETAILS

LOCATION:
HIGGANUM COVE
19 NOSAL ROAD
HADDAM, CONNECTICUT

DATE: JULY 14, 2015

SCALE: AS NOTED

REF. NO. 3069

DRAWING NO:
2 of 2