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ENVIRONMENTAL NOTIFICATION FORM

Ipswich Coastal Bank Restoration and Resiliency Project

Ipswich, Massachusetts

April 2019

Prepared for:
Town of Ipswich
25 Green Street
Ipswich, MA 02557

Prepared by:
Horsley Witten Group, Inc.
in conjunction with
Coneco Design Engineers, Inc.

LIST OF APPLICATION DOCUMENTS AND ATTACHMENTS

ENVIRONMENTAL NOTIFICATION FORM

Ipswich River Coastal Bank Stabilization and Resiliency and Project
Ipswich, Massachusetts

1. Cover Letter
2. ENF Application
3. ENF Distribution List
4. Public Notice
5. Attachment 1: Existing Conditions Memo to Alicia Geilen, Administrator (Wetland Resource Areas – Ipswich River Coastal Resiliency and Coastal Bank Stabilization Project, County Street, Ipswich, MA" (report includes site photos and locus maps, including

    - Figure 1. USGS Locus Map, AOC 4, Ipswich, MA
    - Figure 2. Aerial Photo, AOC 4, Ipswich, MA
    - Figure 3. FEMA Floodzones, AOC 4, Ipswich, MA
    - Figure 3a. FIRMette, AOC 4, Ipswich MA, MA
    - Figure 4. Existing Constraints, AOC 4, Ipswich, MA
    - Figure 5. Soils, AOC 4, Ipswich, MA

6. Attachment 2: 75% Design Plans:

    Ipswich River Coastal Resiliency and Coastal Bank Stabilization Project, Design Plans, County Street, Ipswich, MA 01938" prepared by Coneco Engineers & Scientists, Inc., dated April 3, 2019 (Phase IIA), and

    Ipswich River Coastal Resiliency Permitting Plans, Ipswich, Massachusetts" prepared by Horsley Witten Group, Inc. and dated April 2019 (Phase IIB).

Horsley Witten Group
Sustainable Environmental Solutions
294 Washington Street • Suite 801 • Boston, MA 02108
857-263-8193 • horsleywitten.com

April 15, 2019

Secretary Matthew A. Beaton
Executive Office of Energy & Environmental Affairs
Attn: MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: Ipswich River Coastal Bank Restoration and Resiliency Project
Ipswich, Massachusetts

Dear Secretary Beaton and Applicable Regulatory Agencies:

On behalf of the Town of Ipswich (the Town), the Horsley Witten Group, Inc. (HW) is pleased to submit this Environmental Notification Form (ENF) and supporting documentation for the proposed Ipswich Coastal Bank Restoration and Resiliency Project (the Project). The goals of the Project are to apply nature-based, sustainable shoreline techniques, slope stabilization, and stormwater improvements to address a section of currently eroding and undercut coastal bank along the Ipswich River. The project will generally involve:

- Replacing existing stormwater drainage pipes and outfalls that are currently undercutting the coastal bank;
- Improving upgradient stormwater infrastructure and right-of-way; and
- Stabilizing the eroded and undercut coastal bank using living shoreline techniques.

Living shorelines are a minimally constructed and proven approach to protecting shorelines from erosion by mimicking the natural movement of water, waves and sand. The concept is to utilize and/or enhance existing natural systems to protect shorelines from erosion. Living shorelines can improve water quality by settling sediments and filtering pollutants, provide wildlife habitat, look natural rather than made-made and artificial, and absorb wave energy.

Portions of the Project will occur below mean high tide (mean high water) and within Land Under Water Bodies and Waterways, Coastal Beach (Tidal Flats), Land Subject to Coastal Storm Flowage, Coastal Bank, Rocky Intertidal Shoreline, and Riverfront Area. These resource areas and associated buffer zones are regulated under the Massachusetts Wetlands Protection Act (M.G.L. Ch. 131 § 40) and its regulations at 310 CMR 10.00, the Town of Ipswich Wetlands Protection By-Law (Chapter 224) Rules and Regulations, Section 404 of the Federal Clean Water Act (33 U.S.C. 1251, et seq.), as well as the Massachusetts Public Waterfront Act (M.G.L. c. 91) and associated regulations at 310 CMR 9.00. The project is funded in part by a Massachusetts Coastal Zone Management (CZM) Coastal Resiliency Grant.

Short-term resource area impacts will be avoided and minimized to the extent practicable. The overall goal of the project is to improve coastal resiliency and protect infrastructure. The benefits

to these resource areas from the Project will be substantial and include improved wildlife habitat, flood water storage, and resilience to erosion and storm damage.

Implementation of this project will require the Town to obtain approvals or permits from various regulatory agencies, including:

(1) Review under Massachusetts Environmental Policy Act through an ENF;
(2) Approval under the Massachusetts Wetlands Protection via an Order of Conditions from the Ipswich Conservation Commission;
(3) Approval under the Massachusetts Department of Environmental Protection (MassDEP) Chapter 91 Waterways Regulations (310 CMR 9.00);
(4) Review under Massachusetts Coastal Zone Management for federal consistency;
(5) Approval through a U.S. Army Corps of Engineers Section 404 General Permit.

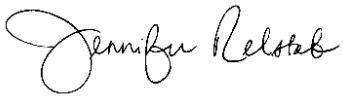
All applicable permit applications and supporting documentation will be sent to the appropriate regulatory agencies during permitting, and all public notification requirements will be met individually in accordance with the appropriate permit applications.

Enclosed please find two copies of the ENF application, supporting documentation, and complete sets of full-sized and reduced copies of the project plans. A copy of the public notification sent to the Ipswich Chronicle is enclosed.

Thank you for your review of the Project. We look forward to hearing from you. Should you have any questions, please do not hesitate to contact me directly at (508) 833-6600.

Sincerely,

Horsley Witten Group, Inc.



Jennifer Relstab, P.E.
Project Manager

Enclosures

cc: See attached distribution list

Commonwealth of Massachusetts

Executive Office of Energy and Environmental Affairs
Massachusetts Environmental Policy Act (MEPA) Office

Environmental Notification Form

For Office Use Only

EEA#: _____

MEPA Analyst: _____

The information requested on this form must be completed in order to submit a document electronically for review under the Massachusetts Environmental Policy Act, 301 CMR 11.00.

Project Name: Ipswich River Coastal Resiliency Project		
Street Address: 25 Green Street		
Municipality: Ipswich	Watershed: Ipswich	
Universal Transverse Mercator Coordinates:	Latitude: 42°40'44.55" Longitude: 70°50'5.92"W	
Estimated commencement date: Summer 2020	Estimated completion date: Fall 2021	
Project Type: Coastal Bank restoration to protect critical infrastructure; living shoreline.	Status of project design: 75% complete	
Proponent: Town of Ipswich		
Street Address: 25 Green Street		
Municipality: Ipswich	State: MA	Zip Code: 01938
Name of Contact Person: Jennifer Relstab, P.E.		
Firm/Agency: Horsley Witten Group, Inc.	Street Address: 294 Washington St., suite 801	
Municipality: Boston	State: MA	Zip Code: 02108
Phone: (857) 263-8193	Fax:	E-mail: jrelstab@horsleywitten.com

Does this project meet or exceed a mandatory EIR threshold (see 301 CMR 11.03)?
☐Yes ☒No

If this is an Expanded Environmental Notification Form (ENF) (see 301 CMR 11.05(7)) or a Notice of Project Change (NPC), are you requesting:

a Single EIR? (see 301 CMR 11.06(8)) ☐Yes ☐No
a Special Review Procedure? (see 301CMR 11.09) ☐Yes ☐No
a Waiver of mandatory EIR? (see 301 CMR 11.11) ☐Yes ☐No
a Phase I Waiver? (see 301 CMR 11.11) ☐Yes ☐No
(Note: Greenhouse Gas Emissions analysis must be included in the Expanded ENF.)

Which MEPA review threshold(s) does the project meet or exceed (see 301 CMR 11.03)?
301 CMR 11.03 (3)(b)(1)(a): Alteration of a Coastal Bank
Which State Agency Permits will the project require?
Chapter 91 License; Army Corps of Engineers General Permit
Identify any financial assistance or land transfer from an Agency of the Commonwealth, including the Agency name and the amount of funding or land area in acres:
MA Coastal Zone Management Coastal Resiliency Grant for $76,885 in FY2019

Summary of Project Size & Environmental Impacts	Existing	Change	Total
LAND			
Total site acreage	9.98*		
New acres of land altered		0.35	0.35
Acres of impervious area	0.06	0.06	0.06
Square feet of new bordering vegetated wetlands alteration		0	
Square feet of new other wetland alteration		0.5	
Acres of new non-water dependent use of tidelands or waterways		0	
STRUCTURES			
Gross square footage	n/a	n/a	n/a
Number of housing units	n/a	n/a	n/a
Maximum height (feet)	n/a	n/a	n/a
TRANSPORTATION			
Vehicle trips per day	n/a	n/a	n/a
Parking spaces	n/a	n/a	n/a
WASTEWATER			
Water Use (Gallons per day)	n/a	n/a	n/a
Water withdrawal (GPD)	n/a	n/a	n/a
Wastewater generation/treatment (GPD)	n/a	n/a	n/a
Length of water mains (miles)	n/a	n/a	n/a
Length of sewer mains (miles)	n/a	n/a	n/a

Has this project been filed with MEPA before?
Yes (EEA #_____) ☒No

Has any project on this site been filed with MEPA before?
☐ Yes (EEA #_____) ☒No

***NOTE:**

Total site (25 Green Street) = 9.98 ac
New work (in two phases) occurs in overlapping coastal resources = 0.35 ac (redevelopment or restoration)
Total permanent change 3,031 SF (0.07 ac)

GENERAL PROJECT INFORMATION – all proponents must fill out this section

PROJECT DESCRIPTION:

Background and History: In Phase I of a planned multi-phase coastal resiliency project, the Town of Ipswich assessed a one-mile reach of the Ipswich River between the Ipswich Mills Dam and Town Wharf, where erosion of coastal bank currently threatens critical infrastructure such as roadways and utilities (e.g., water, sewer, storm drain systems, and utility poles). Portions of this reach are armored with stone revetments or granite/boulder seawalls, which – particularly when subjected to increased strong storms from climate change and sea level rise – has exacerbated the rate of coastal bank erosion at unarmored locations. Six Areas of Concern (AOCs) were identified and further assessed to determine their suitability for nature-based and/or green infrastructure stabilization solutions. Initial design sketches were prepared for each AOC, and two sites (AOC 1c and AOC 4) were selected for advancement to the 30% conceptual design phase during Phase I.

Phase II of this project, and the subject of this Environmental Notification Form (ENF), focuses on advancing AOC 4 to the permitting stage. This site, which is located near the County Street Bridge and the Shurcliff Riverwalk, has been experiencing serious undercutting/erosion of the toe of the coastal bank, primarily from erosive stormwater runoff. The focus of this project is the coastal bank restoration and stormwater improvement efforts at AOC 4, as detailed below. The Town has received a CZM Coastal Resiliency Grant to support these efforts. The Town plans to address all AOCs over the next 5-7 years, as funding becomes available.

AOC 4 consists of approximately 122 linear feet (lf) of coastal bank situated just downgradient of the Shurcliff Riverwalk, on the downstream side of the County Street Bridge, and along the left bank of the Ipswich River. Restoration under this ENF includes a combination of nature-based, sustainable shoreline techniques, slope stabilization, and stormwater management improvements.

Other AOCs identified in Phase I are being further assessed separately, by the Ipswich Water and Wastewater Department, Department of Public Works, and Department of Planning and Development. Additional coastal bank restoration and stormwater management improvements at these remaining AOCs would be reviewed via a future Expanded ENF(s), as discussed below.

:

Describe the existing conditions and land uses on the project site: _____

The project area for this ENF (AOC 4) consists of a portion of a single property, 25 Green Street (Town Hall complex). The parcel is located between Green Street Bridge and the County Street Bridge and consists of Town Hall, associated parking areas, and athletic fields. A series of locus maps is included within **Attachment 1**. This reach of the Ipswich River is separated from the athletic fields by a vegetated embankment. This vegetative buffer ranges from 60' wide to 140' wide, with an average approximate width of 85'. The top of the regulatory coastal bank generally follows the seaward edge of an unimproved riverwalk. A set of timber steps descends from the playing fields to the Riverwalk in the vicinity of AOC 4.

In 1959, the Town's main sewer trunk line was installed in/adjacent to the Ipswich River under a Chapter 91 Waterways license. AOC 4 (this ENF) and AOCs 2 and 5 (to be included in future ENF Expansions) are located within the vicinity of this sewer line. The Chapter 91 plans show that the sewer line was installed beneath what is now called the Shurcliff Riverwalk (created in the 1980s) and included fill within the River in at least two locations.

The Shurcliff Riverwalk appears to originally have been a gravel surface, but now consists largely of compacted soil. The Riverwalk is used by residents and visitors for recreation, and for accessing the river in several locations. Occasionally, small non-motorized boats are launched near the County Street Bridge. Several informal dirt foot paths lead from the playing fields adjacent to Town Hall to the Riverwalk, and from the Riverwalk to the water.

AOC 4 consists of an approximately 0.35 ac portion of this property, largely downgradient of the Shurcliff Riverwalk, along a section of coastal bank, and extending into a portion of the tidal flats along the Ipswich River. The project site also includes a small portion of the sidewalk and stormwater structures along County Street. There are two stormwater outfalls set within the coastal bank near the County Street Bridge. AOC-4 is also located just upstream of an historic mill site where there are natural falls and remnants of old manmade dam or raceway structure. The presence of this relic dam structure changes the flow regime under the various tide conditions, and at lower tides waters pool in the upstream area. A rocky outcrop within the riverbed further physically separates the right and left sides of the Ipswich River at this location. **Attachment 1** includes a more detailed description of the existing conditions and the coastal resource areas, and includes representative photos of the site.

Describe the proposed project and its programmatic and physical elements: _____

In general terms, restoration of AOC-4 includes a combination of nature-based sustainable shoreline techniques, slope stabilization, and stormwater improvements to stabilize an undercut area of coastal bank. The project will be approached in two phases, with Phase IIA being the proposed stormwater improvements, and Phase IIB being the bank stabilization elements and creation of the living shoreline.

Phase IIA: As noted, there are two existing stormwater outfalls within the coastal bank, each resulting in erosion and undercutting of the coastal bank. Proposed stormwater improvements include extending the existing 18-inch diameter corrugated metal drainage outfall pipe (the larger, westernmost of the two outfalls) further out toward the river along with associated fill and re-grading of the eroded undercut bank. A new concrete headwall will be installed at the outfall to support the replacement pipe, and a small rock-lined scour pool/splash pad will be installed below the outfall. The second, smaller 12-inch corrugated metal outfall and easternmost existing scour pool/splash pad will be repaired, supported by a headwall and associated grading to improve efficiency. Upgradient of the coastal bank, stormwater improvements will include the regrading of 800 sf of existing sidewalk, installation of new curbing, and upgrades to the existing drainage outlets and catch basins along a section of County Street; regrading a portion of the existing Shurcliff Riverwalk to minimize overland flow to the slopes; and replacement of the existing degraded timber steps with an infiltration step system to promote infiltration and reduced upgradient erosion. This redevelopment project is designed to meet the Massachusetts Stormwater Management Standards to the maximum extent practicable.

Phase IIB: Following implementation of stormwater improvements, the project will install nature-based sustainable shoreline and slope stabilization to further stabilize the eroding coastal bank at AOC-4. These measures include filling undercut areas with clean native soil, adding a row of coir fiber rolls at the toe of the slope where undercutting is occurring, creating two areas of living shoreline communities, and installing boulder protection along the downgradient coir fiber logs to provide reinforcing stabilization of the bank and to break up the flows in the area. The living shoreline areas will be planted by salvaging, to the extent practicable, existing vegetation within the tidal flats and supplementing this vegetation with plant species that are more tolerant of brackish conditions to address potential sea level rise.

The existing informal footpath, which is exacerbating coastal bank erosion in this location, will be revegetated to discourage foot traffic. Provisions for a more formal access point will be made at a location downstream of AOC-4 to maintain public access to the river. The coastal bank at AOC-4 is dominated by a non-native plant community, including Norway maple (*Acer platanoides*), Oriental bittersweet (*Celastrus orbiculatus*), multiflora rose (*Rosa multiflora*), Japanese barberry (*Berberis thunbergii*), hairy willow herb (*Epilobium hirsutum*), garlic mustard (*Alliaria petiolata*), as well as some escaped landscape plantings. Complete removal of all invasives at this location would result in destabilizing the coastal bank. However, as part of Phase IIB, the Town will implement limited invasive species management by pruning some of the Norway maples, removing invasive shrubs and herbaceous groundcover, and revegetating these areas with native shrubs and groundcover to help restore a native plant community. A section of split rail fencing will be added at the top of the coastal bank

above AOC-4 for safety purposes.

Work at this site will occur within coastal resource areas: tidal flats (coastal beach), coastal bank, riverfront area, Land Subject to Coastal Storm Flowage (LSCSF), and within the buffer zone to the top of the coastal bank.

Details of the existing conditions and proposed project elements are provided in the attached project plans entitled "*Ipswich River Coastal Resiliency and Coastal Bank Stabilization Project, Design Plans, County Street, Ipswich, MA 01938*" prepared by Coneco Engineers & Scientists, Inc., dated April 3,2019 (Phase IIA) and "*Ipswich River Coastal Resiliency Permitting Plans, Ipswich, Massachusetts*" prepared by Horsley Witten Group, Inc. and dated April 2019 (Phase IIB).

NOTE: The project description should summarize both the project's direct and indirect impacts (including construction period impacts) in terms of their magnitude, geographic extent, duration and frequency, and reversibility, as applicable. It should also discuss the infrastructure requirements of the project and the capacity of the municipal and/or regional infrastructure to sustain these requirements into the future.

Describe the on-site project alternatives (and alternative off-site locations, if applicable), considered by the proponent, including at least one feasible alternative that is allowed under current zoning, and the reasons(s) that they were not selected as the preferred alternative:

No Build Alternative – The No Build or No Action alternative was considered and discarded due to the current threats to critical infrastructure. This alternative would not meet the project objectives of improving bank stability, coastal resilience, and stormwater management while protecting vulnerable infrastructure.

Hard Armoring Alternative – The Town considered stabilizing the eroded and undercut bank using har-armoring (revetment wall), given that much of the immediate downstream slope consists of a rocky shoreline. However, this alternative would not completely address the upgradient erosion from the outfall and would not support the Town's objectives of climate change and coastal resiliency.

Other Nature-based Alternatives - In Phase I of the Coastal Resiliency Assessment project (FY17), several restoration alternatives for each of several AOCs were reviewed. It was determined that there are five shoreline stabilization techniques that are appropriate for the type of erosion observed at the AOCs in the study area, which also rely on "green infrastructure" design principles. These include coconut coir rolls; brush mattress and live stakes; revetments (including boulder, log, root wad, and tree); boulder sills; and live crib walls. Generally, these techniques may be used individually or in combination. As part of the 10% design in Phase I, these techniques were summarized and the AOCs prioritized. While the Town plans to advance some of these alternate sites, AOC-4 was determined to be one of the most critical areas. The design for this site addresses the existing erosion by improving upgradient stormwater runoff and addressing both the stability of the coastal bank and coastal resiliency, using the most appropriate techniques for the site based on existing conditions. Alternatives approaches such as those described above, were determined to not be suitable for the site conditions and or have limited applications not appropriate for this site.

Off-site Alternative – This is a natural resource restoration project, so alternative properties beyond the CZM Grant study area (i.e., off-site) were not considered. As noted, the proposed project at AOC-4 was prioritized over other AOC areas identified in the previous CZM grant, and the Town plans to advance the design of these at a later time as funding becomes available.

Preferred Alternative – The proposed green infrastructure techniques create a shoreline that is naturally adaptable to the changing conditions along the shoreline, which can be anticipated in the face of climate change as well as the ongoing development in the contributing watershed. The proposed stabilization techniques were determined to be best suited to the existing site topography, the causes of erosion, the location within a tidal regime, and proximity to critical infrastructure; and therefore, more likely to be successful in their implementation.

Additionally, the proposed project provides a stretch of river bank without rip rap improving habitat for wildlife.

This alternative is a sustainable solution incorporates a higher elevation with toe slope stabilization which is more adaptable to sea level rise, changing climate conditions, considers the influence of the existing tidal conditions, and increasing stormwater runoff.

NOTE*: The purpose of the alternatives analysis is to consider what effect changing the parameters and/or siting of a project, or components thereof, will have on the environment, keeping in mind that the objective of the MEPA review process is to avoid or minimize damage to the environment to the greatest extent feasible. Examples of alternative projects include alternative site locations, alternative site uses, and alternative site configurations.*

Summarize the mitigation measures proposed to offset the impacts of the preferred alternative:
_____

The project represents a natural resource restoration project using a combination of nature-based green infrastructure stabilization techniques and stormwater management improvements to improve coastal bank stability as well as to protect upgradient critical infrastructure and is intended to improve environmental conditions at the site. The project itself may be viewed as mitigation for over 300 years of human impact.

If the project is proposed to be constructed in phases, please describe each phase:
_____

While the Town does not anticipate specifically phasing this project, the Town describes the general sequencing of the project, addressing the sources of erosion form stormwater runoff, followed by coastal bank stabilization and installation of living shoreline areas. This will allow for flexibility if funding or project time of year restrictions become limited. As noted above, the Town plans to advance other AOC projects in the future as funding becomes available.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN:
Is the project within or adjacent to an Area of Critical Environmental Concern?
☐Yes (Specify_____) ☒No
if yes, does the ACEC have an approved Resource Management Plan? ☐ Yes ☐ No;
If yes, describe how the project complies with this plan.
_____
Will there be stormwater runoff or discharge to the designated ACEC? ☐ Yes ☐ No;
If yes, describe and assess the potential impacts of such stormwater runoff/discharge to the designated ACEC.
_____

RARE SPECIES:
Does the project site include Estimated and/or Priority Habitat of State-Listed Rare Species?
(see http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/priority_habitat/priority_habitat_home.htm)
☐Yes (Specify_____) ☒No

HISTORICAL / ARCHAEOLOGICAL RESOURCES:

Does the project site include any structure, site or district listed in the State Register of Historic Place or the inventory of Historic and Archaeological Assets of the Commonwealth?
☐Yes (Specify_____) ☒No

If yes, does the project involve any demolition or destruction of any listed or inventoried historic or archaeological

resources? ☐Yes (Specify_____) ☒No

WATER RESOURCES:

Is there an Outstanding Resource Water (ORW) on or within a half-mile radius of the project site? ☐Yes ☒No; if yes, identify the ORW and its location. _____

(NOTE: Outstanding Resource Waters include Class A public water supplies, their tributaries, and bordering wetlands; active and inactive reservoirs approved by MassDEP; certain waters within Areas of Critical Environmental Concern, and certified vernal pools. Outstanding resource waters are listed in the Surface Water Quality Standards, 314 CMR 4.00.)

Are there any impaired water bodies on or within a half-mile radius of the project site? ☒Yes ☐No; if yes, identify the water body and pollutant(s) causing the impairment:

Ipswich River from Sylvania Dam to the mouth of the river is impaired for fecal coliform.

Is the project within a medium or high stress basin, as established by the Massachusetts Water Resources Commission? ☒Yes ☐No

The entire Ipswich River watershed is a High Stress basin.

STORMWATER MANAGEMENT:

Generally describe the project's stormwater impacts and measures that the project will take to comply with the standards found in MassDEP's Stormwater Management Regulations:

This natural resource improvement project, in particular the stormwater management improvement portion, has been designed to meet stormwater requirements of 310 CMR 10.05. Specifically, the project meets the 10 stormwater requirements of the Wetlands Protection Act regulations as follows:

1. Standard 1: No New Untreated Discharges

   No new untreated discharges are being created as the proposed work revolves around controlling stormwater on the site to mitigate erosion of the coastal bank; conversely, the proposed work treats more stormwater versus the existing conditions. The proposed work utilizes the location of the existing two outfalls and routes the upgraded storm system to these discharges. The stabilized walking path will be regraded to direct stormwater into the neighboring grass swale, which delivers the water into an existing catch basin and then to a drain manhole before discharging to the proposed plunge pool, where the velocity of the stormwater is dissipated to prevent erosion of the wetland; this rerouting of stormwater also prevents the runoff from eroding the steep river bank where it flows to in the existing conditions. The infiltration steps to be installed will also reduce the total stormwater running off in this area. Additional stormwater is directed to the replacement catch basin on the western side of the site via the Nyloplast drain, resulting in more stormwater undergoing treatment than in existing conditions. The existing sidewalk along County Street is being regraded and a vertical granite curb added to ensure that stormwater will flow into the street and south to the replacement catch basin instead of flowing untreated over the site and into the river. Additionally, this rerouting of stormwater and redirection of runoff from the sidewalk and walkway will provide relief for the steep bank slopes which are presently suffering degradation due to stormwater erosion. The plunge pool on the western outlet will serve to dissipate velocity as well to prevent erosion to the wetland.

2. Standard 2: Peak Rate Attenuation

   A Standard 2 waiver is requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

   A formal analysis was not performed for the site conditions as the proposed work only serves to control stormwater flow, increase infiltration, and alleviate erosion to the riverbank. No additional impervious is proposed and the current wooden steps on site are being converted to infiltration steps so the overall volume of runoff from the site should be reduced. The drainage system leading to the western outlet will be collecting more stormwater than in existing conditions due to the addition of the Nyloplast drain and releasing it at lower flow rates than the previous stormwater system as a result of the shallower pipe slope and proposed plunge pool. The drainage system leading to the eastern outlet will also be receiving more stormwater, and although the replaced pipe will produce a high flow rate due to material change, the proposed plunge pool will aid in dissipating flow velocity. In addition, the site discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04 and so the peak discharges are not strictly subject to Standard 2.

3. Standard 3: Recharge

   Recharge BMPs have been sized to infiltrate the Required Recharge Volume only to the maximum extent practicable because the project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

   Standard 3 requires that a certain volume of water be recharged to the site depending on existing soil types and square feet of total impervious area over each soil type. The existing sidewalk to be replaced is the only impervious area in the existing conditions and no additional impervious area is proposed for this project; the remainder of the site is covered with mature vegetation. Infiltration steps are proposed to promote recharge and the grass swale along the walking path will provide an improved chance for infiltration compared to the current conditions in which the stormwater flows down a 1.5:1 slope with little chance for infiltration

4. Standard 4: Water Quality

   The proposed stormwater management system is primarily utilized to convey groundwater away from the steep bank slopes which are susceptible to erosion and to promote overland flow and widespread infiltration. Therefore, pretreatment, water quality and TSS removal are not applicable in the traditional sense. The proposed system will, however, achieve some TSS removal. The proposed infiltration steps will reduce TSS by 80% and the proposed deep sump catch basin will reduce TSS by 25%. Please refer to Table 2 for a TSS removal summary.

   A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

5. Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

   The project site is not a land use with higher pollutant loads.

6. Standard 6: Critical Areas

   The project site is not within a Zone II or Interim Wellhead Protection Area of a public water supply and does not discharge near or to any other critical areas.

7. Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

   The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a Bike Path and/or Foot Path and Redevelopment Project.

The project involves redevelopment of an existing site. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook is included after the Table of Contents within the body of this report. The proposed stormwater management system complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable, and significantly improves the existing conditions.

8. Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

   A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan is included in the Stormwater Report.

9. Standard 9: Operation and Maintenance Plan

   The Post Construction Operation and Maintenance Plan is included in the Stormwater Report

10. Standard 10: Prohibition of Illicit Discharges

    To our knowledge, no illicit discharges are made to the stormwater management system. The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges and an Illicit Discharge Compliance Statement is attached to the Stormwater Report.

MASSACHUSETTS CONTINGENCY PLAN:

Has the project site been, or is it currently being, regulated under M.G.L.c.21E or the Massachusetts Contingency Plan? Yes ☐ No ☒ ; if yes, please describe the current status of the site (including Release Tracking Number (RTN), cleanup phase, and Response
Action Outcome classification):

Is there an Activity and Use Limitation (AUL) on any portion of the project site? Yes ☐ No ☒;
if yes, describe which portion of the site and how the project will be consistent with the AUL:
_____.

Are you aware of any Reportable Conditions at the property that have not yet been assigned an RTN?
Yes ☐ No ☒; if yes, please describe:_____

SOLID AND HAZARDOUS WASTE:

If the project will generate solid waste during demolition or construction, describe alternatives considered for re-use, recycling, and disposal of, e.g., asphalt, brick, concrete, gypsum, metal, wood:

(NOTE: Asphalt pavement, brick, concrete and metal are banned from disposal at Massachusetts landfills and waste combustion facilities and wood is banned from disposal at Massachusetts landfills. See 310 CMR 19.017 for the complete list of banned materials.)

Will your project disturb asbestos containing materials? Yes ☐ No ☒ ;
if yes, please consult state asbestos requirements at http://mass.gov/MassDEP/air/asbhom01.htm

Describe anti-idling and other measures to limit emissions from construction equipment: When not in use, construction equipment will be shut off to limit emissions.

DESIGNATED WILD AND SCENIC RIVER:

Is this project site located wholly or partially within a defined river corridor of a federally designated Wild and Scenic River or a state designated Scenic River? Yes ☐ No ☒;

if yes, specify name of river and designation:

If yes, does the project have the potential to impact any of the “outstandingly remarkable” resources of a federally Wild and Scenic River or the stated purpose of a state designated Scenic River?
Yes ☐ No ☐ ; if yes, specify name of river and designation: _____;
if yes, will the project will result in any impacts to any of the designated “outstandingly remarkable” resources of the Wild and Scenic River or the stated purposes of a Scenic River.
Yes ☐ No ☐ ;
if yes, describe the potential impacts to one or more of the “outstandingly remarkable” resources or stated purposes and mitigation measures proposed.

ATTACHMENTS:

1. List of all attachments to this document.
2. U.S.G.S. map (good quality color copy, 8½ x 11 inches or larger, at a scale of 1:24,000) indicating the project location and boundaries.
3. Plan, at an appropriate scale, of existing conditions on the project site and its immediate environs, showing all known structures, roadways and parking lots, railroad rights-of-way, wetlands and water bodies, wooded areas, farmland, steep slopes, public open spaces, and major utilities.
4 Plan, at an appropriate scale, depicting environmental constraints on or adjacent to the project site such as Priority and/or Estimated Habitat of state-listed rare species, Areas of Critical Environmental Concern, Chapter 91 jurisdictional areas, Article 97 lands, wetland resource area delineations, water supply protection areas, and historic resources and/or districts.
5. Plan, at an appropriate scale, of proposed conditions upon completion of project (if construction of the project is proposed to be phased, there should be a site plan showing conditions upon the completion of each phase).
6. List of all agencies and persons to whom the proponent circulated the ENF, in accordance with 301 CMR 11.16(2).
7. List of municipal and federal permits and reviews required by the project, as applicable.

LAND SECTION – all proponents must fill out this section

I. Thresholds / Permits

A. Does the project meet or exceed any review thresholds related to **land** (see 301 CMR 11.03(1) ☐ Yes ☒ No; if yes, specify each threshold:

II. Impacts and Permits

A. Describe, in acres, the current and proposed character of the project site, as follows:

	Existing	Change	Total
Footprint of buildings	0	0	0
Internal roadways	0	0	0
Parking and other paved areas	0.06	0.06	00.06
Other altered areas	0	0	0
Undeveloped areas	0.29	0.29	0.29
Total: Project Site Acreage	0.35		0.35

Note – changes occur within overlapping coastal resource areas (coastal bank, riverfront area, tidal flats) as a result of restoration and/or replacement/redevelopment of existing outfalls and other impervious features (sidewalk, timber steps)

B. Has any part of the project site been in active agricultural use in the last five years?
☐ Yes ☒ No; if yes, how many acres of land in agricultural use (with prime state or locally important agricultural soils) will be converted to nonagricultural use?

C. Is any part of the project site currently or proposed to be in active forestry use?
☐ Yes ☒ No; if yes, please describe current and proposed forestry activities and indicate whether any part of the site is the subject of a forest management plan approved by the Department of Conservation and Recreation:

D. Does any part of the project involve conversion of land held for natural resources purposes in accordance with Article 97 of the Amendments to the Constitution of the Commonwealth to any purpose not in accordance with Article 97? ☐ Yes ☒ No; if yes, describe:

E. Is any part of the project site currently subject to a conservation restriction, preservation restriction, agricultural preservation restriction or watershed preservation restriction?
☒ Yes ☐ No; if yes, does the project involve the release or modification of such restriction?
☐ Yes ☒ No; if yes, describe:

F. Does the project require approval of a new urban redevelopment project or a fundamental change in an existing urban redevelopment project under M.G.L.c.121A? ☐ Yes ☒ No; if yes, describe:

G. Does the project require approval of a new urban renewal plan or a major modification of an existing urban renewal plan under M.G.L.c.121B? Yes ☐ No ☒; if yes, describe:

III. Consistency

A. Identify the current municipal comprehensive land use plan
Title: Ipswich Community Development Plan Date: 2003

B. Describe the project's consistency with that plan with regard to:

1) economic development _A guiding principle of the Plan is to support the survival of resource-based businesses, as they are critical to the character of the town, conservation of open space, and livelihood of local residents. This natural resource restoration project is not a development project._____

2) adequacy of infrastructure _A guiding principle of the Plan is to enforce the highest standards when reviewing any project affecting the Town's critical natural resources, such as the Great Marsh, Parker River-Essex Bay ACEC, Ipswich River, and other resources such as contiguous habitat. This natural resource restoration project is designed to improve the Ipswich River._____
3) open space impacts _This natural resource restoration project is not in conflict with open space planning goals. It seeks to maintain and/or improve water access._____
4) compatibility with adjacent land uses _This natural resource project is not in conflict with adjacent land uses goals. It seeks to maintain and/or improve water access. _____

C. Identify the current Regional Policy Plan of the applicable Regional Planning Agency (RPA)
RPA: _Metropolitan Area Planning Council_____
Title: _MetroFuture: Making a Greater Boston Region_____
Date: 2008_____

D. Describe the project's consistency with that plan with regard to:
1) economic development _The Plan promotes sustainable growth: towns will retain their sense of uniqueness and character; historic resources will be preserved and enhanced; region will be prepared for and resilient to natural disasters and climate change. This natural resource restoration project is intended to improve resiliency to natural disasters and climate change._____
2) adequacy of infrastructure _The Plan calls for carefully budgeted and sustainably managed water resources so that clean water is available for appropriate uses and development. This natural resource restoration project is intended to improve water quality._____
3) open space impacts _The Plan calls for a robust network of protected open spaces, farms, parks and greenways that will provide wildlife habitat, ecological benefits, recreational opportunities, and scenic beauty. This natural resource restoration project is intended to maintain existing open space, and to maintain and/or improve water access._____

RARE SPECIES SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **rare species or habitat** (see 301 CMR 11.03(2))? ☐ Yes ☒ No; if yes, specify, in quantitative terms:

(NOTE: If you are uncertain, it is recommended that you consult with the Natural Heritage and Endangered Species Program (NHESP) prior to submitting the ENF.)

B. Does the project require any state permits related to **rare species or habitat**? ☐ Yes ☒ No

C. Does the project site fall within mapped rare species habitat (Priority or Estimated Habitat?) in the current Massachusetts Natural Heritage Atlas (attach relevant page)? ☐ Yes ☒ No.

D. If you answered "No" to all questions A, B and C, proceed to the **Wetlands, Waterways, and Tidelands Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Rare Species section below.

II. Impacts and Permits

A. Does the project site fall within Priority or Estimated Habitat in the current Massachusetts Natural Heritage Atlas (attach relevant page)? ☐ Yes ☐ No. If yes,

1. Have you consulted with the Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program (NHESP)? ☐ Yes ☐ No; if yes, have you received a determination as to whether the project will result in the "take" of a rare species? ☐ Yes ☐ No; if yes, attach the letter of determination to this submission.

2. Will the project "take" an endangered, threatened, and/or species of special concern in accordance with M.G.L. c.131A (see also 321 CMR 10.04)? ☐ Yes ☐ No; if yes, provide a summary of proposed measures to minimize and mitigate rare species impacts

3. Which rare species are known to occur within the Priority or Estimated Habitat?

4. Has the site been surveyed for rare species in accordance with the Massachusetts Endangered Species Act? ☐ Yes ☐ No

5. If your project is within Estimated Habitat, have you filed a Notice of Intent or received an Order of Conditions for this project? ☐ Yes ☐ No; if yes, did you send a copy of the Notice of Intent to the Natural Heritage and Endangered Species Program, in accordance with the Wetlands Protection Act regulations? ☐ Yes ☐ No

B. Will the project "take" an endangered, threatened, and/or species of special concern in accordance with M.G.L. c.131A (see also 321 CMR 10.04)? ☐ Yes ☐ No; if yes, provide a summary of proposed measures to minimize and mitigate impacts to significant habitat:

WETLANDS, WATERWAYS, AND TIDELANDS SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **wetlands, waterways, and tidelands** (see 301 CMR 11.03(3))? ☒ Yes ☐ No; if yes, specify, in quantitative terms:
301 CMR 11.03 (3)(b)(1)(a): Alteration of a Coastal Bank (122 LF);

B. Does the project require any state permits (or a local Order of Conditions) related to **wetlands, waterways, or tidelands**? ☒ Yes ☐ No; if yes, specify which permit:
State and local Orders of Conditions; Ch. 91 License

C. If you answered "No" to both questions A and B, proceed to the **Water Supply Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Wetlands, Waterways, and Tidelands Section below.

II. Wetlands Impacts and Permits

A. Does the project require a new or amended Order of Conditions under the Wetlands Protection Act (M.G.L. c.131A)? ☒ Yes ☐ No; if yes, has a Notice of Intent been filed? ☐ Yes ☒ No; if yes, list the date and MassDEP file number:_____; if yes, has a local Order of Conditions been issued? ☐ Yes ☐ No; Was the Order of Conditions appealed? ☐ Yes ☐ No. Will the project require a Variance from the Wetlands regulations? ☐ Yes ☐ No.

B. Describe any proposed permanent or temporary impacts to wetland resource areas located on the project site:

The project consists of a coastal bank restoration and shoreline stabilization effort using nature based sustainable shoreline techniques, slope stabilization, and stormwater improvements. This project will impact a total of 4,722 SF (122 linear feet) of Coastal Bank and will result in temporary and permanent impacts to the overlapping coastal resource areas and upgradient buffers. All impacts are for restoration/stabilization of this resource area, to protect critical upgradient infrastructure.

This project will impact a total of X square feet of Tidal Flats (Coastal Beach; a total of X square feet of rocky intertidal. All impacts are for restoration/stabilization of coastal bank, to protect infrastructure adjacent to it.

This project will not impact salt marsh. It will restore 714 SF of brackish tidal marsh at AOC 4.

C. Estimate the extent and type of impact that the project will have on wetland resources, and indicate whether the impacts are temporary or permanent:

	Area (square feet) or Length (linear feet)	Temporary or Permanent Impact?
Coastal Wetlands		
Land Under the Ocean	1,795	permanent (vegetated)
Designated Port Areas		
Coastal Beaches	714	permanent (vegetated)
Coastal Dunes		
Barrier Beaches		
Coastal Banks	4,722 LF	permanent (vegetated)
Rocky Intertidal Shores		

Salt Marshes		
Land Under Salt Ponds		
Land Containing Shellfish		
Fish Runs		
Land Subject to Coastal Storm Flowage	7,991	172 permanent
Inland Wetlands		
Bank (LF)		
Bordering Vegetated Wetlands		
Isolated Vegetated Wetlands		
Land Under Water	9	9 (permanent, vegetated)
Isolated Land Subject to Flooding		
Bordering Land Subject to Flooding		
Riverfront Area	9,806	2,782 permanent

D. Is any part of the project:
1. proposed as a **limited project**? ☐ Yes ☒ No; if yes, what is the area (in SF)?
2. the construction or alteration of a **dam**? ☐ Yes ☒ No; if yes, describe:
3. fill or structure in a **velocity zone** or **regulatory floodway**? ☐ Yes ☒ No
4. dredging or disposal of dredged material? ☐ Yes ☒ No; if yes, describe the volume of dredged material and the proposed disposal site:
   _____.
5. a discharge to an **Outstanding Resource Water (ORW)** or an **Area of Critical Environmental Concern (ACEC)**? ☐ Yes ☒ No
6. subject to a wetlands restriction order? ☐ Yes ☒ No; if yes, identify the area (in SF):
7. located in buffer zones? ☒Yes ☐No; if yes, how much (in SF) 6,091

E. Will the project:
1. be subject to a local wetlands ordinance or bylaw? ☒ Yes ☐ No
2. alter any federally-protected wetlands not regulated under state law? ☐ Yes ☒ No; if yes, what is the area (SF)?_____

III. Waterways and Tidelands Impacts and Permits

A. Does the project site contain waterways or tidelands (including filled former tidelands) that are subject to the Waterways Act, M.G.L.c.91? ☒ Yes ☐ No; if yes, is there a current Chapter 91 License or Permit affecting the project site? ☒ Yes ☐ No; if yes, list the date and license or permit number and provide a copy of the historic map used to determine extent of filled tidelands:

License No. 4211, issued to the Town of Ipswich for sewer trunk line in 1959

B Does the project require a new or modified license or permit under M.G.L.c.91? ☒ Yes ☐ No; if yes, how many acres of the project site subject to M.G.L.c.91 will be for non-water-dependent use?

Current 0 Change 0 Total 0

If yes, how many square feet of solid fill or pile-supported structures (in SF)? 0

C. For non-water-dependent use projects, indicate the following:
Area of filled tidelands on the site:__??_____
Area of filled tidelands covered by buildings:____0_____

For portions of site on filled tidelands, list ground floor uses and area of each use: _____

Does the project include new non-water-dependent uses located over flowed tidelands?
Yes ☐ No ☒
Height of building on filled tidelands_____

Also show the following on a site plan: Mean High Water, Mean Low Water, Water-dependent Use Zone, location of uses within buildings on tidelands, and interior and exterior areas and facilities dedicated for public use, and historic high and historic low water marks.

D. Is the project located on landlocked tidelands? ☐ Yes ☒ No; if yes, describe the project's impact on the public's right to access, use and enjoy jurisdictional tidelands and describe measures the project will implement to avoid, minimize or mitigate any adverse impact:

E. Is the project located in an area where low groundwater levels have been identified by a municipality or by a state or federal agency as a threat to building foundations?
☐Yes ☒ No; if yes, describe the project's impact on groundwater levels and describe measures the project will implement to avoid, minimize or mitigate any adverse impact:

F. Is the project non-water-dependent **and** located on landlocked tidelands **or** waterways or tidelands subject to the Waterways Act **and** subject to a mandatory EIR? ☐ Yes ☒ No;
(NOTE: If yes, then the project will be subject to Public Benefit Review and Determination.)

G. Does the project include dredging? ☐ Yes ☒ No; if yes, answer the following questions:
What type of dredging? Improvement ☐ Maintenance ☐ Both ☐
What is the proposed dredge volume, in cubic yards (CY) _____
What is the proposed dredge footprint

[location] _____ length (FT) _____ width (FT) _____ depth (FT)

Will dredging impact the following resource areas?
Intertidal: Yes☐ No☐; if yes, _____ SF
Outstanding Resource Waters: Yes☐ No☐; if yes, _____ SF
Other resource area (i.e. shellfish beds, eel grass beds) Yes☐ No☐; if yes ____ SF

If yes to any of the above, have you evaluated appropriate and practicable steps to:
1) avoidance; 2) if avoidance is not possible, minimization; 3) if either avoidance or minimize is not possible, mitigation?

If no to any of the above, what information or documentation was used to support this determination?

Provide a comprehensive analysis of practicable alternatives for improvement dredging in accordance with 314 CMR 9.07(1)(b). Physical and chemical data of the sediment shall be included in the comprehensive analysis.

A discussion of dredging alternatives and physical and chemical sediment analyses is provided within the attached project narrative.

Sediment Characterization
Existing gradation analysis results? ☐Yes ☐No: if yes, provide results.
Existing chemical results for parameters listed in 314 CMR 9.07(2)(b)6? ☐Yes ☐No; if yes, provide results. _____
Do you have sufficient information to evaluate feasibility of the following management options for dredged sediment? ☐Yes ☐No If yes, check the appropriate option.

☐ Beach Nourishment
☐ Unconfined Ocean Disposal
☐ Confined Disposal:
    ☐ Confined Aquatic Disposal (CAD)
    ☐ Confined Disposal Facility (CDF)
☐ Landfill Reuse in accordance with COMM-97-001
☐ Shoreline Placement
☐ Upland Material Reuse
☐ In-State landfill disposal
☐ Out-of-state landfill disposal
(NOTE: This information is required for a 401 Water Quality Certification.)

IV. Consistency:

A. Does the project have effects on the coastal resources or uses, and/or is the project located within the Coastal Zone? ☐ Yes ☒ No; if yes, describe these effects and the projects consistency with the policies of the Office of Coastal Zone Management:

B. Is the project located within an area subject to a Municipal Harbor Plan? ☐Yes ☒ No; if yes, identify the Municipal Harbor Plan and describe the project's consistency with that plan:

WATER SUPPLY SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **water supply** (see 301 CMR 11.03(4))? ☐ Yes ☒ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **water supply**? ☐ Yes ☒ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Wastewater Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Water Supply Section below.

II. Impacts and Permits

A. Describe, in gallons per day (gpd), the volume and source of water use for existing and proposed activities at the project site:

	Existing	Change	Total
Municipal or regional water supply	_____	_____	_____
Withdrawal from groundwater	_____	_____	_____
Withdrawal from surface water	_____	_____	_____
Interbasin transfer	_____	_____	_____

(NOTE: Interbasin Transfer approval will be required if the basin and community where the proposed water supply source is located is different from the basin and community where the wastewater from the source will be discharged.)

B. If the source is a municipal or regional supply, has the municipality or region indicated that there is adequate capacity in the system to accommodate the project? ☐ Yes ☐ No

C. If the project involves a new or expanded withdrawal from a groundwater or surface water source, has a pumping test been conducted? ☐ Yes ☐ No; if yes, attach a map of the drilling sites and a summary of the alternatives considered and the results. _____

D. What is the currently permitted withdrawal at the proposed water supply source (in gallons per day)? _____ Will the project require an increase in that withdrawal? ☐Yes ☐No; if yes, then how much of an increase (gpd)? _____

E. Does the project site currently contain a water supply well, a drinking water treatment facility, water main, or other water supply facility, or will the project involve construction of a new facility? ☐ Yes ☐ No. If yes, describe existing and proposed water supply facilities at the project site:

	Permitted Flow	Existing Avg. Daily Flow	Project Flow	Total
Capacity of water supply well(s) (gpd)	_____	_____		_____
Capacity of water treatment plant (gpd)	_____	_____		_____

F. If the project involves a new interbasin transfer of water, which basins are involved, what is the direction of the transfer, and is the interbasin transfer existing or proposed?

G. Does the project involve:

1. new water service by the Massachusetts Water Resources Authority or other agency of the Commonwealth to a municipality or water district? ☐ Yes ☐ No

H. a Watershed Protection Act variance? ☐ Yes ☐ No; if yes, how many acres of alteration?

2. a non-bridged stream crossing 1,000 or less feet upstream of a public surface drinking water supply for purpose of forest harvesting activities? ☐ Yes ☐ No

III. Consistency

Describe the project's consistency with water conservation plans or other plans to enhance water resources, quality, facilities and services:

WASTEWATER SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **wastewater** (see 301 CMR 11.03(5))? ☐ Yes ☒No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **wastewater**? ☐ Yes ☒No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Transportation -- Traffic Generation Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Wastewater Section below.

II. Impacts and Permits

A. Describe the volume (in gallons per day) and type of disposal of wastewater generation for existing and proposed activities at the project site (calculate according to 310 CMR 15.00 for septic systems or 314 CMR 7.00 for sewer systems):

	Existing	Change	Total
Discharge of sanitary wastewater			
Discharge of industrial wastewater			
TOTAL			

	Existing	Change	Total
Discharge to groundwater			
Discharge to outstanding resource water			
Discharge to surface water			
Discharge to municipal or regional wastewater facility			
TOTAL			

B. Is the existing collection system at or near its capacity? ☐ Yes ☐ No; if yes, then describe the measures to be undertaken to accommodate the project's wastewater flows:

C. Is the existing wastewater disposal facility at or near its permitted capacity? ☐ Yes ☐ No; if yes, then describe the measures to be undertaken to accommodate the project's wastewater flows:

D. Does the project site currently contain a wastewater treatment facility, sewer main, or other wastewater disposal facility, or will the project involve construction of a new facility?
☐ Yes ☐ No; if yes, describe as follows:

	Permitted	Existing Avg. Daily Flow	Project Flow	Total
Wastewater treatment plant capacity (in gallons per day)				

E. If the project requires an interbasin transfer of wastewater, which basins are involved, what is the direction of the transfer, and is the interbasin transfer existing or new?

(NOTE: Interbasin Transfer approval may be needed if the basin and community where wastewater will be discharged is different from the basin and community where the source of water supply is located.)

F. Does the project involve new sewer service by the Massachusetts Water Resources Authority (MWRA) or other Agency of the Commonwealth to a municipality or sewer district?
☐ Yes ☐ No

G. Is there an existing facility, or is a new facility proposed at the project site for the storage, treatment, processing, combustion or disposal of sewage sludge, sludge ash, grit, screenings, wastewater reuse (gray water) or other sewage residual materials? ☐ Yes ☐ No; if yes, what is the capacity (tons per day):

	Existing	Change	Total
Storage	_____	_____	_____
Treatment	_____	_____	_____
Processing	_____	_____	_____
Combustion	_____	_____	_____
Disposal	_____	_____	_____

H. Describe the water conservation measures to be undertaken by the project, and other wastewater mitigation, such as infiltration and inflow removal.

III. Consistency

A. Describe measures that the proponent will take to comply with applicable state, regional, and local plans and policies related to wastewater management:

B. If the project requires a sewer extension permit, is that extension included in a comprehensive wastewater management plan? ☐ Yes ☐ No; if yes, indicate the EEA number for the plan and whether the project site is within a sewer service area recommended or approved in that plan:

TRANSPORTATION SECTION (TRAFFIC GENERATION)

I. Thresholds / Permit

A. Will the project meet or exceed any review thresholds related to **traffic generation** (see 301 CMR 11.03(6))? ☐ Yes ☒ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **state-controlled roadways**? ☐ Yes ☒No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Roadways and Other Transportation Facilities Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Traffic Generation Section below.

II. Traffic Impacts and Permits

A. Describe existing and proposed vehicular traffic generated by activities at the project site:

	Existing	Change	Total
Number of parking spaces			
Number of vehicle trips per day			
ITE Land Use Code(s):			

B. What is the estimated average daily traffic on roadways serving the site?

Roadway	Existing	Change	Total
1.			
2.			
3.			
etc.			

C. If applicable, describe proposed mitigation measures on state-controlled roadways that the project proponent will implement:

D. How will the project implement and/or promote the use of transit, pedestrian and bicycle facilities and services to provide access to and from the project site?

E. Is there a Transportation Management Association (TMA) that provides transportation demand management (TDM) services in the area of the project site? ☐ Yes ☐ No; if yes, describe if and how will the project will participate in the TMA:

F. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation facilities? ☐ Yes ☐ No; if yes, generally describe:

G. If the project will penetrate approach airspace of a nearby airport, has the proponent filed a Massachusetts Aeronautics Commission Airspace Review Form (780 CMR 111.7) and a Notice of Proposed Construction or Alteration with the Federal Aviation Administration (FAA) (CFR Title 14 Part 77.13, forms 7460-1 and 7460-2)?

III. Consistency

Describe measures that the proponent will take to comply with municipal, regional, state, and federal plans and policies related to traffic, transit, pedestrian and bicycle transportation facilities and services:

TRANSPORTATION SECTION (ROADWAYS AND OTHER TRANSPORTATION FACILITIES)

I. Thresholds

A. Will the project meet or exceed any review thresholds related to **roadways or other transportation facilities** (see 301 CMR 11.03(6))? ☐ Yes ☒ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **roadways or other transportation facilities**? ☐ Yes ☒ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Energy Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Roadways Section below.

II. Transportation Facility Impacts

A. Describe existing and proposed transportation facilities in the immediate vicinity of the project site:

B. Will the project involve any:

1. Alteration of bank or terrain (in linear feet)? _____
2. Cutting of living public shade trees (number)? _____
3. Elimination of stone wall (in linear feet)? _____

III. Consistency

Describe the project's consistency with other federal, state, regional, and local plans and policies related to traffic, transit, pedestrian and bicycle transportation facilities and services, including consistency with the applicable regional transportation plan and the Transportation Improvements Plan (TIP), the State Bicycle Plan, and the State Pedestrian Plan:

ENERGY SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **energy** (see 301 CMR 11.03(7))? ☐ Yes ☒ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **energy**? ☐ Yes ☒ No; if yes, specify which permit: _____

C. If you answered "No" to both questions A and B, proceed to the **Air Quality Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Energy Section below.

II. Impacts and Permits

A. Describe existing and proposed energy generation and transmission facilities at the project site:

	Existing	Change	Total
Capacity of electric generating facility (megawatts)	_____	_____	_____
Length of fuel line (in miles)	_____	_____	_____
Length of transmission lines (in miles)	_____	_____	_____
Capacity of transmission lines (in kilovolts)	_____	_____	_____

B. If the project involves construction or expansion of an electric generating facility, what are:
1. the facility's current and proposed fuel source(s)?
2. the facility's current and proposed cooling source(s)?

C. If the project involves construction of an electrical transmission line, will it be located on a new, unused, or abandoned right of way? ☐ Yes ☐ No; if yes, please describe:

D. Describe the project's other impacts on energy facilities and services:

III. Consistency

Describe the project's consistency with state, municipal, regional, and federal plans and policies for enhancing energy facilities and services:

AIR QUALITY SECTION

I. Thresholds

A. Will the project meet or exceed any review thresholds related to **air quality** (see 301 CMR 11.03(8))? ☐ Yes ☒ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **air quality**? ☐ Yes ☒ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Solid and Hazardous Waste Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Air Quality Section below.

II. Impacts and Permits

A. Does the project involve construction or modification of a major stationary source (see 310 CMR 7.00, Appendix A)? ☐ Yes ☐ No; if yes, describe existing and proposed emissions (in tons per day) of:

	Existing	Change	Total
Particulate matter			
Carbon monoxide			
Sulfur dioxide			
Volatile organic compounds			
Oxides of nitrogen			
Lead			
Any hazardous air pollutant			
Carbon dioxide			

B. Describe the project's other impacts on air resources and air quality, including noise impacts:

III. Consistency

A. Describe the project's consistency with the State Implementation Plan:

B. Describe measures that the proponent will take to comply with other federal, state, regional, and local plans and policies related to air resources and air quality:

SOLID AND HAZARDOUS WASTE SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **solid or hazardous waste** (see 301 CMR 11.03(9))? ☐ Yes ☒ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **solid and hazardous waste**? ☐ Yes ☒ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Historical and Archaeological Resources Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Solid and Hazardous Waste Section below.

II. Impacts and Permits

A. Is there any current or proposed facility at the project site for the storage, treatment, processing, combustion or disposal of solid waste? ☐ Yes ☐ No; if yes, what is the volume (in tons per day) of the capacity:

	Existing	Change	Total
Storage			
Treatment, processing			
Combustion			
Disposal			

B. Is there any current or proposed facility at the project site for the storage, recycling, treatment or disposal of hazardous waste? ☐ Yes ☐ No; if yes, what is the volume (in tons or gallons per day) of the capacity:

	Existing	Change	Total
Storage			
Recycling			
Treatment			
Disposal			

C. If the project will generate solid waste (for example, during demolition or construction), describe alternatives considered for re-use, recycling, and disposal:

D. If the project involves demolition, do any buildings to be demolished contain asbestos? ☐ Yes ☐ No

E. Describe the project's other solid and hazardous waste impacts (including indirect impacts):

III. Consistency

Describe measures that the proponent will take to comply with the State Solid Waste Master Plan:

HISTORICAL AND ARCHAEOLOGICAL RESOURCES SECTION

I. Thresholds / Impacts

A. Have you consulted with the Massachusetts Historical Commission? ☐ Yes ☒ No; if yes, attach correspondence. For project sites involving lands under water, have you consulted with the Massachusetts Board of Underwater Archaeological Resources? ☐ Yes ☒ No; if yes, attach correspondence

B. Is any part of the project site a historic structure, or a structure within a historic district, in either case listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth? ☐ Yes ☒ No; if yes, does the project involve the demolition of all or any exterior part of such historic structure? ☐ Yes ☒ No; if yes, please describe:

C. Is any part of the project site an archaeological site listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth? ☐ Yes ☒ No; if yes, does the project involve the destruction of all or any part of such archaeological site? ☐ Yes ☐ No; if yes, please describe:

D. If you answered "No" to all parts of both questions A, B and C, proceed to the **Attachments and Certifications** Sections. If you answered "Yes" to any part of either question A or question B, fill out the remainder of the Historical and Archaeological Resources Section below.

II. Impacts

Describe and assess the project's impacts, direct and indirect, on listed or inventoried historical and archaeological resources:

The project is designed to refurbish and/or repair existing structures that are proposed for nomination on the National Registry of Historic Places. Please see the attached narrative for historic background and additional details.

III. Consistency

Describe measures that the proponent will take to comply with federal, state, regional, and local plans and policies related to preserving historical and archaeological resources:

Please see the attached project narrative for measures designed to comply with such plans and policies to preserve these resources.

CERTIFICATIONS:

1. The Public Notice of Environmental Review has been/will be published in the following newspapers in accordance with 301 CMR 11.15(1):

   (Name) Ipswich Chronicle (Date) 04/25/19

2. This form has been circulated to Agencies and Persons in accordance with 301 CMR 11.16(2).

Signatures:

Date — Signature of Responsible Officer or Proponent	4/15/19 — Date — Signature of person preparing ENF (if different from above)
Anthony Marino, Town Manager	Jennifer Relstab, P.E.
Name (print or type)	Name (print or type)
Town of Ipswich, MA	Horsley Witten Group, Inc.
Firm/Agency	Firm/Agency
25 Green Street	294 Washington Street, Suite 801
Street	Street
Ipswich, MA 01938	Boston, MA 02108
Municipality/State/Zip	Municipality/State/Zip
978-356-6609	(857) 263-8193
Phone	Phone

Ipswich River Coastal Bank Restoration and Resiliency Project

ENF Distribution List

Secretary Matthew A. Beaton *****2 Copies***
Executive Office of Energy & Environmental Affairs
Attn: MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02114

Overnight Delivery

Department of Environmental Protection
Boston Office
Commissioner's Office
One Winter Street
Boston, MA 02108

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Attn: MEPA Coordinator
205B Lowell Street
Wilmington, MA 02347

MA Department of Transportation
Public/Private Development Unit
10 Park Plaza, Suite #4150
Boston, MA 02116

MA DOT – District #4
Attn: MEPA Coordinator
519 Appleton Street
Arlington, MA 02476

Massachusetts Historical Commission
The MA Archives Building
220 Morrissey Boulevard
Boston, MA 02125

Metropolitan Area Planning Council
60 Temple Place, 6th Floor
Boston, MA 02111

Town of Ipswich
Board of Selectmen
c/o Anthony Marino, Town Manager
25 Green Street
Ipswich, MA 01938

Town of Ipswich
Planning Board
c/o Glenn Gibbs, Planning Director
25 Green Street
Ipswich, MA 01938

Town of Ipswich
Conservation Commission
c/o Alicia Geilen, Conservation Administrator
25 Green Street
Ipswich, MA 01938

Town of Ipswich
Board of Health
c/o Colleen E. Fermon, Director
25 Green Street
Ipswich, MA 01938

Coastal Zone Management
Attn: Kathryn Glenn, North Shore Coordinator
251 Causeway Street, Suite 800
Boston, MA 02114

Division of Marine Fisheries (North Shore)
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930
Email: DMF.EnvReview-North@state.ma.us

Ipswich River Watershed Association
c/o Kristen Grubbs, Environmental Planner
P.O. Box 576
Ipswich, MA 01938

Kevin McHugh, PE
Coneco Engineering
238 Littleton Road
Westford, MA 01886

Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs

MEPA Office

100 Cambridge St., Suite 900
Boston, MA 02114
Telephone 617-626-1020

The following should be completed and submitted to a local newspaper:

PUBLIC NOTICE OF ENVIRONMENTAL REVIEW

PROJECT: Ipswich River Coastal Bank Restoration and Resiliency Project

LOCATION: 25 Green Street, Ipswich, MA

PROPONENT: Town of Ipswich

The undersigned is submitting an Environmental Notification Form ("ENF") to the Secretary of Energy & Environmental Affairs on or before
April 16, 2019 *(date)*

This will initiate review of the above project pursuant to the Massachusetts Environmental Policy Act ("MEPA", M.G.L. c. 30, s.s. 61-62I). Copies of the ENF may be obtained from:
Jennifer Relstab
294 Washington Street, Boston MA 02108
(857) 263-8193
(Name, address, phone number of proponent or proponent's agent)

Copies of the ENF are also being sent to the Conservation Commission and Planning Board of Ipswich *(Municipality)* **where they may be inspected.**

The Secretary of Energy & Environmental Affairs will publish notice of the ENF in the Environmental Monitor, will receive public comments on the project for 20 days, and will then decide, within ten days, if an environmental Impact Report is needed. A site visit and consultation session on the project may also be scheduled. All persons wishing to comment on the project, or to be notified of a site visit or consultation session, should write to the Secretary of Energy & Environmental Affairs, 100 Cambridge St., Suite 900, Boston, Massachusetts 02114, Attention: MEPA Office, referencing the above project.

By Town of Ipswich *(Proponent)*

Attachment 1

Existing Conditions Memo
Site Photos
Locus Maps

Horsley Witten Group
Sustainable Environmental Solutions
90 Route 6A • Unit 1 • Sandwich, MA 02563
508-833-6600 • horsleywitten.com

MEMORANDUM

To: Alicia Geilan, CEP, Administrator

From: Amy M. Ball, PWS, CWS

Date: 11 March 2019

Re: Wetland Resource Areas – Ipswich River Coastal Resiliency and Coastal Bank Stabilization Project, County Street, Ipswich, MA

The following summarizes the wetland resource areas and existing conditions observed at the referenced site and discusses considerations for future project design and permitting.

1. General Site Description

The project site, formerly identified as "AOC-4" is situated in a small cove along the Ipswich River just downstream of the County Street bridge in Ipswich, Massachusetts (Figures 1 and 2). Ipswich Town Hall and recreational ball fields are located to the northeast of the site, while downtown Ipswich is generally located to the north and west of the site. An existing gravel walking path, the Sidney N. Shurcliff River Walk, parallels the river from County Street to Green Street bisecting the moderately steep slope that descends from the ball fields to the river. These embankments are densely vegetated with trees, shrubs, and groundcover (although much of the vegetation is non-native), and/or support boulders and rocky outcrops. However, there appear to be two areas where foot traffic to the waters' edge has begun to erode the slope. In addition, there was erosion noted along the stairway from the ball fields to the walking path.

Photo 1. View of 18-inch corrugated metal pipe that discharges stormwater into the Ipswich River at the site along County Street. The land beneath the culvert is deeply undercut.

Portions of the lower reaches of the embankments are deeply undercut and eroded, most extensively beneath the outfall pipe that discharges stormwater from County Street into the river at this location (Photo 1).

Downgradient of the vegetated slopes, tidal flats are periodically exposed with the rise and fall of the tide and support a freshwater to slightly brackish plant community.

FEMA Designation

According to the FEMA Flood Insurance Rate Map (Community Panel 25009CO287 G; effective July 16, 2014), the entire site falls within Zones AE (elevation 10 feet above sea level) “areas of 100-year flood; base flood elevations and flood hazard factors determined” (Figures 3 and 3A).

State-listed Rare Species Habitat

The most recent version of the Massachusetts Natural Heritage Atlas (14th Edition, August 1, 2017), identifies that the site does not fall within areas of Estimated Habitat of Rare Wildlife or within Priority Habitat of Rare Species as designated by the Massachusetts Natural Heritage and Endangered Species Program (NHESP)(Figure 4).

2. Wetland Resource Areas

The site supports several wetland and coastal resource areas. Each is defined and described below and shown on the Existing Conditions plans prepared by Coneco Engineers & Scientists, dated November 28, 2018, and revised.

Resource Area Delineation Methodology

HW conducted a site visit on October 4, 2018 to identify and delineate the landward boundaries of wetland resource areas at the site. In determining the resource area boundaries, HW followed the definitions, program policies, and guidance under the Massachusetts Wetlands Protection Act regulations at 310 CMR 10.00 and under the Town of Ipswich Wetlands Protection By-Law (Chapter 224) Rules and Regulations.

Prior to conducting field delineations, HW reviewed existing source data, including USGS Geological Survey topographic maps, USDA Natural Resources Conservation Service (NRCS) soils survey, and other source data available through the Massachusetts Geographic Information System (MassGIS) to identify the presence of jurisdictional resource areas and other constraints within the site.

HW identified the following resource areas associated with this site:

- Land Under Water Bodies and Waterways (310 CMR 10.56)
- Tidal Flat (310 CMR 10.27)
- Land Subject to Coastal Storm Flowage (310 CMR 10.04)
- Coastal Bank (310 CMR 10.30)
- Rocky Intertidal Shore (310 CMR 10.31) and
- Riverfront Area (310 CMR 10.58).

These resource areas are summarized and discussed in the following pages.

Land Under Water Bodies and Waterways

Land Under Water Bodies and Waterways is defined at 310 CMR 10.56(2)(a) as "*the land beneath any creek, river, stream, pond or lake. Said land may be composed of organic muck or peat, fine sediments, rocks or bedrock. The boundary of LUW is the mean annual low water level.*"

Ipswich River is a tidally influenced body of water that flows along this site. Here, the river itself exhibits two different flow regimes, roughly separated by a rocky outcrop in the center of the river (Photos 2 and 3). The different flow regimes are further influenced by a partial dam located at the downgradient limit of this site (Photos 3 and 4). Water flow along the right bank of the river exhibits higher energy ("Lower Falls"), while flow along the left bank of the river appears to be calmer.

Photo 2.View from County Street Bridge looking downgradient along the right bank of river with the rocky outcrop that physically separates the right and left sides of the river at this location.

Photo 3. View of left bank of Ipswich River (looking downstream). A portion of an old dam restricts water flow during low tide cycles. The dam, coupled with a rocky outcrop located in the center of the river creates a different flow regime on the left and right banks of the river at this location.

Photo 4. Aerial view of site. Flow and water circulation within this reach of the Ipswich River are influenced by a portion of an existing dam structure and a rock outcrop in the center of the river. Google images ©2018.

The boundary of Land Under Waterbodies and Waterways is the mean annual low water level as shown on the Existing Conditions plans.

Tidal Flat

Tidal Flat is defined at 310 CMR 10.27(2) as "*any nearly level part of a coastal beach which usually extends from the mean low water line landward to the more steeply sloping face of the coastal beach or which may be separated from the beach by land under the ocean.*"

The area between the river and the upgradient land is best characterized as a tidal flat at this site. This area consists largely of open mud flats that are partially-vegetated by a Freshwater Tidal Marsh community. Most notable at the time of our site visit was a dense population of seaside brookweed or water pimpernel (*Samolus valerandi*) that occupied a variable 3 to 5 foot wide swath immediately downgradient of the delineated MHW (Photo 5). Other species observed include smartweed (*Polygonum* sp.), aster (*Aster* or *Symphotrichum* spp.), beggar's ticks (*Bidens frondosa*), and water willow (*Decodon verticillatus*). This vegetation community diminishes downstream, as the substrate becomes increasingly rocky.

Flagging stations MHW 1 through MHW 25 depict the landward limit of the Tidal Flats, which approximately coincides with elevations 4-5 feet.

Photo 5. The upper reaches of the tidal flats are vegetated with a Freshwater to Brackish Tidal Marsh community. Inset is a close up view of the seaside brookweed.

Riverfront Area

The regulations at 310 CMR10.58(2)(a)1.a. state that "*A river or stream shown as perennial on the current United States Geological Survey (USGS) or more recent map provided by the Department is perennial*."

Riverfront Area is defined at 310 CMR 10.58(2)(a)3 as "*the area of land between a river's mean annual high-water line measured horizontally outward from the river and a parallel line located 200 feet away…*"

Ipswich River is depicted as a perennial stream on the USGS map (see Figure 1), and therefore, is afforded a 200-foot Riverfront Area. Riverfront Area at this site encompasses the entire area upgradient of the MAHW line (here equated with the MHW boundary).

Coastal Bank

Coastal Bank is defined at 310 CMR 10.30(2) as "*the seaward face or side of any elevated landform, other than a coastal dune, which lies at the landward edge of a coastal beach, land subject to tidal action, or other wetland.*"

Coastal Bank at this site is moderately steeply sloped (generally greater than a 25% slope) and is characterized as densely vegetated with trees, shrubs, and groundcover but for a few areas that are eroding due to foot traffic. Scattered areas of rocks and boulders are also found throughout the Coastal Bank at this location. Vegetation observed include a relatively dense canopy dominated by Norway maple (*Acer platanoides*), with scattered slippery elm (*Ulmus rubra*) and occasional silver maple (*Acer saccharinum*).[1] Scattered shrubs consist largely of non-native species, including multiflora rose (*Rosa multiflora*), Japanese barberry (*Berberis thunbergii*), blackberry (*Rubus* sp), privet (*Ligustrum sp.*), and euonymus (*Euonymus* sp.) with occasional *Catalpa* sp. seedlings. Groundcover also consists largely of weedy or invasive species and escaped landscaped plantings, such as English Ivy (*Hedera helix*), willow-herb (*Epilobium* sp.), garlic mustard (*Alliaria petiolata*), and common burdock (*Arctium minus*).

In accordance with the MassDEP Program Policy 92-1, HW established seven transects along the embankment to determine the top of the Coastal Bank. Each of the transect profiles has been correlated with the corresponding MassDEP Figure. The top of the Coastal Bank is generally associated with a break in slope above the 100-year floodzone elevation (10 feet) and is approximately coincident with the seaward edge of the existing path way, as shown on the Existing Conditions plans. A copy of the Coastal Bank Delineation Checklist[2] is attached as required under the local bylaw.

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[1] Trees larger than six inches DBH are shown on the Existing Conditions plans, and the general health and condition of these trees has been noted.

[2] Applying the Massachusetts Coastal Wetlands Regulations: A Practical Manual for Conservation Commissions to Protect the Storm Damage Prevention and Flood Control Functions of Coastal resource Areas, Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs (EEA) and Massachusetts Coastal Zone Management (CZM), August 2017.

Photo 6. View of site from County Street bridge. Partially vegetated Tidal Flats are visible along the left side of the image, while downstream, the river's left bank becomes more of a rocky intertidal community. The vegetated Coastal Bank is visible in the background.

Rocky Intertidal Shore

Immediately downstream of the site, the habitat along the shoreline is more characteristic of a Rocky Intertidal Shore, which is defined as "*naturally occurring rocky areas, such as bedrock or boulder-strewn areas between the mean high water line and the mean low water line*" (see Photo 6).

Land Subject to Coastal Storm Flowage and Land Subject to Tidal Action

Land Subject to Coastal Storm Flowage (LSCSF) is defined at 310 CMR 10.04 as "*land subject to any inundation caused by coastal storms up to and including that caused by the 100-year storm, surge of record or storm of record, whichever is greater*."

LSCSF at this site includes all areas lying within the 100-year coastal flood elevation of Zone AE (elevation 10 feet), which includes the majority of the embankment (coastal bank) and areas downgradient.

Plant Communities

There are two plant communities associated with this site that should be considered during future design work and permitting at this site, including the vegetation along the Coastal Bank and the vegetation community within the Tidal Flats.

Coastal Bank Vegetation

As part of the existing conditions study, HW assessed trees along the embankment for size (diameter at breast height or DBH), species, and general condition. Table 1, attached, provides a summary of the vegetation. HW generally assessed trees greater than approximately 6-inches in diameter, unless the tree was part of a cluster of trees. In those instances, HW assessed all

trees growing in a cluster. The vast majority of the tree species at this site consist of Norway maples, with lesser amounts of slippery elm and silver maple. Smaller trees and saplings (i.e., less than 6 inches DBH) consist of a mix of slippery elm and Norway maple.

The majority of the vegetation, including trees, shrubs, and groundcover is comprised of non-native vegetation, some of which has been identified by Massachusetts Invasive Plant Advisory Group (MIPAG)[3] as invasive or likely invasive; just one tree species observed (silver maple) is native. HW recommends that if restoration activities require revegetation, that native species be utilized in the planting plan.

Tidal Flat Plant Community

As noted above, a narrow band of low-growing aquatic vegetation grows just downgradient of the MHW line. The approximate location of this vegetation community is shown on the Existing Conditions Plan.

The Massachusetts Division of Fisheries & Wildlife, NHESP notes that this species is associated with two different types of plant communities, Freshwater Tidal Marsh and Brackish Tidal Marsh[4]. These habitats are flooded twice daily by the tidal influence of the high tides and represents the upstream end of the tidal gradient from salt marsh to brackish marsh to freshwater tidal marsh. The dominant species observed during our site visit was seaside brookweed/ water pimpernel, which can tolerate slightly brackish conditions and is found in both habitats. Freshwater Tidal Marshes are characterized by plant species that are generally salt-intolerant (0.5 parts per thousand (ppt) salinity or less), though there is a salinity gradient of 0.5 to 5 ppt salinity. Brackish Tidal Marshes, while similar in nature to Freshwater Tidal Marshes, occur in areas with more salt-tolerant species and a higher salinity gradient of 5-18 ppt. Species within Freshwater Tidal Marsh communities overlap somewhat with those found more commonly in Brackish Tidal Marsh communities. Within Brackish Tidal Marsh communities, it is typical to find more freshwater (less salt-tolerant) plants occurring in higher marsh areas.

Available salinity data collected by the Ipswich River Watershed Association (IRWA) for this approximate location taken between March 28, 2012 and January 12, 2017 indicate that this site is generally freshwater or only slightly brackish. Average salinity during this time period was 4.2 ppt with a range of 0-20 ppt, although two samples collected are much greater than remaining samples (14 and 20 ppt taken August 9, 2016 and July 16,2012, respectively). Remaining data indicate an average salinity of approximately 1 ppt.

Upstream of AOC-4, near Choate Bridge, salinity readings collected between January 26, 2010 and October 24, 2017 average just 1.2 ppt, with just one outlying data point (13 ppt recorded on August 9, 2016). Site observations made by the Town of Ipswich near 4 South Main Street, indicate that the plant community found at AOC-4 may also be located just upstream on the

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[3] Massachusetts Invasive Plant Advisory Group (https://www.massnrc.org/mipag/)

[4] Swain, P.C. 2016. Classification of the Natural Communities of Massachusetts. Version 2.0. Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries and Wildlife. Westborough, MA.

opposite bank of the river. The Conservation Commission has also identified additional areas where this plant occurs, both upstream and downstream of AOC-4.

NHESP ranks each type of natural community based upon a ranking system developed by The Nature Conservancy. The state rank reflects the rarity and threat to each community within Massachusetts, and ranges from S1-Critically Imperiled in Massachusetts to S5-Secure in Massachusetts. Freshwater Tidal Marshes are ranked as S1 in Massachusetts "*Critically imperiled in the state because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very few remaining acres or miles of stream or other factors making it especially vulnerable to extirpation from the state*." Brackish Tidal Marshes are ranked as S2 "*Imperiled in the state because of rarity (typically 6 -20 occurrences), very restricted range, few remaining acres, or miles of stream or other factors making it very vulnerable to extirpation from the state*."

HW recommends that this habitat be preserved to the extent practical upon restoration, and while this area is not mapped as rare species habitat, we recommend early consultation with NHESP regarding protection of this plant community.

Potential Reference Site

HW also made observations of a site located downstream of this site (former study site "AOC-1") to determine if this site could serve as a reference site for restoration efforts. AOC-1 is located south of Green Street, approximately 0.25 mi downstream of this site. Here the plant community is limited by the presence of Water Street that runs parallel to the river, such that the vegetation communities are limited to a narrow band of vegetation along the Coastal Bank and the plant community below MHW. Here, the tidally influenced river has a greater salinity regime, supporting a band of saltmarsh vegetation (smooth cordgrass (e.g., *Spartina alterniflora*), saltmarsh cordgrass (*Spartina patens*), seaside goldenrod (*Solidago sempervirens*)) as opposed to the freshwater plant community observed at the project site.

As such, the vegetation community below MHW at AOC-1 may not serve as a suitable reference site. However, some of the native vegetation growing along the coastal bank at AOC-1 may be useful should there be a need to restore plantings along the Coastal Bank at this site. These include boxelder (*Acer negundo*), shadbush (*Amelanchier* sp.), black cherry (*Prunus serotina*) maybe suitable as restoration plantings at this site.

Additional Considerations

Other considerations with respect to the site and potential regulatory implications are shown on Figure 4.

- Impaired Waters. The Massachusetts Year 2016 Integrated List of Waters or "303(d) List: identifies this portion of the Ipswich River as a Category 5 water – "Waters requiring a TMDL."[5] The pollutant listed is fecal coliform.

- Filled Tidelands. The MassGIS maps indicate that a portion of this site is located within filled tidelands, a jurisdictional area under the MA Public Waterfront Act (see Figure 4).

- Time of Year Restrictions. The Massachusetts Division of Marine Fisheries (DMF) identifies this reach of the Ipswich River as supporting fisheries habitat for several species. During a pre-permitting consultation, DMF identifies this reach of the river as smelt and herring spawning grounds, and has identified time of year (TOY) restrictions from 15 March to 30 June each year for in-stream activities. This TOY restriction should be confirmed during permitting.

- Article 97 Lands. According to MassGIS, this site is not located within Article 97 lands.

3. Regulatory Implications

Any proposed activities within the resource areas at this site or within 100 feet of the top of Coastal Bank or within 200 feet of the MAHW line (i.e., in Riverfront Area) will require at a minimum, review and permitting through the Ipswich Conservation Commission. In addition, proposed activities below MHW or within filled tidelands will require a Chapter 91 license or permit from the Massachusetts Department of Environmental Protection (MassDEP) Waterways Program. Activities exceeding 5,000 SF of alteration of Land Under Waterbodies and Waterways may also require a Water Quality Certification (WQC) issued by MassDEP. In addition, activities proposed below the MLW line or within navigable waters will also require permitting through the U.S. Army Corps of Engineers under Sections 10 and or Section 404 of the Federal Clean Water Act.

Finally, activities that require permitting, licensing, certification from a State agency (e.g., MassDEP) and/or Projects that are funded through State Financial Assistance also require review under the Massachusetts Environmental Policy Act.

Please do not hesitate to contact HW with any questions regarding existing conditions at this site.

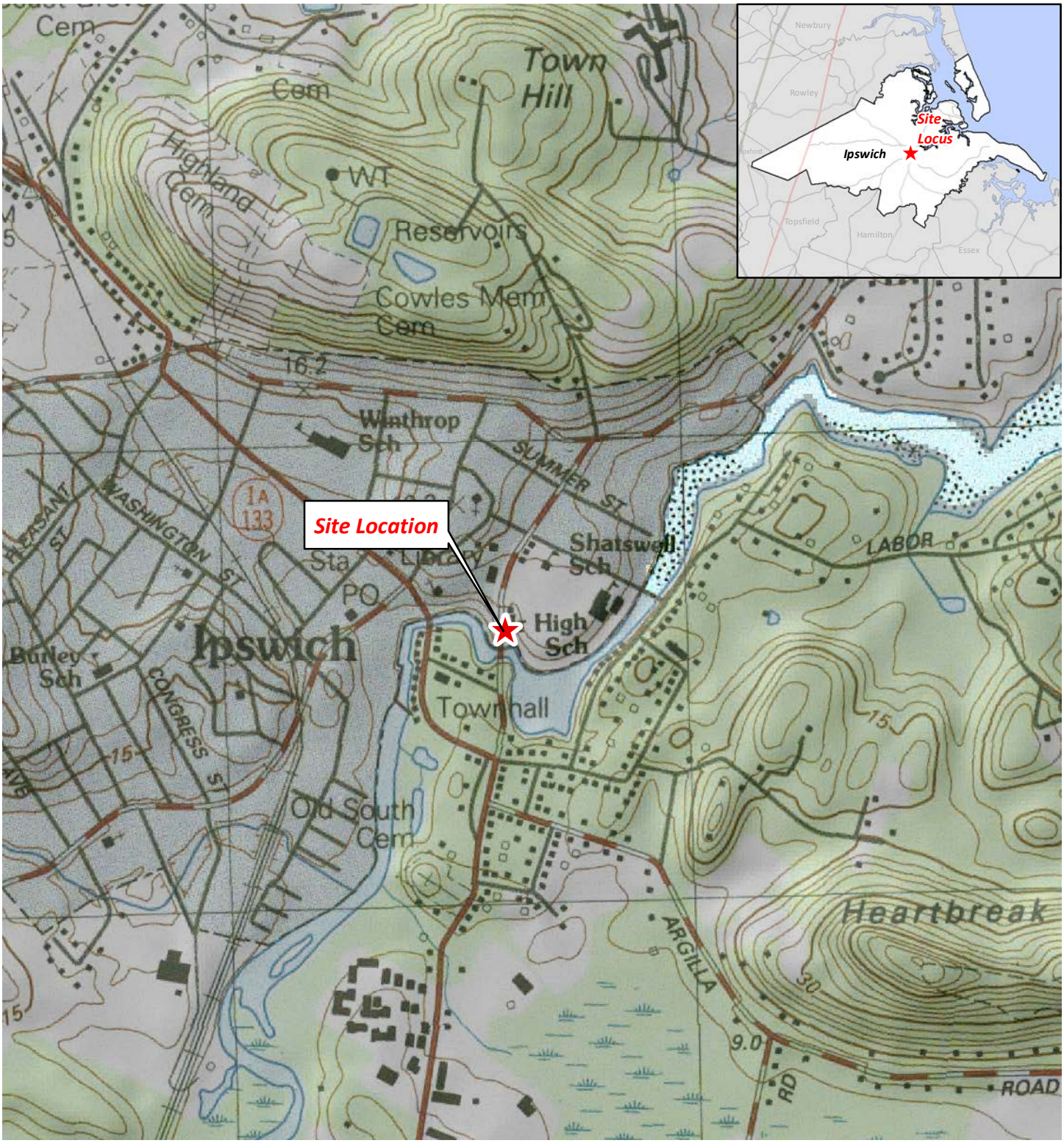
Attachments:

Locus Maps
Table 1. Summary of Trees along Embankment at Site

[5]The Massachusetts Year 2016 Integrated List of Waters: Proposed Listing of the Condition of Massachusetts' Waters Pursuant to Sections 305(b), 314 and 303(d) of the Clean Water Act. Massachusetts Department of Environmental Protection.

Table 1. Summary of Trees along Embankment at Site

Tree #	**DBH** (inches)	**Species**	**Notes**
1	7.5	Norway maple	Almost dead. Abundant bittersweet among branches.
2	7.5	Norway maple	Dead, leaning. Clustered with tree #s 3, 4.
3	7.2	Norway maple	Partly dead, leaning. Clustered with tree #s 2, 4.
4	4.5	Norway maple	Partly dead, leaning. Clustered with tree #s 2, 3.
5	10	Norway maple	Crown partly dead, leaning.
6	8.8	Norway maple	One leader, dead.
7	8.8	Norway maple	Leader dead. Otherwise good condition.
8	20.5	Norway maple	Leader dead. Few dead branches. Leaning. Poison ivy along trunk.
9	7	Norway maple	Relatively healthy. Small *Catalpa* seedling just downgradient. Clusters of Privet, bittersweet and poison ivy upgradient.
10	15.7	Norway maple	Leader dead. Larger branches trimmed. Located near pet waste station.
11/12	13.2/15	Norway maple	Twin. Larger stem closer to river. Relatively good condition. Cavities at base.
13	6.5	Norway maple	Relatively healthy. Few dead branches.
14	10.5	Norway maple	Relatively healthy. Few dead branches.
15	10.6	Norway maple	Many dead branches. Leaning directly over culvert.
16	8.3	Norway maple	Mostly dead but for single branch.
17	6.6	Norway maple	Top dead. No branches.
18	25	Norway maple	Significant root structure along embankment. One leader dead, otherwise healthy.
19	8	Norway maple	Relatively healthy.
20	9.5	Norway maple	Relatively healthy.
21	6.2	Norway maple	Relatively healthy.
22	16.2, 14.5, 7.2, 10.6, 7.2	Silver maple	Quintuple. Just east of other culvert. Two smallest with dead leaders. Larger stem is relatively healthy.
23	5.5	Silver maple	Relatively healthy.
24	15	Slippery elm	Slightly leaning.
25	30.5	Norway maple	Healthy. Right along path. Serves as anchor tree with extensive roots. English ivy.
26	11.4	Norway maple	Relatively healthy. Few dead branches.
27	22	Silver maple	Suckers at base of trunk; leader is mostly dead.
28	8.3	Slippery elm	Relatively healthy. Some bittersweet at base.
29	12	Slippery elm	Relatively healthy. Large overhanging branches at river.
30	5.8	Slippery elm	Lots of suckers. Relatively healthy.
31	8.3	Norway maple	Along path. Relatively healthy. Few dead branches.
32	6.1	Norway maple	Relatively healthy.
33	6.3	Norway maple	Relatively healthy.
34	10.4, 3.5	Norway maple	Twin. Larger is leaning.
35	8.1	Norway maple	Leaning.
36	6.2	Norway maple	Relatively healthy.
37	8.7	Norway maple	Relatively healthy.
38	10.2, 6.4	Norway maple	Twin. Leaning. Located right next to large rock.
39	5.6, 8	Slippery elm	Overhanging river. Leaning over river but upright at base. Growing in rocks.
40	5.2	Slippery elm	Growing along rocks.



Document Path: H:\Projects\2018\18125 Ipswich River Coastal Resiliency - Site 4\GIS\Maps\USGS_Locus.mxd

**Ipswich Topographic Quadrangle*

N

0 1,000

1" = 1,000 feet

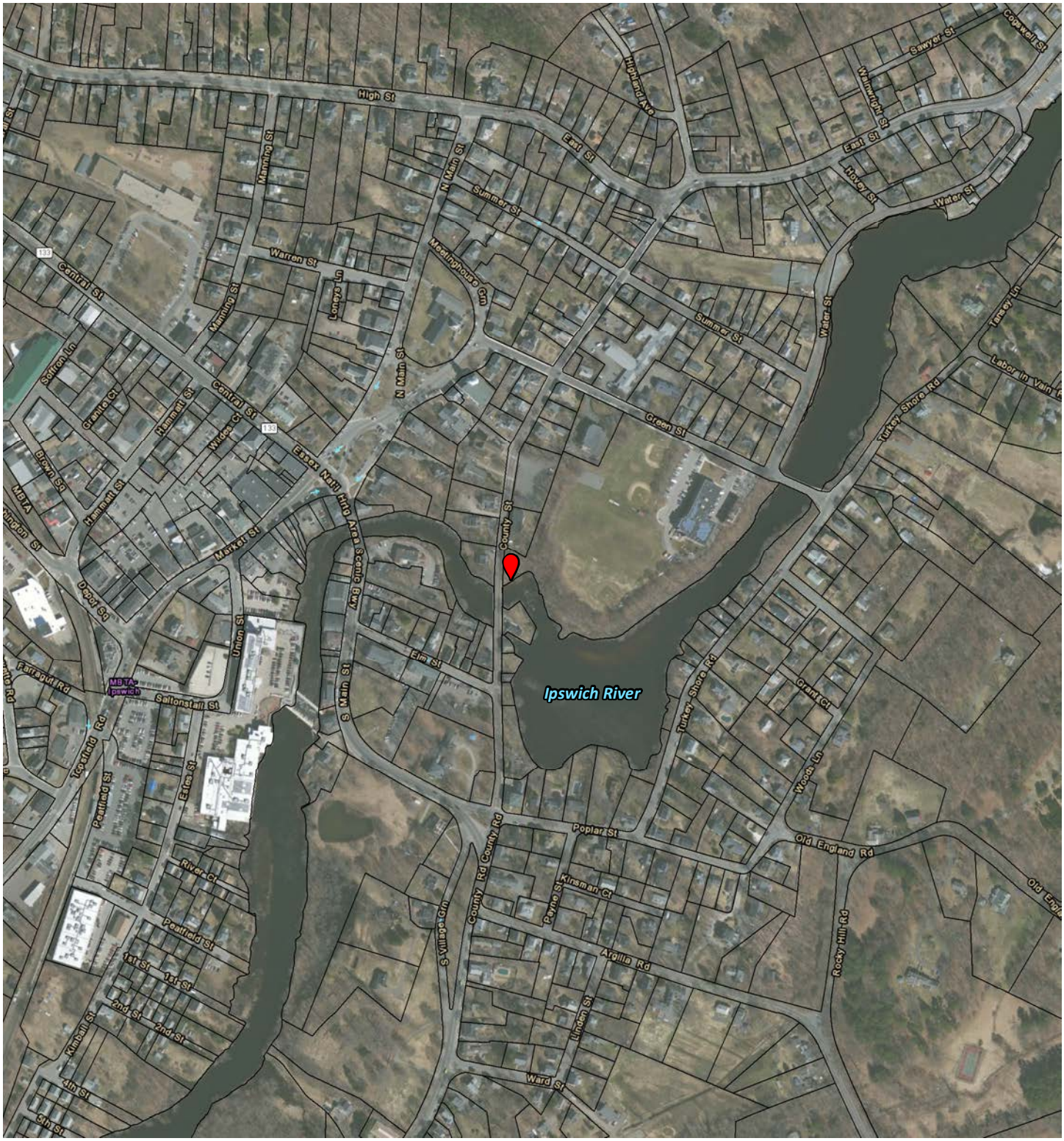
Horsley Witten Group
Sustainable Environmental Solutions
90 Route 6A • Unit 1 • Sandwich, MA 02563
508-833-6600 • horsleywitten.com

USGS Locus
Ipswich River - Area of Concern 4
Ipswich, MA

Date: 9/19/2018

Figure 1

**Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services*



Document Path: H:\Projects\2018\18125 Ipswich River Coastal Resiliency - Site 4\GIS\Maps\Aerial.mxd

**Imagery - World Imagery (Clarity) - ESRI*

Legend

Site Location

N

0 500

1" = 500 feet

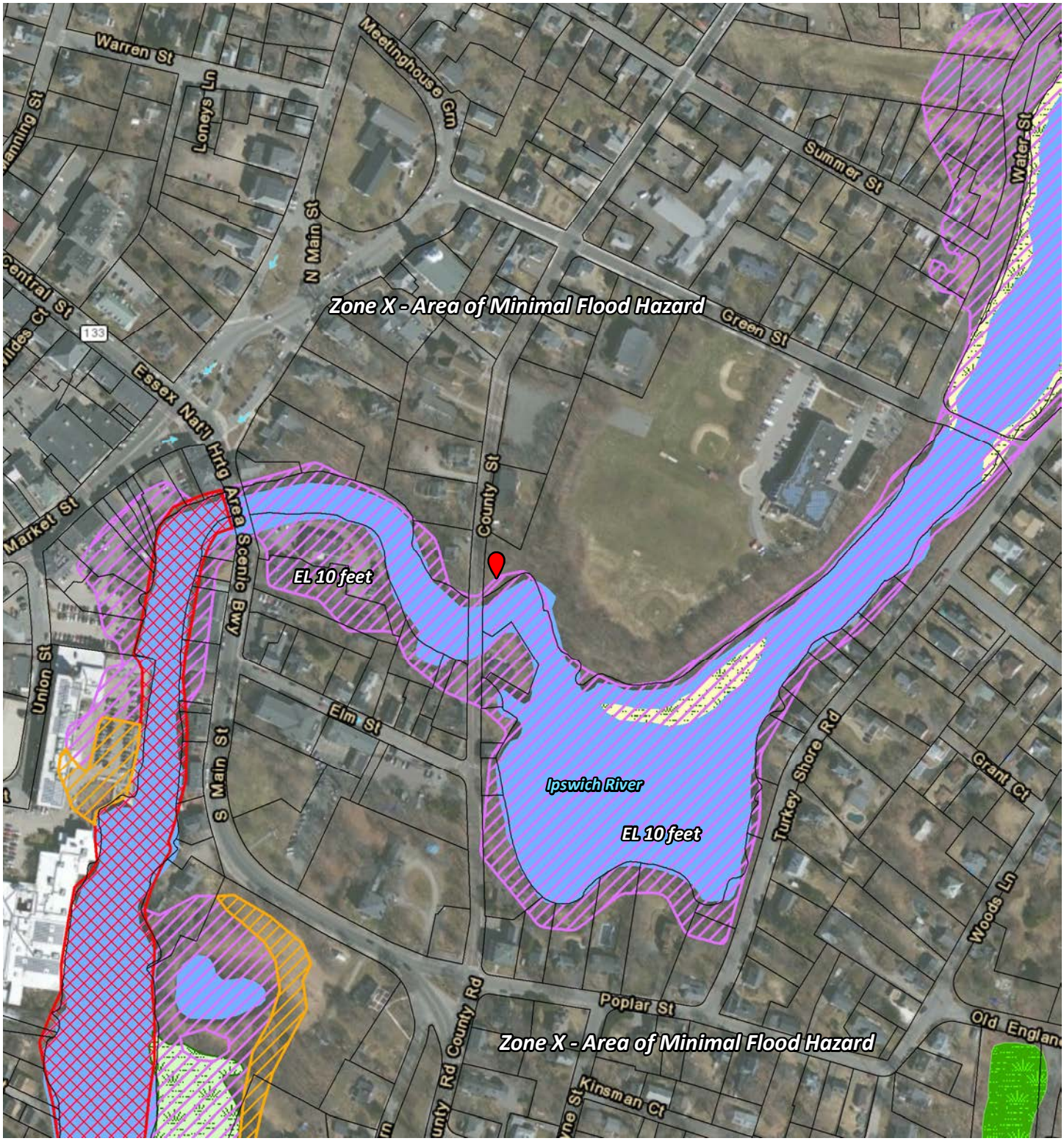
Horsley Witten Group
Sustainable Environmental Solutions
90 Route 6A • Unit 1 • Sandwich, MA 02563
508-833-6600 • horsleywitten.com

Aerial Photo
Ipswich River - Area of Concern 4
Ipswich, MA

Date: 9/19/2018

Figure 2

**Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services*



Document Path: H:\Projects\2018\18125 Ipswich River Coastal Resiliency - Site 4\GIS\Maps\FEMA.mxd

**FEMA's National Flood Hazard Layer (NFHL), 2014*

Legend

- Site Location
- Parcels
- 0.2% Annual Chance Flood Hazard
- Regulatory Floodway
- Zone AE - 1% Annual Chance Flood Hazard

DEP Wetlands

- Hydrologic Connection
- Marsh/Bog
- Wooded marsh
- Open Water
- Tidal Flats

N

0 300

1" = 300 feet

Horsley Witten Group
Sustainable Environmental Solutions
90 Route 6A • Unit 1 • Sandwich, MA 02563
508-833-6600 • horsleywitten.com

FEMA's National Flood Hazard Layer (NFHL)
Ipswich River - Area of Concern 4
Ipswich, MA

Date: 9/20/2018

Figure 3

**Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services*

National Flood Hazard Layer FIRMette

FEMA

42°41'0.88"N

70°50'24.90"W

70°49'47.44"W

42°40'34.44"N

Feet 1:6,000

0 250 500 1,000 1,500 2,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS

- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

- B 20.2 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- 8 Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS

- Digital Data Available
- No Digital Data Available
- Unmapped

N

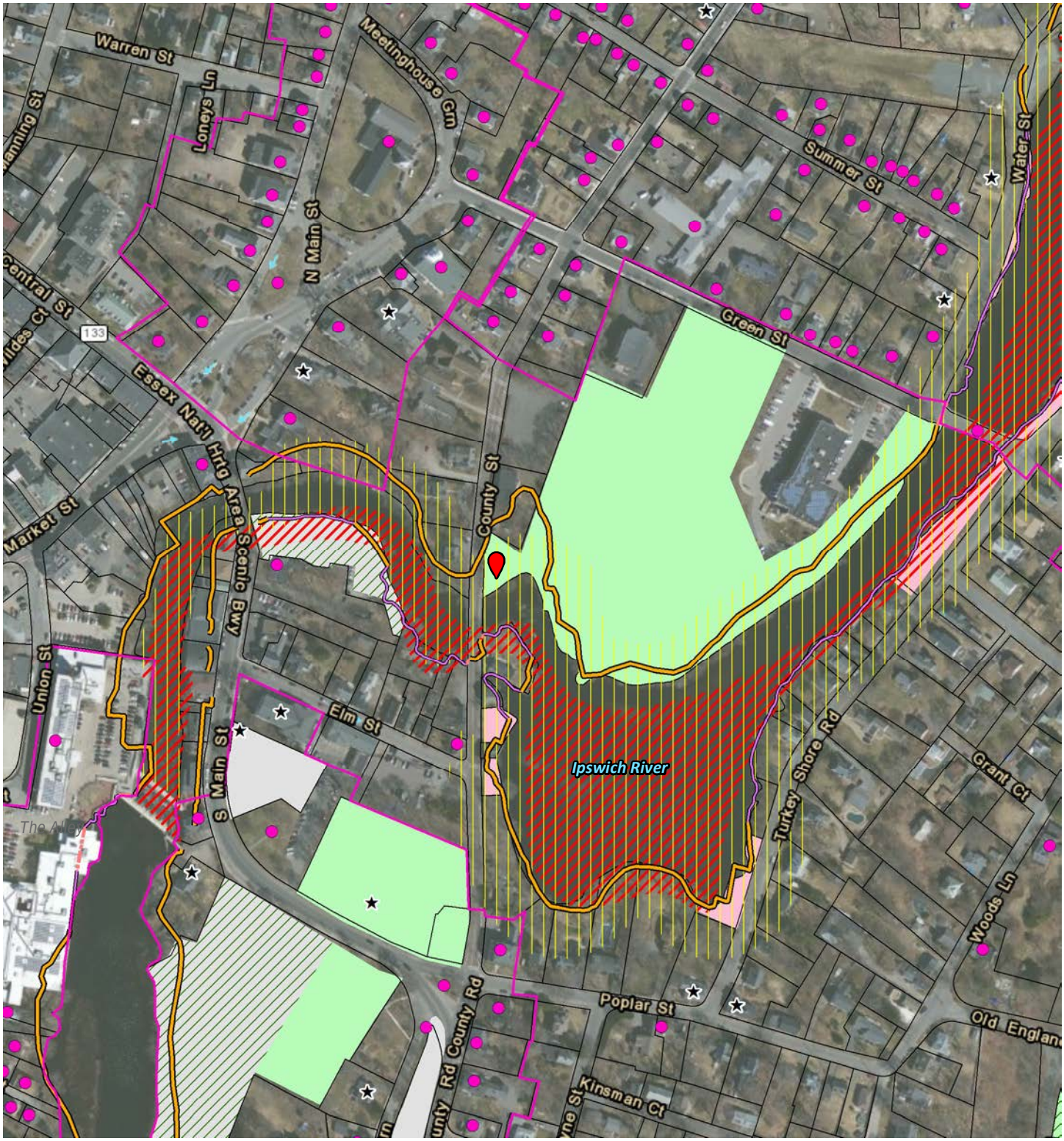
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/18/2018 at 9:22:28 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Figure 3A



Document Path: H:\Projects\2018\18125 Ipswich River Coastal Resiliency - Site 4\GIS\Maps\Constraints.mxd

Legend

ARTICLE 97

- No
- Yes
- Unknown

OpenSpace: Interest Overlay

- Conservation Restriction

- Site Location
- Nat'l Register of Historic Places
- Preservation Restriction
- Nat'l Register of Historic Places
- Core Habitat

Tidelands Jurisdiction Data

- Jurisdiction
- Contemporary High Water
- Inferrred Contemporary High Water

**GIS Data - MassGIS*

- Parcels
- 2014 Integrated List Data 305(b)/303(d) - Impaired

N

0 300

1" = 300 feet

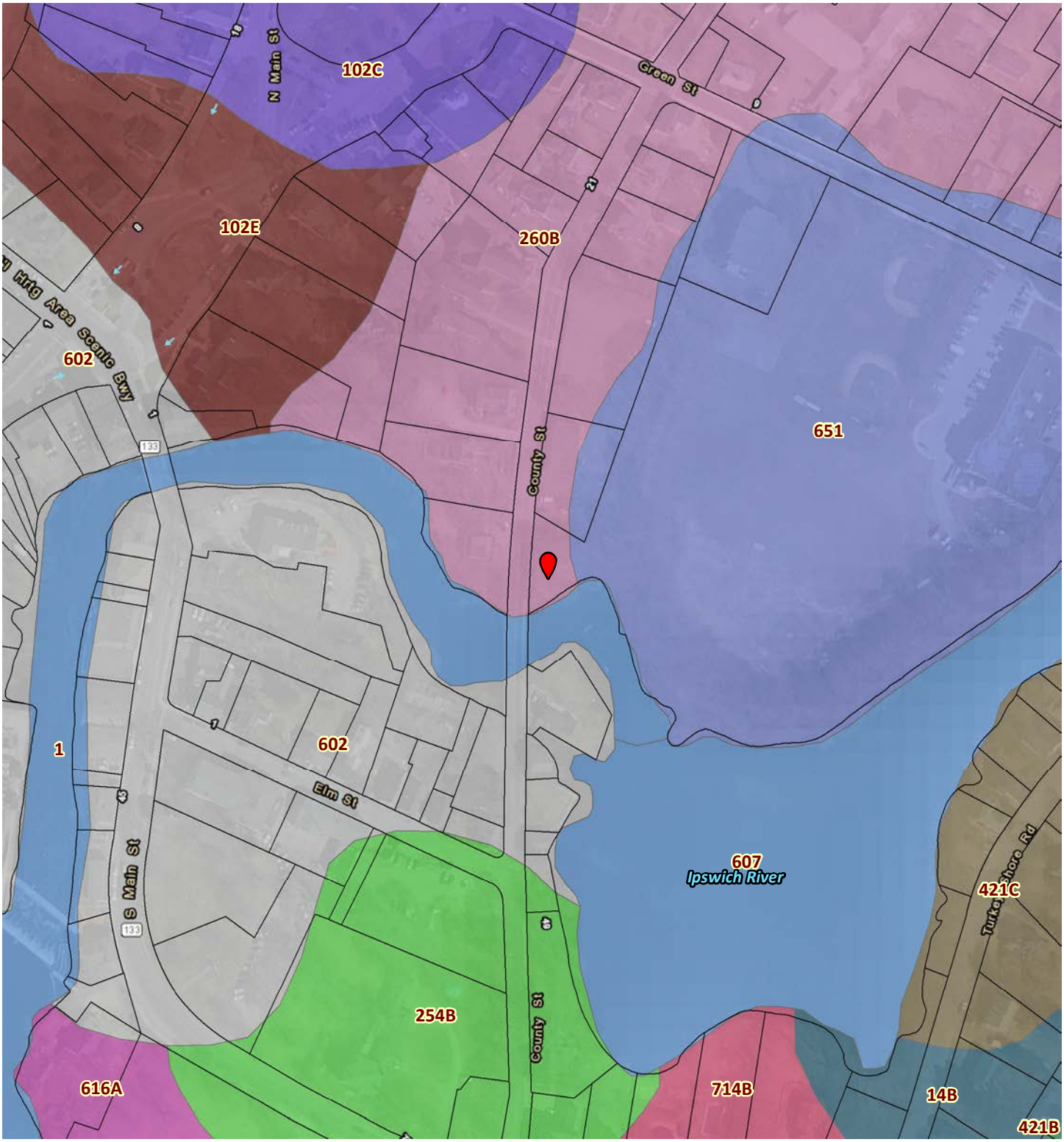
Horsley Witten Group
Sustainable Environmental Solutions
90 Route 6A • Unit 1 • Sandwich, MA 02563
508-833-6600 • horsleywitten.com

Existing Constraints
Ipswich River - Area of Concern 4
Ipswich, MA

Date: 9/20/2018

Figure 4

**Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services*



Document Path: H:\Projects\2018\18125 Ipswich River Coastal Resiliency - Site 4\GIS\Maps\Soils.mxd

*Soils - MassGIS 2012

Legend

- Site Location
- Parcels

MUSYM, compname, hydgrp

- 1, Water, N/A
- 102C, Chatfield, B
- 102E, Chatfield, B
- 14B, Scitico, C
- 254B, Merrimac, A
- 260B, Sudbury, B
- 421B, Canton, B
- 421C, Canton, B
- 602, Urban land, N/A
- 607, Water, N/A
- 616A, Fluvaquents, D
- 651, Udorthents, N/A
- 714B, Melrose, C

N

0 200

1" = 200 feet

Horsley Witten Group
Sustainable Environmental Solutions
90 Route 6A • Unit 1 • Sandwich, MA 02563
508-833-6600 • horsleywitten.com

Essex County Soils
Ipswich River - Area of Concern 4
Ipswich, MA

Date: 9/20/2018

Figure 5

*Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

Coastal Bank Delineation Checklist

Check all that apply:

Indicators of a Coastal Bank	If **yes**:
See other resource area Data Checklists to determine the landward boundaries for beach, dune, salt marsh, rocky intertidal shore, or land subject to coastal storm flowage, and then continue below. Keep in mind that when determining slope, the profile or transect lines must be perpendicular to the contour lines.	
☒ Is there an abrupt change in topography—to a steep seaward-facing slope (steeper than 10:1) or elevated landform that does not meet the criteria for beaches and dunes? *and* ☒ Does the 100-year flood (1%-annual-chance flood) reach this elevated landform? *and* ☒ Is the landform immediately landward of a beach, dune, salt marsh, or rocky intertidal shore; or a body of water such as a lake, stream, or land under a salt pond; or a lowland that is tidal or associated with coastal storm events up to the 100-year storm (1%-annual-chance flood) or storm of record? *and* ☒ Are the underlying sediments on the slope or elevated landform primarily glacial deposits (typically poorly sorted sediments)? *or* ☐ Does the landform consist of artificial fill that serves the functions of a coastal bank (sediment source or vertical buffer)?	The landform is a coastal bank.
Indicators of the Seaward Boundary of a Coastal Bank	If **yes**:
☒ Have you found the landward boundary of the adjacent (seaward) coastal resource area (i.e., beach, dune, salt marsh, or rocky intertidal shore; or a body of water such as a lake, stream, or land under a salt pond; or a lowland that is tidal or associated with coastal storm events up to the 100-year storm or storm of record)? *and* ☒ Does this boundary border a landform that meets the criteria listed above?	You have found the seaward boundary of the coastal bank, which is often marked by an abrupt change in topography to a steep facing slope (steeper than 10:1). See the applicable sections in Chapter 1 to help refine the landward boundaries of the other coastal resource areas.
Indicators of the Landward Boundary of a Coastal Bank (Top of Coastal Bank)	If **yes**:
☒ Is the slope steeper than or equal to 10:1 but less than 4:1?	The 100-year flood elevation *is* the top of coastal bank.
☒ Is the slope steeper than or equal to 4:1?	The top of coastal bank is *above* the 100-year flood elevation and at the point where the slope becomes less than 4:1.
☒ Is there a coastal bank separated by land subject to coastal storm flowage that extends to another rise steeper than 10:1?	The area contains multiple coastal banks. Commissions should be careful to delineate the most landward coastal bank.
☐ Is there a small break in slope, such as at the location of the top of a seawall or a footpath, that is immediately followed landward by a return to a steep slope?	This is a human alteration and does not constitute a change in slope of the underlying landform or the top of coastal bank. Determine the slope of the *overall* landform, not the microtopography.
☒ Are field observations consistent with surveys, maps, and other references?	

- ❑ Other observations:

Field profile data along 6 transects are shown on Existing Conditions Plans

Attachment 2

Site Plans (75% Design)

Ipswich River Coastal Resiliency and Coastal Bank Stabilization Project, Design Plans, County Street, Ipswich, MA 01938, prepared by Coneco Engineers & Scientists, Inc., dated April 3,2019 (Phase IIA)

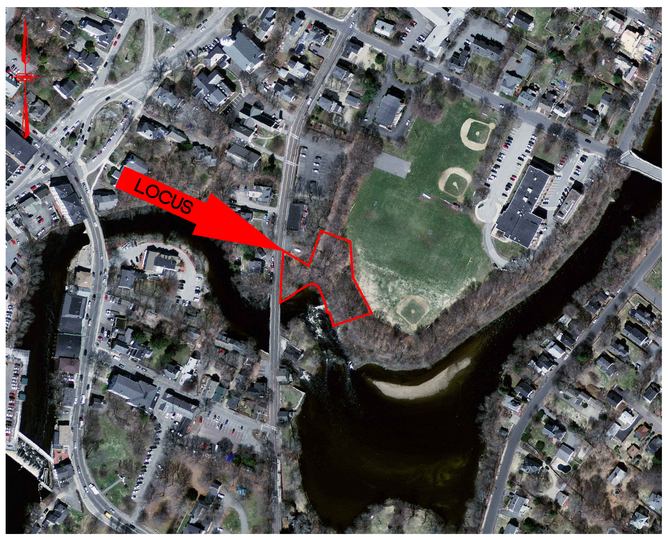
Ipswich River Coastal Resiliency Permitting Plans, Ipswich, Massachusetts prepared by Horsley Witten Group, Inc. and dated April 2019 (Phase IIB)

IPSWICH RIVER COASTAL RESILIENCY AND COASTAL BANK STABILIZATION PROJECT

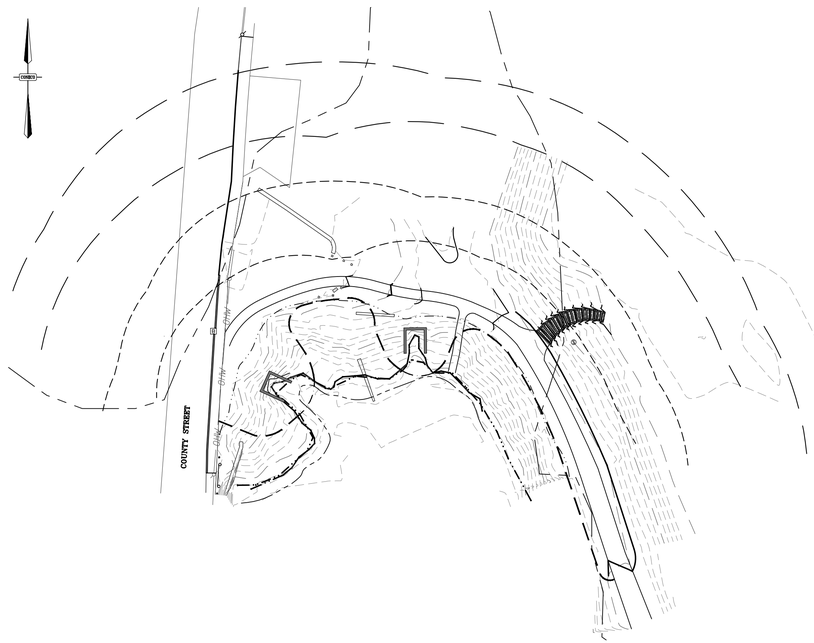
DESIGN PLANS

COUNTY STREET

IPSWICH, MA 01938



MASS GIS 2008 AERIAL PHOTO
SCALE: 1" = 200'



SCALE: 1" = 30'

PREPARED FOR:

TOWN OF IPSWICH
25 GREEN STREET
IPSWICH, MA 01938

PREPARED ON:
APRIL 12, 2019

CONECO
Engineers & Scientists

4 FIRST STREET, BRIDGEWATER, MASSACHUSETTS 02324
PHONE: 508.697.3191, FAX: 508.697.5996
WEBSITE: www.coneco.com

ENGINEER:
KEVIN E. MCHUGH, P.E.
CONECO ENGINEERS & SCIENTISTS, INC.
BRIDGEWATER, MA 02324

MASSACHUSETTS REGISTERED PROFESSIONAL ENGINEER #45196

DATE:

SURVEYOR:
TIMOTHY S. BODAH, P.L.S.
CONECO ENGINEERS & SCIENTISTS, INC.
BRIDGEWATER, MA 02324

MASSACHUSETTS REGISTERED PROFESSIONAL LAND SURVEYOR #46110

DATE:

IPSWICH RIVER COASTAL RESILIENCY AND COASTAL BANK STABILIZATION PROJECT

COUNTY STREET, IPSWICH, MA 01938

REVISIONS

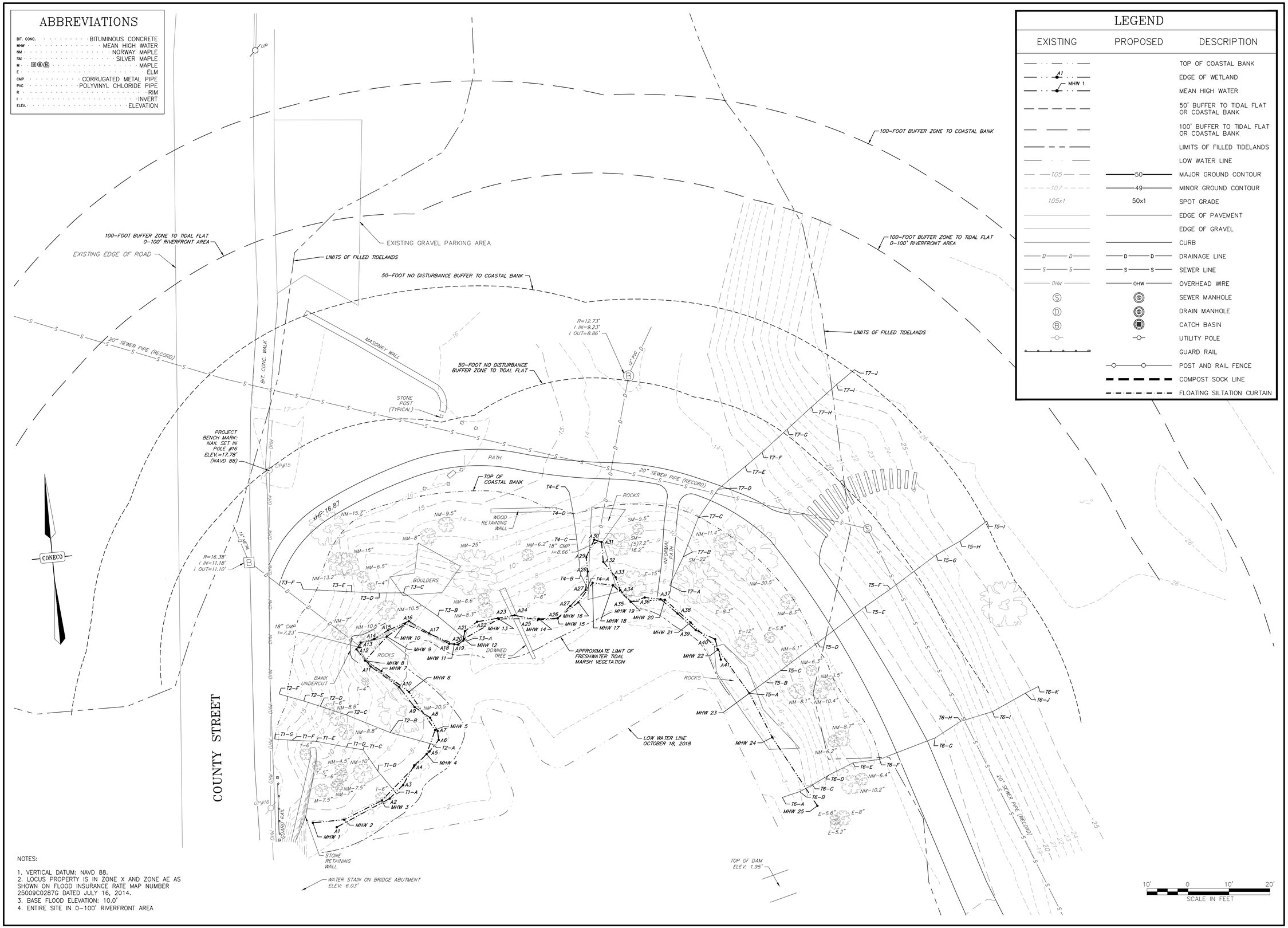
NO.	DATE	DESCRIPTION	DR/CK

ABBREVIATIONS

BIT. CONC.	BITUMINOUS CONCRETE
MHW	MEAN HIGH WATER
NM	NORWAY MAPLE
SM	SILVER MAPLE
M	MAPLE
E	ELM
CMP	CORRUGATED METAL PIPE
PVC	POLYVINYL CHLORIDE PIPE
R	RIM
I	INVERT
ELEV.	ELEVATION

LEGEND

EXISTING	PROPOSED	DESCRIPTION
		TOP OF COASTAL BANK
41		EDGE OF WETLAND
MHW 1		MEAN HIGH WATER
		50' BUFFER TO TIDAL FLAT OR COASTAL BANK
		100' BUFFER TO TIDAL FLAT OR COASTAL BANK
		LIMITS OF FILLED TIDELANDS
		LOW WATER LINE
105	50	MAJOR GROUND CONTOUR
107	49	MINOR GROUND CONTOUR
105x1	50x1	SPOT GRADE
		EDGE OF PAVEMENT
		EDGE OF GRAVEL
		CURB
D D	D D	DRAINAGE LINE
S S	S S	SEWER LINE
OHW	OHW	OVERHEAD WIRE
S	S	SEWER MANHOLE
D	D	DRAIN MANHOLE
B	B	CATCH BASIN
		UTILITY POLE
		GUARD RAIL
		POST AND RAIL FENCE
		COMPOST SOCK LINE
		FLOATING SILTATION CURTAIN



NOTES:

1. VERTICAL DATUM: NAVD 88.
2. LOCUS PROPERTY IS IN ZONE X AND ZONE AE AS SHOWN ON FLOOD INSURANCE RATE MAP NUMBER 25009C0287G DATED JULY 16, 2014.
3. BASE FLOOD ELEVATION: 10.0'
4. ENTIRE SITE IN 0-100' RIVERFRONT AREA

REVISIONS			
NO.	DATE	DESCRIPTION	DR/CK

PREPARED FOR: TOWN OF IPSWICH
25 GREEN STREET
IPSWICH, MA 01938

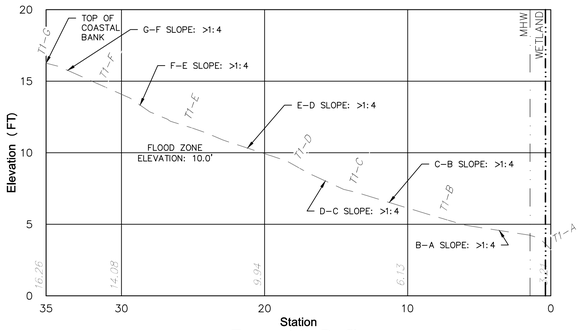
DRAWING: EXISTING CONDITIONS PLAN

PROJECT: IPSWICH RIVER COASTAL RESILIENCY AND COASTAL BANK STABILIZATION PROJECT
COUNTY STREET
IPSWICH, MA 01938

PLAN SET: DESIGN PLANS

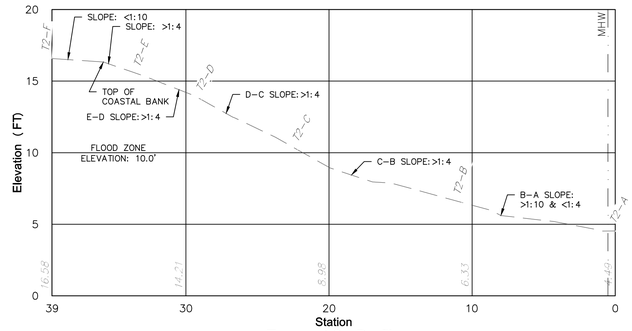
CONECO Engineers & Scientists
4 FIRST STREET, BRIDGEWATER, MASSACHUSETTS 02324
PHONE 508-697-3191 OR 800-548-3355; FAX 508-697-5996
WEBSITE: www.coneco.com

DATE	4/12/2019		
DESIGNED:	TSB	CHECKED:	JEN
DRAFTED:	WB	IN CHARGE:	JEN
SCALE:	1" = 10'		
PROJECT NO.	9581.0		
SHEET NO.	2 OF 8		



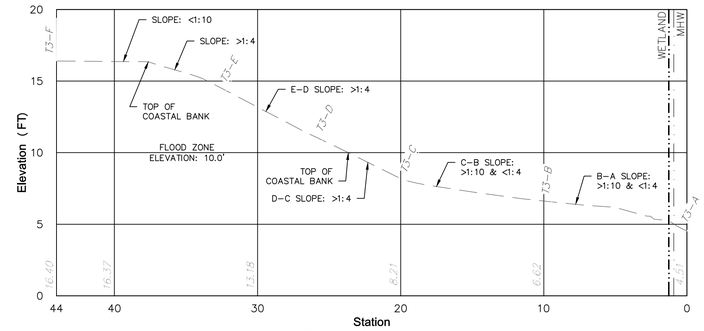
Transect 1 - Profile

VERTICAL SCALE: 1"=5'
HORIZONTAL SCALE: 1"=5'
DEP FIGURE 2



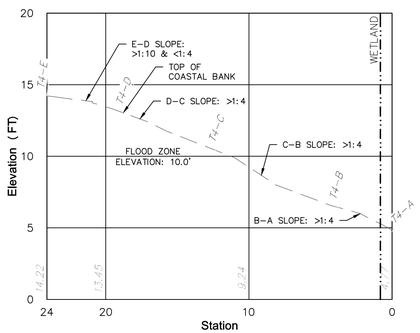
Transect 2 - Profile

VERTICAL SCALE: 1"=5'
HORIZONTAL SCALE: 1"=5'
DEP FIGURE 2



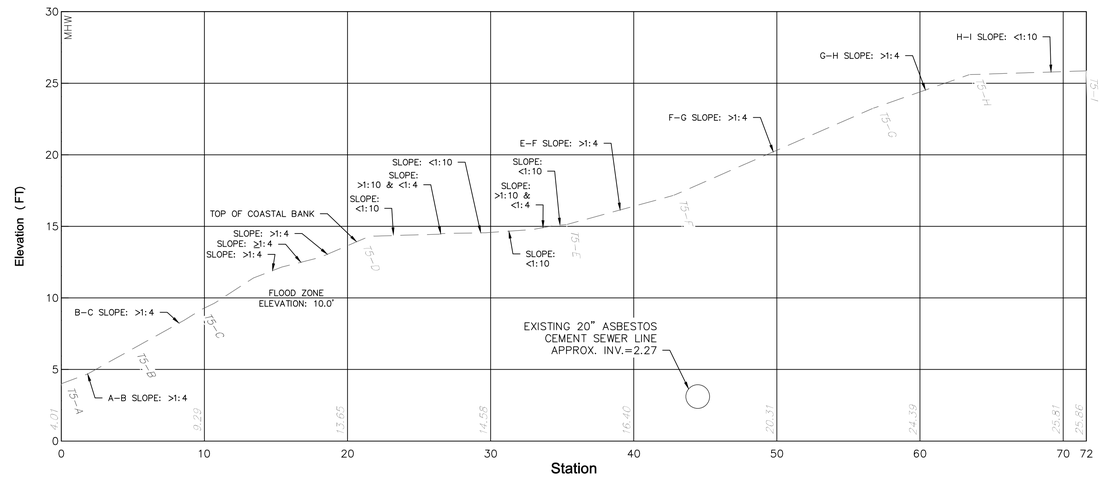
Transect 3 - Profile

VERTICAL SCALE: 1"=5'
HORIZONTAL SCALE: 1"=5'
DEP FIGURE 5/6 (HYBRID)



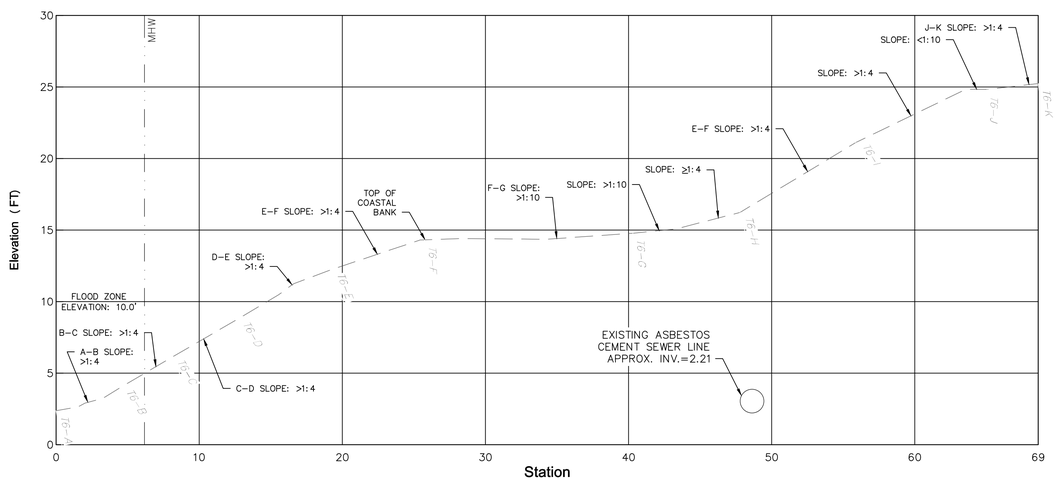
Transect 4 - Profile

VERTICAL SCALE: 1"=5'
HORIZONTAL SCALE: 1"=5'
DEP FIGURE 2



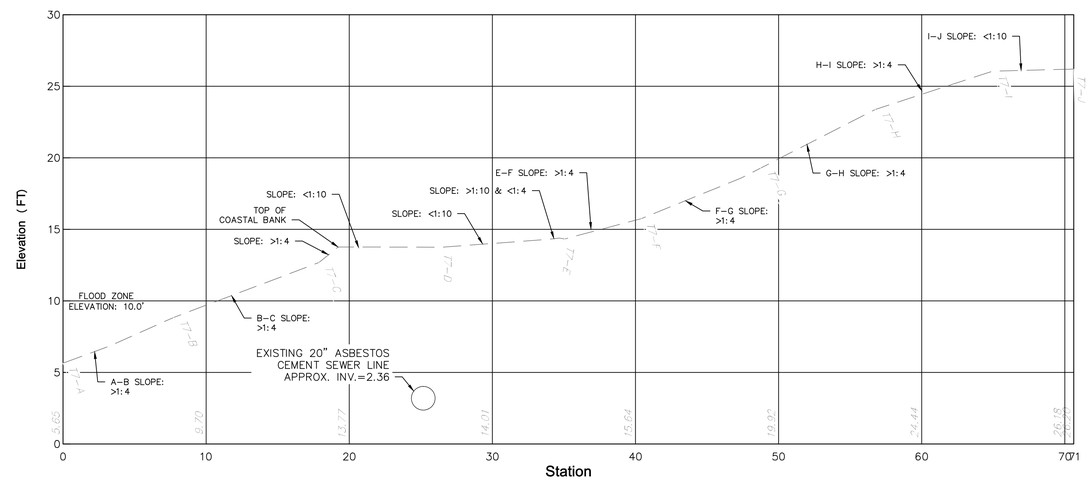
Transect 5 - Profile

VERTICAL SCALE: 1"=5'
HORIZONTAL SCALE: 1"=5'
DEP FIGURE 5/6 (HYBRID)



Transect 6 - Profile

VERTICAL SCALE: 1"=5'
HORIZONTAL SCALE: 1"=5'
DEP FIGURE 5/6 (HYBRID)



Transect 7 - Profile

VERTICAL SCALE: 1"=5'
HORIZONTAL SCALE: 1"=5'
DEP FIGURE 5/6 (HYBRID)

REVISIONS

NO.	DATE	DESCRIPTION	DR/CK

PREPARED FOR:
TOWN OF IPSWICH
25 GREEN STREET
IPSWICH, MA 01938

DRAWING:
TRANSECT PROFILES

PROJECT:
IPSWICH RIVER COASTAL RESILIENCY AND COASTAL BANK STABILIZATION PROJECT
COUNTY STREET
IPSWICH, MA 01938

PLAN SET:
DESIGN PLANS

CONECO
Engineers & Scientists
4 FIRST STREET, BRIDGEWATER, MASSACHUSETTS 02324
PHONE 508-697-3191 OR 800-548-3355; FAX 508-697-5996
WEBSITE: www.coneco.com

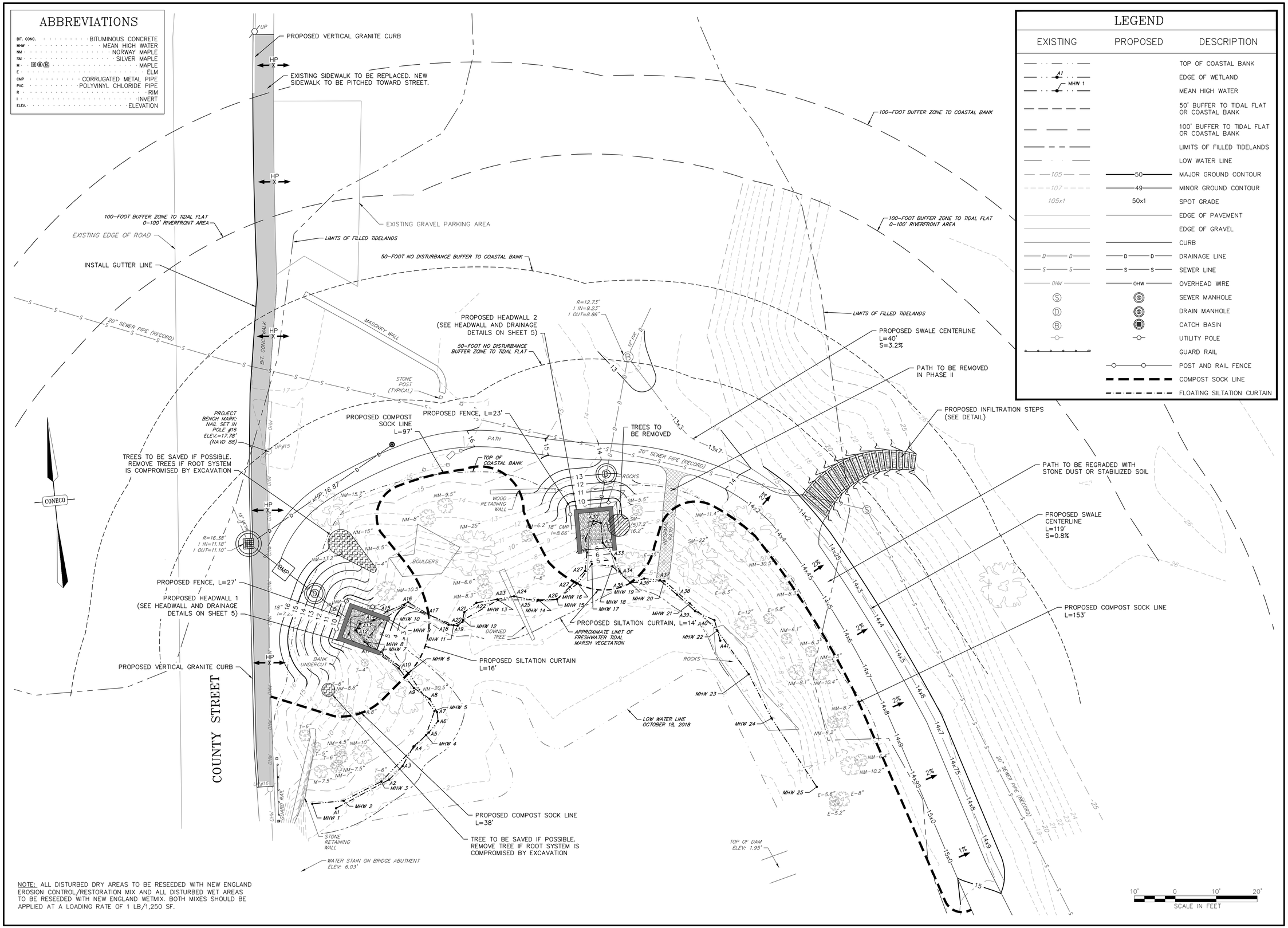
DATE	4/12/2019
DESIGNED: MSD	CHECKED: JEN
DRAFTED: MSD	IN CHARGE: JEN
SCALE:	N.T.S.
PROJECT NO.	9581.0
SHEET NO.	3 OF 8

ABBREVIATIONS

BIT. CONC.	BITUMINOUS CONCRETE
MHW	MEAN HIGH WATER
NM	NORWAY MAPLE
SM	SILVER MAPLE
M	MAPLE
E	ELM
CMP	CORRUGATED METAL PIPE
PVC	POLYVINYL CHLORIDE PIPE
R	RIM
I	INVERT
ELEV.	ELEVATION

LEGEND

EXISTING	PROPOSED	DESCRIPTION
		TOP OF COASTAL BANK
41		EDGE OF WETLAND
MHW 1		MEAN HIGH WATER
		50' BUFFER TO TIDAL FLAT OR COASTAL BANK
		100' BUFFER TO TIDAL FLAT OR COASTAL BANK
		LIMITS OF FILLED TIDELANDS
		LOW WATER LINE
105	50	MAJOR GROUND CONTOUR
107	49	MINOR GROUND CONTOUR
105x1	50x1	SPOT GRADE
		EDGE OF PAVEMENT
		EDGE OF GRAVEL
		CURB
D D	D D	DRAINAGE LINE
S S	S S	SEWER LINE
OHW	OHW	OVERHEAD WIRE
S	S	SEWER MANHOLE
D	D	DRAIN MANHOLE
B	B	CATCH BASIN
		UTILITY POLE
		GUARD RAIL
		POST AND RAIL FENCE
		COMPOST SOCK LINE
		FLOATING SILTATION CURTAIN



NOTE: ALL DISTURBED DRY AREAS TO BE RESEEDED WITH NEW ENGLAND EROSION CONTROL/RESTORATION MIX AND ALL DISTURBED WET AREAS TO BE RESEEDED WITH NEW ENGLAND WETMIX. BOTH MIXES SHOULD BE APPLIED AT A LOADING RATE OF 1 LB/1,250 SF.

REVISIONS			
NO.	DATE	DESCRIPTION	DR/CK

TOWN OF IPSWICH
25 GREEN STREET
IPSWICH, MA 01938

PREPARED FOR:

SITE PLAN

DRAWING:

PROJECT:
IPSWICH RIVER COASTAL RESILIENCY AND COASTAL BANK STABILIZATION PROJECT
COUNTY STREET
IPSWICH, MA 01938

PLAN SET:
DESIGN PLANS

CONECO
Engineers & Scientists
4 FIRST STREET, BRIDGEWATER, MASSACHUSETTS 02324
PHONE 508-697-3191 OR 800-548-3355; FAX 508-697-5996
WEBSITE: www.coneco.com

DATE	4/12/2019
DESIGNED: MSD	CHECKED: JEN
DRAFTED: MSD	IN CHARGE: JEN
SCALE:	1" = 10'
PROJECT NO.	9581.0
SHEET NO.	4 OF 8

ABBREVIATIONS

BIT. CONC.	BITUMINOUS CONCRETE
MHW	MEAN HIGH WATER
NM	NORWAY MAPLE
SM	SILVER MAPLE
M	MAPLE
E	ELM
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LEGEND

EXISTING	PROPOSED	DESCRIPTION
		TOP OF COASTAL BANK
41		EDGE OF WETLAND
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		50' BUFFER TO TIDAL FLAT OR COASTAL BANK
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		LIMITS OF FILLED TIDELANDS
		LOW WATER LINE
105	50	MAJOR GROUND CONTOUR
107	49	MINOR GROUND CONTOUR
105x1	50x1	SPOT GRADE
		EDGE OF PAVEMENT
		EDGE OF GRAVEL
		CURB
D D	D D	DRAINAGE LINE
S S	S S	SEWER LINE
OHW	OHW	OVERHEAD WIRE
S	S	SEWER MANHOLE
D	D	DRAIN MANHOLE
B	B	CATCH BASIN
		UTILITY POLE
		GUARD RAIL
		POST AND RAIL FENCE
		COMPOST SOCK LINE
		FLOATING SILTATION CURTAIN

MASONRY WALL
BIT. CONC. WALK
50-FOOT NO DISTURBANCE BUFFER ZONE TO TIDAL FLAT
STONE POST (TYPICAL)
CONECO
PROJECT BENCH MARK: NAIL SET IN POLE #16 ELEV.=17.78' (NAVD 88)
PROPOSED BEEHIVE DRAIN RIM=16.3 INV.=15.3
PROPOSED DMH RIM=11.75 (BURIED) RIM=13.75 (UNCOVERED) INV. IN=8.73 INV. OUT=6.04
PROPOSED HEADWALL TOP=9.00 BOTTOM=6.00
PROPOSED PLUNGE POOL INV. IN=6.00 BOTTOM=5.25 BERM=6.00
R=12.73' I IN=9.23' I OUT=8.86'
12" PVC
PATH
20" SEWER PIPE
TOP OF COASTAL BANK
PROPOSED FENCE, L=23'
18" HDPE L=7', S=0.5%
ROCKS
PROPOSED 6" HDPE L=40.0' S=10.3%
EXISTING CATCH BASIN TO BE REPLACED WITH CATCH BASIN WITH SUMP RIM=16.38 INV IN.=11.18 INV. OUT=11.10
18" METAL
WOOD RETAINING WALL
18" CMP I=8.66'
INFORMAL PATH
R=16.38' I IN=11.18' I OUT=11.10'
PROPOSED DROP INLET
BMP
18" HDPE L=6', S=12.0%
PROPOSED BMP INV. IN=10.38 INV. OUT=10.22
18" HDPE L=6', S=12.0%
PROPOSED DMH RIM=12.25 (BURIED) RIM=14.50 (UNCOVERED) INV. IN=9.50 NV. OUT=5.04
18" HDPE L=8', S=0.5%
PROPOSED HEADWALL TOP=9.00 BOTTOM=5.00
18" CMP I=7.23'
BANK UNDERCUT
BOULDERS
PROPOSED FENCE, L=27'
PROPOSED PLUNGE POOL INV. IN=5.00 BOTTOM=4.25 BERM=5.00
DOWNED TREE
APPROXIMATE LIMIT OF FRESHWATER TIDAL MARSH VEGETATION
LOW WATER LINE OCTOBER 18, 2018
MHW 1 MHW 4 MHW 5 MHW 6 MHW 7 MHW 8 MHW 9 MHW 10 MHW 11 MHW 12 MHW 13 MHW 14 MHW 15 MHW 16 MHW 17 MHW 18 MHW 19 MHW 20 MHW 21 MHW 22 MHW 23 MHW 24
NM-15.7" NM-9.5" NM-8" NM-25" NM-6.2" NM-11.4" SM-5.5" SM-(5)7.2" 16.2" SM-22" NM-30.5" NM-15" NM-6.5" NM-13.2" NM-6.6" NM-10.5" NM-8.3" NM-7" NM-20.5" NM-8.8" NM-4.5" NM-10" E-15" E-8.3" E-12" E-5.8" T-4" T-6" T-5"
5' 0 5' 10'
SCALE IN FEET
JNTY STREET

REVISIONS			
NO.	DATE	DESCRIPTION	DR/CK

PREPARED FOR: TOWN OF IPSWICH 25 GREEN STREET IPSWICH, MA 01938

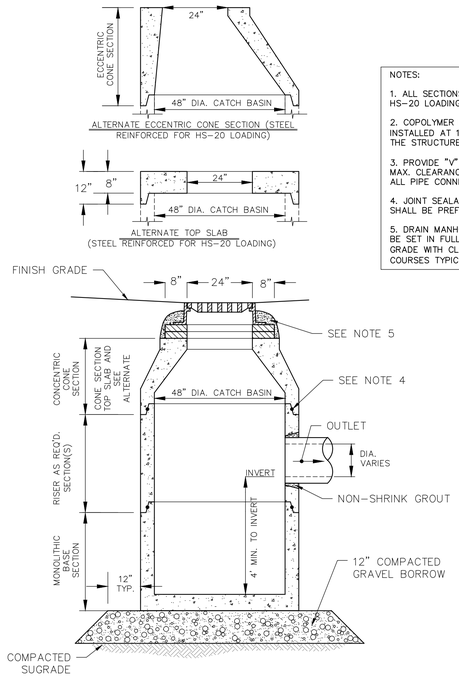
DRAWING: PLUNGE POOL DESIGN

PROJECT: IPSWICH RIVER COASTAL RESILIENCY AND COASTAL BANK STABILIZATION PROJECT COUNTY STREET IPSWICH, MA 01938

PLAN SET: DESIGN PLANS

CONECO Engineers & Scientists
4 FIRST STREET, BRIDGEWATER, MASSACHUSETTS 02324
PHONE 508-697-3191 OR 800-548-3355; FAX 508-697-5996
WEBSITE: www.coneco.com

DATE	4/12/2019
DESIGNED: MSD	CHECKED: JEN
DRAFTED: MSD	IN CHARGE: JEN
SCALE:	1" = 5'
PROJECT NO.	9581.0
SHEET NO.	5 OF 8



NOTES:

1. ALL SECTIONS SHALL BE DESIGNED FOR HS-20 LOADING.

2. COPOLYMER MANHOLE STEPS SHALL BE INSTALLED AT 12" O.C. FOR THE FULL DEPTH OF THE STRUCTURE.

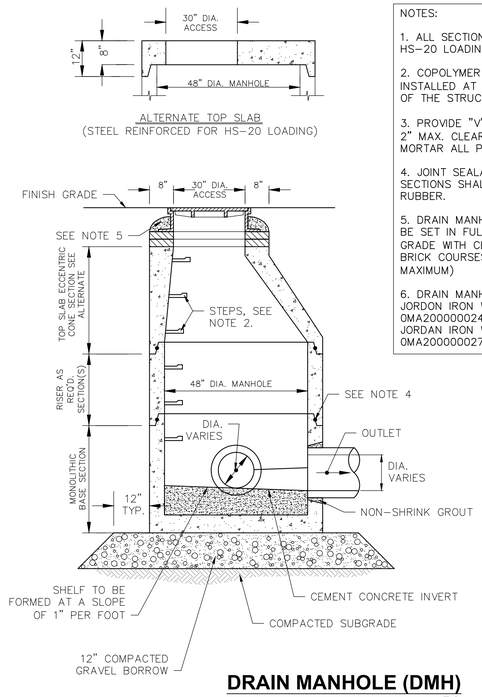
3. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS.

4. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.

5. DRAIN MANHOLE FRAME AND COVER SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR (2 BRICK COURSES TYPICALLY)

CATCH BASIN (CB)

N.T.S.



NOTES:

1. ALL SECTIONS SHALL BE DESIGNED FOR HS-20 LOADING.

2. COPOLYMER MANHOLE STEPS SHALL BE INSTALLED AT 12" O.C. FOR THE FULL DEPTH OF THE STRUCTURE.

3. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS.

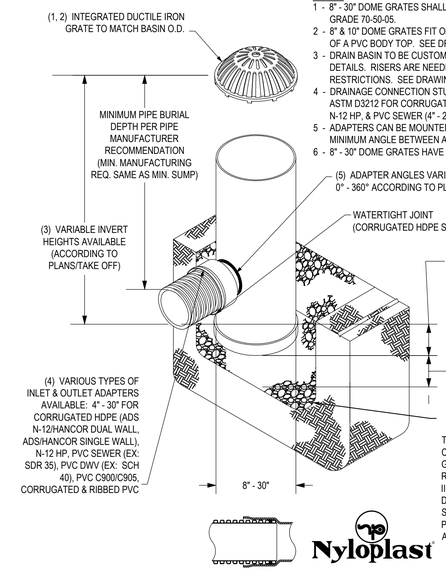
4. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.

5. DRAIN MANHOLE FRAME AND COVER SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR (2 BRICK COURSES TYPICALLY, 5 BRICK COURSES MAXIMUM)

6. DRAIN MANHOLE FRAME SHALL BE EAST JORDON IRON WORKS PRODUCT NUMBER 0MA200000024 AND COVER SHALL BE EAST JORDAN IRON WORKS PRODUCT NUMBER 0MA200000027 OR APPROVED EQUALS.

DRAIN MANHOLE (DMH)

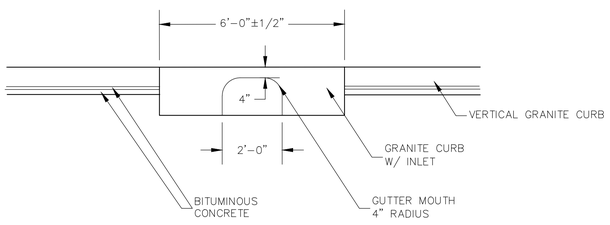
N.T.S.



NOTES:
1 - 8" - 30" DOME GRATES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
2 - 8" & 10" DOME GRATES FIT ONTO THE DRAIN BASINS WITH THE USE OF A PVC BODY TOP. SEE DRAWING NO. 7001-110-045.
3 - DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 84" DUE TO SHIPPING RESTRICTIONS. SEE DRAWING NO. 7001-110-065.
4 - DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS N-12/HANCOR DUAL WALL), N-12 HP, & PVC SEWER (4" - 24").
5 - ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001-110-012.
6 - 8" - 30" DOME GRATES HAVE NO LOAD RATING.

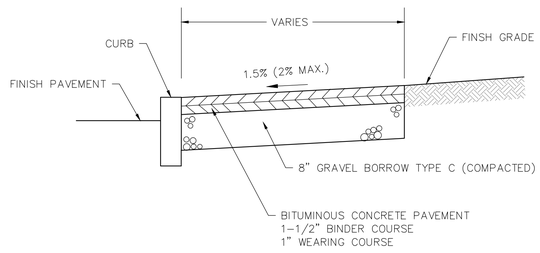
NYLOPLAST DRAIN BASIN WITH DOME GRATE

N.T.S.



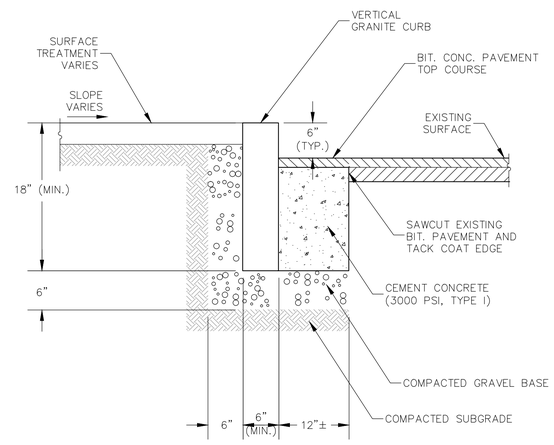
GRANITE CURB INLET

N.T.S.



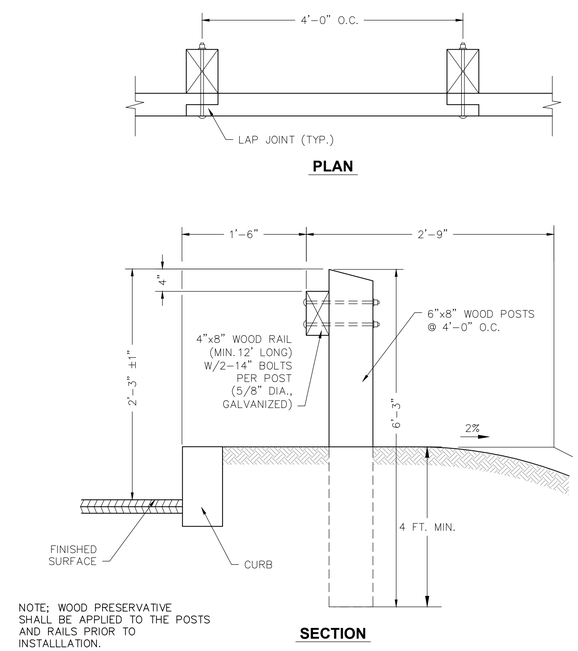
BITUMINOUS CONCRETE SIDEWALK

N.T.S.



VERTICAL GRANITE CURB (VGC) SET IN EXISTING PAVEMENT

N.T.S.



NOTE; WOOD PRESERVATIVE SHALL BE APPLIED TO THE POSTS AND RAILS PRIOR TO INSTALLLATION.

WOOD GUARDRAIL

N.T.S.

REVISIONS

NO.	DATE	DESCRIPTION	DR/CK

PREPARED FOR:
TOWN OF IPSWICH
25 GREEN STREET
IPSWICH, MA 01938

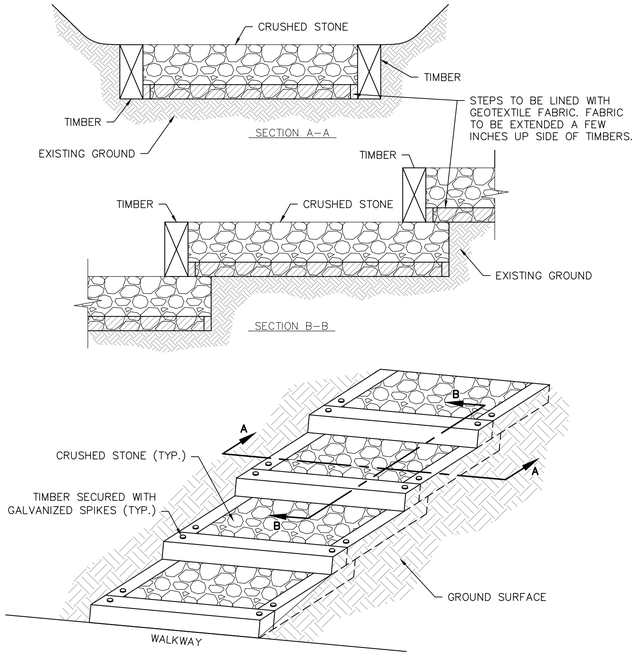
DRAWING:
DETAILS
SHEET 1 OF 3

PROJECT:
IPSWICH RIVER COASTAL RESILIENCY AND COASTAL BANK STABILIZATION PROJECT
COUNTY STREET
IPSWICH, MA 01938

PLAN SET:
DESIGN PLANS

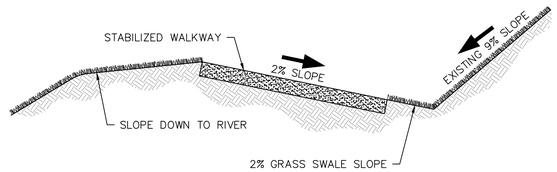
CONECO
Engineers & Scientists
4 FIRST STREET, BRIDGEWATER, MASSACHUSETTS 02324
PHONE 508-697-3191 OR 800-548-3355; FAX 508-697-5996
WEBSITE: www.coneco.com

DATE	4/12/2019
DESIGNED: MSD	CHECKED: JEN
DRAFTED: MSD	IN CHARGE: JEN
SCALE:	N.T.S.
PROJECT NO.	9581.0
SHEET NO.	6 OF 8



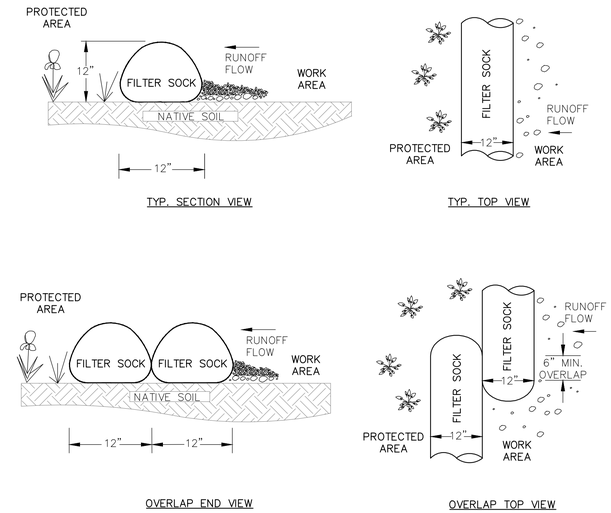
INFILTRATION STEPS DETAIL

N.T.S.



WALKWAY AND GRASS SWALE

N.T.S.

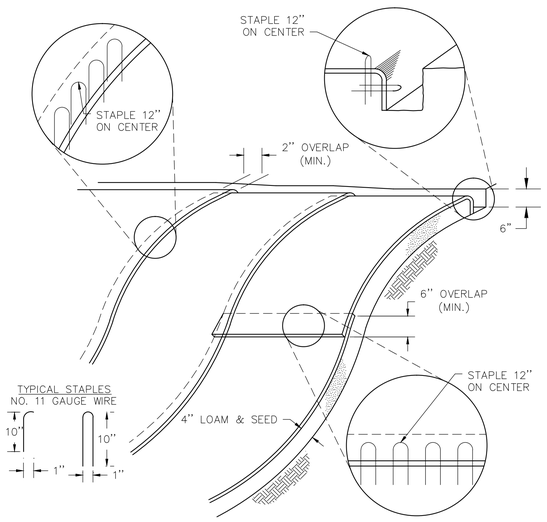


NOTES:

1. EACH FILTER SOCK SHALL CONSIST OF COMPOST MATERIAL WRAPPED IN BURLAP. COMPOST MATERIAL AND BURLAP CASING SHALL BE APPROVED BY ENGINEER PRIOR TO INSTALLATION.
2. CONTRACTOR SHALL PAY FOR COMPOST MATERIAL TESTING IF REQUIRED.
3. FILTER SOCKS SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS, AND REPAIR OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED. SEDIMENT SHALL BE REMOVED FROM FACE OF SOCK WHEN IT REACHES 1/3 HEIGHT OF SOCK
4. COMPOST FILTER SOCK TO BE STAKED WITH A 4' BEANPOLE AT A MAXIMUM DISTANCE OF 10'. STAKE CLOSER AS NEEDED.

12" DIA. COMPOST FILTER SOCK DETAIL

N.T.S.

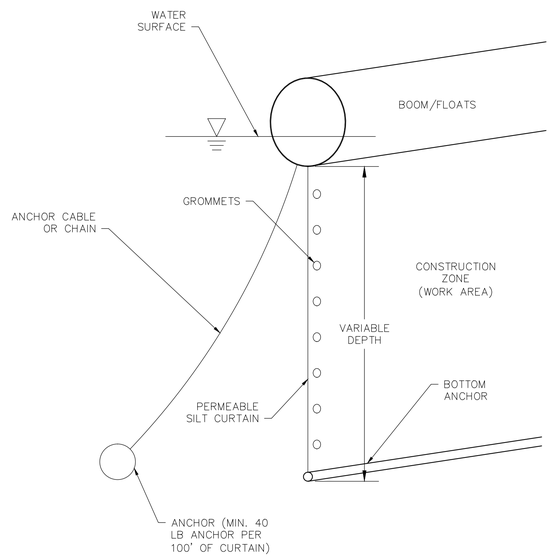


NOTES:

1. BEGIN AT THE TOP OF BLANKET INSTALLATION AREA BY ANCHORING BLANKET IN A 6" DEEP TRENCH. BACKFILL AND COMPACT SOIL INTO TRENCH AFTER STAPLING TO ADJACENT BLANKET.
2. ROLL THE BLANKET DOWN THE SWALE IN THE DIRECTION OF THE WATER FLOW.
3. THE EDGES OF BLANKETS MUST BE STAPLED WITH APPROX. 4 INCH OVERLAP WHERE TWO OR MORE STRIP WIDTHS ARE REQUIRED.
4. WHEN BLANKETS MUST BE SPLICED DOWN THE SWALE, PLACE BLANKET END OVER END WITH 6 INCH (MIN.) OVERLAP AND ANCHOR DOWN SLOPE BLANKET IN A 6 INCH DEEP TRENCH.

SLOPE STABILIZATION BLANKET DETAIL

N.T.S.



FLOATING SILTATION CURTAIN

N.T.S.

REVISIONS

NO.	DATE	DESCRIPTION	DR/CK

PREPARED FOR:
TOWN OF IPSWICH
25 GREEN STREET
IPSWICH, MA 01938

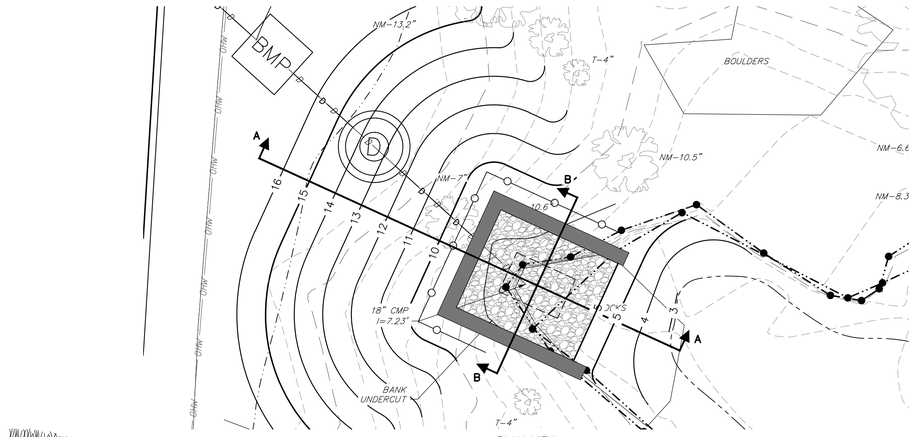
DRAWING:
DETAILS
SHEET 2 OF 3

PROJECT:
IPSWICH RIVER COASTAL RESILIENCY AND COASTAL BANK STABILIZATION PROJECT
COUNTY STREET
IPSWICH, MA 01938

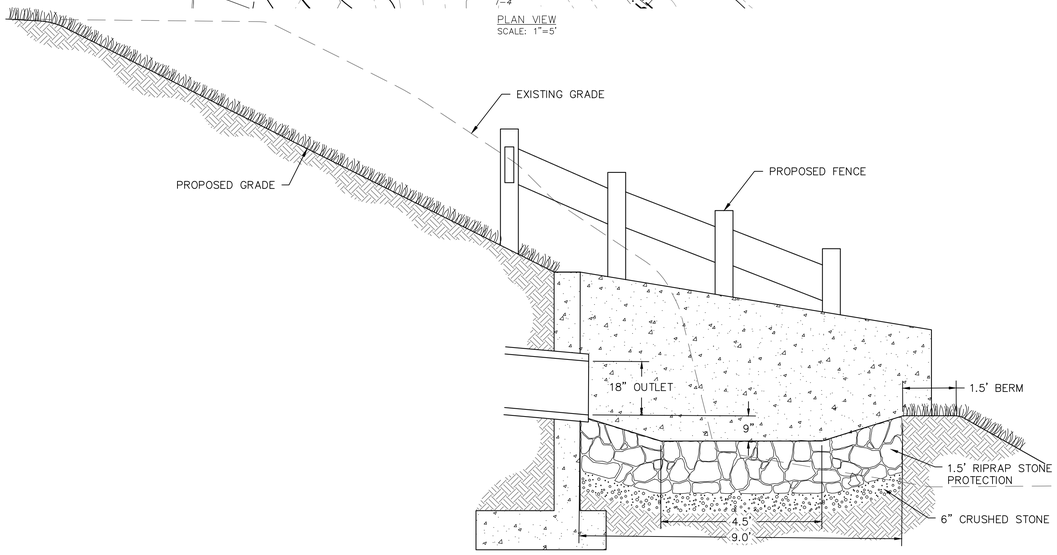
PLAN SET:
DESIGN PLANS

CONECO
Engineers & Scientists
4 FIRST STREET, BRIDGEWATER, MASSACHUSETTS 02324
PHONE 508-697-3191 OR 800-548-3355; FAX 508-697-5996
WEBSITE: www.coneco.com

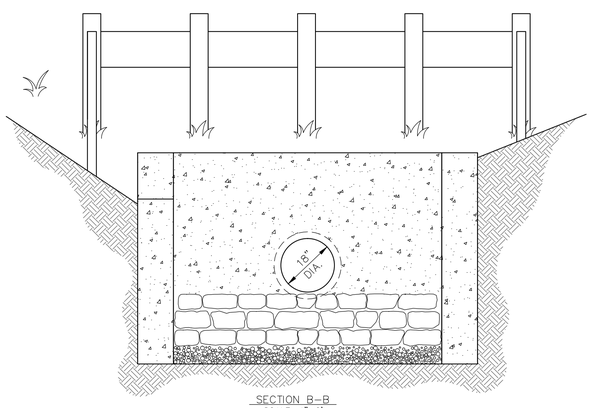
DATE	4/12/2019
DESIGNED: MSD	CHECKED: JEN
DRAFTED: MSD	IN CHARGE: JEN
SCALE:	N.T.S.
PROJECT NO.	9581.0
SHEET NO.	7 OF 8



PLAN VIEW
SCALE: 1"=5'

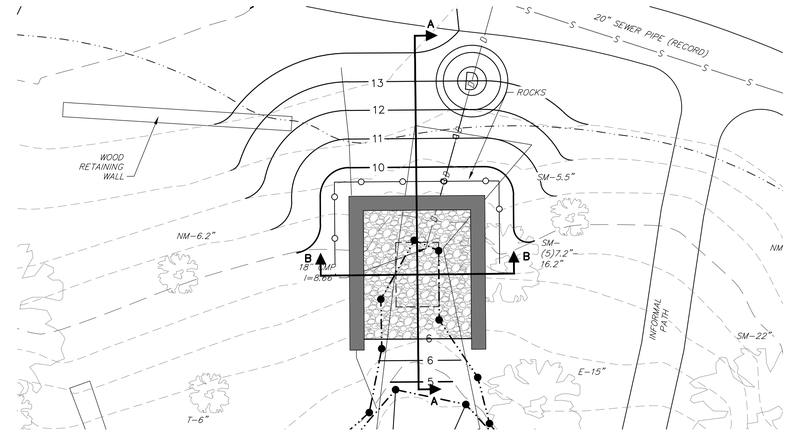


SECTION A-A
SCALE: 1"=2'

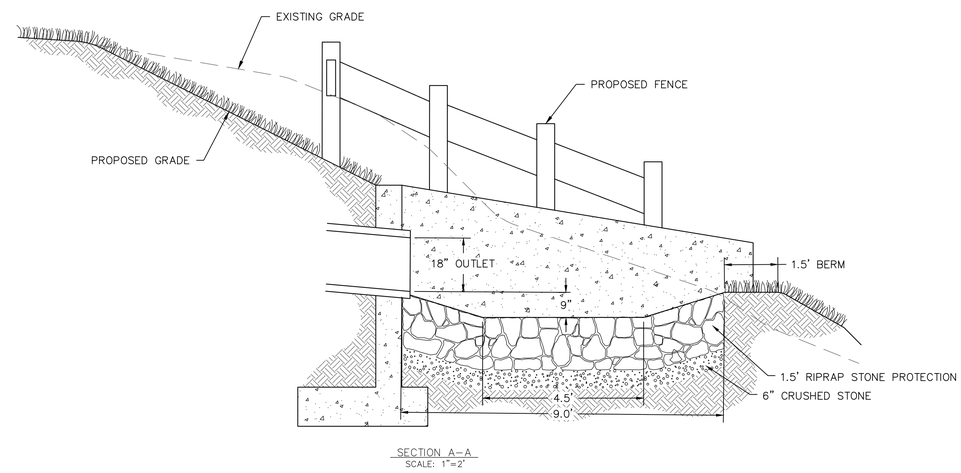


SECTION B-B
SCALE: 1"=2'

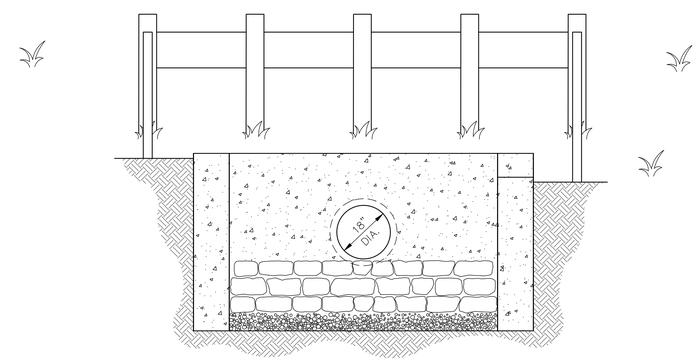
PLUNGE POOL HEADWALL 1



PLAN VIEW
SCALE: 1"=5'



SECTION A-A
SCALE: 1"=2'



SECTION B-B
SCALE: 1"=2'

PLUNGE POOL HEADWALL 2

REVISIONS

NO.	DATE	DESCRIPTION	DR/CK

PREPARED FOR:
TOWN OF IPSWICH
25 GREEN STREET
IPSWICH, MA 01938

DRAWING:
DETAILS
SHEET 3 OF 3

PROJECT:
IPSWICH RIVER COASTAL RESILIENCY AND COASTAL BANK STABILIZATION PROJECT
COUNTY STREET
IPSWICH, MA 01938

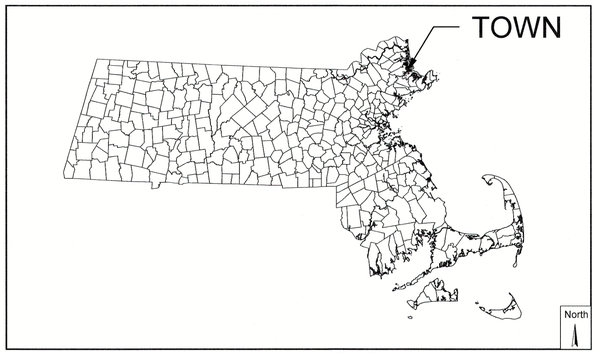
PLAN SET:
DESIGN PLANS

CONECO
Engineers & Scientists
4 FIRST STREET, BRIDGEWATER, MASSACHUSETTS 02324
PHONE 508-697-3191 OR 800-548-3355; FAX 508-697-5996
WEBSITE: www.coneco.com

DATE	4/12/2019
DESIGNED: MSD	CHECKED: JEN
DRAFTED: MSD	IN CHARGE: JEN
SCALE:	N.T.S.
PROJECT NO.	9581.0
SHEET NO.	8 OF 8

IPSWICH RIVER COASTAL RESILIENCY PERMITTING PLANS IPSWICH, MASSACHUSETTS

APRIL 2019

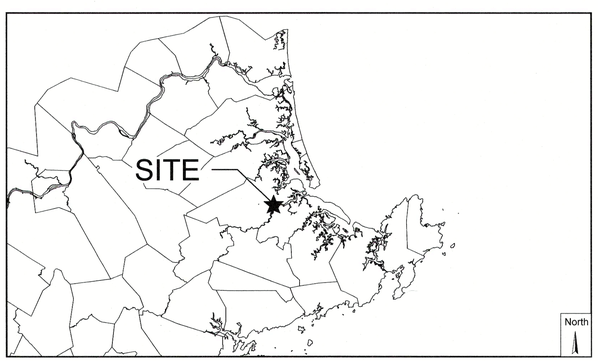


MASSACHUSETTS

Graphic Scale

0 150000

SCALE IN FEET
1:150000

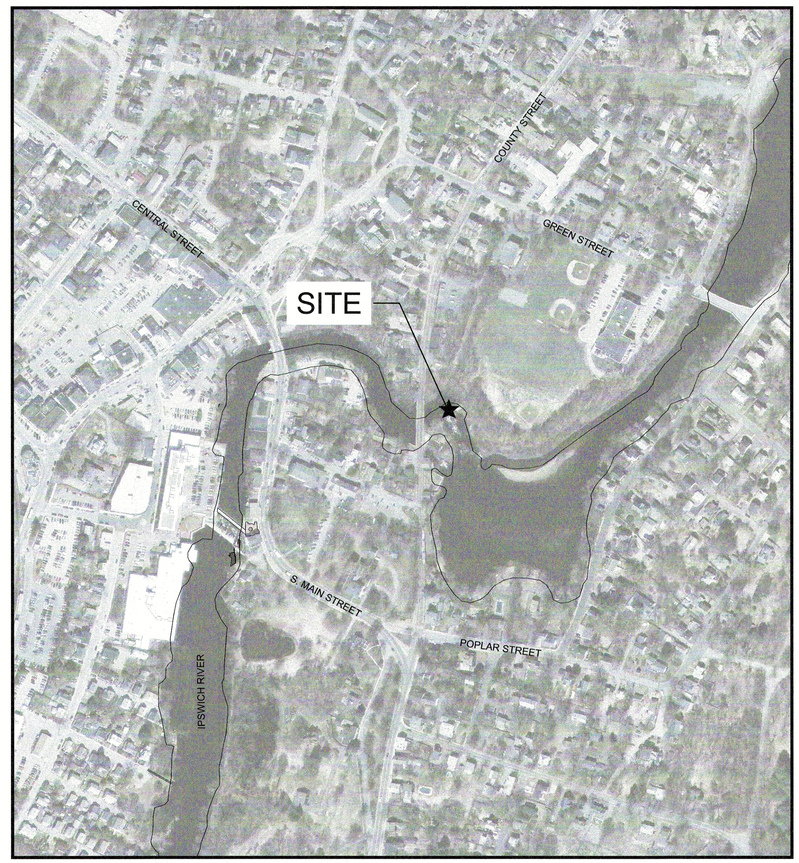


TOWN/CITY

Graphic Scale

0 12000

SCALE IN FEET
1:12000



VICINITY MAP

Graphic Scale

1-inch = 250-feet

Sheet List Table	
Sheet Number	Sheet Title
1	COVER SHEET
2	EXISTING CONDITIONS PLAN
3	EROSION CONTROL PLAN & NOTES
4	SITE LAYOUT & GRADING PLAN
5	LANDSCAPE PLAN
6	LANDSCAPE DETAILS

PERMITTING SET 4/11/2019
NOT FOR CONSTRUCTION

GENERAL NOTES:

1. THIS PLAN SET IS FOR PERMITTING ONLY AND NOT FOR CONSTRUCTION.
2. SURVEY CONDUCTED BY CONECO ENGINEERING AND SCIENTISTS, INC. ELEVATION DATUM IS NAVD 88.
3. THE TOPOGRAPHICAL SURVEY, EXISTING CONDITIONS BASE MAP AND THE FOLLOWING SITE INFORMATION WERE PROVIDED BY CONECO ENGINEERING AND SCIENTISTS, INC. AND TAKEN FROM THE PLAN ENTITLED "EXISTING CONDITIONS PLAN" NOVEMBER 28, 2018.
4. THE PROPERTY IS LOCATED WITHIN F.I.R.M. ZONE X AND ZONE AE AS SHOWN ON COMMUNITY PANEL NO.25009C0287G DATED JULY 16, 2014.
5. THE WETLAND DELINEATION SHOWN HEREON WAS CONDUCTED BY HORSLEY WITTEN GROUP INC. ON OCTOBER 4TH, 2018 AND SUPPLEMENTED OF DECEMBER 10TH, 2018

Plan Set:

IPSWICH RIVER COASTAL RESILIENCY
PERMITTING PLANS
IPSWICH, MASSACHUSETTS

Prepared For:

Town of Ipswich
25 Green Street
Ipswich, MA 01938
(978) 356-6661

Prepared By:

Horsley Witten Group, Inc.
Sustainable Environmental Solutions
www.horsleywitten.com

Headquarters
90 Route 6A
Sandwich, MA 02563
(508) 833-6600 voice
(508) 833-3150 fax

294 Washington Street, Suite 801
Boston, MA 02108
(857) 263-8193 voice
(617) 574-4799 fax

55 Dorrance Street, Suite 200
Providence, RI 02906
(401) 272-1717 voice
(401) 439-8368 fax

113 Water Street, R2
Exeter, NH 03833
(603) 658-1660

Registration:

COMMONWEALTH OF MASSACHUSETTS
RICHARD A. CLAYTOR
CIVIL
NO. 45118
REGISTERED PROFESSIONAL ENGINEER

4-11-19

Revisions

Rev.	Date	By	Appr.	Description
1				
2				
3				
4				
5				
6				
7				

Project Number: 18125

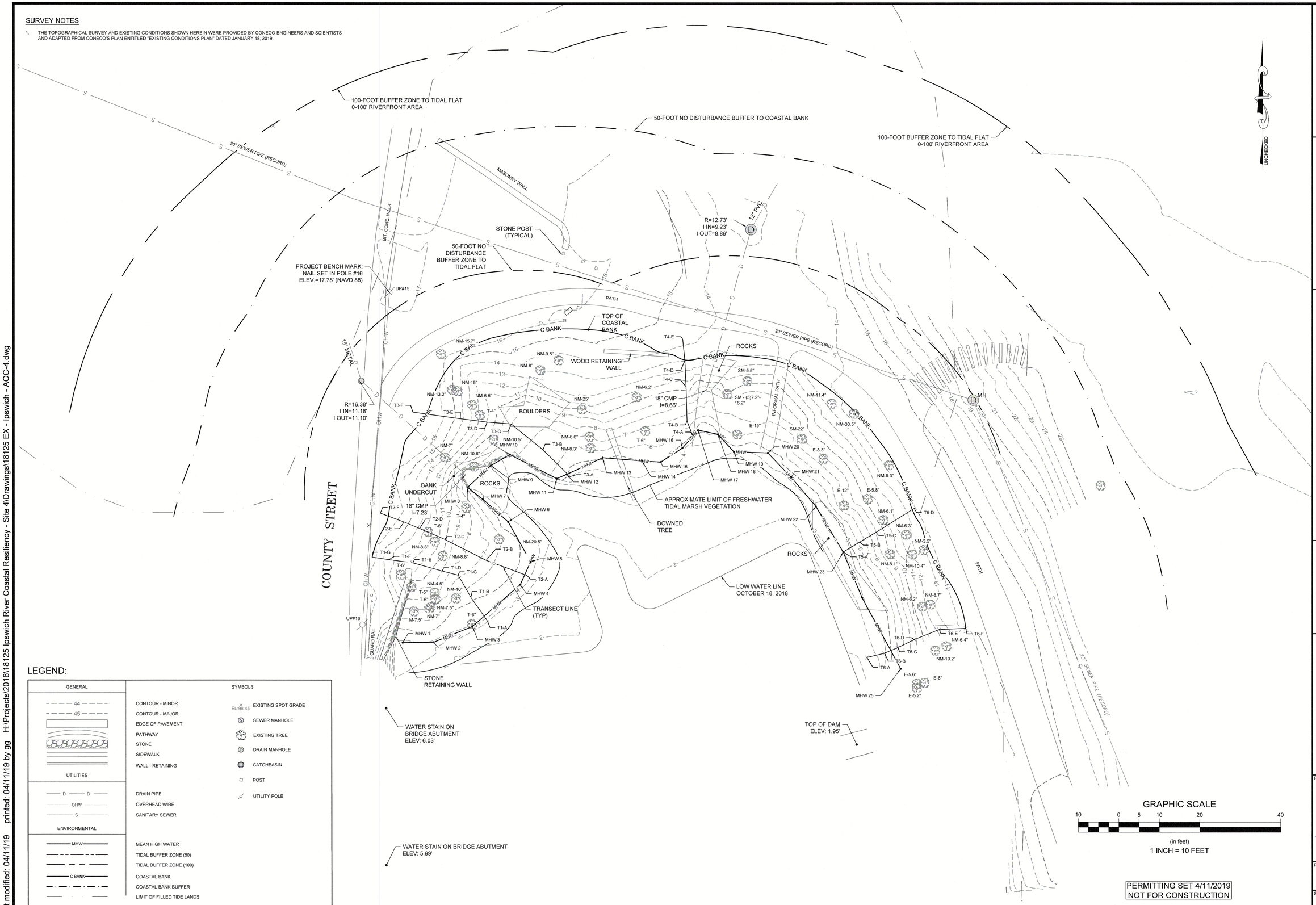
Sheet Number: 1 of 6

Drawing Number: C - 1

last modified: 04/11/19 printed: 04/11/19 by gg H:\Projects\2018\18125 Ipswich River Coastal Resiliency - Site 4\Drawings\18125 CV.dwg

SURVEY NOTES

1. THE TOPOGRAPHICAL SURVEY AND EXISTING CONDITIONS SHOWN HEREIN WERE PROVIDED BY CONECO ENGINEERS AND SCIENTISTS AND ADAPTED FROM CONECO'S PLAN ENTITLED "EXISTING CONDITIONS PLAN" DATED JANUARY 18, 2019.



LEGEND:

GENERAL		SYMBOLS
44	CONTOUR - MINOR	EL 98.45 EXISTING SPOT GRADE
45	CONTOUR - MAJOR	SEWER MANHOLE
	EDGE OF PAVEMENT	EXISTING TREE
	PATHWAY	DRAIN MANHOLE
	STONE	CATCHBASIN
	SIDEWALK	POST
	WALL - RETAINING	UTILITY POLE
UTILITIES		
D D	DRAIN PIPE	
OHW	OVERHEAD WIRE	
S	SANITARY SEWER	
ENVIRONMENTAL		
MHW	MEAN HIGH WATER	
	TIDAL BUFFER ZONE (50)	
	TIDAL BUFFER ZONE (100)	
C BANK	COASTAL BANK	
	COASTAL BANK BUFFER	
	LIMIT OF FILLED TIDE LANDS	

Revisions

Rev.	Date	By	Appr.	Description
---	---	---	---	---

Horsley Witten Group, Inc.
Sustainable Environmental Solutions
www.horsleywitten.com
90 Route 6A
Sandwich, MA 02563
508-833-6600 voice
508-833-3150 fax

Checked By: RAC
Drawn By: GSG
Designed By: GSG
Date: APRIL 2019

Plan Set: IPSWICH RIVER COASTAL RESILIENCY PERMITTING PLANS IPSWICH, MASSACHUSETTS

Plan Title: EXISTING CONDITIONS PLAN

Prepared For:
Town of Ipswich
25 Green Street
Ipswich, MA 01938
Phone: (978) 356-6601
Fax: ---

Survey Provided By:
Coneco Engineering and Scientists, Inc.
4 First Street
Bridgewater, MA 02324
Phone: (800) 458-3355
Fax: (508) 697-6996
Dated: NOVEMBER 2018

Registration:
COMMONWEALTH OF MASSACHUSETTS
RICHARD A. CLAYTON
CIVIL
NO. 45116
PROFESSIONAL ENGINEER
4-11-19

Project Number: 18125
Sheet: 2 of 6
Sheet Number: C - 2

GENERAL CONSTRUCTION NOTES:

1. ALL SITE WORK TO COMPLETE THIS PROJECT AS INDICATED ON THE DRAWINGS AND IN THE SPECIFICATIONS IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. IMMEDIATELY CONTACT AND COORDINATE WITH THE ENGINEER AND OWNER IF ANY DEVIATION OR ALTERATION OF THE WORK PROPOSED ON THESE DRAWINGS IS REQUIRED.
3. UTILIZE ALL PRECAUTIONS AND MEASURES TO ENSURE THE SAFETY OF THE PUBLIC, ALL PERSONNEL AND PROPERTY DURING CONSTRUCTION IN ACCORDANCE WITH OSHA STANDARDS, INCLUDING THE INSTALLATION OF TEMPORARY FENCING BARRICADES, SAFETY LIGHTING, CONES, POLICE DETAIL AND/OR FLAGMEN AS DETERMINED NECESSARY BY THE TOWN OF IPSWICH.
4. IMPORT ONLY CLEAN MATERIAL. MATERIAL FROM AN EXISTING OR FORMER 21E SITE AS DEFINED BY THE MASSACHUSETTS CONTINGENCY PLAN 310 CMR 40.0000 WILL NOT BE ACCEPTED .
5. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH AND MAINTAIN ALL CONTROL POINTS AND BENCHMARKS DURING CONSTRUCTION INCLUDING BENCHMARK LOCATIONS AND ELEVATIONS AT CRITICAL AREAS. COORDINATE WITH THE ENGINEER THE LOCATION OF ALL CONTROL POINTS AND BENCHMARKS.
6. SITE LAYOUT SURVEY REQUIRED FOR CONSTRUCTION MUST BE PROVIDED BY THE CONTRACTOR AND PERFORMED BY A MASSACHUSETTS' REGISTERED PROFESSIONAL LAND SURVEYOR. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH THE SURVEYOR FOR ALL SITE SURVEY WORK.
7. UNLESS OTHERWISE INDICATED ON THE DRAWINGS AND/OR IN THE SPECIFICATIONS, ALL SITE CONSTRUCTION MATERIALS AND METHODOLOGIES ARE TO CONFORM TO THE MOST RECENT VERSION OF THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS (THE MASSACHUSETTS HIGHWAY DEPARTMENT 1988 STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, THE 2015 SUPPLEMENTAL SPECIFICATIONS, AND THE SEPTEMBER 2018 INTERIM SUPPLEMENTAL SPECIFIATIONS).
8. PROVIDE ALL CONSTRUCTION SERVICE IN ACCORDANCE WITH APPLICABLE LAWS AND REGULATIONS REGARDING NOISE, VIBRATION, DUST, SEDIMENTATION CONTAINMENT, AND TRENCH WORK.
9. COLLECT SOLID WASTES AND STORE IN A SECURED DUMPSTER. THE DUMPSTER MUST MEET ALL LOCAL AND STATE SOLID WASTE MANAGEMENT REGULATIONS.
10. RESTORE ALL SURFACES EQUAL TO THEIR ORIGINAL CONDITION AFTER CONSTRUCTION IS COMPLETE PER SPECIFICATIONS. LEAVE ALL AREAS NOT DISTURBED BY CONSTRUCTION IN THEIR NATURAL STATE. TAKE CARE TO PREVENT DAMAGE TO SHRUBS, TREES, OTHER LANDSCAPING AND/OR NATURAL FEATURES. WHEREAS THE PLANS DO NOT SHOW ALL LANDSCAPE FEATURES, EXISTING CONDITIONS MUST BE VERIFIED BY THE CONTRACTOR IN ADVANCE OF THE WORK.
11. REGULARLY INSPECT THE PERIMETER OF THE PROPERTY TO CLEAN UP AND REMOVE LOOSE CONSTRUCTION DEBRIS BEFORE IT LEAVES THE SITE. PROMPTLY REMOVE ALL DEMOLITION DEBRIS FROM THE SITE TO AN APPROVED DUMP SITE.
12. ALL TRUCKS LEAVING THE SITE MUST BE COVERED.
13. DO NOT WASH ANY CONCRETE TRUCKS ONSITE. REMOVE BY HAND ANY CEMENT OR CONCRETE DEBRIS LEFT IN THE DISTURBED AREA.
14. BURIAL OF ANY STUMPS, SOLID DEBRIS, AND/OR STONES/BOULDERS ONSITE IS PROHIBITED.
15. AT THE END OF CONSTRUCTION, REMOVE ALL CONSTRUCTION DEBRIS AND SURPLUS MATERIALS FROM THE SITE. PERFORM A THOROUGH INSPECTION OF THE WORK PERIMETER. COLLECT AND REMOVE ALL MATERIALS AND BLOWN OR WATER CARRIED DEBRIS FROM THE SITE.

BASIC CONSTRUCTION SEQUENCE:

THE FOLLOWING CONSTRUCTION SEQUENCE IS TO BE USED AS A GENERAL GUIDELINE. COORDINATE WITH THE OWNER, ENGINEERS, AND LANDSCAPE ARCHITECTS AND SUBMIT A PROPOSED CONSTRUCTION SEQUENCE FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

1. SURVEY AND STAKE THE PROPOSED LIMIT OF DISTURBANCE AND LIMIT OF SEDIMENTATION BARRIERS.
2. PLACE SEDIMENTATION BARRIERS (TURBIDITY BARRIER, SILT SOCK, ETC.) AS INDICATED ON DRAWINGS AND STAKED OUT IN THE FIELD. UNDER NO CIRCUMSTANCES IS THE LIMIT OF WORK TO EXTEND BEYOND THE SEDIMENTATION BARRIERS/LIMIT OF DISTURBANCE AS INDICATED ON DRAWINGS AS APPROVED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP).
3. INSTALL TEMPORARY CONSTRUCTION ENTRANCES IN LOCATIONS INDICATED ON DRAWINGS. NO OTHER ENTRANCES ARE TO BE USED TO GAIN ACCESS TO THE SITE BY ANY CONSTRUCTION OR DELIVERY VEHICLES.
4. BEGIN CLEARING THE SITE AS REQUIRED.
5. PREPARE AND ROUGH GRADE THE PROPOSED LIVING SHORELINE AREAS. LAYOUT BIODEGRADABLE COIR FIBER LOG TO APPROXIMATE LOCATION AS INDICATED ON THE PLANS. FINAL LOCATION TO BE APPROVED BY THE ENGINEER BEFORE PERMANENT INSTALLATION.
6. INSTALL DOWN GRADIENT BIODEGRADABLE COIR FIBER ROLL AS INDICATED ON THE DRAWINGS. INSTALL COIR FABRIC AS INDICATED ON THE DETAILS.
7. BEGIN IMPORT OF APPROVED LIVING SHORELINE SOIL. BRING ROUGH GRADING TO PROPER ELEVATIONS AS SOON AS PRACTICABLE. COORDINATE WORK TO MINIMIZE TIME SOILS ARE UN-STABILIZED.
8. INSTALL LANDWARD COIR FIBER ROLL AND STAKE IN WITH COIR FABRIC.
9. COMPLETE ALL OTHER INSTALLATION OF SOFT BANK STABILIZATION PRACTICES WITHIN THE LIMIT OF WORK AS INDICATED ON THE DRAWINGS.
10. PERMANENTLY PLANT AND SEED ALL LIVING SHORELINE AREA AND ALL DISTURBED AREAS OUTSIDE OF THE LIVING SHORELINE AREA.
11. COMPLETE ALL REMAINING PLANTING AND SEEDING.
12. ENGINEER TO APPROVE THE REMOVAL OF ALL TEMPORARY SOIL EROSION AND SEDIMENTATION CONTROL MEASURES FOLLOWING VEGETATIVE ESTABLISHMENT OF ALL DISTURBED AREAS AND DETERMINE WHEN THE CONTRIBUTING AREA HAS REACHED A MINIMUM OF 80% STABILIZATION.

GENERAL GRADING AND DRAINAGE NOTES:

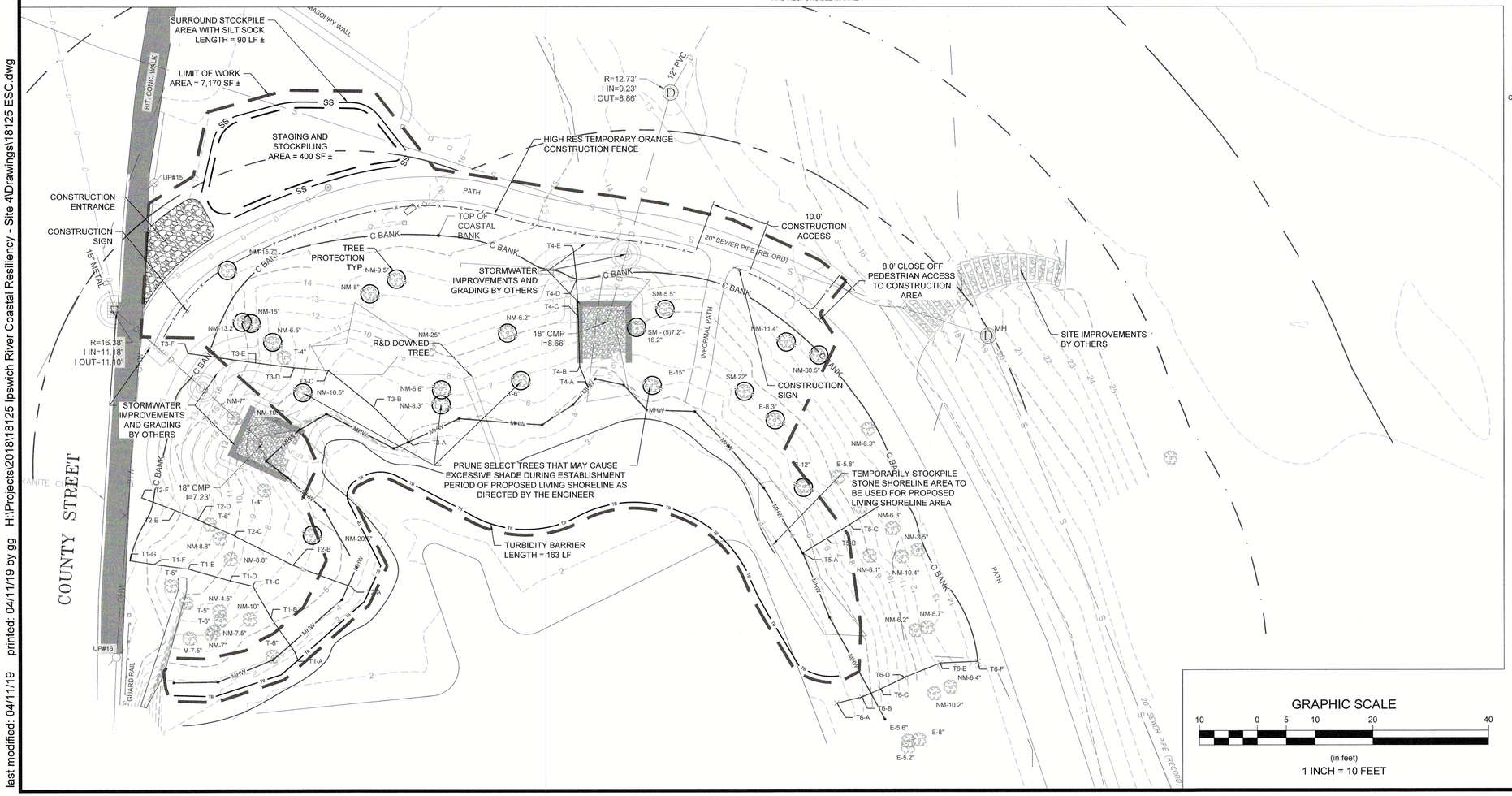
1. ALL CUT AND FILL SLOPES SHALL BE 3:1 OR FLATTER UNLESS OTHERWISE NOTED.
2. EXISTING GRADE CONTOUR INTERVALS SHOWN AT 1 FOOT.
3. PROPOSED GRADE CONTOUR INTERVALS SHOWN AT 1 FOOT.
4. ALL EARTHWORK AND SITE PREPARATION MUST BE DONE IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF ANY SUBSURFACE INVESTIGATION OR GEOTECHNICAL REPORTS PREPARED FOR THIS SITE.

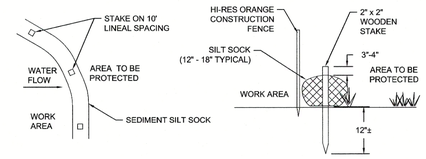
EROSION & SEDIMENT CONTROL NOTES:

1. DESIGNATE THE SITE CONSTRUCTION FOREMAN AS THE ON-SITE PERSONNEL RESPONSIBLE FOR THE DAILY INSPECTION AND MAINTENANCE OF ALL SEDIMENT AND EROSION CONTROLS AND IMPLEMENTATION OF ALL NECESSARY MEASURES TO CONTROL EROSION AND PREVENT SEDIMENT FROM LEAVING THE SITE.
2. INSTALL ALL EROSION AND SEDIMENT CONTROL (ESC) MEASURES AS INDICATED ON DRAWINGS IN CONSULTATION WITH THE CONSERVATION AGENT, AND ENGINEER BEFORE ANY CONSTRUCTION ACTIVITIES BEGIN. INSPECT, MAINTAIN REPAIR AND REPLACE EROSION CONTROL MEASURES, AS NECESSARY, DURING THE ENTIRE CONSTRUCTION PERIOD OF THE PROJECT. THE SITE PERIMETER EROSION CONTROLS ARE THE DESIGNATED LIMIT OF WORK. INFORM ALL PERSONNEL WORKING ON THE PROJECT SITE THAT NO CONSTRUCTION ACTIVITY IS TO OCCUR BEYOND THE LIMIT OF WORK AT ANY TIME THROUGHOUT THE CONSTRUCTION PERIOD.
3. MAINTAIN A MINIMUM SURPLUS OF 50 FEET OF EROSION CONTROL BARRIER (FLOATING TURBIDITY BARRIER, &/OR SILT SOCK) ONSITE AT ALL TIMES.
4. PROTECT THE ADJACENT RESOURCE AREA FROM SEDIMENTATION DURING PROJECT CONSTRUCTION UNTIL ACCEPTANCE BY THE OWNER & IN CONFORMANCE WITH THE ORDER OF CONDITIONS.
5. PROVIDE CONSTRUCTION EXITS AS INDICATED ON DRAWINGS TO SHED DIRT FROM CONSTRUCTION VEHICLE TIRES. CLEAN AND/OR REPLACE THE CRUSHED STONE PAD, AS NECESSARY, TO MAINTAIN ITS EFFECTIVENESS.
6. KEEP THE LIMIT OF CLEARING, GRADING AND DISTURBANCES TO A MINIMUM WITHIN THE PROPOSED AREA OF CONSTRUCTION. PHASE THE SITE WORK IN A MANNER TO MINIMIZE AREAS OF EXPOSED SOIL. IF TREES ARE TO BE CUT ON THE ENTIRE SITE, CLEAR AND GRUB ONLY THOSE AREAS WHICH ARE ACTIVELY UNDER CONSTRUCTION. PROPERLY INSTALL THE SEDIMENTATION CONTROLS PRIOR TO BEGINNING ANY LAND CLEARING ACTIVITY AND/OR OTHER CONSTRUCTION RELATED WORK.
7. MONITOR LOCAL WEATHER REPORTS DURING CONSTRUCTION AND PRIOR TO SCHEDULING EARTHMOVING OR OTHER CONSTRUCTION ACTIVITIES WHICH LEAVE LARGE DISTURBED AREAS UNSTABILIZED. IF INCLEMENT WEATHER IS PREDICTED, USE BEST PROFESSIONAL JUDGEMENT AND GOOD CONSTRUCTION PRACTICES WHEN SCHEDULING CONSTRUCTION ACTIVITIES AND ENSURE THE NECESSARY EROSION CONTROL DEVICES ARE INSTALLED AND FUNCTIONING PROPERLY TO MINIMIZE EROSION FROM ANY IMPENDING WEATHER EVENTS.
8. INSPECT EROSION AND SEDIMENT CONTROL DEVICES AND STABILIZED SLOPES ON A WEEKLY BASIS AND AFTER EACH RAINFALL EVENT OF .25 INCH OR GREATER. REPAIR IDENTIFIED PROBLEMS WITHIN 24 HOURS TO ENSURE EROSION AND SEDIMENT CONTROLS ARE IN GOOD WORKING ORDER. RESET OR REPLACE MATERIALS AS REQUIRED.
9. SURROUND THE PERIMETER OF SOIL STOCKPILES WITH SILT SOCK AS DETERMINED NECESSARY.
10. DISTURBED AREAS AND SLOPES MUST NOT BE LEFT UNATTENDED OR EXPOSED FOR EXCESSIVE PERIODS OF TIME SUCH AS THE INACTIVE WINTER SEASON. PROVIDE APPROPRIATE STABILIZATION PRACTICES ON ALL DISTURBED AREAS AS SOON AS POSSIBLE BUT NOT MORE THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT AREA HAS TEMPORARILY OR PERMANENTLY CEASED. REINFORCE TEMPORARY AREAS HAVING A SLOPE GREATER THAN 4:1 WITH EROSION BLANKETS OR APPROVED EQUAL UNTIL THE SITE IS PROPERLY STABILIZED. TEMPORARY SWALES MAY ALSO BE REQUIRED IF DETERMINED NECESSARY IN THE FIELD BY THE ENGINEER.
11. CONTAIN ALL SEDIMENT ONSITE. SWEEP ALL EXITS FROM THE SITE AS NECESSARY INCLUDING ANY SEDIMENT TRACKING. SWEEP PAVED AREAS AS NEEDED TO REMOVE SEDIMENT AND POTENTIAL POLLUTANTS ACCUMULATED DURING SITE CONSTRUCTION.
12. PROVIDE ON SITE OR MAKE READILY AVAILABLE THE NECESSARY EQUIPMENT AND SITE PERSONNEL DURING CONSTRUCTION HOURS FOR THE DURATION OF THE PROJECT TO ENSURE ALL EROSION AND SEDIMENTATION CONTROL DEVICES ARE PROPERLY MAINTAINED AND REPAIRED IN A TIMELY AND RESPONSIBLE MANNER. IF SITE WORK IS SUSPENDED DURING THE WINTER MONTHS THE CONTRACTOR MUST CONTINUE TO PROVIDE PERSONNEL AND EQUIPMENT EITHER ON SITE OR READILY AVAILABLE TO PROPERLY MAINTAIN AND REPAIR ALL EROSION AND SEDIMENTATION CONTROL DEVICES IN A TIMELY AND RESPONSIBLE MANNER
13. THE CONTRACTOR IS RESPONSIBLE FOR THE INSPECTION AND MAINTENANCE DURING CONSTRUCTION OF ALL INSTALLED IMPROVEMENTS. REMOVE SEDIMENT OR DEBRIS COLLECTED WITHIN THESE AREAS FROM THE PROJECT WORK PRIOR TO THE OWNER'S ACCEPTANCE.

SITE PREPARATION NOTES:

1. REMOVE ALL DEBRIS FROM THE SITE AND DISPOSE OF THE DEBRIS IN A PROPER AND LEGAL MANNER
2. STOCKPILE ALL MATERIAL THAT ARE TO BE REUSED IN THE DESIGNATED STAGING AND STOCKPILE AREA, AS SHOWN ON THE PLANS.
3. ANY PRUNING THAT IS REQUIRED TO EXISTING VEGETATION IS TO BE APPROVED BY THE OWNER AND/OR ENGINEER.
4. MAINTAIN CONTINUOUS ACCESS AND OPERATION FOR SURROUNDING FACILITIES, AS DEEMED BY THE OWNER, AT ALL TIMES DURING PREPARATION OF THE SITE.
5. PRIOR TO SITE PREPARATION OCCURRING, ALL EROSION CONTROL DEVICES ARE TO BE INSTALLED.

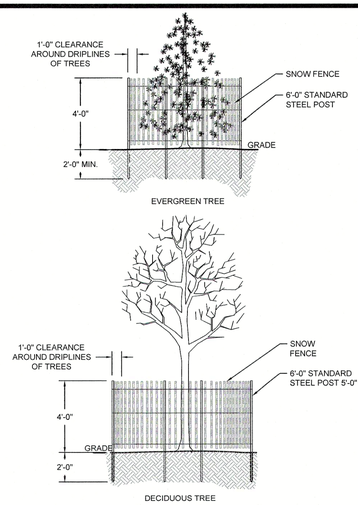




PLAN VIEW **SECTION**

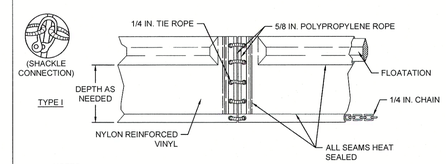
NOTES:
1. SILT SOCK MANUFACTURER TO BE SILT SOXX OR ENGINEER APPROVED EQUAL.
2. ALL MATERIAL TO MEET MANUFACTURER'S SPECIFICATIONS.
3. SEDIMENT SILT SOCK TO BE FILLED WITH LEAF COMPOST AND/OR WOODY MULCH PER MANUFACTURER'S REQUIREMENTS.
4. FOLLOWING CONSTRUCTION AND SITE STABILIZATION, COMPOST MATERIAL TO BE REMOVED OR DISPERSED ON SITE, AS APPROVED BY THE ENGINEER.

SEDIMENT SILT SOCK DETAIL
NOT TO SCALE



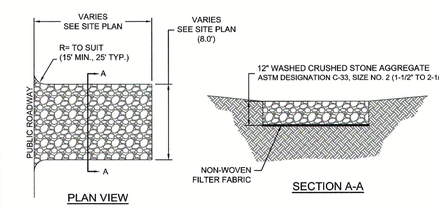
NOTES:
1. FENCING SHALL BE ORANGE RESINET SM60 BARRIER FENCE "SNOW FENCE" OR APPROVED EQUIVALENT.
2. POST SHALL BE HOT ROLLED RAIL STEEL AND FORMED INTO A "T". DIMENSIONS OF "T" POST SECTION, APPROXIMATELY 1 7/16" X 1 5/16" X 1/8" X 6' (SIX FEET) LONG. THE POST SHALL BE PAINTED GREEN OR GALVANIZED.
3. THE FENCING SHALL REMAIN IN PLACE UNTIL ALL EXCAVATION HAS BEEN COMPLETED AND THE SURFACE HAS BEEN RE-ESTABLISHED

TREE PROTECTION DETAIL
NOT TO SCALE



NOTES:
1. FABRIC TO BE LAMINATED VINYL OR POLYESTER
2. POLYPROPYLENE ROPE TO HAVE REINFORCED VERTICAL EDGES AND #4 BRASS GROMMETS
3. FLOTATION TO BE 14.4 LB/FT BUOYANCY, FOR SALTWATER CONDITIONS.

FLOATING TURBIDITY BARRIERS
NOT TO SCALE



PLAN VIEW SECTION A-A

NOTE:
1. STONE CONSTRUCTION ENTRANCE(S) TO REMAIN UNTIL DEMOBILIZATION OF ALL MACHINERY.
2. SEE SITE PLAN FOR LOCATION & ACTUAL DIMENSIONS

STONE CONSTRUCTION ENTRANCE DETAIL
NOT TO SCALE

LEGEND:

GENERAL	
— X — X —	FENCE - ORANGE HI-VIS CONSTRUCTION
	LIMIT OF WORK
	PATHWAY
	STONE
EROSION & SEDIMENT CONTROL	
—— TP ——	TREE PROTECTION
—— TB ——	TURBIDITY BARRIER
—— SS ——	SILT SOCK

GRAPHIC SCALE
10 0 5 10 20 40
(in feet)
1 INCH = 10 FEET

PERMITTING SET 4/11/2019
NOT FOR CONSTRUCTION

Revisions

Rev.	Date	By	Appr.	Description
△				
△				
△				
△				
△				
△				
△				

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Date: APRIL 2019 | Designed By: GSS | Drawn By: GSS | Checked By: RAC

Plan Set: IPSWICH RIVER COASTAL RESILIENCY PERMITTING PLANS IPSWICH, MASSACHUSETTS

Plan Title: EROSION CONTROL PLAN & NOTES

Prepared For:
Town of Ipswich
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Survey Provided By:
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Dated: NOVEMBER 2018

Registration:
COMMONWEALTH OF MASSACHUSETTS
RICHARD A. CLAYTOR
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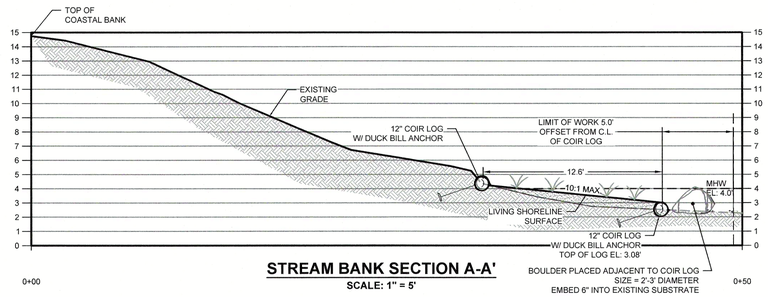
NO. 45116
REGISTERED PROFESSIONAL ENGINEER
4-11-19

Project Number: 18125 | Sheet: 3 of 6

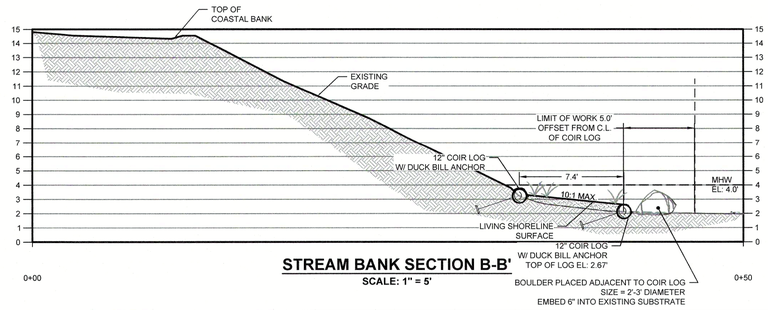
Sheet Number: C - 3

last modified: 04/11/19 printed: 04/11/19 by gg H:\Projects\2018\18125 Ipswich River Coastal Resiliency - Site 4\Drawings\18125 ESC.dwg



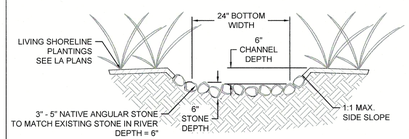
STREAM BANK SECTION A-A'

SCALE: 1" = 5'



STREAM BANK SECTION B-B'

SCALE: 1" = 5'

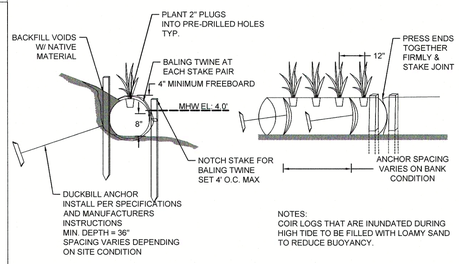


TYPICAL SECTION

NOTES:
1. EMBED STONE INTO SIDES OF CHANNEL AS SHOWN ON THE DETAIL. STONES SHOULD EXTEND HALFWAY UP SIDE SLOPE
2. STONE SOURCE TO BE FROM EXISTING STOCKPILED STONE.

STONE CHANNEL

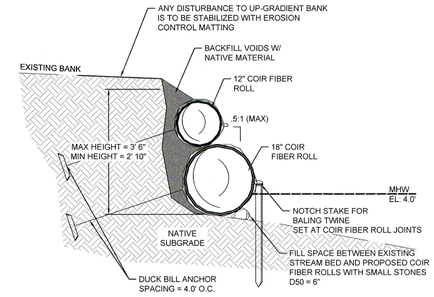
NOT TO SCALE



NOTES:
COIR LOGS THAT ARE INUNDATED DURING HIGH TIDE TO BE FILLED WITH LOAMY SAND TO REDUCE BUOYANCY.

COIR FIBER LOG

NOT TO SCALE

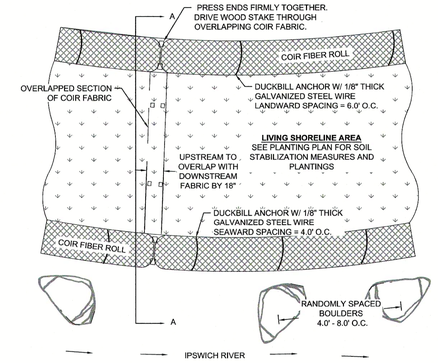


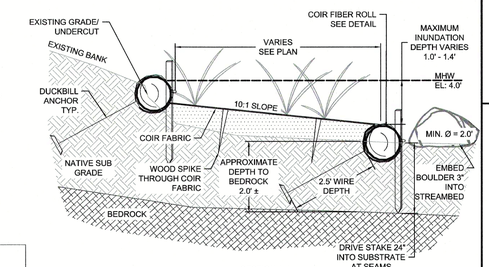
TYPICAL SECTION

NOTES:
1. FILL IN ADDITIONAL VOIDS BEHIND COIR FIBER ROLLS WITH NATIVE MATERIAL DEPENDING ON SITE CONDITIONS. VOID AREA TO BE GRADED UP TO EXISTING EDGE OF UNDERCUT AT 2:1 SLOPE MINIMUM.
2. COORDINATE TERMINATION POINTS OF DOUBLE COIR FIBER LOG WITH ENGINEER.
3. DUCKBLL ANCHOR MODEL TO BE EARTH ANCHOR 68-DB1 OR APPROVED EQUIVALENT.

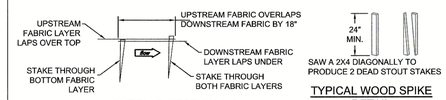
DOUBLE COIR FIBER LOG

NOT TO SCALE





SECTION A-A



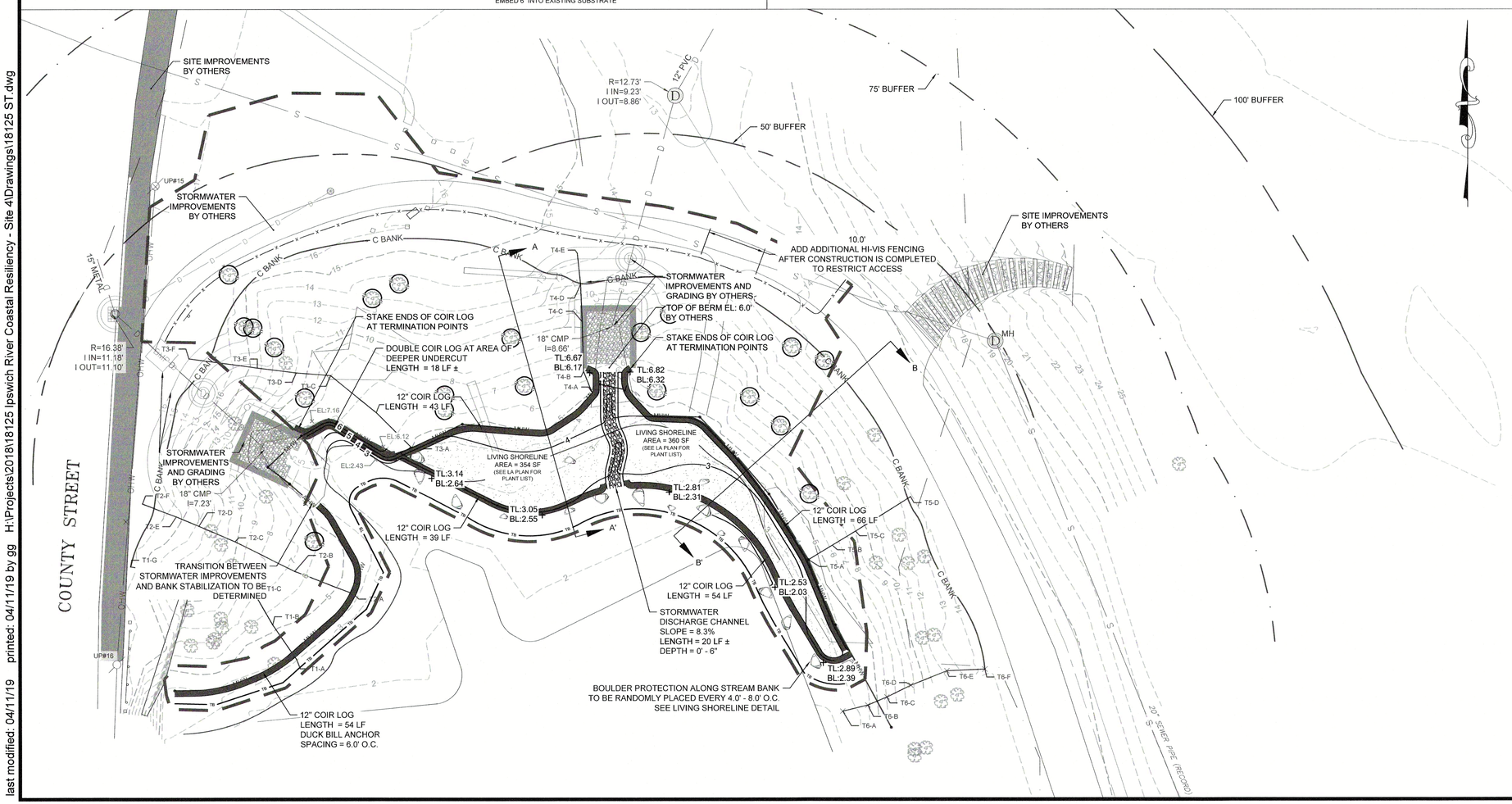
OVERLAP SECTION A-A

TYPICAL WOOD SPIKE DETAIL

NOTES:
1. BOULDERS TO BE CHOSEN FROM STOCKPILED BOULDERS FROM SITE. NO ADDITIONAL STONE IS TO BE BROUGHT ON SITE.
2. DUCKBILL SPACING WILL DEPEND ON CONDITION OF BANK. SEE DETAIL AND SITE PLAN.
3. DUCKBLL ANCHOR MODEL TO BE EARTH ANCHOR 68-DB1 OR APPROVED EQUIVALENT
4. ANCHOR CAPACITY = 1,100 LBS ON NORMAL SOILS.
5. INSTALLATION WIRE ROPE TO BE 1/8" GALVANIZED WITH A BREAKING STRENGTH OF 1,700 LBS.
6. COIR FABRIC SHALL BE A WOVEN COCONUT EROSION CONTROL BLANKET ABLE TO WITHSTAND 10 FPS WATER VELOCITIES AND 4.5 PSF SHEAR STRESS. FABRIC SHALL BE 'GEOCOIR 700' OR APPROVED EQUAL.

LIVING SHORELINE TYPICAL SECTION

NOT TO SCALE



LEGEND:

GENERAL	SYMBOLS
CENTERLINE	EXISTING TREE
CONTOUR - MINOR (44)	SIGN
CONTOUR - MAJOR (50)	BOULDER
FENCE - ORANGE CONSTRUCTION	TL:??? BL:??? TOP LOG/BOTTOM LOG
LIMIT OF WORK	
PATHWAY	
STONE	
COIR FIBER ROLL	
LIVING SHORELINE	

GRAPHIC SCALE

10 0 5 10 20 40

(in feet)
1 INCH = 10 FEET

PERMITTING SET 4/11/2019
NOT FOR CONSTRUCTION

Revisions

Rev.	Date	By	App.	Description
A				
A				
A				
A				
A				
A				
A				

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Designed By: SGS | Drawn By: SGS | Checked By: RAC | Date: APRIL 2019

Plan Set: IPSWICH RIVER COASTAL RESILIENCY PERMITTING PLANS IPSWICH, MASSACHUSETTS

Plan Title: SITE LAYOUT & GRADING PLAN

Prepared For:
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Survey Provided By:
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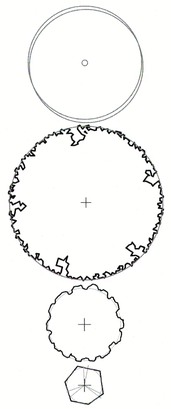
Dated: NOVEMBER 2018

Registration:

COMMONWEALTH OF MASSACHUSETTS
RICHARD A. CLAYTON
CIVIL
NO. 45116
Registered Professional Engineer

4-10-19

Project Number: 18125
Sheet: 4 of 6
Sheet Number: C - 4

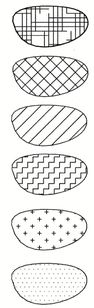


EXISTING CANOPY TREE

PROPOSED CANOPY TREE

PROPOSED LARGE SHRUB

PROPOSED MEDIUM SHRUB



PERENNIAL COMBINATION

SALVAGED VEGETATION (SEASIDE BROOK PLANT COMMUNITY)

BR & PC (SALTMARSH BULRUSH & PICKERELWEED)

CC & HM (BLUE JOINT & ROSE-MALLOW)

ST & IVE (SOFT-STEMMED BULRUSH & IRIS VERSICOLOR)

PV & SS (SWITCH GRASS & SEA GOLDENROD)

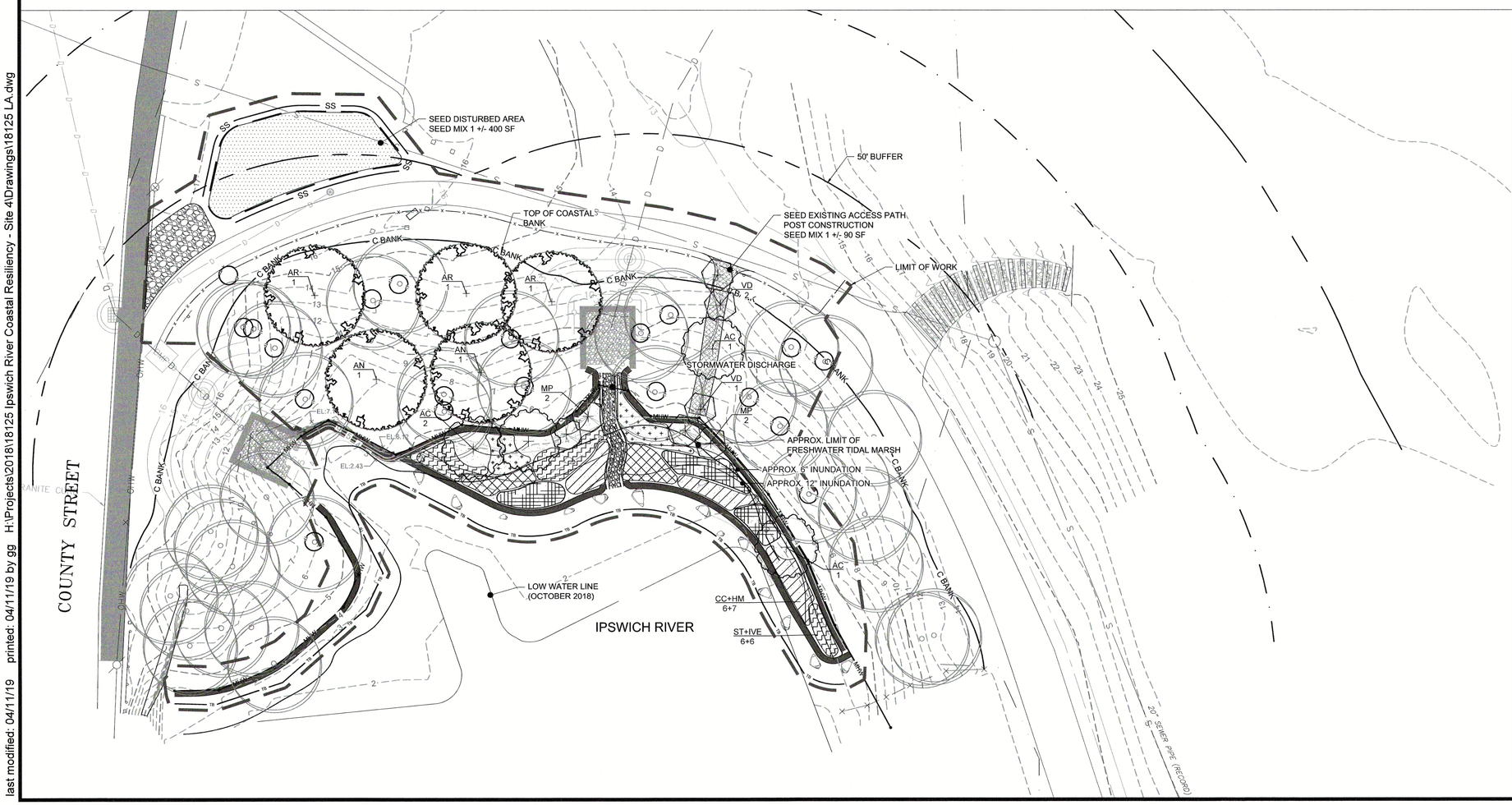
SEED MIX 1
NEW ENGLAND CONSERVATION/WILDLIFE MIX

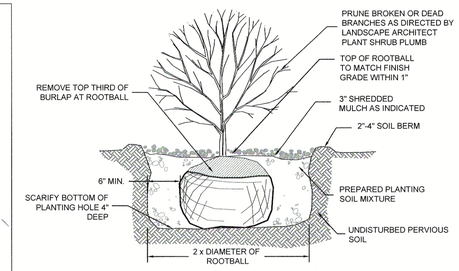
BIG BLUESTEM
SWITCHGRASS
LITTLE BLUESTEM
VIRGINIA WILD RYE
PARTRIDGE PEA
COMMON MILKWEED
SHOWY TICK-TREFOIL
NEW ENGLAND ASTER
SPOTTED JOE PYE WEED
GRASS-LEAVED GOLDEN ROD
CREEPING RED FESCUE
OX-EYE SUNFLOWER
DEER TONGUE
GREEN HEADED CONEFLOWER
EARLY GOLDENROD
INDIAN GRASS

TOTAL SEEDED AREA = ± 400 SF

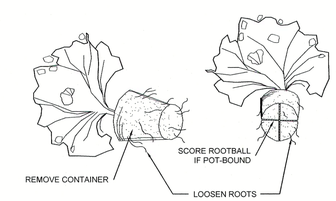
PLANT LIST

Key	*Botanical Name*	Common Name	Size	Spacing	Notes
	Trees				
AN	*Acer negundo*	Boxelder	#3		
AR	*Acer rubrum*	Red Maple	#3		
	Shrubs				
AC	*Amelanchier canadensis*	Shadbush	#7	10' O.C.	
MP	*Myrica pensylvanica*	Northern Bayberry	#5	6' O.C.	
VD	*Viburnum dentatum*	Arrowwood Viburnum	2 gal.	5' O.C.	
	Ground Cover/Grasses/Perennials				
CC	*Calamagrostis canadensis*	Blue joint	#1	18"O.C.	Up to 12" Inundation
HM	*Hibiscus moscheutos*	rose-mallow	#1	18" O.C.	Up to 12" Inundation
BR	*Bolboschoenus robustus*	Saltmarsh bulrush	#1	18" O.C.	Up to 12" Inundation
IVE	*Iris versicolor*	Blue Flag	#1	18" O.C.	Up to 12" Inundation
PV	*Panicum virgatum*	Switch Grass	#1	18"O.C.	Up to 3" Inundation
ST	*Schoenoplectus tabernaemontani*	Soft-stemmed Bulrush	#1	18" O.C.	4-6" inundation
PC	*Potederia cordata*	Pickerelweed	#1	18"O.C.	Up to 12" Inundation
SS	*Solidago sempervirens*	Seaside Goldenrod	#1	18"O.C.	Up to 3" Inundation





SHRUB PLANTING DETAIL
NOT TO SCALE



CONTAINER PLANT ROOTBALL TREATMENT
NOT TO SCALE

GRAPHIC SCALE

10 0 5 10 20 40

(in feet)
1 INCH = 10 FEET

PERMITTING SET 4/11/2019
NOT FOR CONSTRUCTION

Revisions

Rev.	Date	By	Appr.	Description
1	--	--	--	--
2	--	--	--	--
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8	--	--	--	--

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Date: APRIL 2019 | Designed By: EB | Drawn By: EB | Checked By: ERK

Plan Set: IPSWICH RIVER COASTAL RESILIENCY PERMITTING PLANS IPSWICH, MASSACHUSETTS

Plan Title: LANDSCAPE PLAN

Prepared For:
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Survey Provided By:
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Dated: NOVEMBER 2018

Registration:

COMMONWEALTH OF MASSACHUSETTS
RICHARD A. CLAYTON
CIVIL
NO. 45116
PROFESSIONAL ENGINEER

4-11-19

Project Number: 18125 | Sheet: 5 of 6

Sheet Number: LA - 5

GENERAL PLANTING NOTES:

1. THE FOLLOWING NOTES ARE PROVIDED AS GENERAL PLANTING GUIDELINES ONLY. THOROUGHLY REVIEW THE PROJECT SPECIFICATIONS FOR ALL LANDSCAPE REQUIREMENTS PRIOR TO THE COMMENCEMENT OF ANY LANDSCAPE WORK. SUBMIT IN WRITING TO THE LANDSCAPE ARCHITECT ANY QUESTIONS OR CLARIFICATIONS REQUIRED AT A MINIMUM OF 30 DAYS PRIOR TO ORDERING ANY MATERIALS OR BEGINNING ANY LANDSCAPE CONSTRUCTION.

2. SUBMIT TO THE LANDSCAPE ARCHITECT FOR REVIEW AND APPROVAL ALL REQUIRED LANDSCAPE SUBMITTALS AS DESCRIBED IN THE SPECIFICATIONS INCLUDING A PLANT LIST WITH PLANT SIZE AND QUANTITIES TO BE ORDERED PRIOR TO DELIVERY TO THE PROJECT SITE.

3. PRIOR TO CONSTRUCTION, EXISTING VEGETATION GROWING BELOW MHW SHALL BE IDENTIFIED AND STAKED FOR SALVAGE. SALVAGED VEGETATION SHALL BE CAREFULLY REMOVED BY HAND IN PATCHES, INCLUDING AT LEAST 6 INCHES OF THE UNDERLYING SOIL, AND TEMPORARILY STOCKPILED IN A PREPARED SALVAGE BED LOCATED NEARBY BUT AWAY FROM THE CONSTRUCTION AREA. SALVAGED PLANTINGS SHALL BE KEPT AT THE SAME ELEVATION TO ENSURE TWICE DAILY TIDE INUNDATION.

4. FURNISH AND INSTALL ALL PLANTS AS SHOWN ON THE DRAWINGS AND IN THE SIZE AND QUANTITIES SPECIFIED ON THE PLANTING SCHEDULE. PLANT SUBSTITUTION SELECTION MUST BE APPROVED BY BIOLOGIST OR LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.

5. ALL PLANTS TO COMPLY WITH APPLICABLE REQUIREMENTS OF ANSI Z60.1 "AMERICAN STANDARD FOR NURSERY STOCK." LATEST EDITION, PUBLISHED BY THE AMERICAN NURSERY AND LANDSCAPE ASSOCIATION INC.

6. PLANTS TO BE GROWN UNDER CLIMATIC CONDITIONS SIMILAR TO THOSE IN THE LOCALITY OF THE PROJECT FOR AT LEAST TWO (2) YEARS. USE HEALTHY NURSERY GROWN PLANTS, FREE OF DISEASE, INSECTS, AND PESTS. EGGS OR LARVAE, AND HAVE A WELL DEVELOPED ROOT SYSTEM.

7. INSTALL PLANTS WITHIN ONE (1) WEEK OF PURCHASE. IF PLANTS ARE TO BE STORED AT THE SITE PRIOR TO PLANTING, IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THEY ARE PROPERLY MAINTAINED, WATERED, AND REMAIN HEALTHY.

8. PROCEED WITH PLANTING ONLY WHEN EXISTING AND FORECASTED WEATHER CONDITIONS PERMIT. SUBMIT TO THE LANDSCAPE ARCHITECT IN WRITING THE PROPOSED PLANTING SCHEDULE. OBTAIN APPROVAL OF PLANTING SCHEDULE FROM THE LANDSCAPE ARCHITECT PRIOR TO PERFORMING ANY WORK.

9. SEASONS FOR PLANTING:

SPRING:	DECIDUOUS:	APRIL 1 TO JUNE 15
	EVERGREEN:	APRIL 1 TO JUNE 15
	PERENNIALS:	APRIL 15 TO JUNE 1
	GROUNDCOVERS:	APRIL 15 TO JUNE 1
FALL:	DECIDUOUS:	SEPTEMBER 15 TO NOVEMBER 15
	EVERGREEN:	SEPTEMBER 15 TO NOVEMBER 15
	PERENNIALS:	SEPTEMBER 15 TO NOVEMBER 15
	GROUNDCOVERS:	SEPTEMBER 15 TO NOVEMBER 15

9. PLANTING UNDER FROZEN CONDITIONS IN EITHER THE SPRING OR FALL WILL NOT BE PERMITTED. PLANTING BEFORE OR AFTER THE ABOVE REFERENCED PLANTING DATES WILL INCREASE THE LIKELIHOOD OF PLANT OR GRASS SEED ESTABLISHMENT FAILURE. ANY DEVIATION FROM THE ABOVE REFERENCED PLANTING DATES IS UNDERTAKEN AT SOLE RISK OF THE CONTRACTOR AND IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ANY ADDITIONAL MAINTENANCE AND WATERING WHICH MAY BE REQUIRED TO ENSURE SATISFACTORY PLANT AND SEED ESTABLISHMENT.

10. FURNISH ONE YEAR MANUFACTURER WARRANTY FOR TREES, PLANTS, AND GROUND COVER AGAINST DEFECTS INCLUDING DEATH AND UNSATISFACTORY GROWTH, EXCEPT FOR DEFECTS RESULTING FROM LACK OF ADEQUATE MAINTENANCE, NEGLECT, OR ABUSE BY OWNER, OR ABNORMAL WEATHER CONDITIONS UNUSUAL FOR WARRANTY PERIOD. THE DATE OF FINAL ACCEPTANCE OF ALL COMPLETED PLANTING WORK ESTABLISHES THE END OF INSTALLATION AND INITIAL MAINTENANCE PERIOD AND THE COMMENCEMENT OF THE GUARANTEE PERIOD.

11. ALL TREES WITHIN 5'-0" OF WALKWAYS AND SIDEWALKS TO HAVE A 6'-8" STANDARD BRANCHING HEIGHT.

12. INSPECT ALL AREAS TO BE PLANTED OR SEEDED PRIOR TO STARTING ANY LANDSCAPE WORK. REPORT ANY DEFECTS SUCH AS INCORRECT GRADING, INCORRECT SUBGRADE ELEVATIONS OR DRAINAGE PROBLEMS, ETC. TO THE LANDSCAPE ARCHITECT AND ENGINEER PRIOR TO BEGINNING WORK. COMMENCEMENT OF WORK INDICATES ACCEPTANCE OF SUBGRADE AREAS TO BE PLANTED, AND THE LANDSCAPE CONTRACTOR ASSUMES RESPONSIBILITY FOR ALL LANDSCAPE WORK.

13. PROVIDE PROPER PREPARATION OF ALL PROPOSED PLANTED AND SEEDED AREAS PER THE NOTES AND SPECIFICATIONS.

14. ALL PLANT LAYOUT AND ACTUAL PLANTING LOCATIONS ARE TO BE FIELD VERIFIED BY LANDSCAPE ARCHITECT PRIOR TO PLANTING. NOTIFY THE LANDSCAPE ARCHITECT AT A MINIMUM OF 48 HOURS IN ADVANCE PRIOR TO SCHEDULING ANY FIELD INSPECTIONS.

15. SALVAGED PLANTINGS FROM SHORELINE ARE TO BE INSTALLED IN PATCHES WITHIN THE LIVING SHORELINE AREAS. SALVAGED PLANTS SHALL BE SECURED IN PLACE WITH WIDE MESH JUTE NETTING STAKED OR ANCHORED IN PLACE. INTRODUCED PLANTINGS SHALL BE INTERSPERSED AMONG PATCHES OF SALVAGED VEGETATION.

16. BALL AND BURLAP: REMOVE BURLAP AND WIRE BASKETS FROM TOPS OF BALLS AND FROM TOP HALF OF ROOTBALL AS INDICATED ON DRAWINGS. REMOVE PALLETS, IF ANY, BEFORE SETTING.

17. POTTED PLANTS: REMOVE THE PLANT FROM THE POT AND LOOSEN OR SCORE THE ROOTS BEFORE PLANTING TO PROMOTE OUTWARDS ROOT GROWTH INTO THE SOIL.

18. DIG THE THE PLANTING HOLE TO THE SAME DEPTH AS THE ROOT BALL AND TWO TO THREE TIMES WIDER. SCORE ALL SIDES OF THE HOLE, PLACE THE PLANT IN THE HOLE SO THE TOP OF ROOT BALL IS EVEN WITH SOIL SURFACE. FILL THE HOLE HALFWAY AND THEN ADD WATER ALLOWING IT TO SEEP INTO BACK FILLED MATERIAL. BE SURE TO REMOVE ALL AIR POCKETS FROM BACK FILLED SOIL. DO NOT SPREAD SOIL ON TOP OF THE ROOTBALL. IF SOIL IS EXTREMELY POOR, REPLACE BACK FILL WITH GOOD QUALITY TOP SOIL. AMEND THE SOIL, AS NECESSARY.

19. CREATE A 2" TO 4" BERM AROUND THE EDGE OF PLANTING HOLE WITH REMAINING SOIL TO RETAIN WATER.

20. REMOVE ALL PLANT TAGS AND FLAGS FROM THE PLANTS.

21. MULCH ALL PLANTING BEDS AS INDICATED ON DRAWINGS. UNLESS NOTED OTHERWISE, ALL PLANTS TO RECEIVE 2-3 INCHES OF MULCH. DO NOT PILE OR MOUND MULCH AROUND THE PLANT STEMS OR TRUNK.

22. TRIM BROKEN AND DEAD BRANCHES FROM TREES AND SHRUBS AFTER PLANTING. NEVER CUT A LEADER.

GENERAL SEEDING NOTES:

1. SEND A REPRESENTATIVE SAMPLE OF THE TOPSOIL TO A TESTING LABORATORY FOR STANDARD SOIL ANALYSIS AS DESCRIBED IN THE SPECIFICATIONS. SUBMIT TO THE LANDSCAPE ARCHITECT AND ENGINEER TEST RESULTS WITH RECOMMENDED SOIL TREATMENTS TO PROMOTE PLANT AND GRASS GROWTH. CORRECT DEFICIENCIES IN THE LOAM AND STOCKPILED TOPSOIL AS DIRECTED BY THE TESTING AGENCY.

2. ALL AREAS THAT ARE DISTURBED AND/OR GRADED DURING CONSTRUCTION ARE TO BE BROUGHT TO FINISHED GRADE WITH AT LEAST 4" MINIMUM DEPTH OF GOOD QUALITY LOAM AND SEEDED WITH A QUICK GERMINATING GRASS SEED SUCH AS NEW ENGLAND EROSION CONTROL RESTORATION MIX OR AS SPECIFIED ON THE PLANS.

3. PRIOR TO THE PLACEMENT OF TOP SOIL, LOOSEN THE SUBGRADE OF ALL PROPOSED SEEDED AREAS TO A DEPTH OF 6" AND RAKE TO REMOVE STONES LARGER THAN 1 INCH, STICKS, ROOTS, RUBBISH AND OTHER EXTRANEOUS MATTER AND LEGALLY DISPOSE TO AN OFF SITE LOCATION.

4. DO NOT SPREAD TOPSOIL IF THE SUBGRADE IS FROZEN, EXCESSIVELY WET, COMPACTED OR NOT PROPERLY PREPARED PER THE NOTES AND SPECIFICATIONS.

WATERING NOTES:

1. PROVIDE PROPER PLANT CARE, MAINTENANCE AND WATERING ON SITE UNTIL SUCH TIME AS THE LANDSCAPING IS ACCEPTED BY THE PROPERTY OWNER AS SATISFACTORY PER THE SPECIFICATIONS OR AS DETERMINED BY ANY WRITTEN AGREEMENTS BETWEEN THE CONTRACTOR AND PROPERTY OWNER.

2. ESTABLISH AN APPROPRIATE WATERING SCHEDULE FOR ALL PLANT MATERIAL BASED UPON PLANT SPECIES REQUIREMENTS AND PROVIDE IN WRITING TO THE LANDSCAPE ARCHITECT AND OWNER FOR REVIEW AND APPROVAL, ADHERE TO THE APPROVED SCHEDULE UNTIL PLANTS ARE FULLY ESTABLISHED.

3. AT A MINIMUM THE NEWLY SEEDED AND/OR HYDROSEEDED AREAS SHOULD BE WATERED DAILY. SPECIAL CARE SHOULD BE TAKEN TO ENSURE THAT THE LAWN IS NOT SATURATED DURING WATERING. IF AN IRRIGATION SYSTEM IS NOT PROVIDED, A TEMPORARY IRRIGATION SYSTEM OR HANDHELD GARDEN HOSE SHALL BE USED FOR WATERING SEEDED AREAS. THE AREA MUST BE MAINTAINED CONSISTENTLY MOIST FOR THE BEST GERMINATION RESULTS. ADDITIONAL WATERING WILL BE REQUIRED IF PLANTING AND SEEDING OCCUR OUTSIDE OF THE RECOMMENDED PLANTING SEASONS.

PLANTING LAYOUT NOTES

1. HATCHED AREAS - DO NOT PLANT LARGE AREAS OF THE SAME SPECIES. RANDOMLY PLANT AS INDICATED ON THE PLANTING PLANS INTO SMALL GROUPINGS OF THE SAME SPECIES TO CREATE A MORE NATURALISTIC APPEARANCE. PLANT THE SAME PLANT SPECIES IN GROUPS OF 3-7 AND NOT LARGER THAN 7, DEPENDING ON THE OVERALL NUMBER OF PLANTINGS.

INVASIVE SPECIES MANAGEMENT - **REMOVE INVASIVE SPECIES WITHIN THE L.O.W.**

INVASIVE SPECIES MANAGEMENT SHOULD BE CUSTOMIZED TO THE INDIVIDUAL SPECIES FOLLOWING THE SPECIFIC MEASURES OUTLINED BELOW. MANAGERS SHOULD READ AND UNDERSTAND THE ENCLOSED INVASIVES SPECIES CONTROL SPECIFICATION FOR THIS SITE PRIOR TO COMMENCING ANY INVASIVE SPECIES MANAGEMENT ACTIVITIES. THE USE OF HERBICIDES MUST BE APPROVED BY THE TOWN OF IPSWICH. ALL PESTICIDE APPLICATIONS MUST BE CONDUCTED BY A MASSACHUSETTS' LICENSED PESTICIDE APPLICATOR.

THE FOLLOWING INVASIVE SPECIES WERE IDENTIFIED AT THE SITE. ANY OF THESE SPECIES LOCATED WITHIN THE LIMIT OF WORK SHOULD BE REMOVED FOLLOWING THE MEASURES LISTED BELLOW.

NORWAY MAPLE (ACER PLATANOIDES)

SEVERAL NORWAY MAPLE TREES EXIST AT THE SITE

PRUNING
1. CUT BACK BRANCHES ON THE EXISTING NORWAY MAPLES TO ALLOW POCKETS OF LIGHT TO REACH UNDER STORY PLANTING.

ORIENTAL BITTERSWEET (CELASTRUS ORBICULATUS)

LARGE GROUPS OF ORIENTAL BITTERSWEET WERE FOUND AT THE SITE

MANAGEMENT OF THIS SPECIES REQUIRES EXTENSIVE MONITORING AND OFTEN A MULTI-YEAR COMMITMENT. DUE TO THE PERSISTENCE OF THE SEED BANK AND THE ABILITY TO SPREAD BY ROOT SUCKERING, MECHANICAL CONTROL IS A LONG-TERM PROJECT. CHEMICAL CONTROL METHODS ARE MORE EFFECTIVE THAN MANUAL TECHNIQUES AND THEREFORE ARE THE PREFERRED FOR MANAGEMENT OF ORIENTAL BITTERSWEET. HOWEVER, IN THIS SENSITIVE AQUATIC SETTING, NO CHEMICAL CONTROLS SHOULD BE IMPLEMENTED WITHOUT FIRST CONSULTING THE TOWN OF IPSWICH.

MANUAL AND MECHANICAL CONTROLS
1. LARGER STEMS SHOULD BE CUT EVERY TWO WEEKS DOWN TO THE GROUND AND AS CLOSE TO THE ROOT COLLAR AS POSSIBLE. CUT STEMS FREQUENTLY (WEEKLY OR BI-WEEKLY) THROUGHOUT THE YEAR, AS CUTTING LESS FREQUENTLY WILL STIMULATE VIGOROUS RE-SPROUTING FROM BELOW-GROUND STEMS (RHIZOMES). ALL PLANT PARTS (INCLUDING FRUITS) SHOULD BE SEALED IN BAGS AND DISPOSED OF IN A LANDFILL TO PREVENT REESTABLISHMENT ON A GIVEN SITE.
2. SMALLER PLANTS SHOULD BE PULLED OR GRUBBED INCLUDING ALL ROOTS AND RUNNERS USING A "PULASKI" OR SIMILAR DIGGING TOOL. MANAGERS SHOULD ANTICIPATE AT LEAST SOME REGROWTH IF NOT ALL THE ROOT MATERIAL IS REMOVED. REGROWTH MAY ALSO OCCUR FROM GERMINATION OF SEEDS PRESENT IN THE SEED BANK. ALL PLANT PARTS (INCLUDING FRUITS) SHOULD BE SEALED IN BAGS AND DISPOSED OF IN A LANDFILL TO PREVENT REESTABLISHMENT ON A GIVEN SITE.

CHEMICAL CONTROL
1. CHEMICAL CONTROL METHODS USING TRICLOPYR ARE TYPICALLY CONSIDERED MORE EFFECTIVE THAN MANUAL TECHNIQUES. WHILE BOTH GLYPHOSATE AND TRICLOPYR HAVE BEEN USED TO CONTROL BITTERSWEET, MOST OF THE LITERATURE CITES MORE EFFECTIVE CONTROL WITH TRICLOPYR. AGAIN, THE TOWN OF IPSWICH SHOULD BE CONSULTED PRIOR TO IMPLEMENTING CHEMICAL CONTROLS AT THIS SITE.

MULTIFLORA ROSE (ROSA MULTIFLORA)

MANUAL OR MECHANICAL CONTROL
1. YOUNG PLANTS MAY BE REMOVED BY HAND, BUT CAUTION MUST BE TAKEN TO ENSURE THE ENTIRE ROOT SYSTEM HAS BEEN REMOVED.
2. CUT OR MOW MATURE PLANTS REPEATEDLY DURING THE CONSTRUCTION PERIOD / GROWING SEASON (3 TO 6 TIMES). STEMS MUST BE AS CLOSE TO THE GROUND LEVEL AS POSSIBLE.

JAPANESE BARBERRY (BERBERIS THUNBERGII)

MANUAL OR MECHANICAL CONTROL
1. CUT OR SEVER THE ABOVE GROUND PROTION OF THE PLANT BY MECHANICAL MEANS SUCH AS LOPPERS, CHAINSAW, BRUSH SAW. 2. PULL ABOVE GROUND STEMS AND ROOTS.

WINGED EUONYMUS (EUONYMUS ALATUS) / PRIVET (LIGUSTRUM VULGARE)

MANUAL OR MECHANICAL CONTROL
1. PULL SEEDLINGS FROM THE GROUND.
2. LARGE PLANTS AND THEIR ROOT SYSTEMS MAY BE DUG OUT THROUGH THE USE OF A WEED WRENCH OR SPADE FORK.
3. CUT LARGE SHRUBS, BUT THE STUMP MUST BE GROUND OUT OR THE RE-GROWTH CUT REPEATABLY.

ENGLISH IVY (HENDERA HELIX)

1. CONTROL ENGLISH IVY BY CUTTING EACH STEM AT SIX INCHES OFF THE GROUND AND CUT AGAIN SEVERAL INCHES FROM THE FIRST CUT. REMOVE CUT PIECE TO MAKE A VINE-FREE BAND AROUND TREE TRUNK. THE UPPER PORTION OF THE VINE WILL DIE, ROT AND FALL OFF TREE. NO NEED TO REMOVE FROM TREE. ADDITIONALLY CHEMICAL CONTROL SHOULD BE USED IN DENSE STANDS. APPLICATIONS SHOULD OCCUR BETWEEN LATE AUGUST AND OCTOBER; LEAVES SHOULD BE SELECTIVELY PAINTED WITH A 1½ TO 2 % SOLUTION OF GLYPHOSATE USING A DISPOSABLE BRUSH, COTTON RAG, OR COTTON GLOVE (WORN OVER PLASTIC GLOVES).

EPILOBIUM (EPILOBIUM HIRSUTUM) / GARLIC MUSTARD (ALLIARIA PETIOLATA)

1. PULL AT THE BASE OF THE PLANT AND REMOVE THE ENTIRE ROOT. BAG AND DISPOSE OF PULLED PLANTS.

EDOSION CONTROL, INVASIVE SPECIES MANAGEMENT AREAS

1. ALL AREAS THAT HAVE INVASIVE SPEICES REMOVED WILL BE SEEDED AND STABILIZED WITH AN EROSION CONTROL BLANKET
2. FOR AREAS ABOVE THE COASTAL BANK LINE USE SEED MIX 1: NEW ENGLAND CONSERVATION/WILDLIFE MIX *(BIG BLUESTEM, SWITCHGRASS, LITTLE BLUESTEM, VIRGINIA WILD RYE, PARTRIDGE PEA, COMMON MILKWEED, SHOWY TICK-TREFOIL, NEW ENGLAND ASTER, SPOTTED JOE PYE WEED, GRASS-LEAVED, GOLDEN ROD, CREEPING RED FESCUE, OX-EYE SUNFLOWER, DEER TONGUE, GREEN HEADED CONEFLOWER, EARLY GOLDENROD, INDIAN GRASS)* OR ACCEPTABLE EQUIVALENT.
3. FOR AREAS BELOW THE COASTAL BANK LINE USE SEED MIX 2: NEW ENGLAND COASTAL SALT TOLERANT GRASS MIX *(CANADA WILD RYE, RED FESCUE, ATLANTIC COASTAL PANIC GRASS, BIG BLUESTEM, INDIAN GRASS, SWITCH GRASS, PATH RUSH)* OR ACCEPTABLE EQUIVALENT.

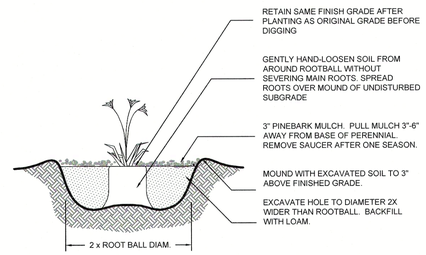
MANAGEMENT CONSIDERATIONS DURING THE CONSTRUCTION PERIOD FOR ALL SPECIES

2. MONITOR ALL DESCRIBED SPECIES AT THE SITE THROUGHOUT THE DURATION OF THE CONSTRUCTION PERIOD. NEW GROWTH OF ANY INVASIVE SPECIES SHOULD BE REMOVED AS SOON AS IT IS DETECTED.
3. PULL SEEDLINGS AS SOON AS DETECTED AND REMOVE AS MUCH AS POSSIBLE OF ENTIRE ROOT STRUCTURE.
4. REGROWTH MAY BE CONTROLLED BY SHADING FROM NEW PLANTINGS.
5. AFTER INVASIVE SPECIES ARE SUCCESSFULLY CONTROLLED, THE AREA SHOULD BE PERIODICALLY CHECKED FOR THE APPEARANCE OF NEW SEEDLINGS (OR ROOT SUCKERS). NEW GROWTH OF ANY INVASIVE SPECIES SHOULD BE REMOVED AS SOON AS IT IS DETECTED.

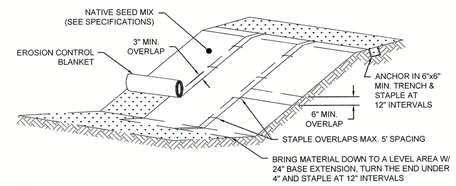
INVASIVE SPECIES REMOVAL AND MONITORING SEQUENCE

THE FOLLOWING CONSTRUCTION SEQUENCE IS TO BE USED AS A GENERAL GUIDELINE. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER, ENGINEERS, AND LANDSCAPE ARCHITECTS AND SUBMIT A PROPOSED CONSTRUCTION SEQUENCE FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

1. INSTALL ALL EROSION AND SEDIMENTATION CONTROL MEASURES (E.G., SILT SOCK, STRAWBALE, SILT FENCE) AS INDICATED ON THE PLANS.
2. IDENTIFY AND MARK INVASIVE SPECIES TO BE REMOVED. PLANT IDENTIFICATION SHALL BE PERFORMED BY QUALIFIED PERSONNEL ONLY, AS INDICATED IN THE SPECIFICATIONS.
3. REMOVE AND TREAT REMAINING INVASIVE TREES, SHRUBS, AND VEGETATION AS INDICATED ON THE PLANS.
4. IN 2-4 WEEKS AFTER INITIAL CUTTING AND/OR CHEMMICAL TREATMENT, FOLLOW-UP REMOVAL OF OTHER INVASIVE SPECIES (E.G., REGROWTH OF TREE SPROUTS, SHRUBS, AND VEGETATION) AS INDICATED.
5. PLANT THE DISTURBED SLOPE ONLY IN THE AREAS IDENTIFIED ON THE PLANTING PLAN.
6. ALL PLANTINGS ARE TO BE WATERED AT LEAST TWICE WEEKLY (DEPENDENT ON RAINFALL) FOR THE FIRST GROWING SEASON. REPLACE DEAD OR DYING PLANTS AS NECESSARY.
7. MONITOR AT LEAST ONCE A MONTH FOR EMERGENCE OF SEEDLING INVASIVE SPECIES, INCLUDING. REMOVE AS NECESSARY AND DISPOSE OF REMOVED MATERIALS AS INDICATED IN INVASIVE SPECIES REMOVAL NOTES.

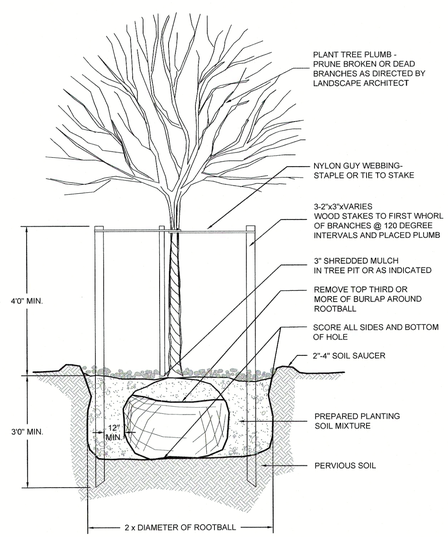


PERENNIAL PLANTING DETAIL
NOT TO SCALE

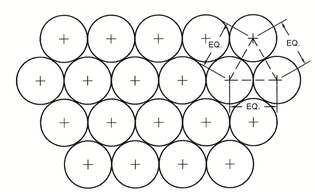


NOTES:
1. EROSION CONTROL BLANKET TO BE ALL NATURAL MATERIAL SUITABLE FOR TEMPORARY STABILIZATION - NORTH AMERICAN GREEN BIONET S150BN OR APPROVED EQUIVALENT.
2. SLOPE SURFACE SHALL BE SMOOTH BEFORE PLACEMENT FOR PROPER SOIL CONTACT.
3. STAPLING PATTERN AS PER MANUFACTURER'S RECOMMENDATIONS.
4. DO NOT STRETCH BLANKETS/MATTINGS TIGHT. ALLOW THE ROLLS TO MOLD TO ANY IRREGULARITIES.
5. FOR SLOPES LESS THAN 3H:1V, ROLLS MAY BE PLACED IN HORIZONTAL STRIPS.
6. LIME, FERTILIZE AND SEED BEFORE INSTALLATION. PLANTING OF SHRUBS, TREES, ETC. SHOULD OCCUR AFTER INSTALLATION.

EROSION CONTROL BLANKET
NOT TO SCALE

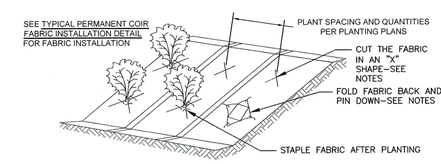


TREE PLANTING DETAIL
NOT TO SCALE



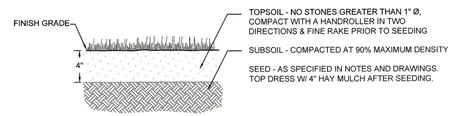
USE EQUIDISTANT TRIANGULAR SPACING FOR PLANTS - FOR ACTUAL SPACING SEE PLANS OR PLANTING SCHEDULE

PLANTING SPACING DETAIL
NOT TO SCALE



NOTES:
1. CUT THE FABRIC IN AN "X" SHAPE TO ACCOMODATE 2 TIMES THE DIAMETER OF THE ROOTBALL.
2. FOLD FABRIC BACK AND PIN DOWN TO CREATE A HOLE IN THE MAT.
3. DIG THE HOLE PER PLANTING DETAILS.
4. AFTER PLANTING, FOLD FABRIC BACK INTO PLACE AND STAPLE DOWN AS REQUIRED TO SECURE FABRIC IN PLACE.

PLANTING IN COIR FABRIC DETAIL
NOT TO SCALE



LOAM AND SEED DETAIL
NOT TO SCALE

PERMITTING SET 4/11/2019
NOT FOR CONSTRUCTION

Revisions

Rev.	Date	By	Appr.	Description

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Checked By: BRK
Drawn By: EB
Designed By: EB
Date: APRIL 2019

Plan Set: IPSWICH RIVER COASTAL RESILIENCY PERMITTING PLANS IPSWICH, MASSACHUSETTS

Plan Title: LANDSCAPE DETAILS

Prepared For:
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Dated: NOVEMBER 2018

Registration:
COMMONWEALTH OF MASSACHUSETTS
RICHARD A. CLAYTOR
CIVIL
NO. 45118
REGISTERED PROFESSIONAL ENGINEER
4/11/19

Project Number: 18125
Sheet: 6 of 6
Sheet Number: LA - 6