Ipswich Sewer Interceptor Rehabilitation and Siphon Replacement Project
4 South Main Street
Ipswich, Massachusetts

Environmental Notification Form

Prepared For:

Town of Ipswich
Wastewater Department

March 2019

Tighe&Bond
Engineers | Environmental Specialists

I-0066-10
March 15, 2019

Secretary of Energy and Environmental Affairs
Attn: MEPA Office
100 Cambridge Street – Suite 900
Boston, MA 02114

Re: **Environmental Notification Form (ENF)**
Sewer Interceptor Rehabilitation and Siphon Replacement Project
Ipswich, Massachusetts

Dear Secretary Beaton:

On behalf of the Town of Ipswich Wastewater Department, Tighe & Bond is submitting this Environmental Notification Form (ENF) for the Sewer Interceptor Rehabilitation and Siphon Replacement Project in the Town of Ipswich, Essex County, Massachusetts. The proposed project includes replacing an existing siphon with a new triple-barrel siphon, and rehabilitating and physically protecting the existing interceptor. The goal of this project is to maintain and protect existing wastewater infrastructure at the Ipswich River.

The existing sewer siphon runs northeast beneath the Ipswich River between South Main Street and County Street. The siphon is over 60 years old and has experienced overflows and backups from time-to-time. Currently there is no redundancy for this siphon. If it were to fail, there is no other means to transfer the sewage across the river and an emergency pumping operation would be required until the siphon could be repaired. The interceptor is an 18-inch cast iron sewer main on the northern bank of the Ipswich River. The interceptor is exposed to the elements and runs the risk of damage due to the exposure. If the interceptor fails, there could be significant impacts to the Ipswich River including public health, commercial, recreational and ecological impacts. The proposed, rehabilitation, replacement and protection of sewers in the project area will improve the resiliency and reliability of the infrastructure, and protect the existing environment.

The project meets several ENF review thresholds for wetlands, waterways, and tidelands. No mandatory EIR thresholds are triggered by the proposed project. Enclosed with this submittal are the ENF form, a project narrative and alternatives analysis, project figures and plans, and other required materials.

The ENF is being submitted for publication in the March 20, 2019 edition of the Environmental Monitor. Should you have any questions or require additional information, please contact me by phone at (508) 304-6354 or by email at AJHoule@TigheBond.com.

Very truly yours,

TIGHE & BOND, INC.

Amanda J. Houle, PWS, CERP
Senior Environmental Scientist

Copy: Vicki Halmen, Director of Water & Wastewater
Refer to the Distribution and Circulation List

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SECTION 1

Section 1
Required Forms

- ENF
- Filing and Circulation List
- Form of Public Notice

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: **Sewer Siphon Replacement and Interceptor Rehabilitation Project**		
Street Address: **4 South Main Street**		
Municipality: **Ipswich**	Watershed: **Ipswich River**	
Universal Transverse Mercator Coordinates: **Zone 19, Easting: 349542, Northing: 4726814**	Latitude: **42.67909** Longitude: **-70.836366**	
Estimated commencement date: **Spring 2020**	Estimated completion date: **Winter 2020**	
Project Type: **Sewer Infrastructure Improvements**	Status of project design: **30% complete**	
Proponent: **Ipswich Wastewater Department, c/o Vicki Halmen, Director**		
Street Address: **272 High Street**		
Municipality: **Ipswich**	State: **MA**	Zip Code: **01938**
Name of Contact Person: **Amanda J. Houle**		
Firm/Agency: **Tighe & Bond**	Street Address: **4 Barlows Landing Rd., Unit 15**	
Municipality: **Pocasset**	State: **MA**	Zip Code: **02559**
Phone: **(508) 304-6354**	Fax: **(508) 564-4298**	E-mail: **ajhoule@tighebond.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

Which MEPA review threshold(s) does the project meet or exceed (see 301 CMR 11.03)?

- **11.03(3)(b)(1)(a) – alteration of coastal bank**
- **11.03(3)(b)(1)(e) – new fill in a velocity zone or regulatory floodway**
- **11.03(3)(b)(1)(f) – alteration of ½ or more acres of any other wetlands**

Which State Agency Permits will the project require?

- **Chapter 91 License**
- **Section 401 Water Quality Certification**

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:
At present, no financial assistance for project has been received from an Agency of the Commonwealth. The Town anticipates applying for the Coastal Zone Management and Municipal Vulnerability Preparedness Grants will be applied for in 2019.

Summary of Project Size & Environmental Impacts	Existing	Change	Total
LAND			
Total site acreage	**1.06 ac***		
New acres of land altered		**N/A**	
Acres of impervious area	**0.44 ac**	**0**	**0.44 ac**
Square feet of new bordering vegetated wetlands alteration		**N/A**	
Square feet of new other wetland alteration		**77,327 sf****	
Acres of new non-water dependent use of tidelands or waterways		**N/A**	
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)	**0.028 miles**	**0**	**0.028 miles**

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

*** The Project Site consists of the Ipswich River and lands immediately adjacent thereto, as delineated on Figure 3 in Appendix A. Refer to the ENF narrative for a discussion of the Project Site.**

**** Other wetland alteration consists of 710 lf of Coastal Bank, 41,905 sf of Riverfront Area, 25,493 sf of Land Subject to Coastal Storm Flowage, and 9,219 sf of Land Under Water associated with proposed trenching within the Ipswich River.**

GENERAL PROJECT INFORMATION – all proponents must fill out this section

PROJECT DESCRIPTION:

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

The project site is located on the Ipswich River between South Main Street and County Street in Ipswich,

Massachusetts. Another section of the project is located approximately 100 feet south of the Green Street Bridge, parallel to Sidney Shurcliff River Walk. The Ipswich River is a perennial tidal river that connects Ipswich Bay to Teal Pond. The Ipswich River consists of approximately 96,000-acre watershed area. The land below mean high water within the river is comprised primarily of gravel and unconsolidated sediment with sections of large cobble. The Ipswich River is abutted by commercial businesses to the south and residential properties to the north by South Main Street. Downstream by the Green Street Bridge, the Ipswich River is abutted by residential properties to the south and the Town Hall and recreational areas to the north. The interceptor runs through the northern stone arch opening of the historic Choate Bridge.

An existing sewer siphon is located beneath the Ipswich River between South Main Street and County Street, and crosses the river approximately 300 feet east of the Choate Bridge. The siphon is a single barrel cast iron pipe measuring 12 inches in diameter spans 130 feet beneath the grade of the river bed. The siphon discharges into an 18-inch cast iron sewer interceptor pipe located on the northern bank of the river. The interceptor is located within the bank parallel to the river. The interceptor is supported by 18 concrete three-foot diameter caissons bearing on bedrock to the east and west of the bridge. Downstream, the interceptor is buried within the northern bank of the Ipswich River.

The Ipswich River Siphon was constructed in 1958 and has not been improved since it was constructed. When originally constructed, the siphon was at least two feet below the river bottom; however, over the last 60 years significant portions of the riverbed have washed away, exposing the top of pipe at some locations. Similar to the siphon, the interceptor was constructed circa 1958. The original structure was protected around 1965 with 1:1 rock fill revetment slope upriver and downriver of the Choate Bridge. By the Green Street Bridge, the interceptor was protected with a 2:1 rock fill revetment slope. Over time, this stone armoring has washed away, leaving the interceptor and its support piers exposed to the elements, increasing the potential for deterioration and catastrophic failure.

The sewer siphon collects flow from the Union Street and Market Street areas. Currently there is no redundancy for the siphon. If it were to fail, there is no other means to transfer the sewage across the river and an emergency pumping operation would be required until the siphon could be repaired. The interceptor on the northern bank is exposed to the elements and runs the risk of damage due to the exposure. The interceptor remains buried by the Green Street Bridge; however, the stone armoring has washed away and the interceptor risks being exposed at this location. Physical damage to either the interceptor or siphon that resulted in the release of sewage to the Ipswich River would impact human health and the environment.

The project will occur on multiple properties. For the siphon installation access to the southern bank will be obtained from the commercial parking lot at J Barrett & Co., located at 4 South Main Street. The northern bank will be accessed via an easement at 35 County Street. Access to the northwest bank will occur through a temporary easement with 12 Market Street. Temporary access roads will be installed, and the equipment will be able to access the site within a demarcated work area. The interceptor will be accessed by the Town-owned Sidney Shurcliff River Walk. The project limit-of-work will encompass approximately 1.06 acres.

Additional information is presented in the ENF Narrative.

Describe the proposed project and its programmatic and physical elements:

The Town of Ipswich is seeking to maintain its current sewer infrastructure adjacent to the Ipswich River by replacing, rehabilitating and protecting existing mains. The proposed project will:

- **Replace the existing 12-inch cast iron siphon with a three-barreled siphon, consisting of two six-inch high-density polyethylene (HDPE) primary and secondary barrels and one six or eight-inch HDPE emergency flow siphon barrel, the replacement siphon will be installed by staged open trenching within the existing siphon easement.**
- **Rehabilitate the interceptor pipe by lining the existing pipe with cured in place pipe (CIPP).**
- **Encase the interceptor in concrete for physical protection and install toe stone at the base to protect from the undercutting.**
- **Stabilize the northern bank with geocells filled with native soil.**
- **Install a 14-foot wide gravel access road within the easement by 35 County Street to the existing sewer infrastructure for construction access and to facilitate long-term maintenance activities.**
- **Install water-tight manhole covers to protect the existing infrastructure.**

Jurisdictional wetland resource areas impacted by the proposed project include Coastal Bank, Land Under Water Bodies and Waterways (LUWW), Riverfront Area, and Land Subject to Coastal Storm Flowage. The siphon replacement will result in direct, temporary impacts to LUWW, Coastal Bank, Riverfront Area, and LSCSF. The interceptor repairs will result in direct, permanent impacts to Coastal Bank, LSCSF, and LUWW as a result of the pipe armoring/protection. The project has been designed and will be constructed using best management practices to avoid and/or minimize adverse impacts to resource areas during and following construction. Please refer to the ENF Narrative for a detailed discussion of the project elements and associated resource area impacts.

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:

Tighe & Bond performed an evaluation of the existing siphon and interceptor in 2018 to determine the condition of the infrastructure and explore design alternatives for repairs on behalf of the Town. As the project seeks to address the deteriorated condition of critical existing on-line sewer infrastructure at this specific location, no off-site or new alignment alternatives were considered. Exploration of off-site alternatives would not address the immediate repair needs of the sewer system and the commercial and residential areas it serves in downtown Ipswich.

Alternative actions, configurations, and construction methods were assessed during project planning and design. Alternative actions considered included:

- **The No Action Alternative – This option will not address the Town's needs of repairing this portion of existing and deteriorated infrastructure to continue to maintain sewer service in downtown Ipswich. If no action is taken, the interceptor and siphon will continue to age and pose a risk for failure. Failure could result in a discharge into the Ipswich River and/or an interruption of service to downtown Ipswich.**
- **Siphon Alternatives – A number of siphon replacement alternatives were explored by the Town. A single barrel replacement was considered and would provide adequate volume to prevent backups within the system; however, it would not provide adequate velocity to flush out the system and prevent solids from settling and potentially clogging the system. A triple barrel siphon is the preferred replacement alternative, as it would provide the adequate hydraulics for the system while providing added protection during for extreme flows or other scenarios. The Town also explored a variety of installation methods for the replacement of the siphon within the Ipswich River. The use of horizontal directional drilling (HDD) was seriously considered, as it would greatly minimize resource area impacts. HDD was not selected as the preferred installation method given constraints posed by existing utilities and buildings. The use of HDD would require relocation of other existing utilities. The HDD method would also require land acquisition and it would be difficult to have the space for the required entry and exit pits. The Town's preferred installation method is through traditional open trenching with coffer dams within the Ipswich River. The open trench method will allow the replacement siphon to be located within the easement of the existing siphon. The installation of coffer dams will be staged to maintain river flows through the construction period.**
- **Interceptor Alternatives – A number of interceptor rehabilitation alternatives were explored by the Town. Rehabilitating the riprap slope was considered and would provide protection to the interceptor pipe; however, it would have a large footprint within the Ipswich River, which would affect flood flows. In addition, the new bell joint clamps would need to be installed on the interceptor prior to the riprap slope installation. Encasing the interceptor is the preferred rehabilitation alternative, as it provides protection to the interceptor pipe with a smaller footprint, can help seal the joints and prevent any leaks, and extends the lifetime of the interceptor.**

Additional information on alternative designs and construction methods explored by the Town is provided in the ENF narrative.

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

The project has been designed to avoid, minimize, and finally mitigate environmental impacts associated with sewer replacement and rehabilitation activities. Construction-period mitigation measures include the use of erosion and sediment controls, coffer dams to avoid unconfined work in water, time of year restrictions for fisheries, and definition of limits of staging and access routes. The proposed project is

anticipated to provide benefits through stabilizing the currently eroding bank and protecting against potential sewer failure. A more detailed discussion of construction-phase BMPs and other mitigation measures is presented in the ENF narrative.

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

This project will be constructed in phases. The first phase of work involves the interceptor rehabilitation and siphon replacement by the Choate Bridge. The interceptor will be lined with CIPP and then encased in concrete for physical protection. Toe stone will be installed at the base to protect from the undercutting. The siphon will be replaced with a three-barreled siphon, consisting of two six-inch HDPE primary and secondary barrels and one six or eight-inch HDPE emergency flow siphon barrel. The open trenching of the siphon will be conducted in stages, with approximately one-half of the siphon being installed at a time to maintain the navigability of the river.

The second phase involves the installation of riprap to protect the interceptor by the Green Street Bridge. Approximately one- to four-foot stone riprap will be installed along the interceptor footprint, within the footprint of the previously authorized fill. The area will be restored upon the completion of construction.

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?
☐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: Choate Bridge National Register ID: 72000137; Green Street Bridge National Register ID: 80000461) ☐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. _____

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:

The Massachusetts Year 2014 Integrated List of Waters and the Draft Year 2016 Integrated List of Waters identify the Ipswich River (segment ID MA92-02) for the following impairments:

- **Fecal Coliform**

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

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:

The proposed siphon and interceptor project will not include creation of additional impervious area, addition of any new point source discharges, or expansion of a drainage system for increased collection.

Construction-period stormwater impacts will be addressed through implementation of appropriate erosion and sediment controls. The Massachusetts Stormwater Management Standards will be addressed in the Wetlands Protection Act Notice of Intent that will be filed with the Town of Ipswich Conservation Commission, as applicable.

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

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.

Solid waste generated from the installation of the manhole covers, interceptor armoring, siphon replacement, and the gravel access road will be taken to a Massachusetts licensed facility and will be reused or recycled in accordance with Massachusetts waste-ban laws. Based on the sampling results, the excavated soil and river sediment will be transported under a Bill of Lading (BOL) or Uniform Hazardous Waste Manifest to an approved facility for disposal. Soils and sediment will be stockpiled on, and under, 10 mil polyethylene sheeting on the site, pending laboratory analysis of composite soil samples to determine suitable reuse and/or disposal options. The temporary sediment and soil stockpile will be surrounded with appropriate erosion controls and stored as far away from resource areas as practicable. Excess soil will be disposed of based on facility acceptance criteria either at a Massachusetts lined or unlined landfill, asphalt batching facility, thermal desorption facility, Out-of-State RCRA Subtitle D landfill or RCRA Subtitle C Hazardous Waste Landfill.

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:

The Proponent is committed to reducing air quality and emissions impacts from construction-period traffic through the use of ultra-low sulfur diesel fuel and anti-idling requirements.

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	0.08	0	0.08
Parking and other paved areas	0.01	0	0.01
Other altered areas	0.37	0.1	0.47
Undeveloped areas	0.60	-0.1	0.50
Total: Project Site Acreage	1.06	0	1.06

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 (ICDP)** Date: **July 2003, Updated March 2008**

B. Describe the project's consistency with that plan with regard to:
1) economic development
The project will improve the existing sewer infrastructure capacity and help mitigate future sewer failures. The additional capacity resulting from these improvements will allow further economic development in Town center. In addition, by improving the infrastructure and mitigating the failure of the interceptor the commercial businesses in this area would be protected from an interruption in sewer service. This project indirectly supports the ICDP's goal of sustaining Ipswich's fisheries industries, as

repairs to the deteriorated system will avoid a future failure and potential sewage discharge into the Ipswich River.

2) adequacy of infrastructure

The ICDP includes better managing of the Town's septic systems, wastewater, and stormwater as part of a long-term goal. The proposed infrastructure rehabilitation and replacement project will improve the functionality and increase the capacity and resiliency of the sewer systems and supports this goal.

3) open space impacts

The project will not adversely impact open space access or resources, and protect adjacent open space over the long term by improving the resiliency of the sewer infrastructure. The Ipswich River and surrounding open space would be directly impacted if the siphon or the interceptor were compromised and failed.

4) compatibility with adjacent land uses

Improvements to the interceptor and siphon will maintain the capacity of the system and minimize back-ups, which will improve the reliability and service to the area the system serves. In addition, failure of the current infrastructure would result in negative impacts for nearby residences and businesses.

C. Identify the current Regional Policy Plan of the applicable Regional Planning Agency (RPA)
RPA: **Metropolitan Area Planning Commission (MAPC)**
Title: **MetroFuture: Making a Greater Boston Region** Date: **May 2008 - 2038**

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

1) economic development

The project does not have a direct economic development component, although it will fund construction jobs and improve sewage capacity in the area, which may result in indirect economic benefits. The project will strength the existing infrastructure.

2) adequacy of infrastructure

The project will increase the resiliency and functionality of the Town's sewer infrastructure by rehabilitating the interceptor, replacing the current siphon with multiple siphon barrels, and protecting the interceptor from exposure, which meets the MetroFuture Plan goal of strengthening the current infrastructure to be better prepared for natural disasters.

3) open space impacts

One of the MetroFuture plan goals is to protect the region's rivers to support a healthy population of fish, as well as to protect recreational resources. The proposed interceptor rehabilitation and siphon replacement will reduce the probability of a sewage failure and will ultimately protect the Ipswich River. The fish populations and recreational uses of the Ipswich River will indirectly benefit from the project.

4) compatibility with adjacent land uses

The proposed project is anticipated to result in benefits to adjacent land uses of the existing commercial and residential areas by providing improved reliability of the existing sewer. This meets the MetroFuture goals of sustainable growth patterns where growth in the region will be concentrated with well-served infrastructure and growth in the region will be by proactive planning. The improvement of the capacity of the sewer system allows for sustainable growth within Ipswich Center. The Town wants to replace and rehabilitate the infrastructure in a proactive, well-planned, and controlled manner as compared to reactive repairs as an emergency project if the infrastructure fails.

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:

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:

- **Alteration of Coastal Bank [11.03(3)(b)(1)(a)] – 710 lf of Coastal Bank are anticipated to be altered by the proposed project**
- **New fill or structure or expansion of existing fill or structure in a regulatory floodways [11.03(3)(b)(1)(e)] - 5,990 sf and 1,109 cy of fill are anticipated to be impacted by the proposed interceptor armoring.**
- **Alteration of one half or more acres of any other wetland [11.03(3)(b)(1)(f)] 9,219 sf of LUWW, 25,493 sf Land Subject to Coastal Storm Flowage, and 41,905 sf Riverfront Area are anticipated to be impacted by the proposed excavation**

C. 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:

Order of Conditions (Ipswich Conservation Commission); Section 401 Water Quality Certification; Chapter 91 Waterways License; Pre-Construction Notification (United States Army Corps of Engineers)

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:
As quantified below, the proposed project is anticipated to result in temporary impacts to Coastal Bank, Land Under Waterways and Waterbodies (LUWW), Riverfront Area, and Land Subject to Coastal Storm Flowage (LSCSF) related to construction-period access and impacts. Permanent impacts to Coastal Bank, LSCSF, LUWW, and Riverfront Area are anticipated as a result of the proposed interceptor protection, and installation of an access road to the sewer manhole on the north bank. Additional information is provided in the ENF narrative.

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	**N/A**	**N/A**
Land Under the Ocean	**N/A**	**N/A**
Designated Port Areas	**N/A**	**N/A**
Coastal Beaches	**N/A**	**N/A**
Coastal Dunes	**N/A**	**N/A**
Barrier Beaches	**N/A**	**N/A**
Coastal Banks	**39 LF / 679 LF**	**Temporary / Permanent**
Rocky Intertidal Shores	**N/A**	**N/A**
Salt Marshes	**N/A**	**N/A**
Land Under Salt Ponds	**N/A**	**N/A**
Land Containing Shellfish	**N/A**	**N/A**
Fish Runs	**N/A**	**N/A**

Land Subject to Coastal Storm Flowage	**13,425SF / 12,067SF**	**Temporary / Permanent**
Inland Wetlands	**N/A**	**N/A**
Bank (LF)	**N/A**	**N/A**
Bordering Vegetated Wetlands	**N/A**	**N/A**
Isolated Vegetated Wetlands	**N/A**	**N/A**
Land Under Water	**1,898 SF / 7,321 SF**	**Temporary / Permanent**
Isolated Land Subject to Flooding	**N/A**	**N/A**
Bordering Land Subject to Flooding	**N/A**	**N/A**
Riverfront Area	**20,251SF / 21,654 SF**	**Temporary / Permanent**

D. Is any part of the project:
1. proposed as a **limited project**? ☒ **Yes** ☐ No; if yes, what is the area (in SF)? **77,327 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: **1,109 CY and the dredged material will be tested and disposed of at an approved facility in accordance with state and federal guidelines.**
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) **20,251 SF temporary / 20,653 SF of permanent impacts**

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:

Based on a review of the Town of Ipswich's historic files, there is an existing Chapter 91 license for the interceptor. License 4922 was issued in July 1, 1965 to the Town of Ipswich to place and maintain riprap protection over the existing 18-inch interceptor pipe in the Ipswich River. License 4922 references another Chapter 91 license, License 4211, for the existing fill on the site, which extends the fill footprint upstream approximately 95 feet and approximately 137 downstream. The 4211 License plans depict the original siphon footprint.

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?

The proposed interceptor rehabilitation and siphon replacement project consist of water-dependent uses per 310 CMR 9.12(2)(a)11 (shoreline protection structures which are necessary to protect an existing structure from natural erosion or to protect a water-dependent use) and 310 CMR 9.12(2)(a)13 (discharge pipes, outfalls, tunnels, and diffuser systems for conveyance of stormwater, wastewater, or other effluents to a receiving waterway).

Current **0 acres** Change **0 acres** Total **0 acres**

If yes, how many square feet of solid fill or pile-supported structures (in SF)? **5,990 sf**

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

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) ___241___
What is the proposed dredge footprint _130_ length (FT) __10_ width (FT) _5_ depth (FT)

Will dredging impact the following resource areas?
Intertidal: **Yes**☒ No☐**;** if yes,**_1,300**___ 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?

Due to the location of the existing siphon, the project can not avoid working below the mean high tide line within the Ipswich River. Project design alternatives were considered and are presented in the enclosed narrative. Installing the siphon through horizontal directional drilling to avoid open trenching would result in a significant relocation of the existing sewer infrastructure, installation of new sewer lines to connect to the siphon, construction of a sewer pump house, and would also require land acquisition. Impacts have been minimized to the maximum extent practicable through traditional open trench construction by locating the siphon replacement within the existing siphon footprint. The trench will be backfilled with the excavated material and other best management practices will be used during the construction period. The area will be restored following the completion of construction.

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

Research through MassGIS and site visits conducted during low tide cycles confirm that there are no eel grass beds or shellfish beds within the project site.

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

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? 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

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:
The proposed project will involve the rehabilitation of an interceptor and the replacement of the sewer siphon within the Coastal Zone along the Ipswich River. The project will vastly improve the resiliency of the aging infrastructure and increase its resiliency to extreme tides and weather events. The project design considers and incorporates projected sea level rise, for added coastal resiliency.

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:

Due to the location of the existing infrastructure, work near the Choate and Green Street Bridges is unavoidable. The interceptor will be protected by concrete poured around it to completely encase it. The section of the interceptor under the Choate Bridge is also proposed to be encased in concrete. The goal will be to protect both the interceptor pipe and adjacent north abutment of the bridge from scour impacts. We anticipate reviewing the design with the Massachusetts Historic Commission responding to comments. No direct alteration of the Choate or Green Street Bridge is anticipated by this project.

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:

The project will require work near a National Historic Register bridge. Coordination with MHC is anticipated and may include additional consultation by a historic consultant if requested by MHC. Review from the United States Army Corps of Engineers will also require compliance with Section 106 of the National Historic Preservation Act.

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) **March 14, 2019**

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	Date Signature of person preparing ENF (if different from above)
Vicki Halmen	**Amanda J. Houle, PWS, CERP**
Name (print or type)	Name (print or type)
Town of Ipswich Wastewater Department	**Tighe & Bond**
Firm/Agency	Firm/Agency
272 High Street	**4 Barlows Landing Road, Unit 15**
Street	Street
Ipswich, MA 01938	**Pocasset, MA 02559**
Municipality/State/Zip	Municipality/State/Zip
(978) 356-6635 Ext. 2108	**(508) 304-6354**
Phone	Phone

Addressee	Number of Copies
Secretary Matthew A. Beaton Executive Office of Energy and Environmental Affairs Attn. MEPA Office 100 Cambridge Street, Suite 900 Boston, MA 02114	1 Original 1 Copy, first 3 pages of ENF and Project Description
MassDEP/Commissioner's Office One Winter Street Boston, MA 02108	1
MassDEP/Northeast Regional Office Attn: MEPA Coordinator 205B Lowell Street Wilmington, MA 01887	1
Massachusetts Dept. of Transportation Public/Private Development Unit 10 Park Plaza Boston, MA 02116	1
Massachusetts Dept. of Transportation - District #4 Attn: MEPA Coordinator 519 Appleton Street Arlington, MA 02476	1
Massachusetts Historical Commission The MA Archives Building 220 Morrissey Boulevard Boston, MA 02125	1
Board of Underwater Archaeological Resources Attn: Victor Mastone, Director 251 Causeway Street, Suite 800 Boston, MA 02114-2199	1
Metropolitan Area Planning Council 60 Template Place 6th Floor Boston, MA 02111	1
Ipswich Select Board 25 Green Street Ipswich, MA 01938	1
Ipswich Planning Division 25 Green Street Ipswich, MA 01938	1
Ipswich Conservation Commission 25 Green Street First floor Ipswich, MA 01938	1
Ipswich Department of Public Health 25 Green Street Ipswich, MA 01938	1

Ipswich Public Library 25 North Main Street Ipswich, MA 01938	1
Coastal Zone Management Attn: Project Review Coordinator 251 Causeway Street, Suite 800 Boston, MA 02114	1
Division of Marine Fisheries (North Shore) Attn: Environmental Reviewer 30 Emerson Avenue Gloucester, MA 01930	1
Energy Facilities Siting Board Attn: MEPA Coordinator One South Station Boston, MA 02110	1
MA Department of Energy Resources Attn: MEPA Coordinator 100 Cambridge Street, 10th floor Boston, MA 02114	1
Department of Public Health Director of Environmental Health 250 Washington Street Boston, MA 02115	1
U.S. Army Corps of Engineers New England District 696 Virginia Road Concord, MA 01742	1
Tribal Historic Preservation Officer Wampanoag Tribe of Gay Head (Aquinnah) 20 Black Brook Road Aquinnah, MA 02535	1
Tribal Historic Preservation Officer Mashpee Wampanoag Tribe 483 Great Neck Road South Mashpee, MA 02649	1

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 Sewer Interceptor Rehabilitation and Siphon Replacement Project

LOCATION: Ipswich River approximately 300 feet east of the Choate Bridge and 650 feet of the Green Street Bridge in Ipswich, Massachusetts

PROPONENT: Ipswich Wastewater Department

The undersigned is submitting an Environmental Notification Form ("ENF") to the Secretary of Energy & Environmental Affairs on or before
March 15, 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:
Tighe & Bond, c/o Amanda Houle
4 Barlows Landing Road, Unit 15, Pocasset, MA 02559
Phone: (508) 304-6354
(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 Vicki Halmen, Director of Water and Wastewater _____ *(Proponent)*

Tighe&Bond

SECTION 2

Section 2
Introduction

Project Name: Ipswich Sewer Interceptor Rehabilitation and Siphon Replacement Project

Project Location: 4 South Main Street, Ipswich, Massachusetts

Project Proponent: Town of Ipswich

2.1 Project Summary/Overview

This Environmental Notification Form (ENF) is being submitted on behalf of the Town of Ipswich for the proposed Ipswich Sewer Siphon Replacement and Interceptor Rehabilitation Project. The Town of Ipswich is seeking to rehabilitate the sewer interceptor armoring to protect it from the elements, replace the current siphon to improve sewage conveyance and add redundancy into the system to facilitate future maintenance, and improve long-term access to the sewer infrastructure.

The Ipswich River Siphon was constructed in 1958 and has not been improved since it was constructed. When originally constructed, the siphon was at least two feet below the river bottom; however, over the last 60 years significant portions of the riverbed have washed away, exposing the top of pipe at some locations. Similar to the siphon, the interceptor was constructed circa 1958. The original structure was protected around 1965 with 1:1 rock fill revetment slope upriver and downriver of the Choate Bridge. By the Green Street Bridge, the interceptor was protected with a 2:1 rock fill revetment slope. Over time, this stone armoring protection has washed away, leaving the interceptor and its support piers exposed to the elements, increasing the potential for deterioration and catastrophic failure.

The sewer siphon collects flow from the Union Street and Market Street areas. Currently there is no redundancy for the siphon. If it were to fail, there is no other means to transfer the sewage across the river and an emergency pumping operation would be required until the siphon could be repaired. The interceptor on the northern bank is exposed to the elements and runs the risk of damage due to the exposure. The interceptor remains buried by the Green Street Bridge; however, the stone armoring has washed away and the interceptor risks being exposed at this location. If the interceptor fails, there could be significant impacts to the Ipswich River and the recreational and commercial activities it supports.

The proposed dredging, interceptor armoring, gravel access road installation, and bank stabilization project would serve to improve the existing sewer infrastructure by increasing the capacity and adding in redundancy to the system, protecting it from the elements, and providing access to facilitate future maintenance activities.

The proposed work will result in the armoring of the interceptor and replacement of the siphon within the Ipswich River in order to improve sewer infrastructure. The work would generally progress as follows:

- Mobilize to site

- Install erosion and sediment controls
- Establish access road to the northern bank
- Install coffer dams within the Ipswich River in phases
- Install the replacement siphon within the Ipswich River by trenching and restore riverbed
- Armor the interceptor with concrete, install toe stone as necessary for slope stabilization
- Armor the interceptor with riprap by the Green Street Bridge
- Replace the manhole covers in the area with watertight covers
- Stabilize the northern bank and additional bank stabilization areas
- Restore the work areas and remove erosion and sediment controls

Dredged sediment and excavated soil will be handled in accordance with all appropriate regulations. This may include sediment being dewatered and stockpiled on site prior to transport or being live loaded into a truck and transported to an approved disposal facility. Erosion control measures will be implemented as necessary to accommodate material dewatering, control soil/sediment migration, and prevent transport of sediment.

A Site Locus Map (Figure 1), MassDEP Priority Resources Map (Figure 2), Orthophotograph of Existing Site Conditions (Figure 3), and Orthophotograph with FEMA Flood Zones (Figure 4) are provided in Appendix A. Photographs of existing conditions are provided in Appendix B. Project plans showing existing and proposed conditions are provided in Appendix C.

2.2 MEPA Process

The project is subject to environmental review pursuant to Section 11.01(2)(a) of the MEPA regulations as it requires a State Agency Action (*i.e.,* a permit). The project meets the following ENF review thresholds:

- 301 CMR 11.03(3)(b)(1)(a) – alteration of coastal bank
- 301 CMR 11.03(3)(b)(1)(e) – new fill in a velocity zone or regulatory floodway
- 301 CMR 11.03(3)(b)(1)(f) – alteration of ½ or more acres of any other wetlands

No mandatory EIR thresholds are triggered by the proposed project.

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SECTION 3

Section 3
Existing Environment

3.1 General Project Area

The project site is a 1.06-acre site consisting of the Ipswich River and the lands immediately adjacent to it. An existing sewer siphon is located beneath the Ipswich River between South Main Street and County Street, and crosses the river approximately 300 feet east of the Choate Bridge. The interceptor is located within the bank parallel to the river. The interceptor runs through the northern clear span of the Choate Bridge and is supported by 18 concrete three-foot diameter caissons bearing on bedrock to the east and west of the bridge. Approximately 100 feet south of the Green Street Bridge, the interceptor is buried within the northern bank of the Ipswich River.

The project will occur on multiple properties and access to the southern bank will be obtained from the commercial parking lot at J. Barrett & Co., located at 4 South Main Street. The northern bank will be accessed via an easement at 35 County Street. Access to the northwest bank will occur through a temporary easement with 12 Market Street. The interceptor will be accessed by the Town-owned Sidney Shurcliff River Walk. A timber mat ramp will be installed, and the equipment will be able to access the site within a demarcated work area.

Southwest of the project site lies the Ipswich Dam (formerly known as the Sylvania Dam). The dam is built on a natural rock outcrop at the head of the tide, approximately 3.7 miles from the mouth of the river. In 1995, a Denil fishpass was installed; however, it prevents fish species such as rainbow smelt and American shad from passing. During the underwater inspection of the siphon in 2018, there was no indicators of salt water flora or fauna observed. The river is dominated by freshwater flows by the Choate Bridge.

3.2 Existing Conditions

3.2.1 Existing Sewer Infrastructure

The siphon and interceptor are located between South Main Street and County Street within historic downtown Ipswich. The siphon is located beneath the Ipswich River and the interceptor is located on the northern bank of the river. The interceptor continues to run parallel to the northern bank of the river and is buried approximately 650 feet away from the Green Street Bridge. The Ipswich River is shown as a perennial stream on the USGS topographic map (Ipswich, Massachusetts; 1985). Mean High Tide was determined based on observations of changes in surficial conditions, vegetation composition, and bankfull indicators. Generally, the southern bank gently slopes into the brook while the northern bank has a steeper slope. Portions of the northern bank is armored with boulders or stone walls. The northern bank is incised, and moderate erosion was observed south of the Green Street Bridge.

The siphon is a single barrel cast iron pipe measuring 12 inches in diameter that spans 130 feet beneath the grade of the river bed. The siphon discharges into an 18-inch cast iron sewer interceptor pipe located on the northern bank of the river. Currently, an approximately 42 feet long section of the siphon is exposed above the riverbed. Steel bolts that hold together a reinforcing clamp were visually inspected after cleaning and

were observed to be approximated 40 to 50% corroded. In addition, an inspection of the interior of the siphon revealed evident cracking on the interior of the pipe, as well as grease buildup in certain areas.

The interceptor is currently above grade at the existing stone retaining wall to the west of the bridge and goes back below grade on the east side of the bridge. Where the interceptor is exposed, it is supported on concrete caissons consisting of a rectangular cast-in-place concrete upper pipe connection, supported on a lower foundation of a three-foot concrete caisson. The foundations are installed to bedrock, at 18-foot intervals along the pipe. The concrete supports are in satisfactory condition, although surface weathering was commonly observed. One of the supports at the east side of the bridge appears to be missing the lower caisson with a void under the upper concrete area. A pipe support at the western end of the exposed pipe run has some concrete deterioration/spalling, that may be attributed to freeze-thaw damage. The threaded rods that tie the existing bell joint leak clamp together and provides the pull force needed for reinforcement are barely intact where they were exposed.

An inspection of the interior of the interceptor revealed structural concerns (cracking and spalling). The spalling observed looked to be to the top course of the interior of the pipe facing deterioration over time to the point where the surface lost its smooth interior. This cracking does not jeopardize the structurally integrity of the pipe, but, if allowed to continue under this pressure this could lead to further damage.

The interceptor remains buried within the northern bank of the Ipswich River, approximately 100 feet south of the Green Street Bridge. The original footprint of the riprap placed to protect the interceptor has receded and in some areas the riprap has completely washed away. A portion of the bank is heavily incised, and erosion has been observed. The interceptor risks becoming exposed to the elements.

There are manholes throughout the Town of Ipswich's wastewater collection system that provide access for maintenance at each end of the siphon and along the interceptor. Roots were observed within sewer manhole (SMH) 18, which indicates a potential for infiltration to enter this manhole through the same path. SMH 19 had an issue with surrounding vegetation growing through the rim. This prevents the rim from fully closing and creates a void for debris to fall in. At SMH 20, there is a low voltage wire surrounding the MH which creates an unsafe environment for maintenance workers. The manhole is also in a rock garden, and rocks can potentially fall into the manhole when the cover is removed.

The interceptor is abutted by residential properties to the east of the Choate Bridge, and commercial properties to the west of the bridge. The siphon abuts commercial property to the south and residential properties to the north. Downstream by the Green Street Bridge, the Ipswich River is abutted by residential properties to the south and the Town Hall and recreational areas to the north. The Ipswich River is approximately 70 feet to 130 feet wide at the project sites.

3.2.2 Choate Bridge

The Choate Bridge is located approximately 300 feet west of the siphon by South Main Street. The interceptor runs beneath the north side of the bridge and currently is exposed. The two-span stone arch bridge was originally constructed in 1764, making it the oldest known bridge in Massachusetts with an accredited date of construction, and the second-oldest in the United States. The bridge is composed of lime and sand

mortared rough-course stones. Each arch rests on a heavy base of random rubble. In 1838, the bridge was widened by 15 feet on the east side and the new spandrel wall consisted of dry-laid large block granite blocks. The bridge was rehabilitated in 1989, but retained the original 18th century characteristics and parts of the initial construction of the bridge.

The Choate Bridge was certified as a Massachusetts Archaeological and Historic Landmark (IPS. 909) on April 1, 1966. On the same day, a preservation restriction was granted. The National Register listed the bridge as a significant structure for the rare example of two co-existent forms of 18th century masonry construction since August 1972 and listed it as a contributing structure within the South Green Historic District in 1980, recognizing its historic significance (National Register ID: 72000137).

3.2.3 Green Street Bridge

The Green Street Bridge is located approximately 100 feet north of the interceptor by Green Street. The bridge was originally constructed in 1881 out of wood, but was replaced by a double granite arched bridge on May 14, 1894. The 1894 bridge contains components of the 1881 bridge abutments. The Green Street Bridge represents the traditional engineering design of the time, mimicking the style of the historic Choate Bridge. The Green Street Bridge is one of the five stone bridges spanning the Ipswich River. The western wing wall of the bridge was repaired in 1961, and other minor repairs were conducted in 1981.

The Green Street Bridge (IPS. 905) is included in the historic East End District (IPS.M; National Register ID: 80000461) and Ipswich Multiple Resource Areas (IPS. AL). The Green Street Bridge was certified as a National Register District and National Register Multiple Resource area on September 17, 1980.

3.3 Wetland Resource Areas

3.3.1 Methodology of Resource Area Investigations

Tighe & Bond wetland scientists conducted an evaluation of wetland resource areas on July 6, 2018 and February 11, 2019. Wetland resource areas regulated by the Massachusetts Wetland Protection Act (MA WPA) in the vicinity of the proposed work were delineated in accordance with 310 CMR 10.00 and MassDEP guidelines. The resource area boundaries were surveyed using an iPad paired with a Trimble R1 (real-time submeter Bluetooth GPS receiver) unit.

3.3.2 Description of Wetland Resource Areas

Wetland resource areas located within the vicinity of the Ipswich River include Coastal Bank, Land Under Water Bodies and Waterways (LUWW), Riverfront Area, Land Subject to Coastal Storm Flowage (LSCSF), and 100-foot Buffer Zone to Coastal Bank. These areas are depicted on Figures 2, 3, and 4 in Appendix A, site photographs in Appendix B, and on project plans in Appendix C, and are described in greater detail below.

Coastal Bank: Coastal Bank is defined at 310 CMR 10.30(2) as the seaward face or side of any elevated landform, which lies at the landward edge of a coastal beach, land subject to tidal action, or other wetland. Within the project area, Coastal Bank contains the Ipswich River, as it abuts an area subject to the ebb and flow of the tide. At the toe of the bank large cobble and rocks collect. Generally, at South Main Street, the southern bank gently slopes into the river while the northern bank has a steeper slope. Portions

of the northern bank is armored with boulders or stone walls. A small portion of the northwestern bank has been undercut. Common vegetation identified on this section includes poison ivy (*Toxicodendron radicans*), white ash (*Fraxinus americana*), and Norway maple (*Acer platanoides*). Another portion of Coastal Bank occurs south of the Green Street Bridge. The northern bank is gently sloping and is partially armored with riprap. A portion of the bank is incised, and erosion has been observed.

Land Under Water Bodies and Waterways (LUWW): Per 310 CMR 10.56(2), LUWW is 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. Within the project area, LUWW is associated with the Ipswich River.

Land Subject to Coastal Storm Flowage (LSCSF): Land Subject to Coastal Storm Flowage (LSCSF) is defined at 310 CMR 10.04 as land subject to any inundation caused by coastal storms to and including that caused by the 100-year storm, surge of record or storm of record, whichever is greater. The Federal Emergency Management Agency (FEMA) flood map (Panel No. 25009C0287G, effective July 16, 2014) was consulted to evaluate the presence of Land Subject to Coastal Storm Flowage. The project site falls within Zone AE, an area subject to flooding and/or inundation by the 100-year flood with a base elevation of 10 feet (NAVD88) and Regulatory Floodway (see Figure 4 in Appendix A). Areas mapped as Special Flood Hazard (Zone AE and Floodway) are regulated as Land Subject to Coastal Storm Flowage under MA WPA.

Riverfront Area: Riverfront Area is defined at 310 CMR 10.58(2)(a) as "the area of land between a river's mean annual high water line and a parallel line measured horizontally. The riverfront area may include or overlap other resource areas or their buffer zones. The Riverfront area does not have a buffer zone." The Ipswich River is shown as a perennial stream on the USGS topographic map (Ipswich, Massachusetts; 1985). A 200-foot Riverfront Area extends horizontally from the Mean High-Tide Mark (MHTM) of the Ipswich River. Riverfront Area at this site consists of commercial, recreational, and residential development and forested areas.

Buffer Zone: Under the MA WPA, areas extending 100 feet from certain areas subject to protection are considered Buffer Zone. In the vicinity of the project, buffer zone extends landward from Coastal Bank. The buffer zones to the north and south are largely disturbed, and consist of commercial properties, roadways, and residential development.

3.4 Rare Species

The Massachusetts Natural Heritage and Endangered Species Program (NHESP) Atlas, 14th Edition, effective August 1, 2017, was consulted during preparation of this application. According to this source, the proposed project area is not located within designated *Priority Habitats of Rare Species* and *Estimated Habitats of Rare Wildlife* and therefore will not require review pursuant to the Massachusetts Endangered Species Act.

Tighe&Bond

SECTION 4

Section 4
Alternatives Analysis

Several alternatives were considered for the repair and/or replacement of the siphon and the interceptor, and the most feasible solution is presented as the proposed project in the ENF. Factors considered in the evaluation of alternatives include environmental impacts, cost, infrastructure capacity, and permitting complexity.

Tighe & Bond performed an evaluation of the existing siphon and interceptor in 2018 to determine the condition of the infrastructure and explore repair/design alternatives for the Town. As the project seeks to address the deteriorated condition of critical existing sewer infrastructure at this specific location, no off-site alternatives were considered. Exploration of off-site alternatives would not address the immediate repair needs of the sewer system and the commercial and residential areas it serves in downtown Ipswich.

On-site alternatives considered for the project included a no-build scenario, various alternatives for method of restoring the interceptor and replacing the siphon, method of construction, and type of replacement for the siphon, and the preferred scenario, a triple barrel siphon replacement and concrete encasement on the interceptor. All alternatives except for the No Action alternative include bank stabilization. All the methods for the interceptor alternatives included cured in place pipe (CIPP) lining to completely seal the pipe where the interceptor is exposed.

4.1 No Action

The No Action alternative would consist of leaving the existing infrastructure as they are, making no attempt to repair or rehabilitate the infrastructure, improve resiliency or capacity. The No Action alternative would not require any project-related environmental impacts, but also may also result in an emergency project when the current infrastructure fails. This alternative may result in the accidental release of wastewater to the Ipswich River, which would negatively impact the environment, human health, as well as commercial and recreational uses of the river. The No Action alternative does not address the needs of the existing aging infrastructure, and is therefore not preferred.

4.2 Siphon Replacement Alternatives

Siphons are designed to be able to handle peak flow with adequate flushing velocities. Depending on flow and available head, multiple barrels may be needed to achieve crucial siphon characteristics.

4.2.1 Single Barrel Configuration

Under this alternative, the existing 12-inch cast iron siphon would be replaced with a new, single barrel siphon sized to prevent backups from occurring and minimize the potential for solids deposition. A 12-inch siphon is too large to provide adequate velocity through the siphon to prevent the settlement of solids during average and peak flow conditions. As such, this alternative includes a review of whether a smaller siphon would provide adequate flushing velocity without causing backups to occur. Smaller siphon sizes corelate with more friction within the pipe that causes the wastewater to surcharge upstream into the gravity sewer and could result in backups within the sewer system. As such, the Town did not prefer this alternative.

4.2.2 Double Barrel Configuration

Under this alternative, the existing 12-inch cast iron siphon would be replaced with new, double barrel siphons. The intent of this arrangement is that only one siphon barrel would be in use during low/average flow conditions but, during higher flows, a portion of the wastewater reaching the siphon inlet would be directed to the second siphon barrel. This approach would reduce headloss during higher flow conditions.

The dual six-inch siphons would not provide adequate flow velocity during average daily flow conditions, as recommended by TR-16 Guide, based on the limited flow data available. While a smaller siphon diameter would provide a greater flow velocity, it is not recommended to scale the siphon smaller than six-inches. In addition, this alternative does not provide comprehensive redundancy or capacity to accommodate the future peak flow rates and allow further growth in the area. Thus, the Town chose not to select this option.

4.2.3 Triple Barrel Configuration (Preferred Method)

Under this alternative, the existing 12-inch cast iron siphon would be replaced with new, triple barrel siphons. The intent of this arrangement is that only one siphon barrel would be in use during low/average flow conditions, but during higher flows, a portion of the wastewater reaching the siphon inlet would be directed to the second siphon barrel. This approach would reduce headloss during higher flow conditions. The third barrel would only be used when one of the other siphon barrels is taken out-of-service for maintenance or during an emergency. The benefit of this alternative over the double barrel siphon alternative is that it provides sufficient redundancy so that one barrel could be taken out of service and still accommodate the projected peak flow rate with the remaining two barrels. This redundancy provides a security for extreme scenarios and the flexibility to properly maintain the siphon. This is the preferred method for the Town.

4.2.4 Open Cut Excavation (Preferred Method)

Open-trench excavation is the most common and conventional method of gravity sewer installation. Under this alternative, heavy equipment (typically an excavator) would be used to dig a trench along the entire length of the proposed replacement sewer. Once a portion of the trench is excavated, the proposed siphon would be lowered into it, set to the required line and grade, and then subsequently backfilled with appropriate material. Subsequently, surface repairs would be made to the areas disturbed during construction (*e.g.,* pavement patches, lawn restoration, etc.). The open cut excavation in the river would require a coffer dam to isolate the work area from the flow of the river and excavation support for the trench to allow for stable trench walls.

Open-trench excavation would allow the proposed pipe to be accurately set to the proposed line and grade. In addition, unanticipated obstructions (*e.g.*, boulders, urban fill, etc.) and various soil conditions can normally be handled without significant additional cost and without impacts to line and grade. While this method requires extensive water handling and environmental permitting, the Town prefers this method due to the accuracy of the pipe setting and the simplicity of the plan. No additional infrastructure would be required with this alternative.

4.2.5 Horizontal Directional Drilling

Horizontal directional drilling (HDD) is an alternative to open cut construction for siphon installations as it is a trenchless method of pipe installation and is typically used to avoid an obstacle such as rivers. HDD is commonly used to install sewer pressure pipes, where a high degree of vertical and horizontal accuracy is not required. Pipe line and grade

may be impacted if obstructions are encountered, such as cobbles, boulders and urban fill, which could result in deviations from the planned alignment. Therefore, there is no guarantee that there will not be high or low spots in the final alignment of the pipe.

An HDD approach would prevent any temporary restrictions of flow in the Ipswich River. While this method does seem to be the most appealing from an environmental perspective, HDD installation is limited by land requirements and the uncertainty of achieving the desired boring path.

The bend radius a drill can achieve is the limiting factor for the installation at this site. A bend radius is essentially the rate at which the drill can dive to a specified depth and rise back up to break through the surface on the other side of the obstacle. Many factors tie into this rate, including pipe size and subsurface material. The bigger the pipe, the longer and flatter the bend radius. According to multiple drilling contractors, industry standards necessitates a bend radius of at least 300 feet in heavy clay. In order achieve the required bend radius, the existing collection system has to be relocated. The area running north to south from the edge of the river to the back of the parkling lot of 4 South Main Street would be needed for the bore path, which means the collection system for east to west would need to be relocated. This approach would require land acquisition for the new infrastructure. While land acquistion is never ideal and can prove to be difficult and costly, these acquisitions are necessary for the collection system to function properly. Given that HDD is not feasible for the site due to the required bend radius, the Town chose not to select this alternative.

4.2.6 Pump Station

Under this alternative, a new pump station and force main would be constructed to replace the existing siphon. The pump station would be constructed near the upstream end of the siphon to collect the wastewater that currently flows to the siphon.

Pump stations are essential to collection systems that require flow to move through fluctuating elevations where gravity systems are not possible. Gravity collection systems can operate at a very minimum slope and still provide enough flushing velocity to keep all solids and debris moving through the pipe. However, no matter the system, flow will eventually need to travel against gravity. Pump stations can push flow from a lower elevation to a higher elevation to reset flow at a high point in a system to allow for continued gravity flow.

Ideally, a pump station is installed in line with the gravity sewer system to allow for flow to continue in the same path. A driving factor for the location of a pump station is land for construction. A pump station not only requires a space that allows for deep excavation, but also the proper configuration for both a gravity pipe to enter the station and a pressurized pipe to leave the station in the direction of the discharge manhole. With these driving factors, along with the price of land, a middle ground is sometimes difficult to find.

In this case, waterfront property along the river creates a challenge. Ideal locations create a costly land purchase, while also ruining the aesthetics of the waterfront. The public may understand the importance of a municipal wastewater collection system, but most would not appreciate the system affecting the scenery of the Ipswich River. For these reasons, the location next to the Police Department seemed to be the most feasible.

While still close to the river, this location is setback from the main scenic areas. It is away from the historic Choate Bridge and downtown area. While it is close to County Street, a high traffic and visible area, the pump station will be in the back of this parking area away from the public's line of sight. This land is already owned by the Town, which would hopefully allow for an effortless transfer of land.

The benefit of this location, which is a significant distance away from the edge of the river, is that it does not impact river front aesthetics. New gravity sewers would be required to redirect flow to the pump station. The new pipe would have to be installed within the historic County Street Bridge, which may not be feasible. Due to the additional infrastructure required for this alternative, the Town chose not to select this alternative.

4.3 Interceptor Rehabilitation Alternatives

The pipe joints on the interceptor by the Choate Bridge currently have a sufficient seal and there has been no observable leaking of the interceptor; however, the threaded rods that tie the existing bell joint leak clamp together and provides the pull force needed for reinforcement are barely intact. If these bolts fail, the joint could loosen enough for the seal to break, which would result in sewage from this interceptor discharging directly into the river. Approximately half of the joints are exposed. Some are encased in tree roots, while others are only partially exposed due to the embankment.

The other concern is protecting the exterior of the interceptor from the elements. The alternatives below address the clamps and the protection of the interceptor.

4.3.1 Installation of New Bell Joint Leak Clamps

To properly install a new clamp, the existing clamps would have to be removed. While this may cause some concern, removing the existing clamp for a short amount of time should not be an issue as concrete caissons hold the pipe in place at every joint. The joint will be stable during the short amount of time the existing is removed, the gasket and seal will not have enough time to separate.

In some areas, the embankment would have to be excavated to provide adequate room for install. In others, trees may need to be removed to expose the joint. The hardware and threaded rod would be replaced with stainless steel to help prevent corrosion. This is crucial as this will assure longevity in the lifespan of these clamps.

4.3.2 Encase the Existing Interceptor Joints in Concrete

Encasement of the pipe joints in concrete would eliminate any chance of leaking in the joints of the interceptor. Concrete, when allowed to cure properly, provides an impervious layer to liquids. Concrete encasement would plug any small leak due to a failed gasket on a joint.

To stabilize the pipe during installation, concrete caissons were poured from the riverbed up and around the cast iron pipe. Forms would need to be installed along the pipe, extending down far enough into the riverbed to support the weight of the additional concrete along the joints.

One major benefit of concrete encasement would be in the protection factor it provides the interceptor from any external forces at these specific points. This method would only

protect the joints along the interceptor segment by the Choate Bridge and would not address the need for protecting the exposed interceptor pipe. Therefore, the Town chose not to select this method for rehabilitating the interceptor.

4.3.3 Restoring the Riprap Revetment (Preferred)

Another alternative was to replace the revetment around the protection in-kind, from the original design back in 1965. The original revetment stone was undersized, and it has since washed away. Proposed revetment has been sized based on anticipated velocities in the Ipswich River and will take into consideration ice and other potential natural events. There is a potential that the new riprap slope would be washed away by extreme storm events. This alternative would be implemented in conjunction with installing new bell joint leak clamps in order to address the failing joints by the Choate Bridge. The advantage of this approach is that the original footprint of the previously authorized fill would not be exceeded. The original stone footprint does not extend below the Choate Bridge, which would leave that area of the interceptor exposed to the elements. Due to the increased costs and logistical difficulties, this alternative is not preferred by the Choate Bridge.

The interceptor remains buried by the Green Street Bridge; however, the original riprap has been washed away in multiple areas. In this area, restoring the original riprap slope as originally designed in 1965 would be advantageous to protecting the interceptor before it becomes exposed to the elements. The riprap would not exceed the previous authorized footprint of fill. In addition, large riprap would provide beneficial habitat to wildlife. Due to the existing conditions and environmental benefits, this alternative is preferred for the interceptor rehabilitation by the Green Street Bridge.

4.3.4 Encasing the Interceptor in Concrete (Preferred)

This alternative involves encasing the existing exposed cast iron pipe in concrete. Forms would be built around the pipe and concrete would encase the pipe to protect it. Stone would be installed at the toe of the concrete to protect it from being undercut. Measures will be taken to protect resource areas during the construction period. Horizontal helical tie backs are proposed to support the loading from the bank and any stone placed between the pipe and the bank. Concrete could be used to eliminate risk in the joints if concrete is poured along the entire pipe length, which would eliminate any chance of risk associated with the joints.

Encasing the entire length of the pipe would turn the flexible pipe into a rigid structure. Installing a CIPP liner in the existing pipe would be recommended to prevent any leakage in the unlikely event that differential settlement could cause the pipe to crack within the casement. This approach would reduce the stone fill footprint, extending the life expectancy of the cast iron pipe, structurally replacing the joint restraints with reinforced concrete, and providing pipe armoring from any potentially damaging natural occurrences. Due to those reasons, the Town chose to select this alternative.

4.4 Construction Methodology & Mitigation

The Sewer Interceptor Rehabilitation and Siphon Replacement Project will be performed with measures to minimize potential construction disturbances. As noted below, in some instances specific construction means and methods will be determined by the contractor. Due to construction safety concerns, the contractor will be responsible for providing public safety protection measures, including safety signage and observation to ensure

that the public stays at a safe distance from active equipment and does not enter potentially unsafe active work areas.

Truck deliveries and site work will be performed within hours specified by the Town of Ipswich Bylaw, or as further defined by project specifications. Performing site work within hours specified by the Town of Ipswich work hour requirements will help mitigate construction related noise impacts to neighbors.

Construction-period protective measures will include the following:

- Installation of erosion/sediment control barriers
- Definition of limits of staging and access route(s) with construction fencing
- Use of Type II nonwoven geotextile beneath crushed stone and/or construction mats at temporary construction access roads
- Time of year restrictions to protect fish
- Coffer dams
- Tree protection
- On-site spill kit

Contractor requirements and limitations are noted on the project plans provided in Appendix C. Additional conditions are anticipated as part of the project regulatory review and approval process.

Access to the southern bank will be obtained from the commercial parking lot at J Barrett & Co., located at 4 South Main Street. The northern bank will be accessed via an easement at 35 County Street. Access to the northwest bank will occur through a temporary easement with 12 Market Street. A timber mat ramp will be installed, and the equipment will be able to access the site within a demarcated work area. Site access to the work area by Green Street Bridge will be obtained through the Town-owned Sidney Shurcliff River walk. Equipment and materials will be staged in existing developed areas on site.

The areas of construction will remain in a stable condition at the close of each construction day via the use of appropriate erosion and sedimentation control measures. Erosion control measures will be inspected at the close of each construction day and maintained or reinforced as necessary. All erosion and sedimentation control measures will be inspected, cleaned, or replaced during construction and will remain in place until such time as stabilization of all areas that may impact jurisdictional areas is permanent.

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SECTION 5

Section 5
Regulatory Compliance

The proposed project has been designed to avoid environmental impacts when possible, minimize unavoidable impacts when practicable, and provide mitigation that is commensurate with the proposed alterations. Descriptions of the project's compliance with the regulatory requirements of the MA WPA, Ipswich Bylaw, and other pertinent state and federal regulatory programs are provided in the following sections.

5.1 Local Permits

The project will require an Order of Conditions from the Town of Ipswich Conservation Commission pursuant to the MA WPA. A Notice of Intent (NOI) will be submitted to the Town of Ipswich Conservation Commission following submittal of the ENF.

Wetland resource area impacts are primarily associated with temporary construction-period impacts within the existing developed area, excavation and/or dredging of sediment, installation of a gravel access, and rehabilitation of the interceptor. Table 5-1 presents a summary of the resource area impacts from the proposed project. The figures in Appendix A and project plans in Appendix C also depict the proposed activities and Resource Areas.

Table 5-1
Summary of Approximate Wetland Resource Area Impacts

Resource Area	Temporary Impacts	Permanent Impacts	Total Proposed Disturbance
Coastal Bank	39 lf	671 lf	710 lf
LUWW	1,898 sf	7,321 sf	9,219 sf
LSCSF	13,426 sf	12,067 sf	25,493 sf
Riverfront Area	20,251 sf	21,654 sf	41,905 sf
Total	**35,614 sf**	**41,713 sf**	**77,327 sf**

The project will result in 20,251 sf temporary and 20,653 sf of permanent impacts of impacts to the 100-foot buffer zone to Coastal Bank. Approximately 5,731 sf of temporary and 12,887 sf of permanent impacts will occur within the locally-regulated No Build Zone. Approximately 7,167 sf of temporary and 17,177 sf of permanent work will occur within the locally-regulated No Disturbance Zone.

Although the project includes impacts to Coastal Bank, LUWW, LSCSF, and Riverfront Area the project will provide an overall benefit by protecting the existing infrastructure and preventing potential failure, which would result in wastewater within the Ipswich River. The project is anticipated to result in smaller footprint of fill from the original permitted design from the Chapter 91 License issued in 1965.

5.2 State Permits

5.2.1 Section 401 Water Quality Certification

A Section 401 Water Quality Certification is triggered by the filing of a federal Section 404 permit if the project results in a loss of 5,000 square feet cumulatively of Bordering or Isolated Vegetated Wetlands and Land Under Water, the amount of any proposed dredging is greater than 100 cubic yards, or if any of the other thresholds listed in 314 CMR 9.04 are met. The proposed project is expected to result in 6,780 sf of impacts to LUWW and 1,109 cy of dredging, and therefore a 401 Water Quality Certification will be submitted to MassDEP for review and approval. MassDEP confirmed that a joint Section 401/Chapter 91 application will be required.

5.2.2 Chapter 91 License

The interceptor and siphon are located within tidelines under Chapter 91 jurisdiction. Based on a review of the Town of Ipswich's historic files, there is an existing Chapter 91 license for the interceptor. License 4922 was issued on July 1, 1965 to the Town of Ipswich to place and maintain riprap protection over the existing 18-inch interceptor pipe in the Ipswich River. License 4922 references another Chapter 91 license (License 4211) for the existing fill on the site, extending the fill footprint upstream approximately 95 feet and approximately 137 downstream by the Choate Bridge. The 4211 License plans depict the original siphon footprint.

The proposed interceptor rehabilitation and siphon replacement project consists of water-dependent uses per 310 CMR 9.12(2)(a)11 (shoreline protection structures which are necessary to protect an existing structure from natural erosion or to protect a water-dependent use) and 310 CMR 9.12(2)(a)13 (discharge pipes, outfalls, tunnels, and diffuser systems for conveyance of stormwater, wastewater, or other effluents to a receiving waterway). A joint Chapter 91 license application with 401 WQC will be submitted to MassDEP for review and approval.

5.3 Federal Permits

5.3.1 Army Corps Sections 404/10

The proposed project is subject to jurisdiction under the United States Army Corps of Engineers (Corps) authorization under Section 404 of the Clean Water Act, due to work within Waters of the United States. Corps Authorization is also required under Section 10 of the Rivers and Harbors Act due to work within waters subject to the ebb and flow of the tide.

The Corps General Permit (GP) for Massachusetts cover specific activities within the limits of Corps jurisdiction. Specific area limits apply when 1) there is a discharge of dredged or fill material into waters of the U.S., and 2) as stated in each of the activity General Permits. The total temporary and permanent impact area is used to determine if a project is eligible for Self-Verification, Pre-Construction Notification, or Individual Permit coverage.

The project appears to qualify for authorization under multiple GP categories, including: GP 1: Maintenance; GP 9: Utility Line Activities; and GP 14: Temporary Construction, Access, and Dewatering.

The project is anticipated to be reviewed as a Pre-Construction Notification. A permit application will be prepared and submitted to the Corps, and will be concurrently reviewed by other federal agencies, including the U.S. Environmental Protection Agency (EPA), the National Oceanic and Atmospheric Administration (NOAA)/ National Marine Fisheries Service (NMFS) and the U.S. Fish & Wildlife Service (USFWS). This application will be submitted following submittal of the ENF.

In addition to environmental factors, the MA General Permit requires notification of the State Historic Preservation Office (SHPO), Tribal Historic Preservation Officers (THPOs) and Board of Underwater Archeological Resources (MA BUAR) (for underwater projects) per Section 106. Tighe & Bond will mail a copy of the MEPA ENF to the SHPO, THPOs and BUAR describing the proposed activities and providing a general description of the area where construction is proposed. The applicant will continue to coordinate with these parties as the project progresses in accordance with the Section 106 review process.

J:\I\I0066 Ipswich WWTP\10-Siphon Eval and Repair\Permitting\MEPA ENF\5 - Draft ENF Narrative.docx

APPENDIX A

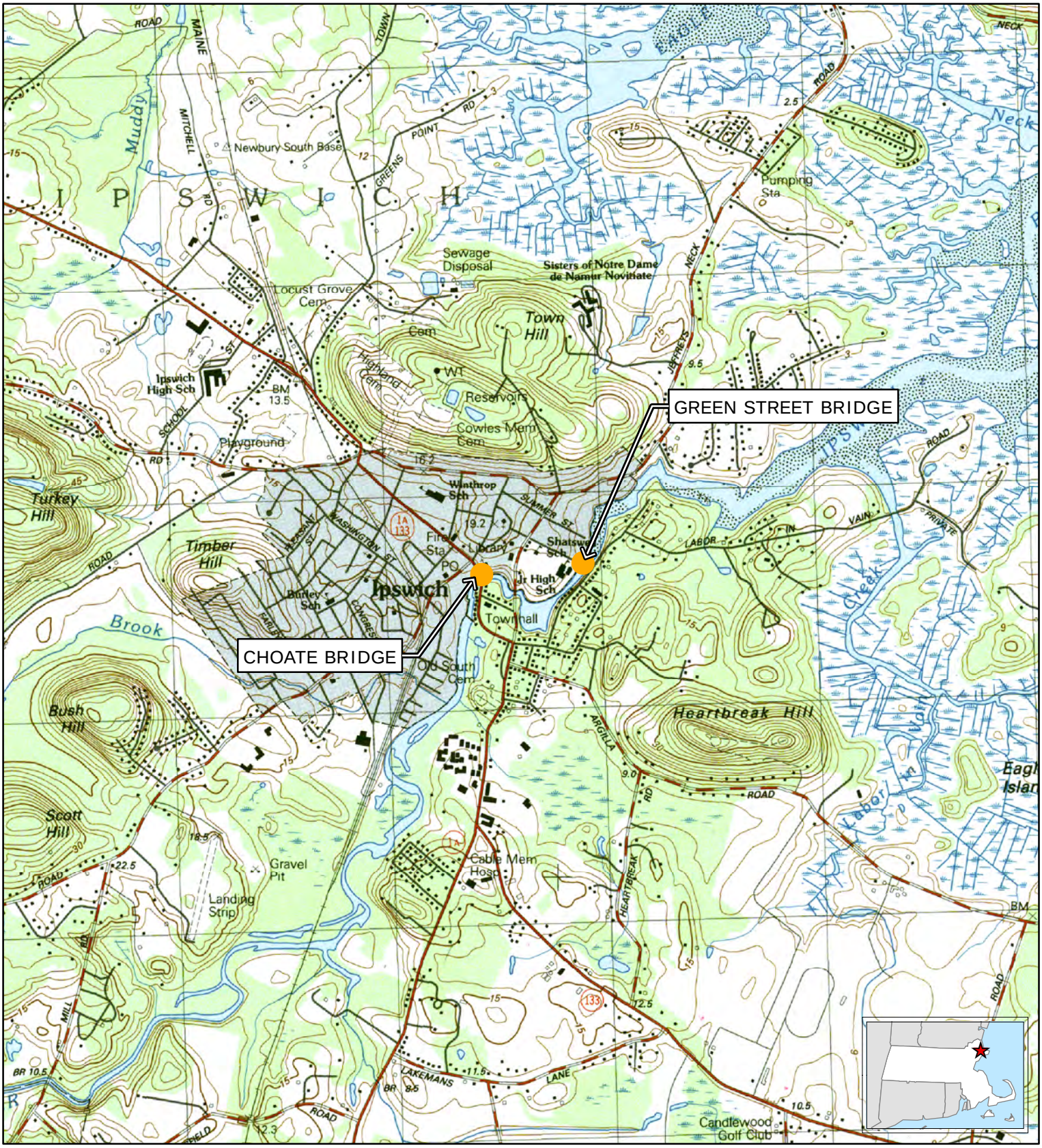

FIGURE 1

SITE LOCATION

Schematic Map of Sewer Interceptor and Siphon Connectivity
Ipswich, Massachusetts

Tighe&Bond
Engineers | Environmental Specialists

Based on USGS Topographic Map for Ipswich, MA Revised 1985.
Contour Interval Equals 3-Meters.
Circles indicate 500-foot and half-mile radii

March 2019

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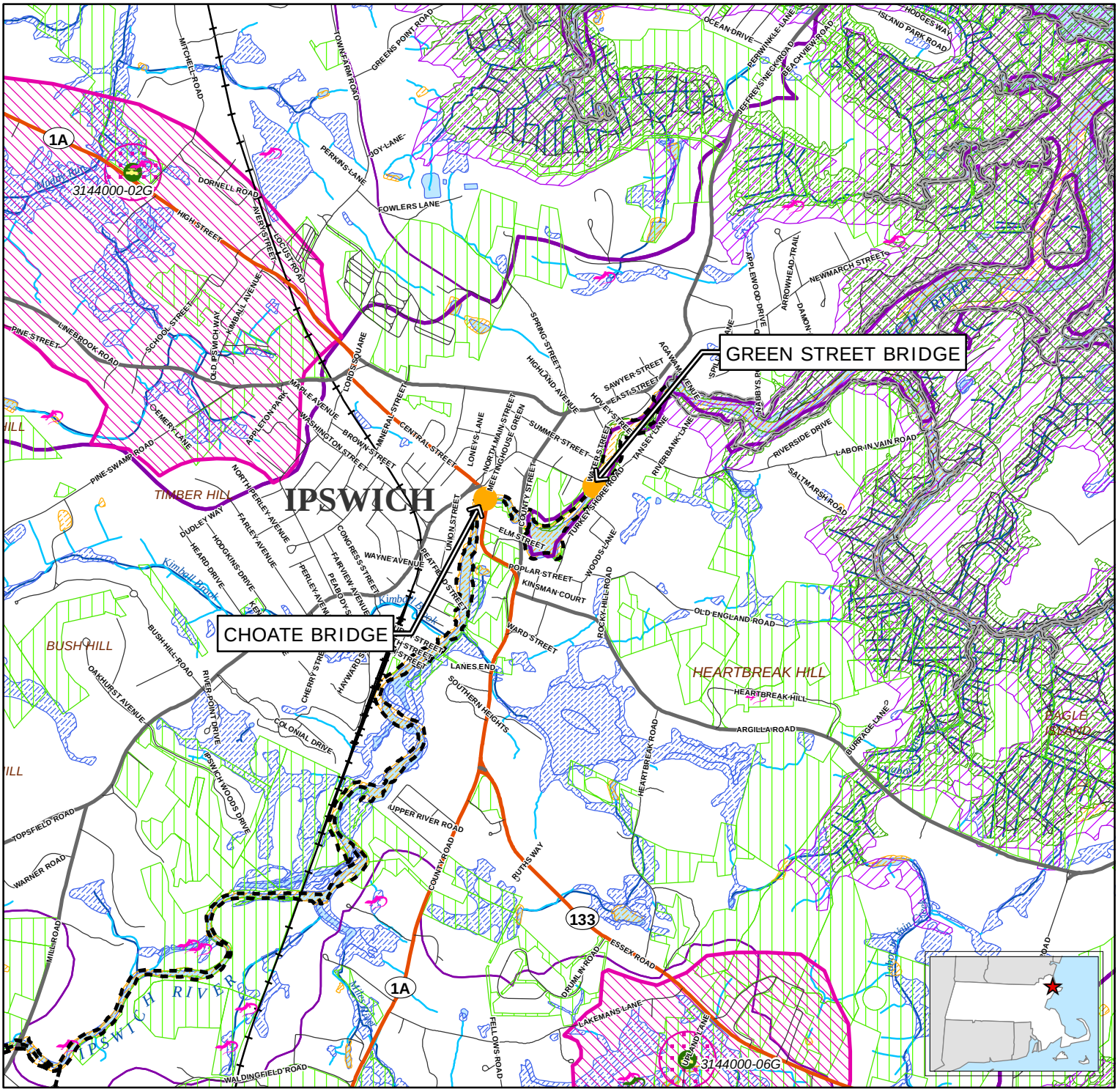

Legend

- NHESP Certified Vernal Pools
- NHESP Potential Vernal Pools
- Non-Landfill Solid Waste Sites
- Proposed Well
- Emergency Surface Water
- Community Public Water Supply - Surface Water
- Community Public Water Supply - Groundwater
- Non-Community Non-Transient Public Water Supply
- Non-Community Transient Public Water Supply
- Limited Access Highway
- Multi-Lane Highway, NOT Limited Access
- Other Numbered Highway
- Major Road - Collector
- Minor Street or Road
- Aquaducts
- Hydrologic Connections
- Stream/Intermittent Stream
- Powerline
- Pipeline
- Track or Trail
- Trains
- Public Surface Water Supply Protection Area (Zone A)
- DEP Approved Wellhead Protection Area (Zone I)
- DEP Approved Wellhead Protection Area (Zone II)
- DEP Interim Wellhead Protection Area (IWPA)
- Protected and Recreational Open Space
- Solid Waste Landfill
- Area of Critical Environmental Concern (ACEC)
- NHESP Priority Habitats for Rare Species
- NHESP Estimated Habitats for Rare Wildlife
- EPA Designated Sole Source Aquifer
- Major Drainage Basin
- Sub Drainage Basin
- MassDEP Open Water
- MassDEP Inland Wetlands
- MassDEP Coastal Wetlands
- MassDEP Not Interpreted Wetlands
- Public Surface Water Supply (PSWS)
- Water Bodies
- Non-Potential Drinking Water Source Area - High Yield
- Non-Potential Drinking Water Source Area - Medium Yield
- Potentially Productive Medium Yield Aquifer
- Potentially Productive High Yield Aquifer
- County Boundary
- Town Boundary
- USGS Quadrangle Sheet Boundary

1:24,000

0 1,000 2,000

Feet

N

FIGURE 2
PRIORITY RESOURCES

Schematic Map of Sewer Interceptor and Siphon Connectivity
Ipswich, Massachusetts

Data source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology
Circles indicate 500-foot and half-mile radii.
Data valid as of March 2019.

March 2019

Tighe&Bond
Engineers | Environmental Specialists

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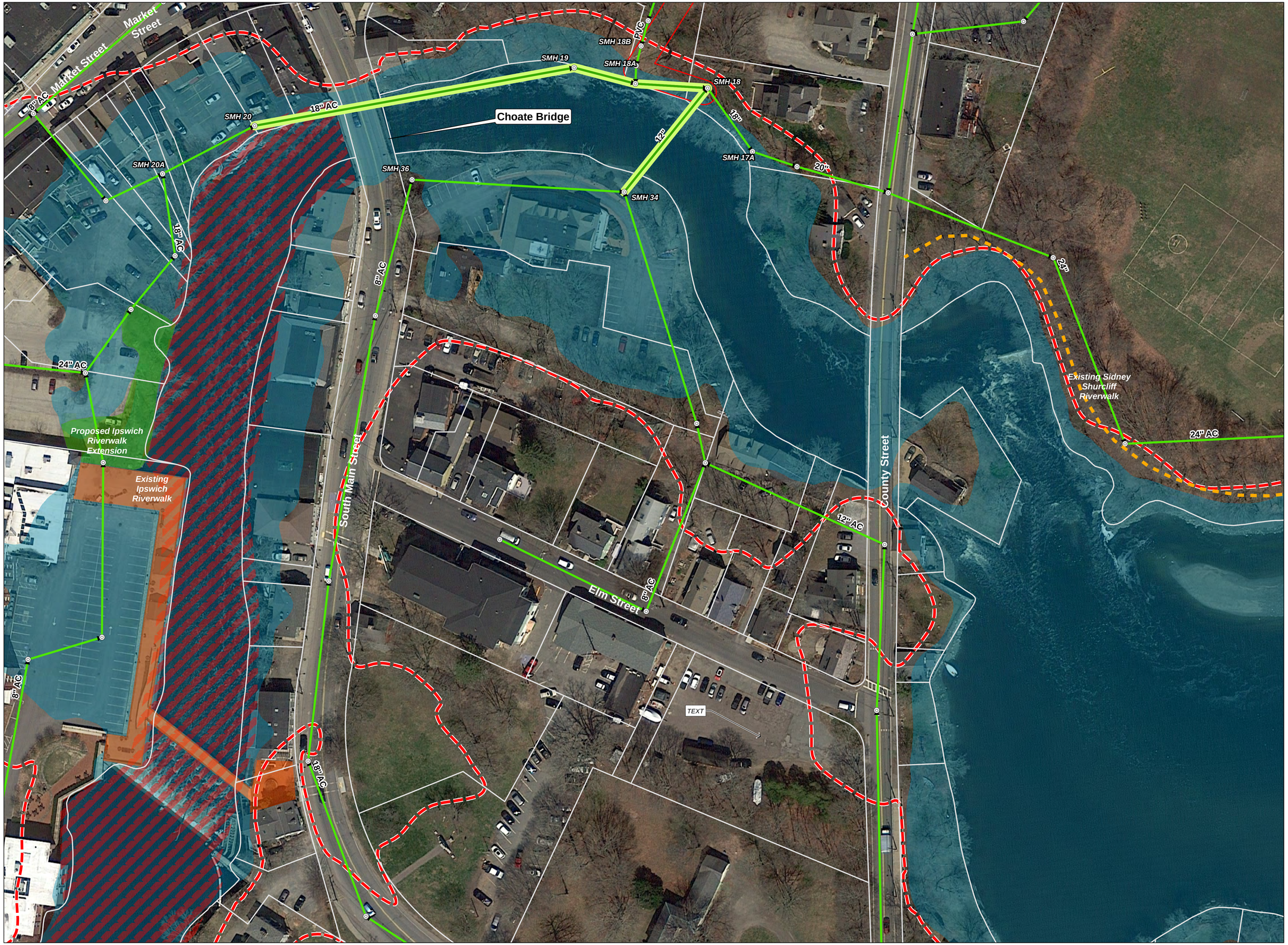
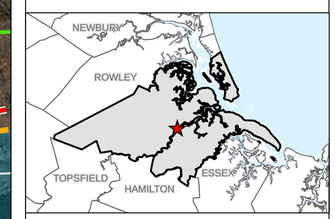


FIGURE 3
ORTHOPHOTOGRAPH SITE PLAN

LEGEND

- Manhole
- Gravity Sewer Main
- Force Main
- Pipes Targeted for Evaluation
- 100-Year Flood + 3 feet
- Existing Sidney Shurcliff Riverwalk
- Existing Ipswich Riverwalk
- Proposed Ipswich Riverwalk Extension
- Regulatory Floodway
- 100 Year Flood Zone

LOCUS MAP



N W E S

0 100
Feet

1:500

NOTES

1. Based on Google Imagery (C) 2017

2. FEMA National Flood Hazard data obtained through MassGIS, Revised based on LiDAR elevations, data valid as of December 2017

Schematic Map of Sewer Interceptor and Siphon Connectivity

Ipswich, Massachusetts

March 2019

Tighe&Bond
Engineers | Environmental Specialists

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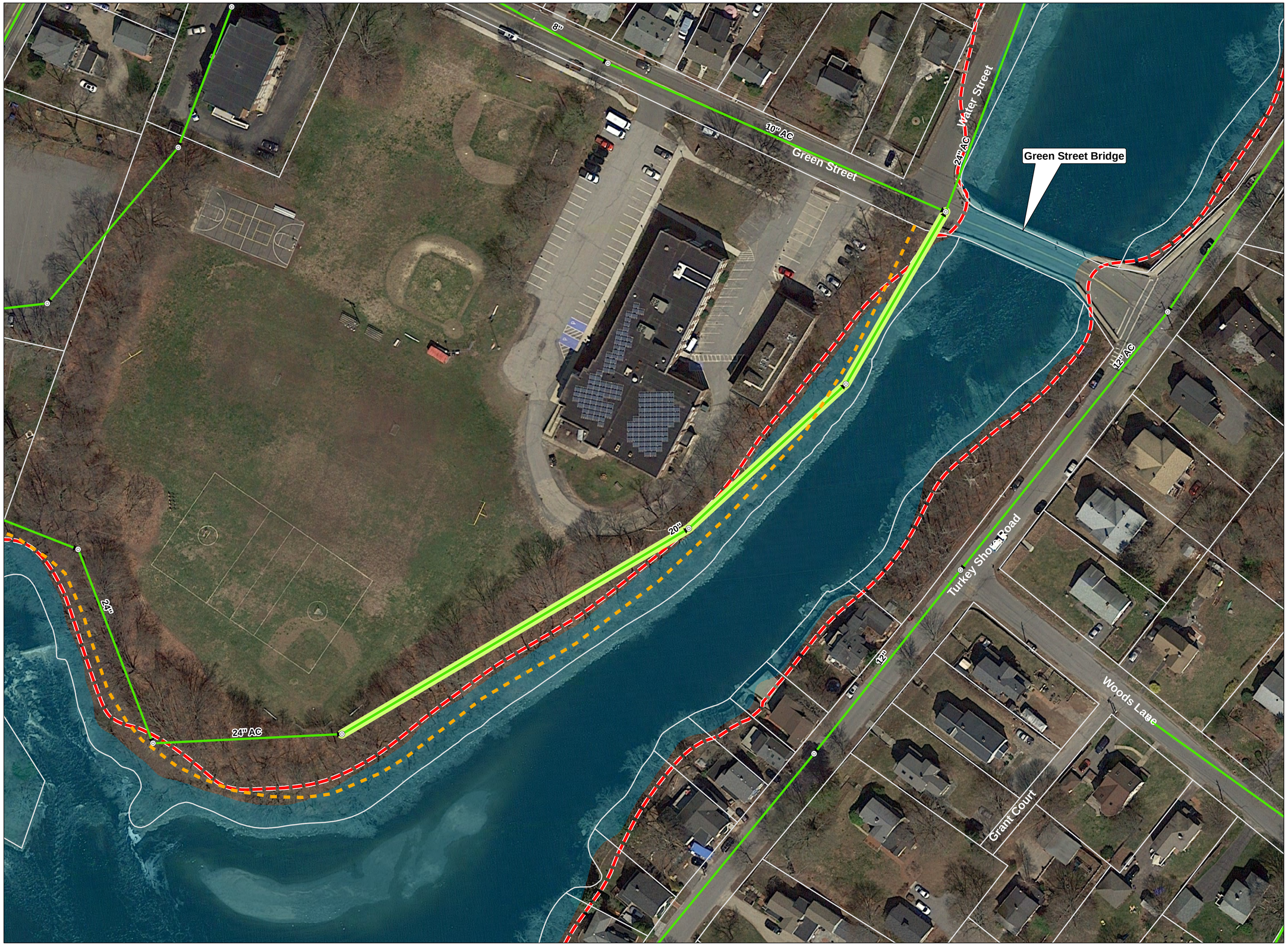
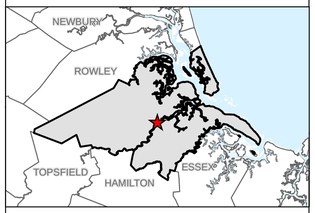


FIGURE 4
ORTHOPHOTOGRAPH SITE PLAN

LEGEND

- Manhole
- Gravity Sewer Main
- Force Main
- Pipes Targeted for Evaluation
- 100-Year Flood + 3 feet
- Existing Sidney Shurcliff Riverwalk
- Regulatory Floodway
- 100 Year Flood Zone

LOCUS MAP



N W E S

0 40 80
Feet

1:480

NOTES

1. Based on Google Imagery (C) 2017

2. FEMA National Flood Hazard data obtained through MassGIS, Revised based on LiDAR elevations, data valid as of December 2017

Schematic Map of Sewer Interceptor and Siphon Connectivity

Ipswich, Massachusetts

March 2019

Tighe&Bond
Engineers | Environmental Specialists

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APPENDIX B

Appendix C - Photographic Log

Client: Town of Ipswich Wastewater Department

Job Number: I-0066010-02

Site: Sewer Interceptor Rehabilitation and Siphon Replacement

Photograph No. 1	**Date:** May 7, 2018	**Direction Taken:** Northeast
Description: The interceptor runs parallel along the north bank of the Ipswich River and currently is exposed to the elements.		

Photograph No. 2	**Date:** July 6, 2018	**Direction Taken:** Northeast
Description: A view of the sewer manhole used to access the siphon.		

Appendix C - Photographic Log

Client: Town of Ipswich Wastewater Department

Job Number: I-0066010-02

Site: Sewer Interceptor Rehabilitation and Siphon Replacement

Photograph No. 3	**Date:** May 7, 2018	**Direction Taken:** Northwest
Description: The interceptor crosses beneath the historic stone-arch Choate Bridge.		

Photograph No. 4	**Date:** July 24, 2018	**Direction Taken:** East
Description: Tree roots are growing around the exposed interceptor pipe.		

Client: Town of Ipswich Wastewater Department

Job Number: I-0066010-02

Site: Sewer Interceptor Rehabilitation and Siphon Replacement

Photograph No. 5	**Date:** July 24, 2018	**Direction Taken:** West
Description: Typical corrosion of the top bolts of the interceptor joints.		

Photograph No. 6	**Date:** May 7, 2018	**Direction Taken:** West
Description: Plaque on the historic Choate Bridge.		

Client: Town of Ipswich Wastewater Department

Job Number: I-0066010-02

Site: Sewer Interceptor Rehabilitation and Siphon Replacement

Photograph No. 7	**Date:** June 15, 2018	**Direction Taken:** Northeast
Description: The approximate location of the siphon within the Ipswich River is depicted by the red line.		

Photograph No. 8	**Date:** August 7, 2018	**Direction Taken:** East
Description: A view of the current condition of the siphon that is exposed above the riverbed.		

Client: Town of Ipswich Wastewater Department

Job Number: I-0066010-02

Site: Sewer Interceptor Rehabilitation and Siphon Replacement

Photograph No. 9	**Date:** February 11, 2019	**Direction Taken:** North
Description: The approximate location of the interceptor is depicted by the red line.		

Photograph No. 10	**Date:** February 11, 2019	**Direction Taken:** East
Description: A view of the incised northern bank of the Ipswich River.		

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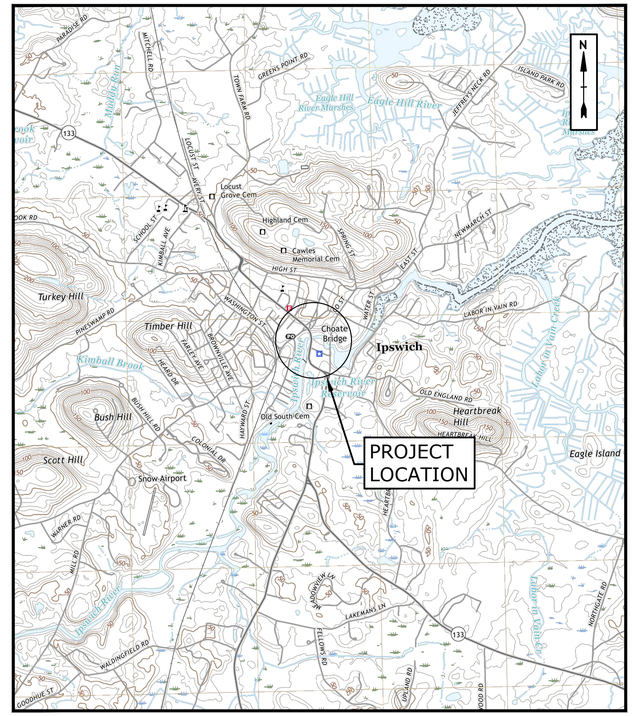
APPENDIX C

TOWN OF IPSWICH, MASSACHUSETTS

SEWER INTERCEPTOR AND SIPHON REHABILITATION

MARCH 2019

LIST OF DRAWINGS	
SHEET NO.	TITLE
1	COVER
2	INTERCEPTOR REHABILITATION CONCEPTS - SITE PLAN (1)
3	INTERCEPTOR REHABILITATION CONCEPTS - SITE PLAN (2)
4	INTERCEPTOR REHABILITATION - DETAILS 1
5	INTERCEPTOR REHABILITATION -DETAILS 2
6	EXISTING SIPHON SECTIONS
7	PROPOSED SIPHON SECTIONS
8	DETAILS
9	DOWNSTREAM REVETMENT DETAILS



PREPARED BY:

Tighe&Bond
www.tighebond.com

PREPARED FOR:

TOWN OF IPSWICH
WATER & WASTEWATER DIRECTOR, VICKI HALMEN
TOWN MANAGER, ANTHONY MARINO

CONCEPTUAL DRAWINGS
NOT FOR CONSTRUCTION

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Plotted On:Mar 13, 2019-2:15pm By: SAT
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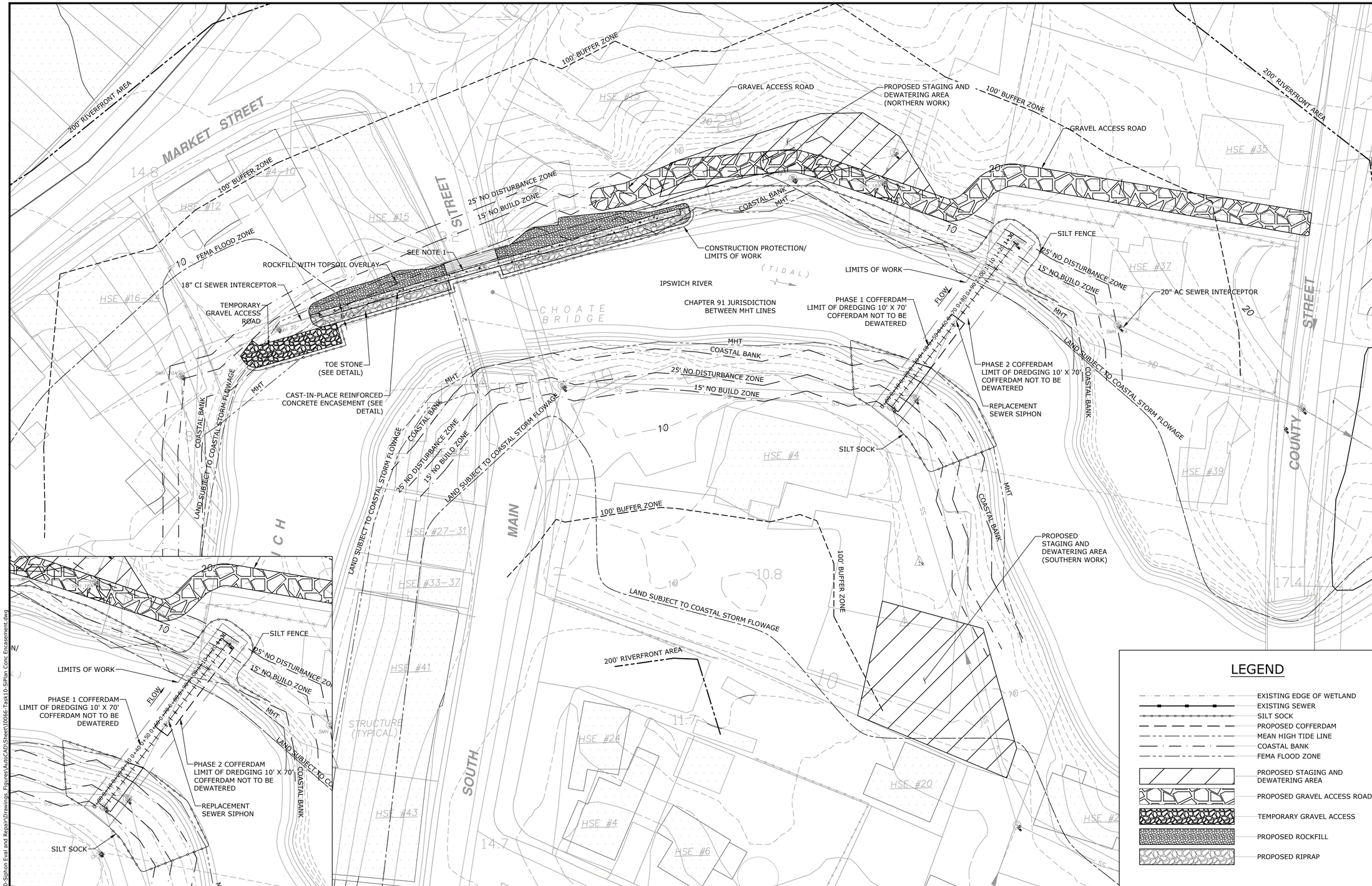

PHASE 2 COFFERDAM

CONCRETE ENCASEMENT

SCALE IN FEET
0 30' 60'
GRAPHIC SCALE

N

NOTE:
1. OMIT SHEET PILE UNDER BRIDGE DUE TO OVERHEAD SPACE CONSTRAINT

REFERENCE PLANS:
1. "SANITARY SEWER PLAN VICINITY OF SOUTH MAIN STREET TO COUNTY STREET" DATED 3/14/2018 REVISED 5/29/2018 IN FEET RELATIVE TO NAVD88. IN RIVER BATHYMETRY NOT PROVIDED AND WATER LEVELS NOT GIVEN.
2. "PLAN ACCOMPANYING PETITION OF TOWN OF IPSWICH TO REPLACE FILL AND SEWER PIPELINE WITH CROSSING IN THE IPSWICH RIVER, IPSWICH, MASS" DATED 4/27/1959.

LEGEND

- EXISTING EDGE OF WETLAND
- EXISTING SEWER
- SILT SOCK
- PROPOSED COFFERDAM
- MEAN HIGH TIDE LINE
- COASTAL BANK
- FEMA FLOOD ZONE
- PROPOSED STAGING AND DEWATERING AREA
- PROPOSED GRAVEL ACCESS ROAD
- TEMPORARY GRAVEL ACCESS
- PROPOSED ROCKFILL
- PROPOSED RIPRAP

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CONCEPTUAL DRAWINGS

NOT FOR CONSTRUCTION

Town of Ipswich

Sewer Interceptor and Siphon Rehabiitation

Ipswich, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	I0066/10
DATE:	03/2019
FILE: I0066-Task10-SiPlan Conc Encasement.dwg	
DRAWN BY:	LPT/JAK
CHECKED:	DOR, SAT
APPROVED:	SES

INTERCEPTOR REHABILITATION SITE PLAN (1)

SCALE: 1"=30'

SHEET 2

Last Saved: 3/13/2019
Plotted On:Mar 13, 2019-2:14pm By: SAT
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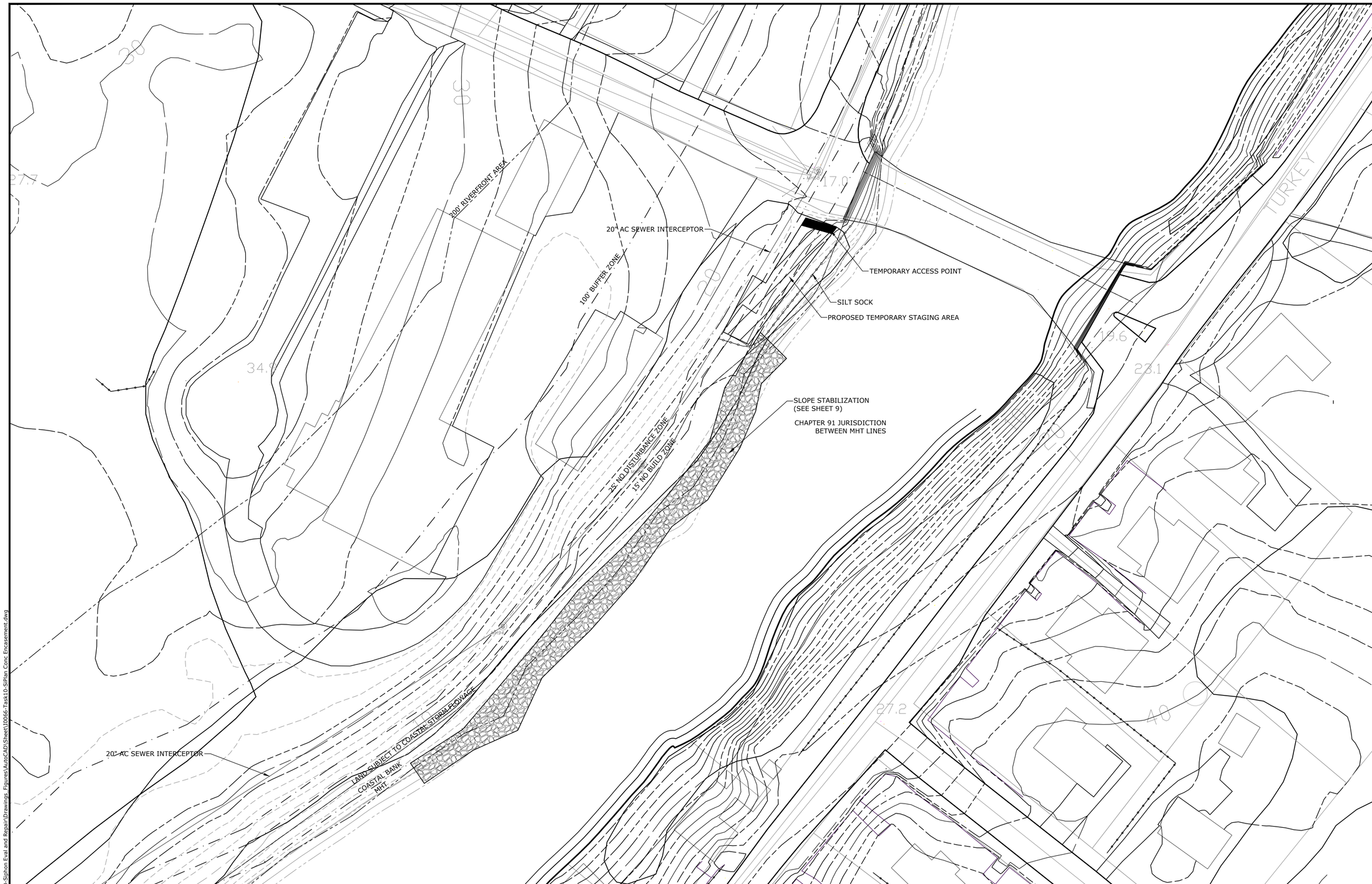

CONCRETE ENCASEMENT

SCALE IN FEET

0 30' 60'

GRAPHIC SCALE

N

REFERENCE PLANS:

1. "SANITARY SEWER PLAN VICINITY OF SOUTH MAIN STREET TO COUNTY STREET" DATED 3/14/2018 REVISED 5/29/2018 IN FEET RELATIVE TO NAVD88. IN RIVER BATHYMETRY NOT PROVIDED AND WATER LEVELS NOT GIVEN.
2. "PLAN ACCOMPANYING PETITION OF TOWN OF IPSWICH TO REPLACE FILL AND SEWER PIPELINE WITH CROSSING IN THE IPSWICH RIVER, IPSWICH, MASS" DATED 4/27/1959.

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CONCEPTUAL DRAWINGS

NOT FOR CONSTRUCTION

Town of Ipswich

Sewer Interceptor and Siphon Rehabiitation

Ipswich, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	I0066/10
DATE:	03/2019
FILE: I0066-Task10-SiPlan Conc Encasement.dwg	
DRAWN BY:	LPT/JAK
CHECKED:	DOR, SAT
APPROVED:	SES

INTERCEPTOR REHABILITATION SITE PLAN (2)

SCALE: 1"=30'

SHEET 3

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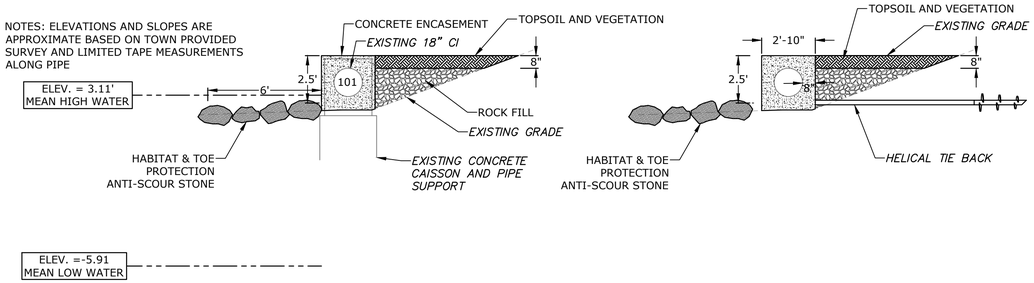
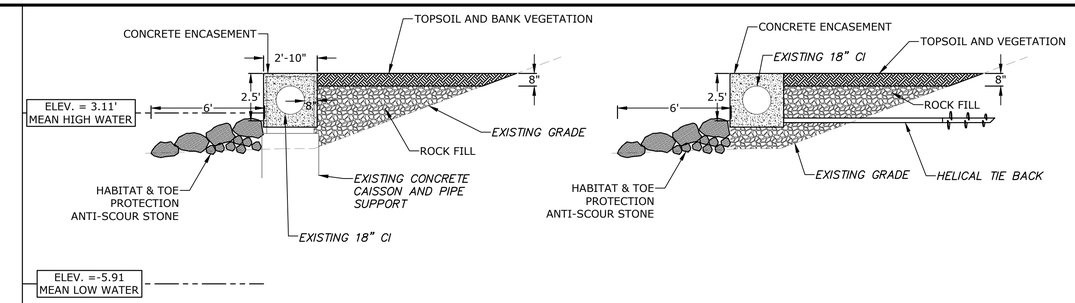
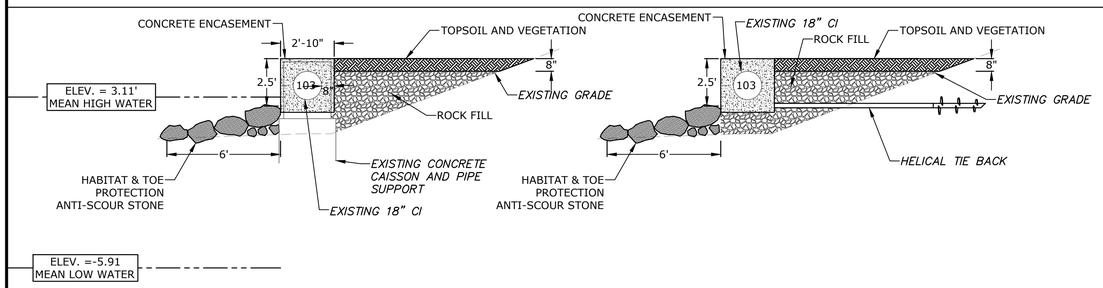
NOTES: ELEVATIONS AND SLOPES ARE APPROXIMATE BASED ON TOWN PROVIDED SURVEY AND LIMITED TAPE MEASUREMENTS ALONG PIPE



CONCRETE PEDESTAL #101 CROSS SECTION



CONCRETE PEDESTAL #102 CROSS SECTION



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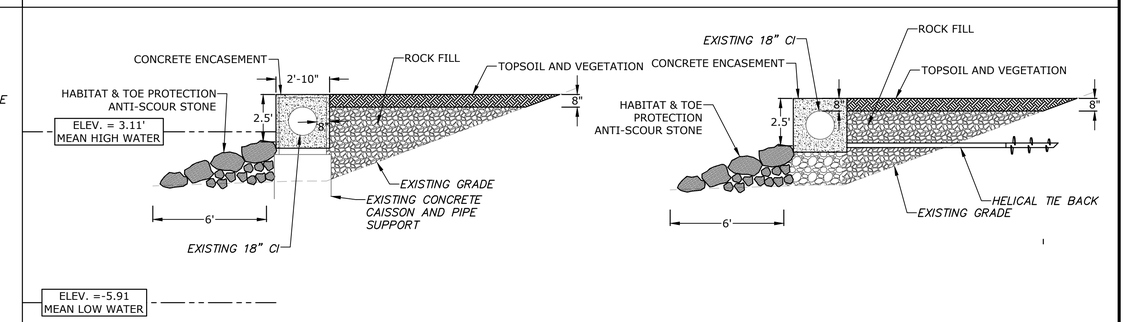

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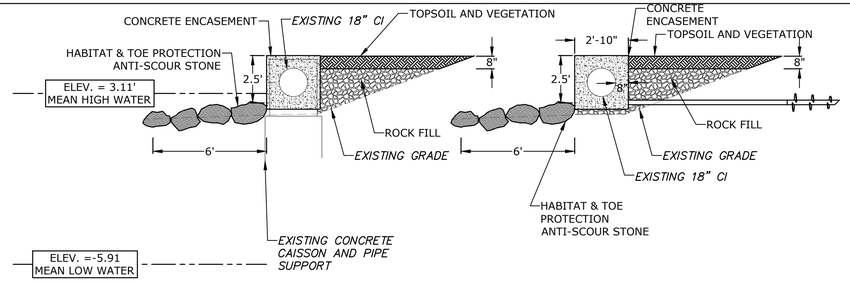

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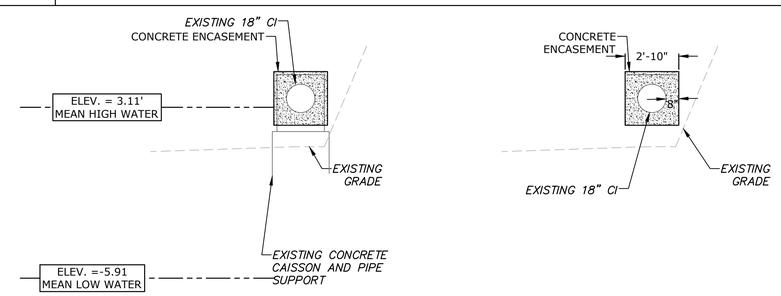

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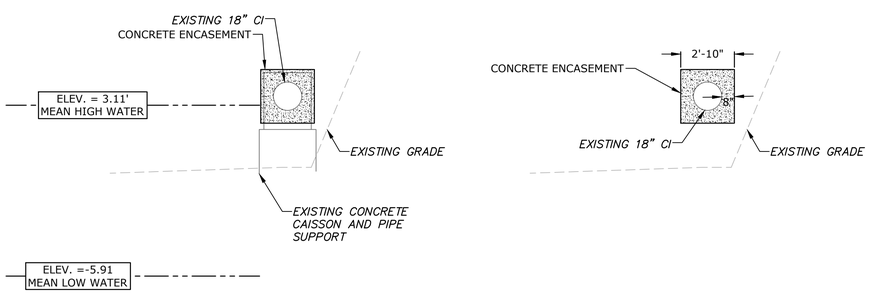

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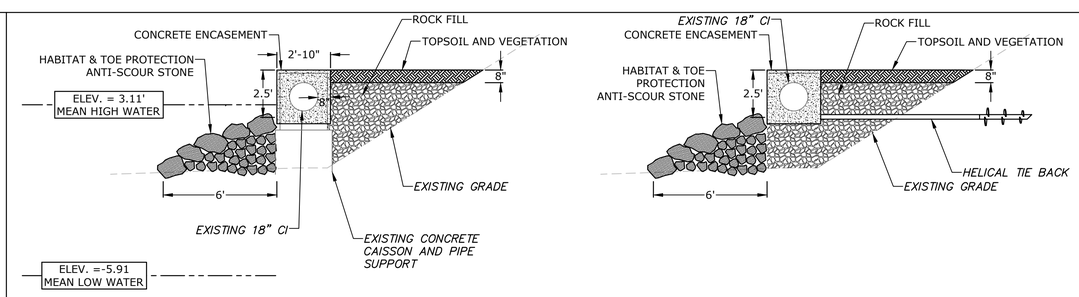

CONCRETE PEDESTAL #108 CROSS SECTION

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CONCEPTUAL DRAWINGS

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Town of Ipswich

Sewer Interceptor and Siphon Rehabiitation

Ipswich, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	I0066/10
DATE:	03/2019
FILE: I0066-Task10-DTLS.dwg	
DRAWN BY:	JAK, SAT
CHECKED:	DCM
APPROVED:	SES

INTERCEPTOR REHABILITATION - DETAILS 1

SCALE: AS SHOWN

SHEET 4

Last Saved: 3/11/2019
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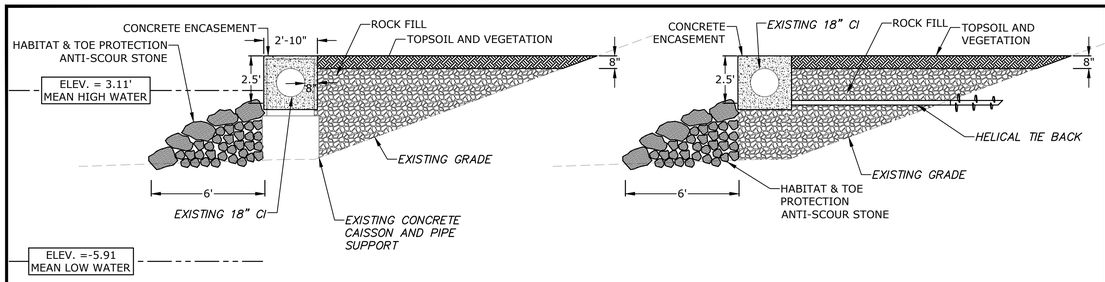

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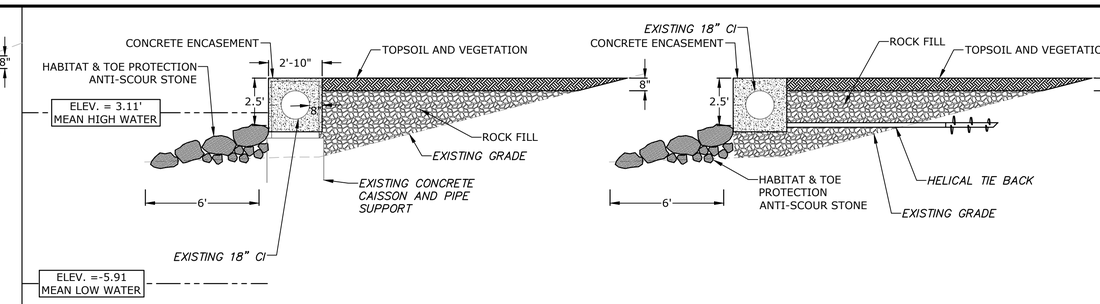

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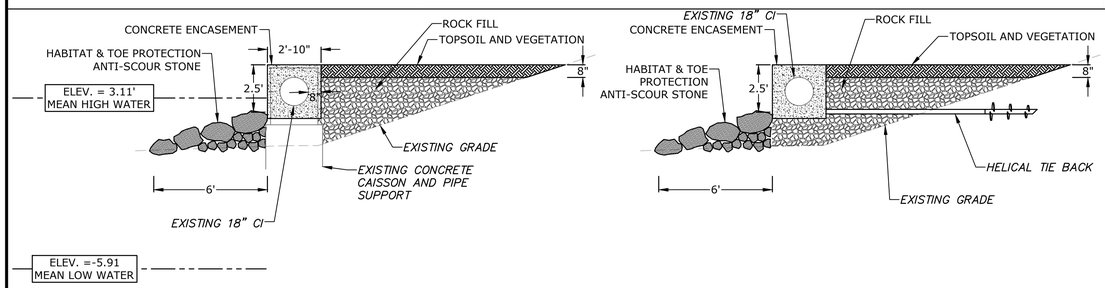

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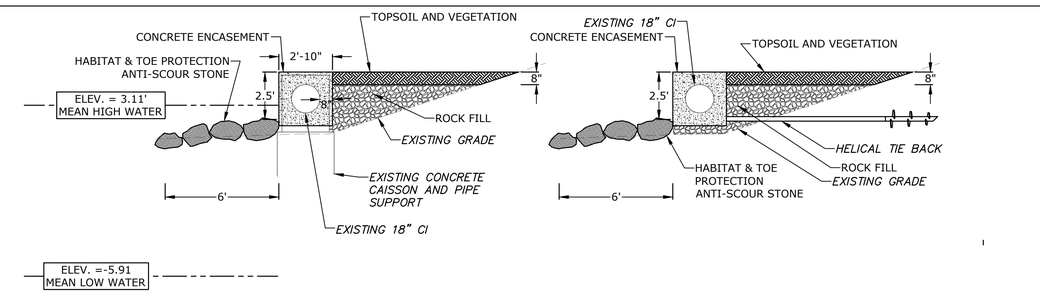

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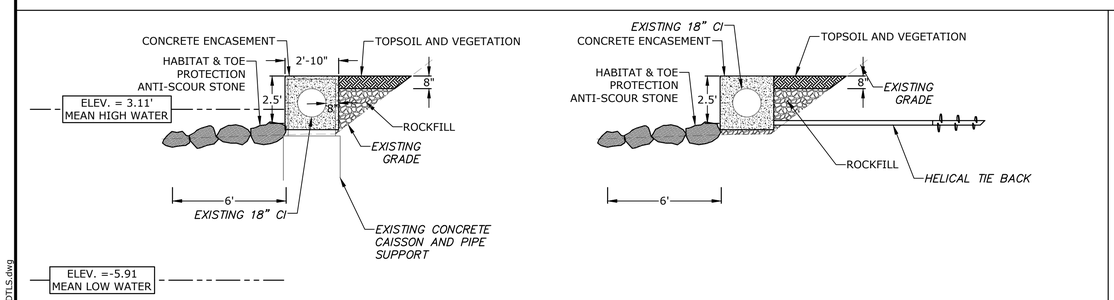

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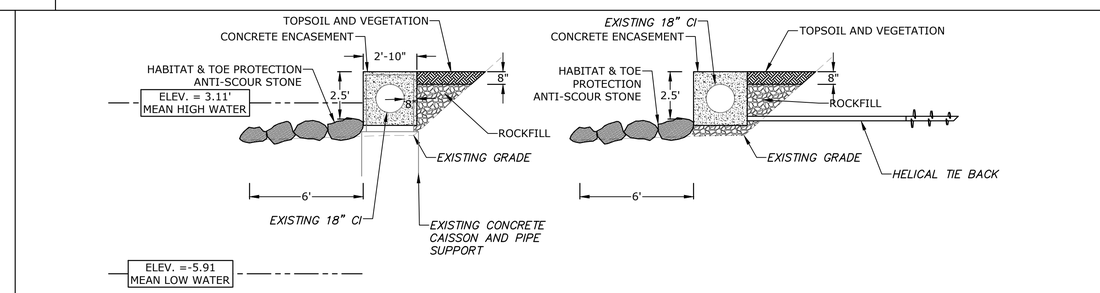

CONCRETE PEDESTAL #114 CROSS SECTION

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Town of Ipswich

Sewer Interceptor and Siphon Rehabiitation

Ipswich, Massachusetts

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APPROVED:	SES

INTERCEPTOR REHABILITATION - DETAILS 2

SCALE: AS SHOWN

SHEET 5

Last Saved: 3/11/2019
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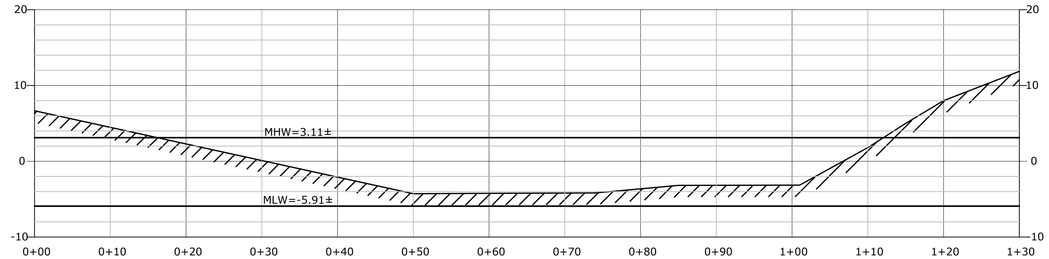
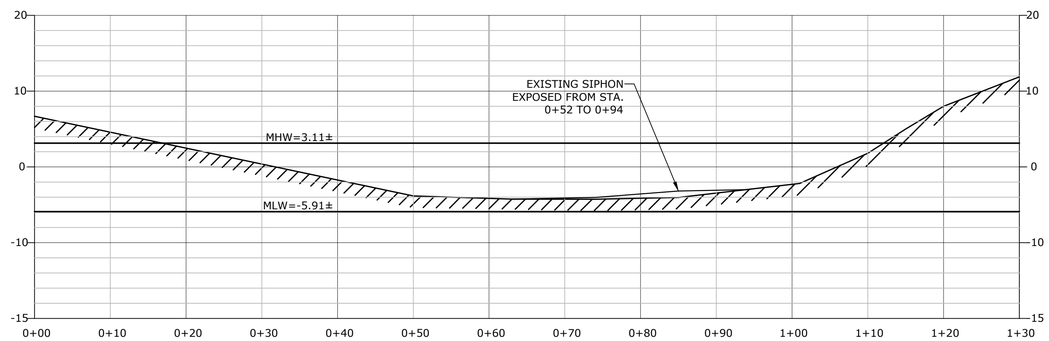


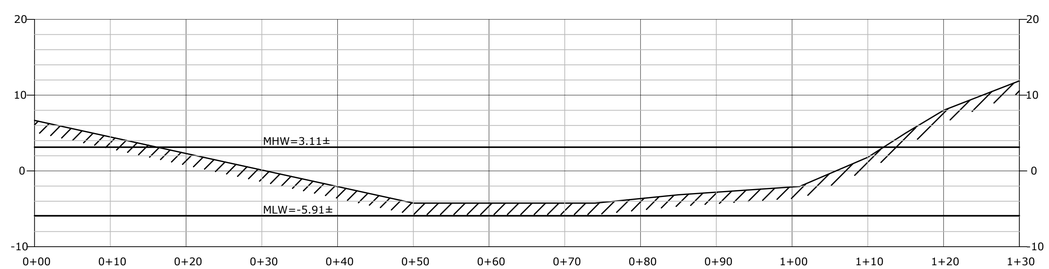
RIVER SECTION 10' UP RIVER OF SIPHON

SCALE IN FEET
0 10' 20'
GRAPHIC SCALE



RIVER SECTION AT SIPHON

SCALE IN FEET
0 10' 20'
GRAPHIC SCALE



RIVER SECTION 10' DOWN RIVER OF SIPHON

SCALE IN FEET
0 10' 20'
GRAPHIC SCALE

NOTES:
1. STATIONING & ELEVATIONS IN FEET WITH STA. 0+00 AT CENTER OF SMH 34 COVER.
2. ELEVATIONS TAKEN BY AUTO LEVEL, ROD AND STATIONING BY TAPE. VERTICAL DATUM BASED ON RIM ELEVATION OF SMH 34 ARCHIVE DATA IN NAVD88.
3. WATER ELEVATIONS VARY WITH RIVER FLOW & TIDES.

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CHECKED:	DCM
APPROVED:	SES

EXISTING SIPHON SECTIONS

SCALE: AS SHOWN

SHEET 6

Last Saved: 3/11/2019
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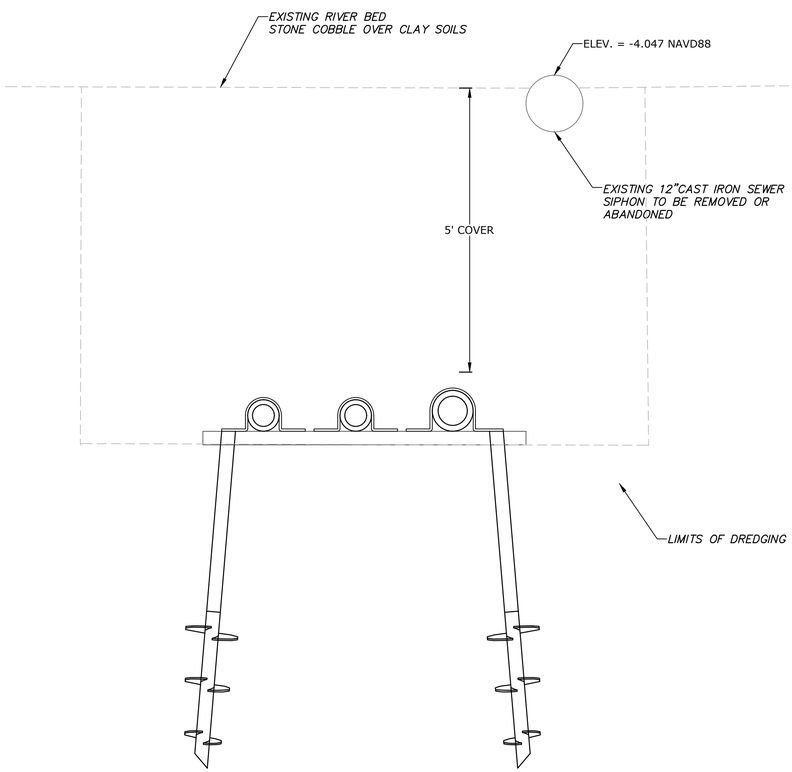
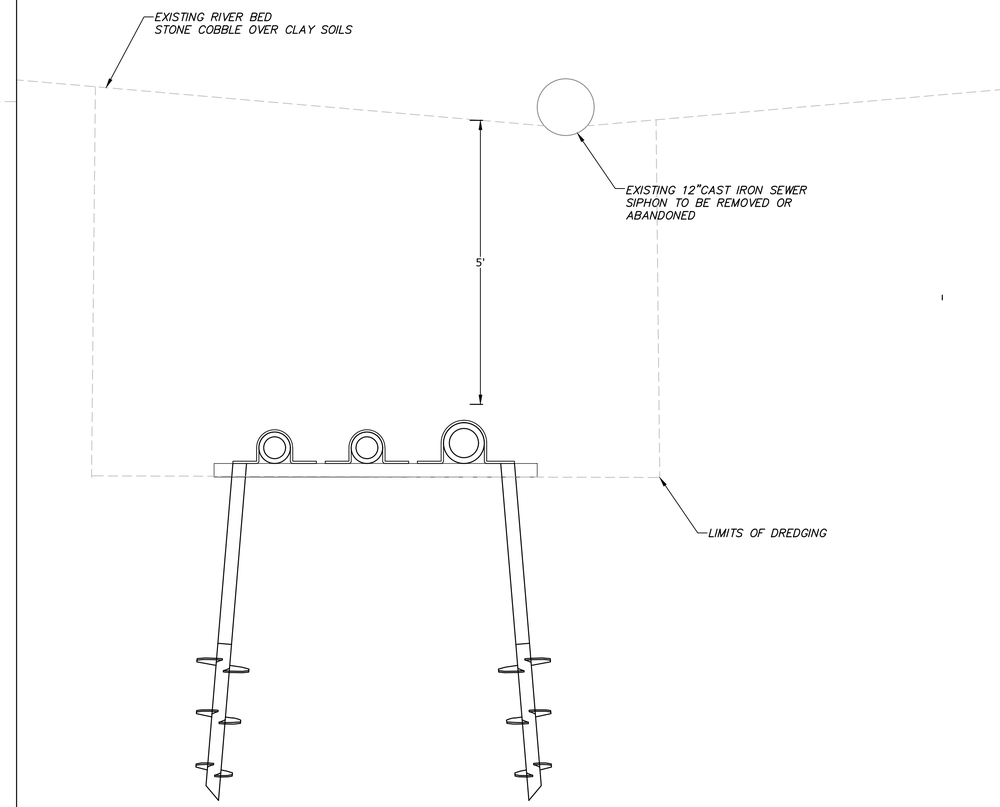


SIPHON CROSS SECTION A-A STA. 0+74.00

0 1' 2' 3'
GRAPHIC SCALE



SIPHON CROSS SECTION B-B STA. 0+85.00

0 1' 2' 3'
GRAPHIC SCALE

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CONCEPTUAL DRAWINGS

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Town of Ipswich

Sewer Interceptor and Siphon Rehabiitation

Ipswich, Massachusetts

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PROPOSED SIPHON SECTIONS

SCALE: AS SHOWN

SHEET 7

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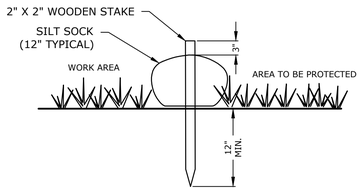
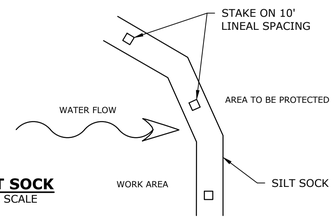
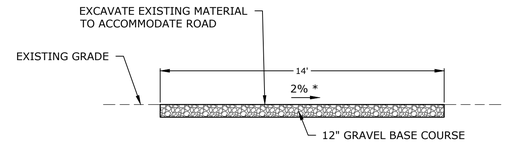


NOTES:
1. SILT SOCK SHALL BE SILT SOXX BY FILTREXX OR APPROVED EQUAL.
2. SILT SOCK SHALL BE FILLED WITH FILTERMEDIA BY FILTREXX OR APPROVED EQUAL.
3. WHERE TWO SILT SOCKS ARE JOINED, A MINIMUM OF 2 FEET OF OVERLAP SHALL BE MAINTAINED.
4. SILT SOCKS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
5. CONTRACTOR TO INSTALL SILT SOCK IN J-HOOK OR SMILE CONFIGURATION TO LIMIT CONCENTRATION OF STORMWATER RUNOFF AT A SINGLE DISHCARGE POINT.



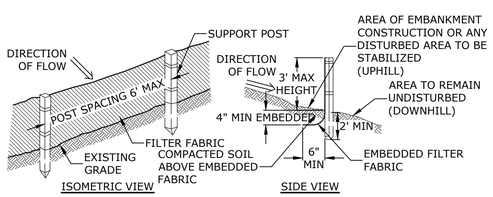
SILT SOCK
NO SCALE



* SLOPE AS REQUIRED FOR DRAINAGE (2% MAX)

TYPICAL ACCESS ROAD SECTION
NO SCALE

NOTES:
1. SILT FENCE SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
2. ADJOINING SECTIONS OF THE FENCE SHALL BE OVERLAPPED BY 6 INCHES, FOLDED AND STAPLED TO A SUPPORT POST.
3. THE MAXIMUM CONTRIBUTING DRAINAGE AREA ABOVE THE FENCE SHOULD BE LESS THAN ¼ ACRE PER 100 LINEAR FEET OF FENCE;
4. THE MAXIMUM LENGTH OF SLOPE ABOVE THE FENCE SHOULD BE 100 FEET;
5. THE MAXIMUM SLOPE ABOVE THE FENCE SHOULD BE 2:1;
6. FENCES SHOULD BE INSTALLED FOLLOWING THE CONTOUR OF THE LAND AS CLOSELY AS POSSIBLE, AND
   a. THE ENDS OF THE FENCE SHOULD BE FLARED UPSLOPE;
   b. THE FABRIC SHOULD BE EMBEDDED A MINIMUM OF 4 INCHES IN DEPTH AND 4 INCHES IN WIDTH IN A TRENCH EXCAVATED INTO THE GROUND, OR IF SITE CONDITIONS INCLUDE FROZEN GROUND, LEDGE, OR THE PRESENCE OF HEAVY ROOTS, THE BASE OF THE FABRIC SHOULD BE EMBEDDED WITH A MINIMUM THICKNESS OF 8 INCHES OF ¾-INCH STONE;
   c. THE SOIL SHOULD BE COMPACTED OVER THE EMBEDDED FABRIC;
   d. SUPPORT POSTS SHOULD BE SIZED AND ANCHORED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS WITH MAXIMUM POST SPACING OF 6 FEET;
   e. ADJOINING SECTIONS OF THE FENCE SHOULD BE OVERLAPPED BY A MINIMUM OF 6 INCHES (24 INCHES IS PREFERRED), FOLDED AND STAPLED TO A SUPPORT POST. IF METAL POSTS ARE USED, FABRIC SHOULD BE WIRE-TIED DIRECTLY TO THE POSTS WITH THREE DIAGONAL TIES.
5. SILT FENCING SHOULD NOT BE STAPLED OR NAILED TO TREES.
6. THE FILTER FABRIC SHOULD BE A PERVIOUS SHEET OF PROPYLENE, NYLON, POLYESTER OR ETHYLENE YARN AND SHOULD BE CERTIFIED BY THE MANUFACTURER OR SUPPLIER.
7. THE FILTER FABRIC SHOULD CONTAIN ULTRAVIOLET RAY INHIBITORS AND STABILIZERS TO PROVIDE A MINIMUM OF 6 MONTHS OF EXPECTED USABLE CONSTRUCTION LIFE AT A TEMPERATURE RANGE OF 0 DEGREES FAHRENHEIT TO 120 DEGREES FAHRENHEIT.
8. POSTS FOR SILT FENCES SHOULD BE EITHER 4-INCH DIAMETER WOOD OR 1.33 POUNDS PER LINEAR FOOT STEEL WITH A MINIMUM LENGTH OF 5 FEET. STEEL POSTS SHOULD HAVE PROJECTIONS FOR FASTENING WIRE TO THEM. POSTS SHOULD BE PLACED ON THE DOWNSLOPE SIDE OF THE FABRIC.
9. THE HEIGHT OF A SILT FENCE SHOULD NOT EXCEED 36 INCHES AS HIGHER FENCES MAY IMPOUND VOLUMES OF WATER SUFFICIENT TO CAUSE FAILURE OF THE STRUCTURE.
10. THE FILTER FABRIC SHOULD BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID THE USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHOULD BE SPLICED TOGETHER ONLY AT SUPPORT POST, WITH A MINIMUM 6-INCH OVERLAP, AND SECURELY SEALED.
11. A MANUFACTURED SILT FENCE SYSTEM WITH INTEGRAL POSTS MAY BE USED.
12. POST SPACING SHOULD NOT EXCEED 6 FEET.
13. CONTRACTOR TO INSTALL SILT FENCE IN J-HOOK OR SMILE CONFIGURATION TO LIMIT CONCENTRATION OF STORMWATER RUNOFF AT A SINGLE DISHCARGE POINT.
14. A TRENCH SHOULD BE EXCAVATED APPROXIMATELY 4 INCHES WIDE AND 4 INCHES DEEP ALONG THE LINE OF POSTS AND UPGRADIENT FROM THE BARRIER.
15. THE STANDARD STRENGTH OF FILTER FABRIC SHOULD BE STAPLED OR WIRED TO THE POST, AND 8 INCHES OF THE FABRIC SHOULD BE EXTENDED INTO THE TRENCH. THE FABRIC SHOULD NOT EXTEND MORE THAN 36 INCHES ABOVE THE ORIGINAL GROUND SURFACE.
16. THE INSTALLATION TRENCH SHOULD BE BACKFILLED AND THE SOIL COMPACTED OVER THE FILTER FABRIC.
17. SILT FENCE MAY BE INSTALLED BY "SLICING" USING MECHANICAL EQUIPMENT SPECIFICALLY DESIGNED FOR THIS PROCEDURE. THE SLICING METHOD USES AN IMPLEMENT TOWED BEHIND A TRACTOR TO "PLOW" OR SLICE THE SILT FENCE MATERIAL INTO THE SOIL. THE SLICING METHOD MINIMALLY DISRUPTS THE SOIL UPWARD AND SLIGHTLY DISPLACES THE SOIL, MAINTAINING THE SOIL'S PROFILE AND CREATING AN OPTIMAL CONDITION FOR SUBSEQUENT MECHANICAL COMPACTION.
18. SILT FENCES SHOULD BE INSTALLED WITH "SMILES" OR "J-HOOKS" TO REDUCE THE DRAINAGE AREA THAT ANY SEGMENT WILL IMPOUND.
19. SILT FENCES PLACED AT THE TOE OF A SLOPE SHOULD BE SET AT LEAST 6 FEET FROM THE TOE TO ALLOW SPACE FOR SHALLOW PONDING AND TO ALLOW FOR MAINTENANCE ACCESS WITHOUT DISTURBING THE SLOPE.
20. SILT FENCES SHOULD BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREAS HAVE BEEN PERMANENTLY STABILIZED.



SILT FENCE
NO SCALE

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CONCEPTUAL DRAWINGS

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Town of Ipswich

Sewer Interceptor and Siphon Rehabiitation

Ipswich, Massachusetts

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APPROVED:	SES

DETAILS

SCALE: AS SHOWN

SHEET 8

Last Saved: 3/11/2019
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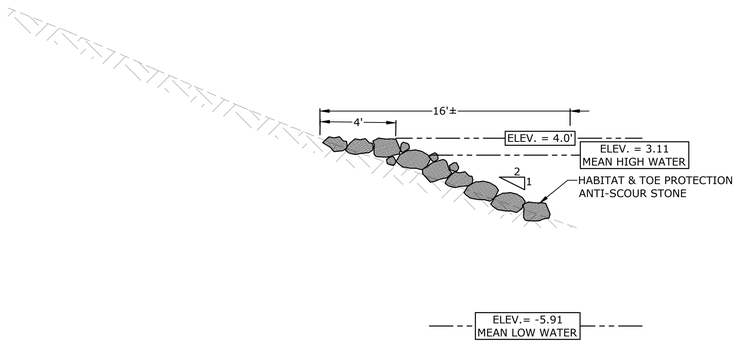
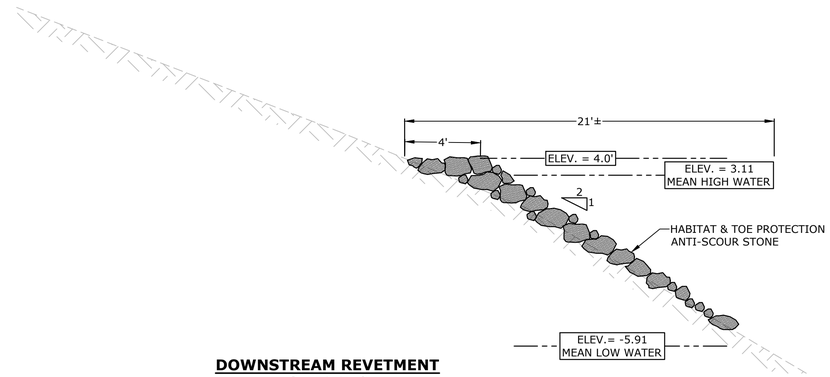
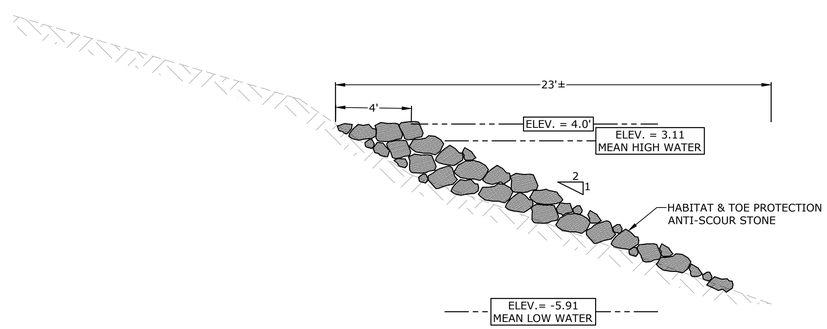


DOWNSTREAM REVETMENT
STA 0+00



DOWNSTREAM REVETMENT
STA 1+50



DOWNSTREAM REVETMENT
STA 3+62

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DOWNSTREAM REVETMENT DETAILS

SCALE: AS SHOWN

SHEET 9

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