Proactive by Design


# NOTICE OF INTENT FOR DISCHARGE OF TEMPORARY CONSTRUCTION DEWATERING PURSUANT TO MASSACHUSETTS DEWATERING PERMIT MAG070000

## ROUTE 1 WATER MAIN IMPROVEMENTS
### Between Madison Street and Thurston Street
### Wrentham, Massachusetts

January 2018
File No. 18.0173534.00

**PREPARED FOR:**
Town of Wrentham Department of Public Works
Wrentham, Massachusetts

**GZA GeoEnvironmental, Inc.**
190 Old Derby Street, Suite 210 | Hingham, MA 02043
781-278-4820

26 Offices Nationwide
www.gza.com

GZA

Proactive by Design

GEOTECHNICAL
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ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

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January 30, 2018
GZA File No. 18.0173534

US Environmental Protection Agency
Dewatering GP Processing
Industrial Permit Unit (OEP 06- 4)
5 Post Office Square – Suite 100
Boston, MA 02109-3912

**RE: Route 1 Water Main Improvements**
**Notice of Intent for Discharge of Temporary Construction Dewatering**
**Wrentham, MA**

To Whom It May Concern:

On behalf of the Wrentham Department of Public Works, GZA GeoEnvironmental, Inc. (GZA) is herein submitting a Notice of Intent (NOI) for Discharge of Temporary Construction Dewatering related to the watermain improvements along Route 1 in Wrentham. The scope of work includes installation of approximately 5,700 feet of 12-inch watermain, along with associated hydrants, valves, interconnections and water service replacement along Route 1 (Washington Street) from Madison Street to Thurston Street in Wrentham, MA. The construction impacts will mainly consist of a trenching for installation of the new watermain piping along the west side of the southbound lane, and connections to the existing watermain pipe system as required. It is anticipated that some areas of the work will require dewatering of the trench due to groundwater infiltration.

Per the DGP NOI instruction, a copy of this application has been submitted concurrently to the MassDEP at the following address:

MassDEP Division of Watershed Management
8 New Bond Street
Worcester, MA 01606

Please contact Matthew Grosschedl at 781-278-4824 or matthew.grosschedl@gza.com with any questions regarding this project.

Very truly yours,

**GZA GEOENVIRONMENTAL, INC.**

Matthew Grosschedl, P.E.
Assistant Project Manager

Thomas C. Sexton, P.E.
Senior Project Manager

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## 1.0 PROJECT NARRATIVE

### A. INTRODUCTION

In accordance with the provisions of the Dewatering General Permit MAG070000 (DGP) that was issued to the Commonwealth of Massachusetts by the US EPA, the following is summary of site and groundwater quality information in support of a Notice of Intent (NOI) for the discharge of construction dewatering. The scope of work includes installation of approximately 5,700 feet of 12-inch watermain, along with associated hydrants, valves, interconnections and water service replacement along Route 1 (Washington Street) from Madison Street to Thurston Street in Wrentham, MA. The construction impacts will mainly consist of a trenching for installation of the new watermain piping along the west side of the southbound lane, and connections to the existing watermain pipe system as required. It is anticipated that some areas of the work will require dewatering of the trench due to groundwater infiltration.

The following narrative is intended to provide project specific information supplemental to the NOI form. A completed copy of the NOI form is attached in Attachment A.

### B. EXISTING CONDITIONS

The project site is located along the southbound lanes of Route 1 (Washington Street), between Madison Street and Thurston Street, and portions of the intersections of Route 1 with Madison Street and Thurston Street, see **Figure 1** Locus Map. Route 1 is an approximately eighty (80) foot wide state highway layout, with four (4) twelve (12) foot wide travel lanes for traffic and ten (10) foot wide paved shoulders on each side. The average total paved width of the roadway is approximately sixty-eight (68) feet. Runoff from the roadway is collected by a subsurface drainage system with catch basins located at the gutter lines in the shoulders of the paved roadway.

In the northern portion of the project site, Route 1 separates a reservoir utilized for a cranberry bog to the east and a large wetland area to the west. The two areas are hydraulically connected with an approximately 3'x6' concrete box culvert that is under the surface of the roadway. Logs from borings taken in the area of the box culvert indicate groundwater elevations are approximately 3 to 4 feet below existing surface grades. Additional logs from borings taken north and south of the box culvert indicate that groundwater elevations are approximately 6 to 7 feet below existing surface grades.

### C. PROPOSED WORK

The proposed project involves the installation of new 12" water main pipe along the southbound side of Route 1 and portions of Madison Street and Thurston Street. Connections to the existing watermains will be transferred over to the new lines, and additional hydrants will be installed along the length of Route 1. In addition, the existing 6-inch and 8-inch watermains in these areas shall be abandoned in place.

Temporary construction dewatering is anticipated to be required in portions of the trench to facilitate excavation to install the new water main piping. The invert of new water main pipe is proposed to be installed approximately 6 feet below existing grades. In areas near the existing box culvert, it is anticipated that the new water main pipe will need to be installed approximately 2 to 3 feet below observed groundwater levels. Further north and south

of the box culvert, logs from borings indicate that the new water main pipe would be installed approximately 1 foot below observed groundwater levels. In addition, based on logs from borings, it is anticipated that approximately 1000 feet south of the box culvert, dewatering of the trench may not be necessary as groundwater was not observed 10 feet below existing surface grades.

D. CONSTRUCTION DEWATERING

Based on boring logs, it is anticipated that dewatering from the trench will be required along Route 1 from approximately 1000 feet south of the existing box culvert up to and including the work at the intersection with Thurston Street. It is anticipated that approximately 2100 linear feet of watermain installation will encounter groundwater. Installation of the new watermain will require the excavation of an approximately 4 foot wide by 6 foot deep trench, and it is anticipated that no more that 300 linear feet of trench will be excavated at any one time. It is anticipated that construction dewatering during excavation of the trench and placement of the new water main piping will be on the order of 10 to 100 gallons per minute (gpm), and will vary based on the proximity of trench to the existing box culvert and amount of excavated trench open prior to backfilling. As construction will occur mainly in areas that are paved, only minimal disturbance to vegetated areas is anticipated.

A treatment system for dewatering of construction activities will be maintained on site throughout the duration of the project. It is anticipated that the system will be composed of one or two submersible pumps to be located within the trench excavation, which will discharge to filter bags that will be placed in the shoulder of the roadway near the intersection of Washington Street and Thurston Street, see **Figure 2** Work Plan and Details. Prior to the placement of the filter bag, the area will be prepared by placing a layer of geotextile filter fabric on the existing grade. A 6-inch thick layer of crushed stone will be placed on the filter fabric, prior to the placement of the filter bag on the crushed stone. The dewatering area will then be surrounded by a compost filter sock, and monitored throughout construction for signs of erosion near the discharge location. Pumps and filter bags will be sized accordingly to maintain the trench in a dry-like working condition.

The component of the system with the most limited flow will be the bag filters. Personnel will be present during dewatering to monitor bag filter system pressure, and will change filters as necessary. Filter bags will be considered full when it can no longer efficiently filter sediment or pass water at a reasonable rate. No chemical water treatment is proposed or anticipated.

As the source of the discharge is groundwater, effluent test/sampling will be completed per Section 4.4.5 of the DGP. Discharges are expected to occur during daylight working hours, over a period of two to 4 weeks. No long-term or ongoing discharges will occur. The dewatering pumps will be removed from the trench on a daily basis, when construction activities are not occurring.

Pre-discharge sampling was performed at the western end of the box culvert, and a representative sample of the surface water was taken for analysis. Laboratory analytical results of the sample are presented in Attachment B.

E. RESOURCE AND RELEASE INFORMATION

A copy of the current MassDEP Bureau of Waste Site Cleaning Phase 1 Site Assessment Map produced on-line for Washington Street indicates that there are no remediation activities in the area of the project, see **Figure 3**.

In accordance with Appendix I of the DGP, the project location was examined against the published list of Areas of Critical Environmental Concern (ACEC) in Massachusetts and it was determined that the project is not located within a currently listed ACEC.

In accordance with Appendix II of the DGP, the project location was examined against the published list of Essential Fish Habitat (EFH) designations in Massachusetts and it was determined that the project is not located within a currently listed EFH.

In accordance with Appendix III of the DGP, a listing of Historic places along Washington Street was obtained from the Massachusetts Cultural Resources Information System (MACRIS) online database. A copy of the MACRIS report is provided in Attachment C. The data base indicated that there are no historic places located along Washington Street. Also, an online search of the National Register of Historic Places indicated no designations in the project area. A copy of results is provided in Attachment D. In addition, the Massachusetts Historical Commission State Historic Preservation Officer (SHPO) and Tribal Historic Preservations Officers (THPO) have been contacted, as required. A copy of the notification letters and proof of mailings is provided in Attachment E.

In accordance with Appendix IV of the DGP, the project coordinates were entered into the United States Fish and Wildlife Service (USFWS) Information Planning and Conservation (IPaC) website. Based on the site location, none of the Endangered Species of Concern for Massachusetts listed in Appendix IV of the DGP were identified in the project area. One Threatened Species, the Northern Long-Eared Bat, was identified that may occur in the vicinity of the project area. No critical habitats were identified on Page 4 of the IPaC report. Based on this information, considering the limited nature of the discharge and the results of the IPaC review, the project meets USFWS Criterion A – No endangered or threatened species or critical habitats are in proximity to the discharges or related activities. A copy of the results is provided in Attachment F.

**FIGURES**






SOURCE NOTES:
USGS QUADRANGLE MAP SHOWN BASED ON PUBLISHED ELECTRONIC DATA FILES OBTAINED FROM THE OFFICE OF GEOGRAPHIC INFORMATION (MassGIS), COMMONWEALTH OF MASSACHUSETTS INFORMATION TECHNOLOGY DIVISION INFORMATION DATABASE.

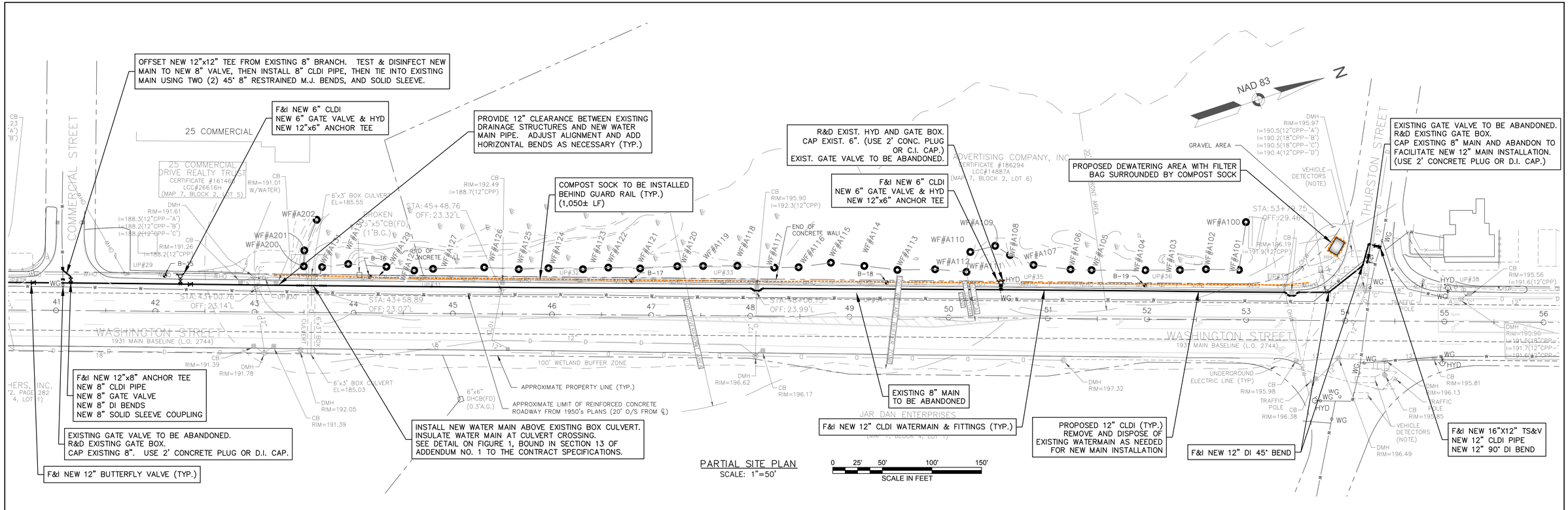
ROUTE 1 WATER MAIN IMPROVEMENTS
WRENTHAM, MASSACHUSETTS

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
TOWN OF WRENTHAM
DEPARTMENT OF PUBLIC WORKS

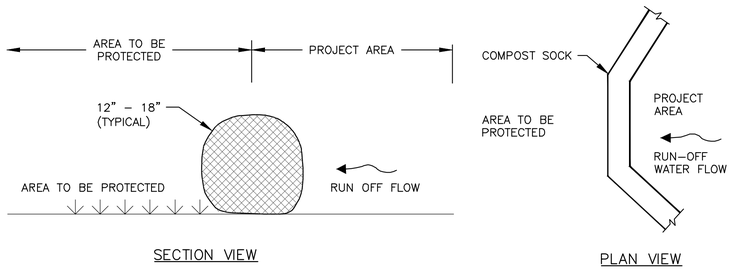
**LOCUS MAP**
**USGS QUANDRANGLE MAP**

| | | | |
|---|---|---|---|
| PROJ MGR: TCS | REVIEWED BY: | CHECKED BY: | FIGURE 1 |
| DESIGNED BY: | DRAWN BY: MAG | SCALE: N.T.S. | |
| DATE: JAN. 2017 | PROJECT NO. 18.0173534 | REVISION NO. | SHEET NO. |



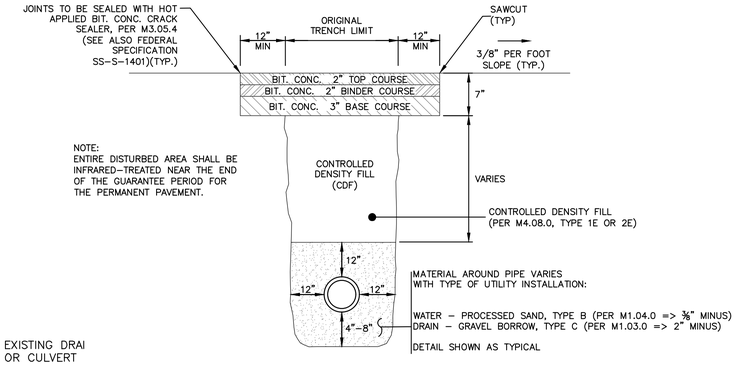

## PARTIAL SITE PLAN
SCALE: 1"=50'

0 25' 50' 100' 150'
SCALE IN FEET



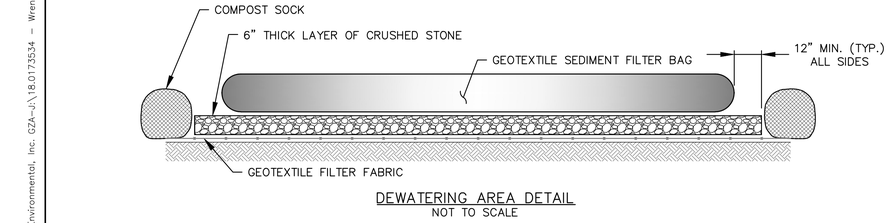

NOTES:
1. COMPOST SOCK FILL TO MEET APPLICATION REQUIREMENTS.
2. COMPOST SOCK DEPICTED IS FOR MINIMUM SLOPES. GREATER SLOPES MAY REQUIRE LARGE SOCKS PER THE ENGINEER.
3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY THE ENGINEER.
4. ADDITIONAL MEASURES WILL BE REQUIRED FOR CONSTRUCTION DEWATERING.

## TYPICAL EROSION CONTROL COMPOST SOCK
NOT TO SCALE

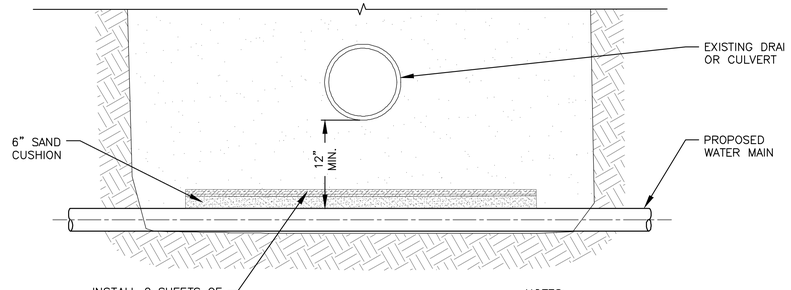



NOTE:
ENTIRE DISTURBED AREA SHALL BE INFRARED–TREATED NEAR THE END OF THE GUARANTEE PERIOD FOR THE PERMANENT PAVEMENT.

## TYPICAL TRENCH DETAIL
NOT TO SCALE




## DEWATERING AREA DETAIL
NOT TO SCALE




## TYPICAL DETAIL

## WATER MAIN DRAIN/CULVERT CROSSING
NOT TO SCALE

NOTES:
1. INSULATION AND SAND CUSHION TO EXTEND 8' ON EITHER SIDE OF CROSSING (TYP. BOTH VIEWS)
2. IN THE EVENT OF THE NEED TO EXCAVATE DEEPER THAN INSTALLATION GRADE, TO CROSS A DRAIN/CULVERT, NO FITTINGS ARE TO BE USED WITHOUT CONTRACTORS THRUST RESTRAINT PROPOSAL AND ENGINEER'S WRITTEN APPROVAL.
3. DEPTH ADJUSTMENT WILL BE MADE BY GRADUAL EXCAVATION ADJUSTMENT.
4. ADDITIONAL SAND CUSHION REQUIRED PER TRENCH DETAIL.



ROUTE 1 WATER MAIN IMPROVEMENTS
WRENTHAM, MASSACHUSETTS

**WORK PLAN AND DETAILS**

| PREPARED BY: | | PREPARED FOR: | |
|---|---|---|---|
| GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com | | TOWN OF WRENTHAM DEPARTMENT OF PUBLIC WORKS | |
| PROJ MGR: TCS | REVIEWED BY: | CHECKED BY: | FIGURE 2 |
| DESIGNED BY: | DRAWN BY: MAG | SCALE: AS SHOWN | |
| DATE: JANUARY 30, 2018 | PROJECT NO. 18.0173534 | REVISION NO. | SHEET NO. |

# FIGURE 3

# MassDEP - Bureau of Waste Site Cleanup

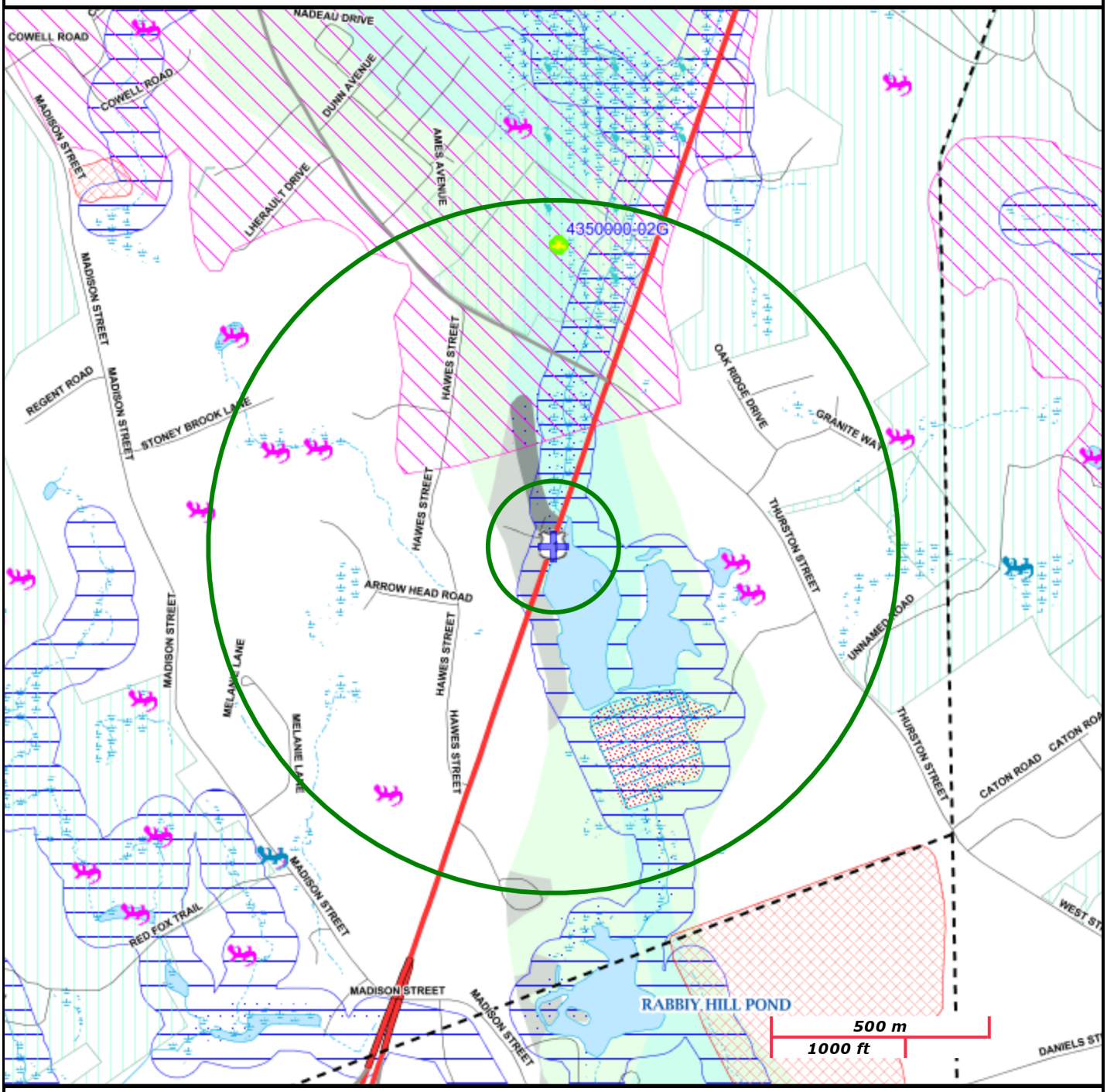
## Phase 1 Site Assessment Map: 500 feet & 0.5 Mile Radii

**Site Information:**
WASHINGTON STREET
WRENTHAM, MA

NAD83 UTM Meters:
4658006mN , 309642mE (Zone: 19)
January 15, 2018

The information shown is the best available at the date of printing. However, it may be incomplete. The responsible party and LSP are ultimately responsible for ascertaining the true conditions surrounding the site. Metadata for data layers shown on this map can be found at: http://www.mass.gov/mgis/.

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection




Roads: Limited Access, Divided, Other Hwy, Major Road, Minor Road, Track, Trail
Boundaries: Town, County, DEP Region; Train; Powerline; Pipeline; Aqueduct
Basins: Major, PWS; Streams: Perennial, Intermittent, Man Made Shore, Dam
Aquifers: Medium Yield, High Yield, EPA Sole Source
Non Potential Drinking Water Source Area: Medium, High (Yield)
PWS Protection Areas: Zone II, IWPA, Zone A
Hydrography: Open Water, PWS Reservoir, Tidal Flat
Wetlands: Freshwater, Saltwater, Cranberry Bog
FEMA 100yr Floodplain; Protected Open Space; ACEC
Est. Rare Wetland Wildlife Hab; Vernal Pool: Cert., Potential
Solid Waste Landfill; PWS: Com.GW,SW, Emerg., Non-Com.

ROUTE 1 WATER MAIN IMPROVEMENTS
WRENTHAM, MASSACHUSETTS

**BOX CULVERT CROSSING DETAIL**

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
TOWN OF WRENTHAM
DEPARTMENT OF PUBLIC WORKS

| | | | |
|---|---|---|---|
| PROJ MGR: TCS | REVIEWED BY: | CHECKED BY: | FIGURE 4 |
| DESIGNED BY: | DRAWN BY: MAG | SCALE: N.T.S. | |
| DATE: JAN. 2018 | PROJECT NO. 18.0173534 | REVISION NO. | SHEET NO. |

**ATTACHMENT A**

**NOI FOR THE GDP**

## II. Suggested Notice of Intent (NOI) Format

**1. General facility information. Please provide the following information about the facility.**

| | | |
|---|---|---|
| **a) Name of facility:**<br>Route 1 (Washington Street) | **Mailing Address for the Facility:**<br>Commonwealth of Massachusetts - MassDOT<br>10 Park Plaza Room 6160<br>Boston, MA 02116 | |
| **b) Location Address of the Facility (if different from mailing address):**<br>Route 1 (Washington Street) between Thurston Street and Madison Street | **Facility Location**<br>**longitude:** 42-03-10<br>**latitude:** 71-17-58 | **Type of Business:**<br>Public Roadway<br>**Facility SIC codes:** |

**c) Name of facility owner:** Commonwealth of Massachusetts - MassDOT **Owner's email:** _____

**Owner's Tel #:** (877) 623-6846 **Owner's Fax #:** (857) 368-0601

**Address of owner (if different from facility address)**

**Owner is (check one): 1. Federal** ____ **2. State** ✔ **3. Private** _____ **4. Other** _____ **(Describe)**_____

**Legal name of Operator, if not owner:** Town of Wrentham

**Operator Contact Name:** Michael T. Lavin, Jr. Director of Public Works

**Operator Tel Number:** (508) 384-5477 **Fax Number:** (508) 384-5481

**Operator's email:** MLavin@wrentham.ma.us

**Operator Address (if different from owner)**

Wrentham Department of Public Works 360 Taunton Street P.O. Box 658 Wrentham, MA 02093

**d) Attach a topographic map indicating the location of the facility and the outfall(s) to the receiving water. Map attached?** ✔

**e) Check Yes or No for the following:**

1. **Has a prior NPDES permit been granted for the discharge? Yes** ____ **No** ✔ **If Yes, Permit Number:** _____
2. **Is the discharge a "new discharger" as defined by 40 CFR Section 122.2? Yes** ✔ **No** _____
3. **Is the facility covered by an individual NPDES permit? Yes** _____ **No** ✔ **If Yes, Permit Number** ____
4. **Is there a pending application on file with EPA for this discharge? Yes** _____ **No** ✔ **If Yes, date of submittal:**

**2. Discharge information. Please provide information about the discharge, (attaching additional sheets as needed)**

**a) Name of receiving water into which discharge will occur:** unnamed stream

**State Water Quality Classification:** Class B **Freshwater:** X **Marine Water:** _____

**b) Describe the discharge activities for which the owner/applicant is seeking coverage:**

- [ ] **1. Construction dewatering of groundwater intrusion and/or storm water accumulation.**
- [ ] **2. Short-term or long-term dewatering of foundation sumps.**
- [ ] **3. Other.**

**c) Number of outfalls** 1

**For each outfall:**

**d) Estimate the maximum daily and average monthly flow of the discharge (in gallons per day – GPD). Max Daily Flow** 48,000 **GPD**
**Average Monthly Flow** 48,000 **GPD**

**e.) What is the maximum and minimum monthly pH of the discharge (in s.u.)? Max pH** _____ **Min pH** _____

**f.) Identify the source of the discharge (i.e. potable water, surface water, or groundwater). If groundwater, the facility shall submit effluent test results, as required in Section 4.4.5 of the General Permit.** Groundwater from construction trench

**g.) What treatment does the wastewater receive prior to discharge?** sediment filter bags

**h.) Is the discharge continuous? Yes** _____ **No** ✔ **If no, is the discharge periodic (P) (occurs regularly, i.e., monthly or seasonally, but is not continuous all year) or intermittent (I) (occurs sometimes but not regularly) or both (B)** I
**If (P), number of days or months per year of the discharge** _____ **and the specific months of discharge** _____;
**If (I), number of days/year there is a discharge** 2 to 4 weeks
**Is the discharge temporary? Yes** ✔ **No** _____
**If yes, approximate start date of dewatering** April 2018 **approximate end date of dewatering** July 2018

**i.) Latitude and longitude of each discharge within 100 feet (See http://www.epa.gov/tri/report/siting_tool): Outfall 1: long.** 42-03-12 **lat.** 71-17-58**; Outfall 2: long.**_____ **lat.**_____**; Outfall 3: long.**_____ **lat.**_____.

**j.) If the source of the discharge is potable water, please provide the reported or calculated seven day-ten year low flow (7Q10) of the receiving water and attach any calculation sheets used to support stream flow and dilution calculations** _____ **cfs**
**(See Appendix VII for equations and additional information)**

**MASSACHUSETTS FACILITIES: See Section 3.4 and Appendix 1 of the General Permit for more information on Areas of Critical Environmental Concern (ACEC):**

**k.) Does the discharge occur in an ACEC? Yes _____ No __✔__**
**If yes, provide the name of the ACEC: _____**

**3. Contaminant Information**

**a) Are any pH neutralization and/or dechlorination chemicals used in the discharge? If so, include the chemical name and manufacturer; maximum and average daily quantity used as well as the maximum and average daily expected concentrations (mg/l) in the discharge, and the vendor's reported aquatic toxicity (NOAEL and/or $LC_{50}$ in percent for aquatic organism(s)).** No.

**b) Please report any known remediation activities or water-quality issues in the vicinity of the discharge.** None.

**4. Determination of Endangered Species Act Eligibility: Provide documentation of ESA eligibility as required at Part 3.4 and Appendix IV. In addition, respond to the following questions.**

**a) Which of the three eligibility criteria listed in Appendix IV, Criterion (A, B, or C) have you met?** A_____
**b) Please attach documentation with your NOI supporting your response. Please see Appendix IV for acceptable documentation**

**5. Documentation of National Historic Preservation Act requirements: Please respond to the following questions:**

**a) See Screening Process in Appendix III and respond to questions regarding your site and any historic properties listed or eligible for listing on the National Register of Historic Places. Question 1: Yes _____ No __✔__ ; Question 2: No __✔__ Yes _____**

**b) Have any State or Tribal historic preservation officers been consulted in this determination? Yes _____ or No __✔__ If yes, attach the results of the consultation(s).**

**c) Which of the three National Historic Preservation Act eligibility criterion listed in Appendix III, Criterion (A, B, or C) have you met?** A_____

**d) Is the project located on property of religious or cultural significance to an Indian Tribe? Yes _____ or No __✔__ If yes, provide that name of the Indian Tribe associated with the property. _____**

**6. Supplemental Information: Please provide any supplemental information. Attach any analytical data used to support the application. Attach any certification(s) required by the general permit**

**7. Signature Requirements: The Notice of Intent must be signed by the operator in accordance with the signatory requirements of 40 CFR Section 122.22 (see below) including the following certification:**

I certify under penalty of law that (1) no biocides or other chemical additives except for those used for pH adjustment and/or dechlorination are used in the dewatering system; (2) the discharge consists solely of dewatering and authorized pH adjustment and/or dechlorination chemicals; (3) the discharge does not come in contact with any raw materials, intermediate product, water product or finished product; (4) if the discharge of dewatering subsequently mixes with other permitted wastewater (i.e. stormwater) prior to discharging to the receiving water, any monitoring provided under this permit will be only for dewatering discharge; (5) where applicable, the facility has complied with the requirements of this permit specific to the Endangered Species Act and National Historic Preservation Act; and (6) this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted.

Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I certify that I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

**Facility Name:** Route 1 (Washington Street) in Wrentham, MA - Wrentham Department of Public Works

**Operator signature:**

**Print Full Name and Title:** Michael T. Lavin, Jr. Director of Public Works

**Date:** 1/30/2018

Federal regulations require this application to be signed as follows:

1. For a corporation, by a principal executive officer of at least the level of vice president;
2. For partnership or sole proprietorship, by a general partner or the proprietor, respectively, or,
3. For a municipality, State, Federal or other public facility, by either a principal executive officer or ranking elected official.

# ATTACHMENT B

# LABORATORY ANALYTICAL RESULTS

*CERTIFICATE OF ANALYSIS*

Thomas Sexton
GZA GeoEnvironmental, Inc.
190 Old Derby Street, Suite 210
Hingham, MA 02043

**RE: Wrentham DPW On Call Services (18.0173534.00)**
**ESS Laboratory Work Order Number: 1801367**

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

**REVIEWED**
**By ESS Laboratory at 5:03 pm, Jan 30, 2018**

**Analytical Summary**
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

*CERTIFICATE OF ANALYSIS*

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Wrentham DPW On Call Services

ESS Laboratory Work Order: 1801367

## SAMPLE RECEIPT

The following samples were received on January 22, 2018 for the analyses specified on the enclosed Chain of Custody Record.

The samples and analyses listed below were analyzed in accordance with the 2017 Remediation General Permit under the National Pollutant Discharge Elimination System (NPDES).

ESS Laboratory is unable to achieve the required detection limit of 0.4 mg/L for Ethanol for the RGP permit. We have also been unable to procure a subcontract laboatory that is able to achieve this limit. The data for Ethanol has been reported using our current method reporting limit.

| Lab Number | Sample Name | Matrix | Analysis |
|---|---|---|---|
| 1801367-01 | Culvert | Aqueous | 1664A, 200.7, 200.8, 245.1, 2540D, 300.0, 3113B, 3500Cr B-2009, 4500Cl D |

*CERTIFICATE OF ANALYSIS*

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Wrentham DPW On Call Services ESS Laboratory Work Order: 1801367

## PROJECT NARRATIVE

**Classical Chemistry**
1801367-01 **The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.**

**Dissolved Metals**
CA82528-BS1 **Blank Spike recovery is below lower control limit (B-).**
Cadmium (74% @ 80-120%)
CA82528-BSD1 **Blank Spike recovery is below lower control limit (B-).**
Cadmium (73% @ 80-120%)

**Total Metals**
CA82528-BS1 **Blank Spike recovery is below lower control limit (B-).**
Cadmium (74% @ 80-120%)
CA82528-BSD1 **Blank Spike recovery is below lower control limit (B-).**
Cadmium (73% @ 80-120%)

**No other observations noted.**

**End of Project Narrative.**

## DATA USABILITY LINKS

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Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists

*CERTIFICATE OF ANALYSIS*

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Wrentham DPW On Call Services

ESS Laboratory Work Order: 1801367

## CURRENT SW-846 METHODOLOGY VERSIONS

### Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015C - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH / VPH

### Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035 - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.

*CERTIFICATE OF ANALYSIS*

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Wrentham DPW On Call Services
Client Sample ID: Culvert
Date Sampled: 01/22/18 09:00
Percent Solids: N/A

ESS Laboratory Work Order: 1801367
ESS Laboratory Sample ID: 1801367-01
Sample Matrix: Aqueous
Units: ug/L

Extraction Method: 3005A/200.7

## Dissolved Metals

| Analyte | Results (MRL) | MDL | Method | Limit | DF | Analyst | Analyzed | I/V | F/V | Batch |
|---|---|---|---|---|---|---|---|---|---|---|
| Antimony | ND (10.0) | | 200.7 | | 1 | KJK | 01/23/18 18:08 | 50 | 10 | CA82233 |
| Arsenic | ND (1.0) | | 3113B | | 1 | KJK | 01/27/18 22:44 | 50 | 10 | CA82233 |
| Cadmium | ND (0.200) | | 200.8 | | 10 | NAR | 01/30/18 12:59 | 100 | 10 | CA82528 |
| Chromium | ND (4.0) | | 200.7 | | 1 | KJK | 01/23/18 18:08 | 50 | 10 | CA82233 |
| Copper | ND (4.0) | | 200.7 | | 1 | KJK | 01/23/18 18:08 | 50 | 10 | CA82233 |
| **Iron** | **96.5** (20.0) | | 200.7 | | 1 | KJK | 01/23/18 19:23 | 50 | 10 | CA82233 |
| Lead | ND (1.6) | | 200.8 | | 20 | NAR | 01/25/18 20:27 | 50 | 10 | CA82233 |
| Mercury | ND (0.20) | | 245.1 | | 1 | MJV | 01/23/18 14:43 | 20 | 40 | CA82242 |
| Nickel | ND (10.0) | | 200.7 | | 1 | KJK | 01/23/18 18:08 | 50 | 10 | CA82233 |
| Selenium | ND (4.0) | | 200.8 | | 20 | NAR | 01/25/18 20:27 | 50 | 10 | CA82233 |
| Silver | ND (2.0) | | 200.7 | | 1 | KJK | 01/23/18 18:08 | 50 | 10 | CA82233 |
| **Zinc** | **28.9** (10.0) | | 200.7 | | 1 | KJK | 01/23/18 18:08 | 50 | 10 | CA82233 |

*CERTIFICATE OF ANALYSIS*

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Wrentham DPW On Call Services
Client Sample ID: Culvert
Date Sampled: 01/22/18 09:00
Percent Solids: N/A

ESS Laboratory Work Order: 1801367
ESS Laboratory Sample ID: 1801367-01
Sample Matrix: Aqueous
Units: ug/L

Extraction Method: 3005A/200.7

## Total Metals

| Analyte | Results (MRL) | MDL | Method | Limit | DF | Analyst | Analyzed | I/V | F/V | Batch |
|---|---|---|---|---|---|---|---|---|---|---|
| Antimony | ND (10.0) | | 200.7 | | 1 | KJK | 01/23/18 17:38 | 50 | 10 | CA82233 |
| Arsenic | ND (1.0) | | 3113B | | 1 | KJK | 01/27/18 21:53 | 50 | 10 | CA82233 |
| Cadmium | ND (0.200) | | 200.8 | | 10 | NAR | 01/30/18 13:06 | 100 | 10 | CA82528 |
| Chromium | ND (4.0) | | 200.7 | | 1 | KJK | 01/23/18 17:38 | 50 | 10 | CA82233 |
| Copper | ND (4.0) | | 200.7 | | 1 | KJK | 01/23/18 17:38 | 50 | 10 | CA82233 |
| **Hardness** | **45300** (165) | | 200.7 | | 1 | KJK | 01/23/18 17:38 | 1 | 1 | [CALC] |
| **Iron** | **291** (40.0) | | 200.7 | | 2 | KJK | 01/23/18 19:06 | 50 | 10 | CA82233 |
| Lead | ND (1.60) | | 200.8 | | 20 | NAR | 01/25/18 19:31 | 50 | 10 | CA82233 |
| Mercury | ND (0.200) | | 245.1 | | 1 | MJV | 01/23/18 14:45 | 20 | 40 | CA82242 |
| Nickel | ND (10.0) | | 200.7 | | 1 | KJK | 01/23/18 17:38 | 50 | 10 | CA82233 |
| Selenium | ND (4.00) | | 200.8 | | 20 | NAR | 01/25/18 19:31 | 50 | 10 | CA82233 |
| Silver | ND (1.0) | | 200.7 | | 1 | KJK | 01/23/18 17:38 | 50 | 10 | CA82233 |
| **Zinc** | **23.6** (10.0) | | 200.7 | | 1 | KJK | 01/23/18 17:38 | 50 | 10 | CA82233 |

*CERTIFICATE OF ANALYSIS*

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Wrentham DPW On Call Services
Client Sample ID: Culvert
Date Sampled: 01/22/18 09:00
Percent Solids: N/A

ESS Laboratory Work Order: 1801367
ESS Laboratory Sample ID: 1801367-01
Sample Matrix: Aqueous

## Classical Chemistry

| Analyte | Results (MRL) | MDL | Method | Limit | DF | Analyst | Analyzed | Units | Batch |
|---|---|---|---|---|---|---|---|---|---|
| **Chloride** | **120** (50.0) | | 300.0 | | 100 | JLK | 01/24/18 18:22 | mg/L | CA82435 |
| Hexavalent Chromium | ND (10.0) | | 3500Cr B-2009 | | 1 | JLK | 01/22/18 21:05 | ug/L | CA82228 |
| Oil & Grease | ND (4.7) | | 1664A | | 1 | LAB | 01/23/18 13:27 | mg/L | CA82220 |
| Total Residual Chlorine | ND (20.0) | | 4500Cl D | | 1 | JLK | 01/22/18 18:20 | ug/L | CA82227 |
| Total Suspended Solids | ND (5) | | 2540D | | 1 | EEM | 01/23/18 16:40 | mg/L | CA82309 |

*CERTIFICATE OF ANALYSIS*

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Wrentham DPW On Call Services

ESS Laboratory Work Order: 1801367

# Quality Control Data

| Analyte | Result | MRL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Qualifier |
|---|---|---|---|---|---|---|---|---|---|---|
| **Dissolved Metals** | | | | | | | | | | |
| **Batch CA82233 - 3005A/200.7** | | | | | | | | | | |
| **Blank** | | | | | | | | | | |
| Lead | ND | 1.6 | ug/L | | | | | | | |
| Selenium | ND | 4.0 | ug/L | | | | | | | |
| **Blank** | | | | | | | | | | |
| Antimony | ND | 10.0 | ug/L | | | | | | | |
| Arsenic | ND | 1.0 | ug/L | | | | | | | |
| Chromium | ND | 4.0 | ug/L | | | | | | | |
| Copper | ND | 4.0 | ug/L | | | | | | | |
| Iron | ND | 40.0 | ug/L | | | | | | | |
| Nickel | ND | 10.0 | ug/L | | | | | | | |
| Selenium | ND | 4.0 | ug/L | | | | | | | |
| Silver | ND | 2.0 | ug/L | | | | | | | |
| Zinc | ND | 20.0 | ug/L | | | | | | | |
| **LCS** | | | | | | | | | | |
| Antimony | 220 | 10.0 | ug/L | 200.0 | | 110 | 85-115 | | | |
| Arsenic | 201 | 50.0 | ug/L | 200.0 | | 100 | 85-115 | | | |
| Chromium | 189 | 4.0 | ug/L | 200.0 | | 95 | 85-115 | | | |
| Copper | 186 | 4.0 | ug/L | 200.0 | | 93 | 85-115 | | | |
| Iron | 865 | 40.0 | ug/L | 1000 | | 86 | 85-115 | | | |
| Lead | 178 | 16.0 | ug/L | 200.0 | | 89 | 80-120 | | | |
| Nickel | 202 | 10.0 | ug/L | 200.0 | | 101 | 85-115 | | | |
| Selenium | 378 | 40.0 | ug/L | 400.0 | | 95 | 80-120 | | | |
| Silver | 90.8 | 2.0 | ug/L | 100.0 | | 91 | 85-115 | | | |
| Zinc | 181 | 10.0 | ug/L | 200.0 | | 91 | 85-115 | | | |
| **LCS Dup** | | | | | | | | | | |
| Arsenic | 203 | 50.0 | ug/L | 200.0 | | 102 | 85-115 | 1 | 20 | |
| Lead | 178 | 16.0 | ug/L | 200.0 | | 89 | 80-120 | 0.4 | 20 | |
| Selenium | 378 | 40.0 | ug/L | 400.0 | | 95 | 80-120 | 0.08 | 20 | |
| **Batch CA82242 - 245.1/7470A** | | | | | | | | | | |
| **Blank** | | | | | | | | | | |
| Mercury | ND | 0.20 | ug/L | | | | | | | |
| **LCS** | | | | | | | | | | |
| Mercury | 5.80 | 0.20 | ug/L | 6.000 | | 97 | 85-115 | | | |
| **LCS Dup** | | | | | | | | | | |
| Mercury | 5.86 | 0.20 | ug/L | 6.000 | | 98 | 85-115 | 0.9 | 20 | |
| **Batch CA82528 - 3005A/200.7** | | | | | | | | | | |
| **Blank** | | | | | | | | | | |
| Cadmium | ND | 0.200 | ug/L | | | | | | | |
| **Blank** | | | | | | | | | | |
| Cadmium | ND | 0.200 | ug/L | | | | | | | |
| **LCS** | | | | | | | | | | |
| Cadmium | 18.4 | 4.00 | ug/L | 25.00 | | 74 | 80-120 | | | B- |

*CERTIFICATE OF ANALYSIS*

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Wrentham DPW On Call Services

ESS Laboratory Work Order: 1801367

# Quality Control Data

| Analyte | Result | MRL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Qualifier |
|---|---|---|---|---|---|---|---|---|---|---|
| **Dissolved Metals** | | | | | | | | | | |
| **Batch CA82528 - 3005A/200.7** | | | | | | | | | | |
| **LCS Dup** | | | | | | | | | | |
| Cadmium | 18.2 | 4.00 | ug/L | 25.00 | | 73 | 80-120 | 1 | 20 | B- |
| **Total Metals** | | | | | | | | | | |
| **Batch CA82233 - 3005A/200.7** | | | | | | | | | | |
| **Blank** | | | | | | | | | | |
| Antimony | ND | 10.0 | ug/L | | | | | | | |
| Arsenic | ND | 1.0 | ug/L | | | | | | | |
| Chromium | ND | 4.0 | ug/L | | | | | | | |
| Copper | ND | 4.0 | ug/L | | | | | | | |
| Hardness | ND | 165 | ug/L | | | | | | | |
| Iron | ND | 40.0 | ug/L | | | | | | | |
| Lead | ND | 1.60 | ug/L | | | | | | | |
| Nickel | ND | 10.0 | ug/L | | | | | | | |
| Selenium | ND | 4.00 | ug/L | | | | | | | |
| Silver | ND | 1.0 | ug/L | | | | | | | |
| Zinc | ND | 10.0 | ug/L | | | | | | | |
| **LCS** | | | | | | | | | | |
| Antimony | 220 | 10.0 | ug/L | 200.0 | | 110 | 85-115 | | | |
| Arsenic | 201 | 50.0 | ug/L | 200.0 | | 100 | 85-115 | | | |
| Chromium | 189 | 4.0 | ug/L | 200.0 | | 95 | 85-115 | | | |
| Copper | 186 | 4.0 | ug/L | 200.0 | | 93 | 85-115 | | | |
| Hardness | 11700 | 165 | ug/L | | | | | | | |
| Iron | 865 | 40.0 | ug/L | 1000 | | 86 | 85-115 | | | |
| Lead | 178 | 16.0 | ug/L | 200.0 | | 89 | 85-115 | | | |
| Nickel | 202 | 10.0 | ug/L | 200.0 | | 101 | 85-115 | | | |
| Selenium | 378 | 40.0 | ug/L | 400.0 | | 95 | 80-120 | | | |
| Silver | 90.8 | 1.0 | ug/L | 100.0 | | 91 | 85-115 | | | |
| Zinc | 181 | 10.0 | ug/L | 200.0 | | 91 | 85-115 | | | |
| **LCS Dup** | | | | | | | | | | |
| Arsenic | 203 | 50.0 | ug/L | 200.0 | | 102 | 85-115 | 1 | 20 | |
| Hardness | 11300 | 165 | ug/L | | | | | | | |
| Lead | 178 | 16.0 | ug/L | 200.0 | | 89 | 85-115 | 0.4 | 20 | |
| Selenium | 378 | 40.0 | ug/L | 400.0 | | 95 | 80-120 | 0.08 | 20 | |
| Zinc | 183 | 10.0 | ug/L | 200.0 | | 92 | 85-115 | 1 | 20 | |
| **Batch CA82242 - 245.1/7470A** | | | | | | | | | | |
| **Blank** | | | | | | | | | | |
| Mercury | ND | 0.200 | ug/L | | | | | | | |
| **LCS** | | | | | | | | | | |
| Mercury | 5.80 | 0.200 | ug/L | 6.000 | | 97 | 85-115 | | | |
| **LCS Dup** | | | | | | | | | | |
| Mercury | 5.86 | 0.200 | ug/L | 6.000 | | 98 | 85-115 | 0.9 | 20 | |
| **Batch CA82528 - 3005A/200.7** | | | | | | | | | | |

*CERTIFICATE OF ANALYSIS*

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Wrentham DPW On Call Services

ESS Laboratory Work Order: 1801367

# Quality Control Data

| Analyte | Result | MRL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Qualifier |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total Metals** | | | | | | | | | | |
| **Batch CA82528 - 3005A/200.7** | | | | | | | | | | |
| **Blank** | | | | | | | | | | |
| Cadmium | ND | 0.200 | ug/L | | | | | | | |
| **LCS** | | | | | | | | | | |
| Cadmium | 18.4 | 4.00 | ug/L | 25.00 | | 74 | 80-120 | | | B- |
| **LCS Dup** | | | | | | | | | | |
| Cadmium | 18.2 | 4.00 | ug/L | 25.00 | | 73 | 80-120 | 1 | 20 | B- |
| **Classical Chemistry** | | | | | | | | | | |
| **Batch CA82220 - General Preparation** | | | | | | | | | | |
| **Blank** | | | | | | | | | | |
| Oil & Grease | ND | 5.0 | mg/L | | | | | | | |
| **LCS** | | | | | | | | | | |
| Oil & Grease | 33.0 | 5.0 | mg/L | 39.38 | | 84 | 79-114 | | | |
| **Batch CA82227 - General Preparation** | | | | | | | | | | |
| **Blank** | | | | | | | | | | |
| Total Residual Chlorine | ND | 20.0 | ug/L | | | | | | | |
| **LCS** | | | | | | | | | | |
| Total Residual Chlorine | 1.80 | | mg/L | 1.800 | | 100 | 85-115 | | | |
| **Batch CA82228 - General Preparation** | | | | | | | | | | |
| **Blank** | | | | | | | | | | |
| Hexavalent Chromium | ND | 10.0 | ug/L | | | | | | | |
| **LCS** | | | | | | | | | | |
| Hexavalent Chromium | 0.490 | | mg/L | 0.4998 | | 98 | 90-110 | | | |
| **LCS Dup** | | | | | | | | | | |
| Hexavalent Chromium | 0.492 | | mg/L | 0.4998 | | 99 | 90-110 | 0.4 | 20 | |
| **Batch CA82309 - General Preparation** | | | | | | | | | | |
| **Blank** | | | | | | | | | | |
| Total Suspended Solids | ND | 5 | mg/L | | | | | | | |
| **LCS** | | | | | | | | | | |
| Total Suspended Solids | 32 | | mg/L | 34.10 | | 94 | 80-120 | | | |
| **Batch CA82435 - General Preparation** | | | | | | | | | | |
| **Blank** | | | | | | | | | | |
| Chloride | ND | 0.5 | mg/L | | | | | | | |
| **LCS** | | | | | | | | | | |
| Chloride | 2.5 | | mg/L | 2.500 | | 99 | 90-110 | | | |

*CERTIFICATE OF ANALYSIS*

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Wrentham DPW On Call Services ESS Laboratory Work Order: 1801367

**Notes and Definitions**

| | |
|---|---|
| U | Analyte included in the analysis, but not detected |
| HT | The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes. |
| D | Diluted. |
| B- | Blank Spike recovery is below lower control limit (B-). |
| ND | Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes |
| dry | Sample results reported on a dry weight basis |
| RPD | Relative Percent Difference |
| MDL | Method Detection Limit |
| MRL | Method Reporting Limit |
| LOD | Limit of Detection |
| LOQ | Limit of Quantitation |
| DL | Detection Limit |
| I/V | Initial Volume |
| F/V | Final Volume |
| § | Subcontracted analysis; see attached report |
| 1 | Range result excludes concentrations of surrogates and/or internal standards eluting in that range. |
| 2 | Range result excludes concentrations of target analytes eluting in that range. |
| 3 | Range result excludes the concentration of the C9-C10 aromatic range. |
| Avg | Results reported as a mathematical average. |
| NR | No Recovery |
| [CALC] | Calculated Analyte |
| SUB | Subcontracted analysis; see attached report |
| RL | Reporting Limit |
| EDL | Estimated Detection Limit |

*CERTIFICATE OF ANALYSIS*

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Wrentham DPW On Call Services

ESS Laboratory Work Order: 1801367

**ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS**

**ENVIRONMENTAL**

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002
http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424
http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006
http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752
http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

# ESS Laboratory Sample and Cooler Receipt Checklist

Client: GZA - Hingham, MA - GZA/MM

Shipped/Delivered Via: Client

ESS Project ID: 1801367
Date Received: 1/22/2018
Project Due Date: 1/25/2018
Days for Project: 3 Day

1. Air bill manifest present? No
   Air No.: NA
2. Were custody seals present? No
3. Is radiation count <100 CPM? Yes
4. Is a Cooler Present? Yes
   Temp: 5.5 Iced with: Ice
5. Was COC signed and dated by client? Yes
6. Does COC match bottles? Yes
7. Is COC complete and correct? Yes
8. Were samples received intact? Yes
9. **Were labs informed about short holds & rushes?** (Yes) / No / NA
10. Were any analyses received outside of hold time? Yes (No)

11. Any Subcontracting needed? Yes / (No)
    ESS Sample IDs:
    Analysis:
    TAT:
12. Were VOAs received? Yes / (No)
    a. Air bubbles in aqueous VOAs? Yes / No
    b. Does methanol cover soil completely? Yes / No / NA
13. Are the samples properly preserved? (Yes) / No
    a. If metals preserved upon receipt: Date: Time: By:
    b. Low Level VOA vials frozen: Date: Time: By:

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes / (No)
    a. Was there a need to contact the client? Yes / No
    Who was contacted? Date: Time: By:

| Sample Number | Container ID | Proper Container | Air Bubbles Present | Sufficient Volume | Container Type | Preservative | Record pH (Cyanide and 608 Pesticides) |
|---|---|---|---|---|---|---|---|
| 01 | 196936 | Yes | NA | Yes | 1L Amber - H2SO4 | H2SO4 | |
| 01 | 196937 | Yes | NA | Yes | 1L Poly - Unpres | NP | |
| 01 | 196938 | Yes | NA | Yes | 500 mL Poly - HNO3 | HNO3 | |
| 01 | 196939 | Yes | NA | Yes | 250 mL Poly - Unpres | NP | |

2nd Review
Are barcode labels on correct containers? (Yes) No

Completed By: Date & Time: 1/22/18 1056
Reviewed By: Date & Time: 1/22/18 1131
Delivered By: 1/22/18 1141

# ESS Laboratory

*Division of Thielsch Engineering, Inc.*
185 Frances Avenue, Cranston, RI 02910-2211
Tel. (401) 461-7181 Fax (401) 461-4486
www.esslaboratory.com

# CHAIN OF CUSTODY

ESS LAB PROJECT ID 1801367

Turn Time _____ Standard Rush 3 day Approved By: _____

Reporting Limits -

State where samples were collected: (MA) NH

Discharge into: Fresh Water [X] Salt Water [ ]

Is this project for:
**Temporary Construction Dewatering**

Electonic Deliverable Yes X No ____
Format: Excel ___ Access ___ PDF X Other ____

Project Manager: Thomas Sexton
Company: GZA GeoEnvironmental, Inc.
Address: 190 Old Derby Street Suite 210
Hingham, MA 02347

Project # 18.0073534
Project Name: WRENTHAM DPW ON CALL SERVICES
PO #

| ESS Lab Sample ID | Date | Collection Time | Grab -G Composite-C | Matrix | Sample Identification | # of Containers | RGP Metals Total | RGP Metals Dissolved | Hardness (Calculation) | Ethanol ASTM D3695 | Chloride 300.0* | Total Cyanide 4500 LL | TPH 1664 | TSS 2540D* | TRC 4500-CL D* | ~~Ammonia 350.1~~ O&G | Tri Cr (Calc. MUST run T. Cr) | Hex Cr 3500 | Phenol 420.1 | RGP VOC Long List 524 | 1,4-Dioxane 8270-SIM | ~~SDB 504.1~~ TSS | RGP SVOC Log List 625-SIM | PCB 608 | Comment # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1-22-18 | 0900 | G | AG | CULVERT | | X | X | X | | X | | | | X | X | | X | | | | + | | | 1,2 |
| | 1-22-18 | 0900 | G | | | | | | | | | | | | | | | | | | | | | | |
| | 1-22-18 | 0900 | G | | | | | | | | | | | | | | | | | | | | | | |
| | 1-22-18 | 0900 | G | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Preservation Code: 1-NP, 2-HCl, 3-H2SO4, 4-HNO3, 5-NaOH, 6-MeOH, 7-Asorbic Acid, 8-ZnAct, 9-_____ | | | | | | | 4 | 4 | 4 | 1 | 1 | 5 | 3 | 1 | 1 | 3 | - | 1 | 3 | 2 | 1 | 2 | 1 | 1 | |
| Container Type: P-Poly G-Glass AG-Amber Glass S-Sterile V-VOA | | | | | | | P | P | P | V | P | P | AG | P | P | P | - | P | AG | V | AG | V | AG | AG | |

Matrix: S-Soil SD-Solid D-Sludge WW-Wastewater GW-Groundwater SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filter

Cooler Present ✓ Yes ____ No
Seals Intact ___ Yes ___ No NA: ___
Cooler Temperature: Icelen 5.5 1/22/18

Sampled by : Matt Grosschedl - GZA

Comments: 1) RGP Metals include Sb, As, Cd, Cu, Fe, Pb, Ni, Se, Ag and Zn by 200.7/3113B and Hg by 245.1
2) Parameters in **BOLD** have Short hold-time **PERMIT ATTACHED**
*** TSS, TRC and Cl taken from the same container**

| Relinquished by: (Signature) | Date/Time | Received by: (Signature) | Relinquished by: (Signature) | Date/Time | Received by: (Signature) |
|---|---|---|---|---|---|
| [signature] | 1-22-18 10:19 | [signature] 10:19 1/22/18 | | | |
| Relinquished by: (Signature) | Date/Time | Received by: (Signature) | Relinquished by: (Signature) | Date/Time | Received by: (Signature) |
| | | | | | |

**Please E-mail all changes to Chain of Custody in writir**

Page ____ of ____

1801367

## 1.1 Discharge Limits and Monitoring Requirements

1. During the period beginning on the effective date and lasting through expiration, the permittee is authorized to discharge uncontaminated water from construction dewatering intrusion and/or storm water accumulation which disturb less than one acre of land, and short and long term dewatering of foundation sumps to the state's Class B and Class SB receiving waters. Discharges to Class A and Class SA waters are authorized upon review and approval by the MassDEP. Each outfall shall be limited and monitored as specified below.

| Effluent Characteristic | Units | Discharge Limitations | | Monitoring Requirements[1] | |
|---|---|---|---|---|---|
| | | Avg. Monthly | Max Daily | Monitoring Frequency[2] | Sample Type |
| Flow[3] | MGD | Report | Report | 1/Week | Actual or Estimated |
| TSS | mg/l | 50 | 100 | 1/Week | Grab |
| Oil and Grease[4] | mg/l | - | 15 | 1/Week | Grab |
| pH[5] (Class A and B) | s.u. | 6.5 – 8.3 range[6,7] | | 1/Week | Grab |
| ~~pH[5] (Class SA and SB)~~ | ~~s.u.~~ | ~~6.5 – 8.5 range[6,8]~~ | | ~~1/Week~~ | ~~Grab~~ |
| Total Residual Chlorine (TRC) (Class A and B)[9] | mg/l | See Part 1.2.7 | | 1/Week | Grab |
| ~~Total Residual Chlorine (TRC) (Class SA and SB)[9]~~ | ~~mg/l~~ | ~~See Part 1.2.7~~ | | ~~1/Week~~ | ~~Grab~~ |
| ~~$LC_{50}$ & NOEC~~ | ~~%~~ | ~~See Part 1.2.8~~ | | | ~~24-hr Composite~~ |

Footnotes:

1. Samples shall be taken only when discharging and should be taken at a location that provides a representative analysis of the effluent just prior to discharge to the receiving water or if the effluent is commingled with another permitted discharge, prior to such commingling.

2.
   a. Short-term discharges:
      i. For discharges of twenty-four (24) hours or less, the permittee must take a minimum of one sample.
      ii. For discharges lasting more than twenty-four (24) hours but less than one week, the permittee must take a minimum of three (3) representative effluent samples. At least one sample must be taken on the first day of discharge and one on the last day of discharge.

1801367

2. The NOI must be signed by the owner and/or operator of the facility in accordance with the signatory requirements of 40 CFR § 122.22.

3. Each applicant must submit a copy of the NOI to EPA and the appropriate State authority listed in Part 5.

4. EPA may request additional information or analytical data from the permittee when it is necessary to adequately review the NOI and evaluate the discharge.

5. If the discharge includes groundwater, the NOI must include the results of laboratory analyses of a representative sample of the effluent for the following parameters:

| | | | |
|---|---|---|---|
| Antimony | Chromium | Chloride | |
| Arsenic | (Total)* | Iron | Silver* |
| Cadmium* | Chromium (VI)* | Mercury | Zinc* |
| pH | Copper* | Nickel* | Lead* |

* Hardness Dependent – sample of receiving water

The effluent sample shall be taken at a location that provides a representative analysis of the proposed discharge. For the effluent sample, to the extent practicable, the sample shall be taken just prior to discharge to the receiving water or, if the effluent is commingled with another permitted discharge, prior to such commingling. The instream sample for hardness shall be taken in the vicinity of the discharge but upstream or in a location unaffected by either the facility discharge or other facility activities that could affect water quality. All metals shall be reported as total recoverable.

All effluent samples, as well as the in-stream sample for hardness, shall be analyzed using the 40 CFR Part 136 approved test methods that will achieve the lowest available minimum levels (MLs) (See Appendix VIII).

### 4.5 When the Director May Require Application for an Individual NPDES Permit

1. The Director may require any person authorized by this permit to apply for and obtain an individual NPDES permit. Any interested person may petition the Director to take such action. Instances where an individual permit may be required include, but are not limited to, the following:

   a. A determination under 40 CFR §122.28(b)(3);
   b. The discharge(s) is a significant contributor of pollution or is in violation of State Water Quality Standards for the receiving water;
   c. The discharger is not in compliance with the conditions of this permit;
   d. A change has occurred in the availability of the demonstrated technology of practices for the control or abatement of pollutants applicable to the point source(s);
   e. Effluent limitation guidelines are promulgated for the point source(s) covered by this permit;

# ATTACHMENT C

# MACRIS DATABASE SEARCH RESULTS

# Massachusetts Cultural Resource Information System
## MACRIS

MHC Home | MACRIS Home

## Results

Get Results in Report Format
(•) PDF ( ) Spreadsheet

Below are the results of your search, using the following search criteria:
**Town(s):** Wrentham
**Street Name:** Washington St
**Resource Type(s):** Area, Building, Burial Ground, Object, Structure

For more information about this page and how to use it, click here

No Results Found.

New Search | New Search – Same Town(s) | Previous

MHC Home | MACRIS Home

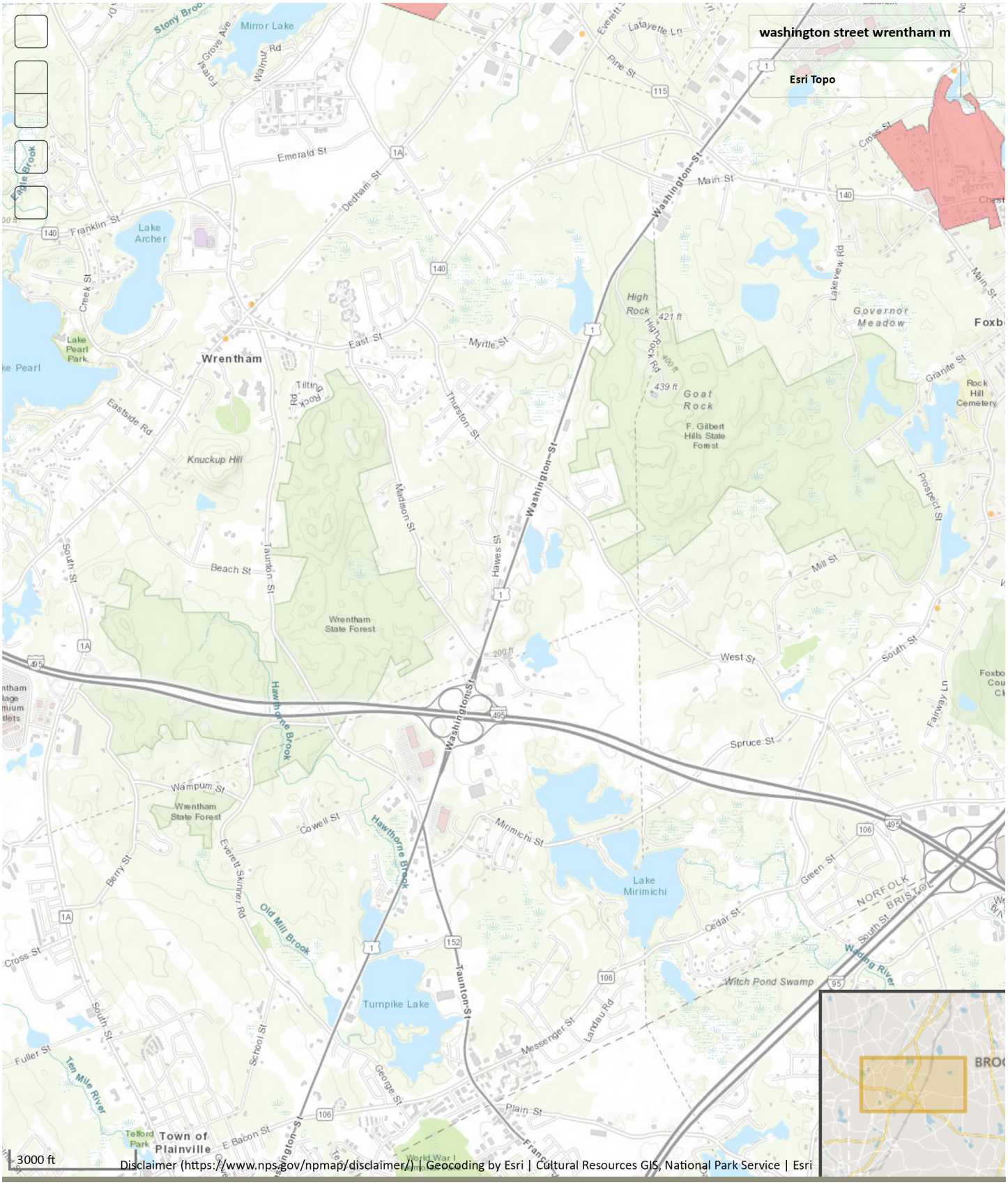
# ATTACHMENT D

# NATIONAL REGISTER OF HISTORIC PLACES SEARCH RESULTS

# National Register of Historic Plac...

National Park Service
U.S. Department of the Interior

Public, non-restricted data depicting National Register spatial data processed by the Cul...



# ATTACHMENT E

# SHPO AND THPO NOTIFICATIONS

GZA

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ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

190 Old Derby Street
Suite 210
Hingham, MA 02043
T: 781.278.4820
F: 781.749.2751
www.gza.com

January 17, 2018
GZA File No. 18.0173534

Brona Simon, SHPO & Executive Director
Massachusetts Historic Commission
220 Morrisey Blvd.
Boston, MA 02125-3314

**RE: Route 1 Water Main Improvements**
**Wrentham, MA**

Dear Ms. Simon:

On behalf of the Wrentham Department of Public Works, GZA GeoEnvironmental, Inc. (GZA) is herein submitting a Project Notification Form (PNF) for the watermain improvements along Route 1 in Wrentham. We are submitting this PNF as required for the EPA Notice of Intent for Dewatering General Permit application process. Included with this PNF form are copies of draft construction plans and a locus map showing the location of the proposed work.

The scope of work includes installation of approximately 5,700 feet of 12-inch watermain, along with associated hydrants, valves, interconnections and water service replacement along Route 1 (Washington Street) from Madison Street to Thurston Street in Wrentham, MA. In addition, the existing 6-inch and 8-inch watermains shall be abandoned in place. The construction impacts will mainly consist of a new trench for installation of the new watermain piping along the west side of the southbound lane, and connections to the existing watermain pipe system as required. It is anticipated that some areas of the work will require dewatering of the trench due to groundwater infiltration.

Please contact Matthew Grosschedl at 781-278-4824 or matthew.grosschedl@gza.com with any questions regarding this project.

Very truly yours,

**GZA GEOENVIRONMENTAL, INC.**

Matthew Grosschedl, P.E.
Assistant Project Manager

Thomas C. Sexton, P.E.
Senior Project Manager

cc: Michael T. Lavin, Jr. – Wrentham DPW (via email)
Douglas R. Valovcin – Wrentham DPW (via email)

**SENDER: COMPLETE THIS SECTION**

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Brona Simon
SHPO & Executive Director
Massachusetts Historic Commission
220 Morrisey Blvd.
Boston, MA 02125-3314

9590 9402 3428 7275 5102 11

2. Article Number *(Transfer from service label)*

7011 3500 0002 1147 1058

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Massachusetts Historic Commission
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City, State, ZIP+4 Boston, MA 02125-3314

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Hingham, MA 02043
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F: 781.749.2751
www.gza.com

January 17, 2018
GZA File No. 18.0173534

Ramona Peters, Tribal Historic Preservation Officer
Mashpee Wampanoag Tribe
483 Great Neck Road South
Mashpee, MA 02649

**RE: Route 1 Water Main Improvements**
**Wrentham, MA**

Dear Ms. Peters:

On behalf of the Wrentham Department of Public Works, GZA GeoEnvironmental, Inc. (GZA) is hereby notifying you of the proposed watermain improvements along Route 1 in Wrentham. Included with this cover letter are copies of draft construction plans and a locus map showing the location of the proposed work. We are submitting this information to you as required for the EPA Notice of Intent for Dewatering General Permit application process.

The scope of work includes installation of approximately 5,700 feet of 12-inch watermain, along with associated hydrants, valves, interconnections and water service replacement along Route 1 (Washington Street) from Madison Street to Thurston Street in Wrentham, MA. In addition, the existing 6-inch and 8-inch watermains shall be abandoned in place. The construction impacts will mainly consist of a new trench for installation of the new watermain piping along the west side of the southbound lane, and connections to the existing watermain pipe system as required. It is anticipated that some areas of the work will require dewatering of the trench due to groundwater infiltration.

Please contact Matthew Grosschedl at 781-278-4824 or matthew.grosschedl@gza.com with any questions regarding this project.

Very truly yours,

**GZA GEOENVIRONMENTAL, INC.**

Matthew Grosschedl, P.E.
Assistant Project Manager

Thomas C. Sexton, P.E.
Senior Project Manager

cc: Michael T. Lavin, Jr. – Wrentham DPW (via email)
Douglas R. Valovcin – Wrentham DPW (via email)

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1. Article Addressed to:

Ramona Peters
Tribal Historic Preservation Officer
Mashpee Wampanoag Tribe
483 Great Neck Road South
Mashpee, MA 02649

9590 9402 3428 7275 5101 98

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City, State, ZIP+4®: Mashpee, MA 02649

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F: 781.749.2751
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January 17, 2018
GZA File No. 18.0173534

Bettina Washington, Tribal Historic Preservation Officer
Wampanoag Tribe of Gay Head
20 Black Brook Road
Aquinnah, MA 02535

**RE: Route 1 Water Main Improvements**
**Wrentham, MA**

Dear Ms. Washington:

On behalf of the Wrentham Department of Public Works, GZA GeoEnvironmental, Inc. (GZA) is hereby notifying you of the proposed watermain improvements along Route 1 in Wrentham. Included with this cover letter are copies of draft construction plans and a locus map showing the location of the proposed work. We are submitting this information to you as required for the EPA Notice of Intent for Dewatering General Permit application process.

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Please contact Matthew Grosschedl at 781-278-4824 or matthew.grosschedl@gza.com with any questions regarding this project.

Very truly yours,

**GZA GEOENVIRONMENTAL, INC.**

Matthew Grosschedl, P.E.
Assistant Project Manager

Thomas C. Sexton, P.E.
Senior Project Manager

cc: Michael T. Lavin, Jr. – Wrentham DPW (via email)
Douglas R. Valovcin – Wrentham DPW (via email)

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1. Article Addressed to:

Bettina Washington
Tribal Historic Preservation Officer
Wampanoag Tribe of Gay Head
20 Black Brook Road
Aquinnah, MA 02535

9590 9402 3428 7275 5102 28

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January 17, 2018
GZA File No. 18.0173534

John Brown, Tribal Historic Preservation Officer
Narragansett Tribe
P.O. Box 268
Charlestown, RI 02813

**RE: Route 1 Water Main Improvements**
**Wrentham, MA**

Dear Ms. Peters:

On behalf of the Wrentham Department of Public Works, GZA GeoEnvironmental, Inc. (GZA) is hereby notifying you of the proposed watermain improvements along Route 1 in Wrentham. Included with this cover letter are copies of draft construction plans and a locus map showing the location of the proposed work. We are submitting this information to you as required for the EPA Notice of Intent for Dewatering General Permit application process.

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Please contact Matthew Grosschedl at 781-278-4824 or matthew.grosschedl@gza.com with any questions regarding this project.

Very truly yours,

**GZA GEOENVIRONMENTAL, INC.**

Matthew Grosschedl, P.E.
Assistant Project Manager

Thomas C. Sexton, P.E.
Senior Project Manager

cc: Michael T. Lavin, Jr. – Wrentham DPW (via email)
Douglas R. Valovcin – Wrentham DPW (via email)

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1. Article Addressed to:

John Brown
Tribal Historic Preservation Officer
Narragansett Tribe
P.O. Box 268
Charlestown, RI 02813

9590 9402 3428 7275 5102 04

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**ATTACHMENT F**

**IPAC REPORT**

**IPaC** Information for Planning and Consultation **U.S. Fish & Wildlife Service**

# IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as trust resources) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.



## Location

Norfolk County, Massachusetts


## Local office

New England Ecological Services Field Office

(603) 223-2541
(603) 223-0104

70 Commercial Street, Suite 300

Concord, NH 03301-5094

http://www.fws.gov/newengland

# Endangered species

**This resource list is for informational purposes only and does not constitute an analysis of project level impacts.**

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service.



1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.

The following species are potentially affected by activities in this location:

## Mammals

| NAME | STATUS |
|---|---|
| Northern Long-eared Bat *Myotis septentrionalis*<br>No critical habitat has been designated for this species.<br>https://ecos.fws.gov/ecp/species/9045 | Threatened |

# Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

# Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see maps of where birders and the general public have sighted birds in and around your project area, visit E-bird tools such as the E-bird data mapping tool (search for the name of a bird on your list to see specific locations where that bird has been reported to occur within your project area over a certain timeframe) and the E-bird Explore Data Tool (perform a query to see a list of all birds sighted in your county or region and within a certain timeframe). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

| NAME | BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.) |
|---|---|
| American Oystercatcher Haematopus palliatus<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.<br>https://ecos.fws.gov/ecp/species/8935 | Breeds Apr 15 to Aug 31 |
| Bald Eagle Haliaeetus leucocephalus<br>This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.<br>https://ecos.fws.gov/ecp/species/1626 | Breeds Oct 15 to Aug 31 |
| Black Skimmer Rynchops niger<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.<br>https://ecos.fws.gov/ecp/species/5234 | Breeds May 20 to Sep 15 |
| Black-billed Cuckoo Coccyzus erythropthalmus<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.<br>https://ecos.fws.gov/ecp/species/9399 | Breeds May 15 to Oct 10 |
| Bobolink Dolichonyx oryzivorus<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds May 20 to Jul 31 |

| | |
|---|---|
| Eastern Whip-poor-will Antrostomus vociferus<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds May 1 to Aug 20 |
| Evening Grosbeak Coccothraustes vespertinus<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds elsewhere |
| Hudsonian Godwit Limosa haemastica<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds elsewhere |
| Kentucky Warbler Oporornis formosus<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds Apr 20 to Aug 20 |
| Least Tern Sterna antillarum<br>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA | Breeds Apr 20 to Sep 10 |
| Lesser Yellowlegs Tringa flavipes<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.<br>https://ecos.fws.gov/ecp/species/9679 | Breeds elsewhere |
| Long-eared Owl asio otus<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.<br>https://ecos.fws.gov/ecp/species/3631 | Breeds elsewhere |
| Nelson's Sparrow Ammodramus nelsoni<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds May 15 to Sep 5 |
| Prairie Warbler Dendroica discolor<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds May 1 to Jul 31 |
| Prothonotary Warbler Protonotaria citrea<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds Apr 1 to Jul 31 |

Purple Sandpiper Calidris maritima — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Red-throated Loon Gavia stellata — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Rusty Blackbird Euphagus carolinus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Seaside Sparrow Ammodramus maritimus — Breeds May 10 to Aug 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Semipalmated Sandpiper Calidris pusilla — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Short-billed Dowitcher Limnodromus griseus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9480

Snowy Owl Bubo scandiacus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Whimbrel Numenius phaeopus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9483

Willet Tringa semipalmata — Breeds Apr 20 to Aug 5
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Wood Thrush Hylocichla mustelina — Breeds May 10 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

# Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds.

**Probability of Presence** (▪)

Each green bar represents the bird's relative probability of presence in your project's counties during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

**Breeding Season** (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

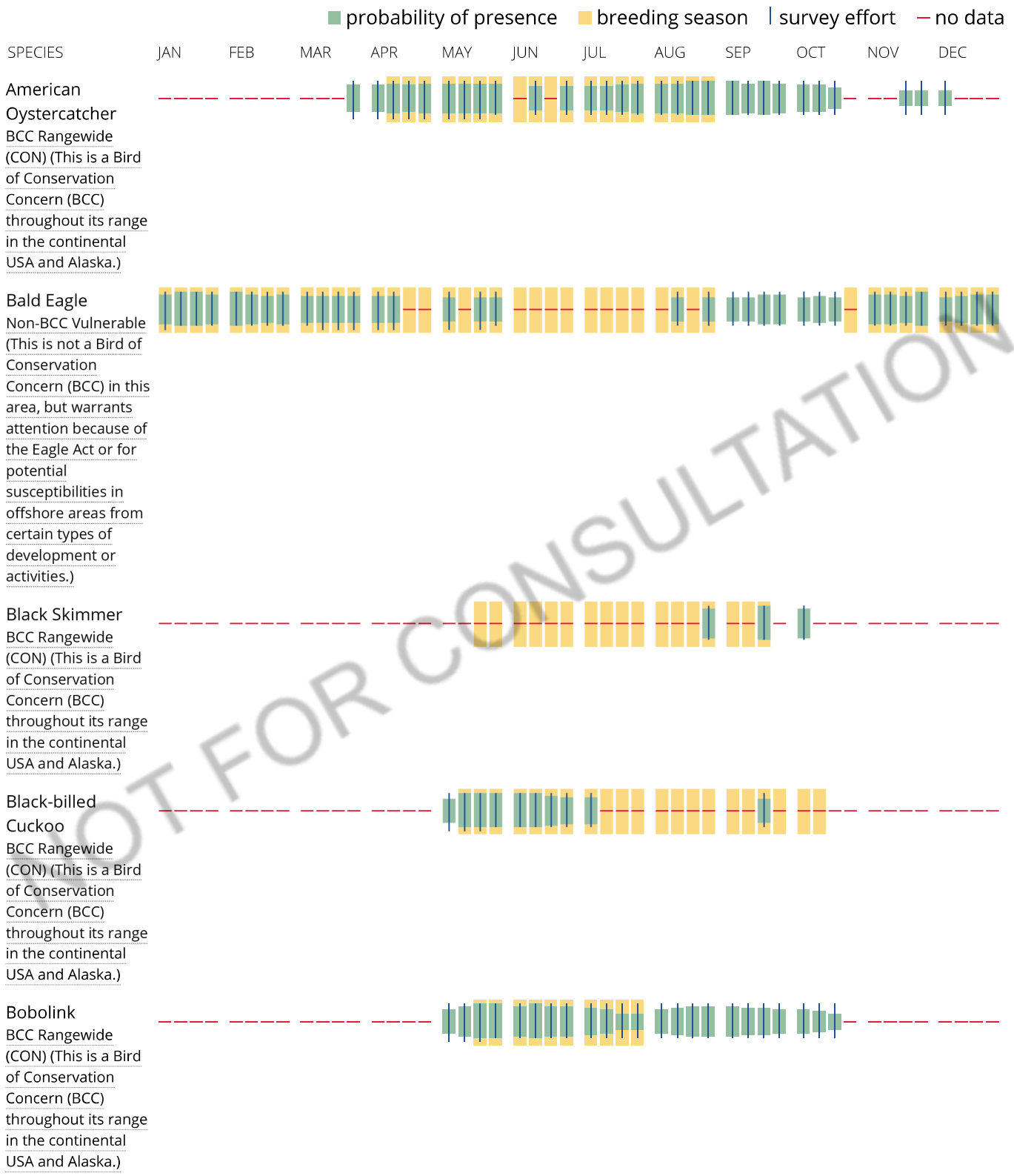
**Survey Effort** (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the counties of your project area. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

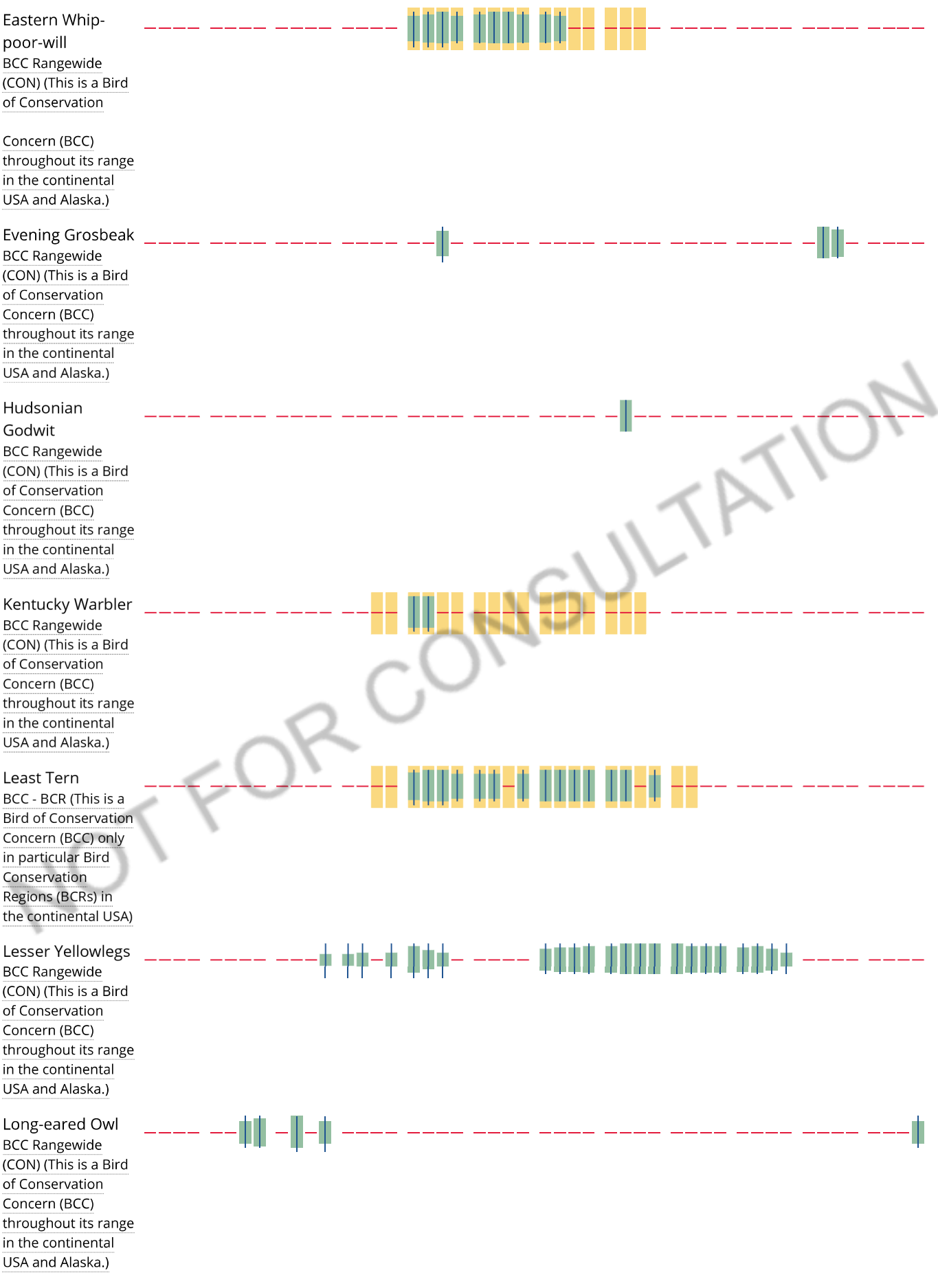
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

**No Data** (–)
A week is marked as having no data if there were no survey events for that week.

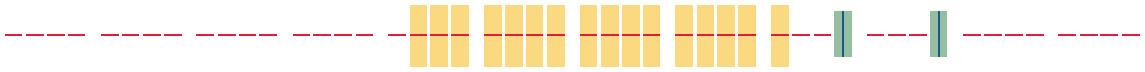
**Survey Timeframe**

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information.

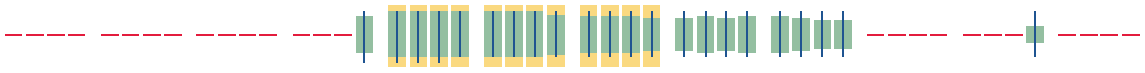




Nelson's Sparrow
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Prairie Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



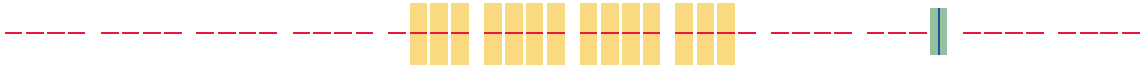
Prothonotary Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

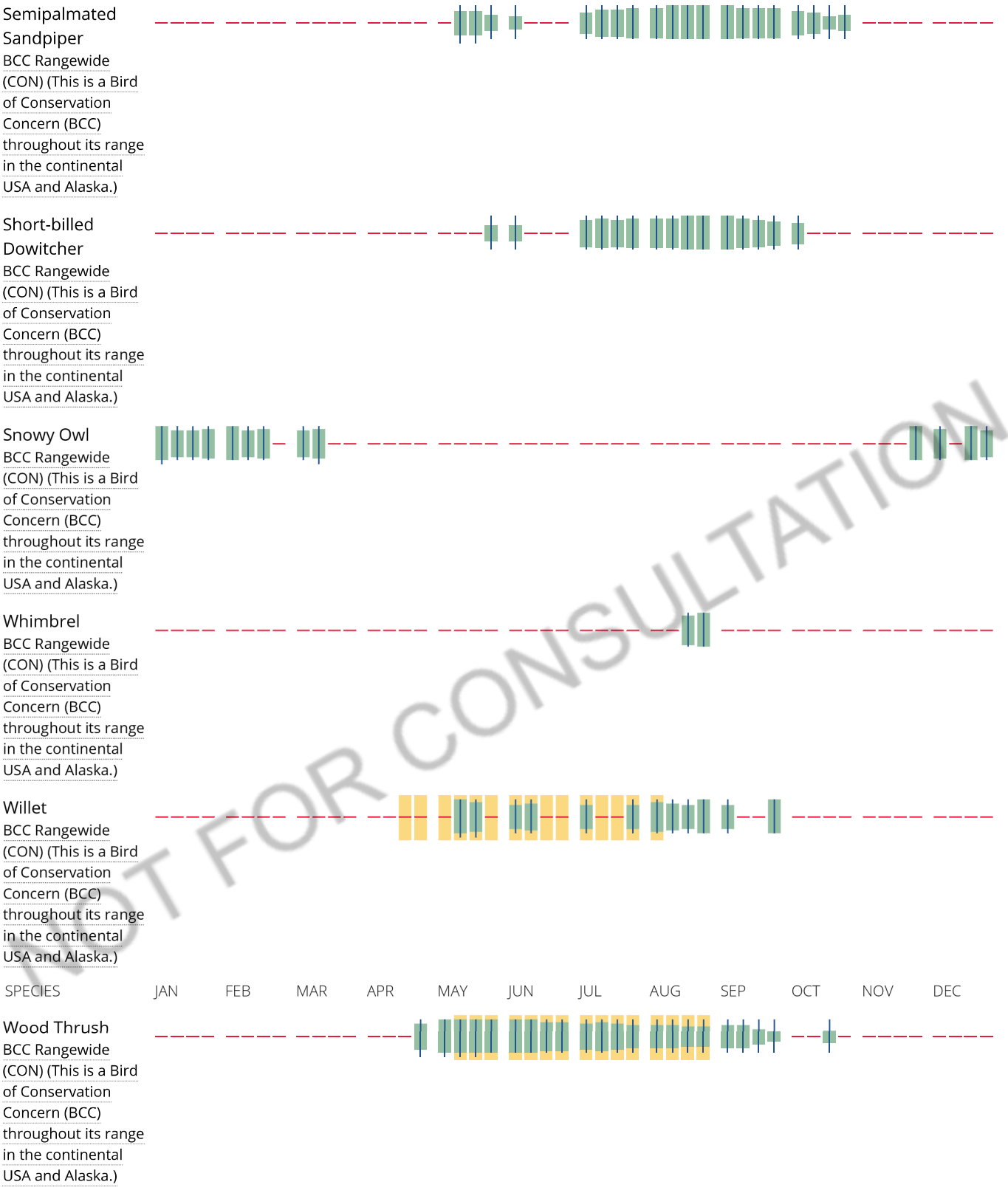
Purple Sandpiper
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Red-throated Loon
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Rusty Blackbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Seaside Sparrow
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)








**Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.**

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when

birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

**What does IPaC use to generate the migratory birds potentially occurring in my specified location?**

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the counties which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

**What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?**

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

**How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?**

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird entry on your migratory bird species list indicates a breeding season, it is probable that the bird breeds in your project's counties at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

**What are the levels of concern for migratory birds?**

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

**Details about birds that are potentially affected by offshore projects**

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

**What if I have eagles on my list?**

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the BGEPA should such impacts occur.



# Facilities

## National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

## Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

# Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

PEM1Fh

FRESHWATER FORESTED/SHRUB WETLAND

PSS1C

FRESHWATER POND

PUBHh

A full description for each wetland code can be found at the National Wetlands Inventory website: https://ecos.fws.gov/ipac/wetlands/decoder

**Data limitations**

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

**Data exclusions**

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

**Data precautions**

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies.

Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

# ATTACHMENT G

# CONSTRUCTION PLANS

# ROUTE 1 WATER MAIN IMPROVEMENTS

## (DPW) CONTRACT 2018–003

## WRENTHAM, MASSACHUSETTS 02093
## FOR
## TOWN OF WRENTHAM


### VICINITY MAP
SCALE: 1"=1000'

### APPLICANT:

TOWN OF WRENTHAM
79 SOUTH STREET
WRENTHAM, MASSACHUSETTS 02093

### SHEET INDEX



ROUTE 1 WATER MAIN IMPROVEMENTS

(DPW) CONTRACT 2018–003

WRENTHAM, MASSACHUSETTS 02093

WRENTHAM DPW
ADDENDUM NO. 1
JANUARY 2017

PREPARED FOR:

Town of Wrentham

79 South Street
Wrentham, Massachusetts 02093

PREPARED BY:


GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com




BASE PLANS AND PROFILES FURNISHED BY:
HANCOCK ASSOCIATES
315 ELM STREET, MARLBOROUGH, MA 01752
VOICE (508) 460–1111, FAX (508) 460–1121
WWW.HANCOCKASSOCIATES.COM

COMMONWEALTH OF MASSACHUSETTS
THOMAS C. SEXTON
CIVIL
No. 34067
REGISTERED PROFESSIONAL ENGINEER

Thomas C Sexton

| NO. | BY | APP | DATE | ISSUE/REVISION DESCRIPTION |
|---|---|---|---|---|
| 2 | MG | TS | 1/30/18 | ADDENDUM NO. 1 |
| 1 | RD | JP | 1/10/18 | DPW COMMENTS |

| | | | |
|---|---|---|---|
| DATE: | 10/5/2017 | DESIGN BY: | JP |
| SCALE: | AS SHOWN | DRAWN BY: | KP |
| APPRVD. BY: | 1"=40' | CHECK BY: | JP |

TITLE SHEET

PLOT DATE: Jan 30, 2018 3:29 pm

| | |
|---|---|
| DWG: 20345U.dwg | C-1 |
| LAYOUT: TITLE | |
| SHEET: 1 OF 9 | |
| PROJECT NO.: | 20345 |

PATH: J:\18.0173534 – Wrentham DPW On Call\Figures-CAD\Dwg\

## LEGEND

| EXISTING | | PROPOSED |
|---|---|---|
| 8"CI | SEWER LINE AND MANHOLE SIZE MATERIAL & FLOW DIRECTION | |
| 12"RCP | DRAINLINE WITH PIPE SIZE, MATERIAL & FLOW DIRECTION, CATCH BASIN MANHOLE & ROUND CATCH BASIN | |
| W | DOMESTIC WELL | |
| WS | WATER SERVICE | |
| W | WATER MAIN AND VALVE | |
| G | NATURAL GAS LINE AND VALVE | |
| | PROPERTY LINE | |
| | EASEMENT LINE | |
| | TOWN LINE | |
| | MATCH LINE | |
| -Z- | LIGATURE TO INDICATE CONTINUOUS OWNERSHIP ACROSS LINES | |
| 55.36' N120°46'23"E | BEARING & DISTANCE ALONG BOUNDARY | |
| << 249.56' >> | TOTALED BOUNDARY FRONTAGE | |
| #2 | ELEVATION BENCH MARK | |
| | STONE WALL | |
| | STONE RETAINING WALL | |
| | RETAINING WALL | |
| | EDGE OF PAVEMENT | |
| VGC | CURB (see abbreviations) | VGC |
| | BUILDING | |
| × 92.6 | SPOT ELEVATION | × 93.3 F.G. |
| — —92— — — | ELEVATION CONTOUR | 92 |
| WFA9 | LIMIT OF BORDERING VEGETATED WETLAND (WITH FLAG NUMBER) | |
| | EDGE OF WOODS OR BRUSH (DRIP LINE) | |
| 96.8 12"M | PROMINENT DECIDUOUS TREE WITH ELEVATION, SIZE AND SPECIES | 96.8 12"M |
| 96.8 18"P | PROMINENT CONIFEROUS TREE WITH ELEVATION, SIZE AND SPECIES | 96.8 18"P |
| | PRESENCE OF SHALLOW LEDGE | |
| | SILT FENCE | |
| | HAYBALES | |
| | COMPOST SOCK | |
| | SURFACE RUNOFF DIRECTION | |
| | WATERCOURSE FLOW | |
| | PIPE FLOW | |
| B-1 95.2 | BORING WITH ELEVATION | |
| | UTILITY POLE | |

## ABBREVIATIONS

| | |
|---|---|
| F&I | FURNISH AND INSTALL |
| R&D | REMOVE AND DISPOSE |
| CLDI | CEMENT-LINED DUCTILE IRON |
| CI | CAST IRON |
| DI | DUCTILE IRON |
| HYD | HYDRANT |
| MJ | MECHANICAL JOINT |

## EXISTING CONDITIONS PLAN NOTE

EXISTING TOPOGRAPHIC, UTILITY AND PROFILE INFORMATION BASED ON PLAN ENTITLED "WATER EXTENSION PLAN, WASHINGTON ST./MADISON ST., WRENTHAM, MASSACHUSETTS 02095" PREPARED BY HANCOCK ASSOCIATES, LAST REVISED JANUARY 10, 2018 (9 SHEETS), WHICH WAS PROVIDED TO GZA IN DIGITAL FORMAT IN THE AUTOCAD FILE ENTITLED "20345U.dwg", FILE DATED JANUARY 10, 2018.

## GENERAL NOTES

1. LOCATIONS OF EXISTING UNDERGROUND UTILITIES/OBSTRUCTIONS/SYSTEMS SHOWN HEREON ARE APPROXIMATE ONLY. ALL UTILITIES/OBSTRUCTIONS/SYSTEMS MAY NOT BE SHOWN. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND PROTECTING ALL UNDERGROUND UTILITIES/OBSTRUCTIONS/SYSTEMS, WHETHER OR NOT SHOWN HEREON.
2. UNLESS OTHERWISE SHOWN, ALL NEW UTILITIES SHALL BE UNDERGROUND.
3. CONTRACTOR SHALL FURNISH CONSTRUCTION LAYOUT OF BUILDING AND SITE IMPROVEMENTS. THIS WORK SHALL BE PERFORMED BY A PROFESSIONAL LAND SURVEYOR.
4. SAFETY MEASURES, CONSTRUCTION METHODS AND CONTROL OF WORK SHALL BE RESPONSIBILITY OF CONTRACTOR.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR AND/OR REPLACEMENT OF ANY EXISTING IMPROVEMENTS DAMAGED DURING CONSTRUCTION THAT ARE NOT DESIGNATED FOR DEMOLITION AND / OR REMOVAL HEREON. DAMAGED IMPROVEMENTS SHALL BE REPAIRED TO THE SATISFACTION OF THEIR RESPECTIVE OWNERS.
6. THE CONTRACTOR SHALL ENCASE AND/OR SLEEVE SEWER AND WATER MAINS WHERE THE CROWN OF THE SEWER PIPE IS LESS THAN 18 INCHES BELOW THE INVERT OF THE WATER PIPE AND WHERE THE HORIZONTAL SEPARATION IS LESS THAN 10 FEET, AS REQUIRED BY THE MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION.
7. ANY INTENDED REVISION OF THE HORIZONTAL AND/OR VERTICAL LOCATION OF IMPROVEMENTS TO BE CONSTRUCTED AS SHOWN HEREON SHALL BE REVIEWED AND APPROVED BY ENGINEER PRIOR TO IMPLEMENTATION.
8. RIM ELEVATIONS SHOWN FOR NEW STRUCTURES ARE APPROXIMATE AND ARE PROVIDED TO ASSIST CONTRACTOR WITH MATERIAL TAKEOFFS. FINISH RIM ELEVATIONS SHOULD MATCH PAVEMENT, GRADING OR LANDSCAPING, UNLESS SPECIFICALLY INDICATED OTHERWISE.
9. WHERE EXISTING UTILITY LINES/STRUCTURES ARE TO BE CUT/BROKEN DOWN/ABANDONED, LINES/STRUCTURES SHALL BE PLUGGED/CAPPED/FILLED IN ACCORDANCE WITH THE TOWN OF WRENTHAM AND MASSDOT REQUIREMENTS.
10. THE CONTRACTOR SHALL VERIFY THE LOCATION AND RELATIVE ELEVATION OF BENCH MARKS PRIOR TO COMMENCEMENT OF CONSTRUCTION. ANY DISCREPANCY SHALL BE REPORTED TO THE ENGINEER.
11. STRUCTURE DETAILS FROM INDEPENDENT VENDORS ARE CONSTANTLY CHANGING. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL VERIFY THAT DETAILS SHOWN MATCH CURRENT DETAILS AND SPECIFICATIONS FROM VENDORS.
12. SILT FENCE AND/OR HAYBALES SHOWN HEREON SHALL BE INSTALLED BEFORE EARTH DISTURBANCE OCCURS WITHIN BUFFER ZONE, AND SHALL SERVE AS THE LIMIT OF WORK.
13. SEE SECTION 11 OF THE CONTRACT DOCUMENTS FOR TEST BORING LOGS (BY ADDENDUM NO. 1).

## REGULATORY NOTES

1. CONTRACTOR SHALL CONTACT DIG-SAFE FOR UNDERGROUND UTILITY MARKING AT 1-888-344-7233 AT LEAST 72 HOURS PRIOR TO COMMENCEMENT OF ANY WORK.
2. CONTRACTOR SHALL MAKE HIMSELF AWARE OF ALL CONSTRUCTION REQUIREMENTS, CONDITIONS, AND LIMITATIONS IMPOSED BY PERMITS AND APPROVALS ISSUED BY REGULATORY AUTHORITIES PRIOR TO COMMENCEMENT OF ANY WORK. CONTRACTOR SHALL COORDINATE AND OBTAIN ALL CONSTRUCTION PERMITS REQUIRED BY REGULATORY AUTHORITIES.
3. ALL WORK OUTSIDE OF BUILDING THAT IS LESS THAN 10 FEET FROM THE INSIDE FACE OF BUILDING FOUNDATIONS SHALL CONFORM WITH THE UNIFORM STATE PLUMBING CODE OF MASSACHUSETTS, 248 CMR 2.00.
4. SEE SECTION 10 OF THE CONTRACT DOCUMENTS FOR PERMIT APPLICATONS (BY ADDENDUM NO. 1).

## TRAFFIC MANAGEMENT NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE TO MANAGE TRAFFIC IN ACCORDANCE WITH ALL LOCAL AND STATE REQUIREMENTS.
2. WORK WITHIN ROUTE 1 IS SUBJECT TO HIGHWAY ACCESS PERMIT ISSUED BY MASSACHUSETTS DEPARTMENT OF TRANSPORTATION. SEE VAI TEMPORARY TRAFFIC CONTROL PLANS DATED SEPTEMBER 2017.

## ROCK REMOVAL NOTES

1. PRIOR TO CONDUCTING ANY ROCK REMOVAL, THE CONTRACTOR SHALL REVIEW THE OVERALL FACTORS AFFECTING THE OPERATIONS. THE REVIEW SHALL CONSIDER THE FOLLOWING, BUT NOT LIMITED TO: ADJACENT AREA STRUCTURE(S); BUILDING(S); BUILDING FOUNDATION(S); UTILITIES, INCLUDING GAS, WATER, STORM DRAINAGE AND ELECTRICAL LINES; SEPTIC SYSTEMS AND SWIMMING POOLS; IMPACTS TO SURFACE AND GROUNDWATER QUALITY WITHIN 250 FEET OF THE ROCK REMOVAL SITE. IN ADDITION, COMPUTERS, ELECTRON MICROSCOPES, LASER EQUIPMENT RELAYS, ETC., WHICH ARE SENSITIVE TO VIBRATIONS AND OTHER UNDERGROUND OBJECTS THAT MAY BE DAMAGED BY THE EFFECTS OF ROCK REMOVAL.
2. THE CONTRACTOR IS RESPONSIBLE FOR ROCK REMOVAL IN A SAFE MANNER, FOR PRODUCING SMOOTH AND SOUND ROCK SURFACES AT THE LINES OF EXCAVATION, AND FOR CONTROLLING DAMAGE, VIBRATION, AND OVER-PRESSURE TO NEARBY STRUCTURES AND BUILDING AND MITIGATION IMPACTS TO SURFACE WATER AND GROUNDWATER QUALITY CONSISTENT WITH LOCAL, STATE AND FEDERAL REGULATIONS. ACCEPTANCE OF THE ROCK REMOVAL PLANS, OF ANY ROCK REMOVAL OPERATION, AND OF ROCK REMOVAL PRODUCTS BY THE OWNER OR ENGINEER, AND COMPLIANCE BY THE CONTRACTOR WITH PROVISIONS OF THE CONTRACT DOCUMENT FOR PROTECTION OF LIFE AND PROPERTY, SHALL NOT RELIEVE THE CONTRACTOR OF THE CONTRACTOR RESPONSIBILITY OR LIABILITY FOR THE SAFETY OF PERSONS AND PROPERTY. ACCEPTANCE OF THE CONTRACTOR SUBMITTALS BY THE OWNER OR ENGINEER DOES NOT CONSTITUTE, NOR SHALL BE CONSTRUED TO BE A GUARANTEE BY THE OWNER OR ENGINEER THAT THE DESIRED RESULTS WILL BE ACHIEVED. ACCEPTANCE OF THE CONTRACTORS SUBMITTALS BY THE OWNER OR ENGINEER SHALL NOT RELIEVE THE CONTRACTOR FROM THE CONTRACTOR'S RESPONSIBILITIES OF COMPLYING WITH REQUIREMENTS OF THE SPECIFICATIONS.
3. THE CONTRACTOR SHALL MONITOR NOISE AND VIBRATION LEVELS OF WORK OPERATIONS TO ASSURE COMPLIANCE WITH THE LIMITATIONS AGREED UPON, AND RETAIN RECORDS OF MEASUREMENTS FOR INSPECTION BY THE OWNER OR ENGINEER.

## IMPORTANT GUARDRAIL NOTE

IT IS THE INTENT OF THIS PROJECT THAT GUARDRAIL IN THE STATE LAYOUT OF ROUTE 1 SHALL BE PROTECTED AND NOT DISTURBED. THE CONTRACTOR SHALL PHOTO-DOCUMENT THE GUARDRAIL CONDITION DAILY IN ADVANCE OF ANY GENERAL OR SUBCONTRACTORS WORK IN THE VICINITY. SHOULD ANY GUARDRAIL BE DAMAGED OR DISTURBED AS A RESULT OF THE CONTRACTOR'S OPERATION, THE ENTIRE SECTION OF GUARDRAIL SHALL BE REMOVED AND REPLACED IN CONFORMANCE WITH THE LATEST STANDARDS FOR STEEL HIGHWAY GUARDRAIL, INCLUDING HEIGHT, OF THE MASSDOT. FAILURE TO PROPERLY DOCUMENT GUARDRAIL CONDITION DAILY WILL NOT RELIEVE THE CONTRACTORS RESPONSIBILITY FOR REPLACEMENT OF THE GUARDRAIL IF IS DAMAGE FOUND THAT IS NOT DEMONSTRABLY ATTRIBUTABLE TO OTHER CAUSES.

## RECORD DRAWINGS

1. WATERMAIN SERVICE RECORD INSTALLATION DRAWINGS ARE PROVIDED IN SECTION 14 OF THE CONTRACT DOCUMENTS (BY ADDENDUM NO. 1)
2. THE CONTRACTOR SHALL PREPARE AND PROVIDE RECORD DRAWINGS OF WATERMAIN, VALVE AND SERVICE INSTALLATIONS AS THE WORK PROGRESSES.

## WATER NOTES*

THE FOLLOWING DESCRIBED MATERIALS AND METHODS OF INSTALLATION OF WATER MAINS IN GENERAL. ALL WORK SHALL CONFORM TO THE 1988 STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, ALL SUBSEQUENT SUPPLEMENTAL SPECIFICATIONS IN THE PARTICULAR CONTRACT AND IN ACCORDANCE WITH THE MOST RECENT A.W.W.A. STANDARDS.

### MAIN INSTALLATION:

ALL MAINS WILL BE A MINIMUM OF EIGHT INCH DUCTILE IRON PIPE, CLASS 52, CEMENT LINED MECHANICAL JOINT OR PUSH-ON JOINT IN ACCORDANCE WITH A.W.W.A. STANDARDS. ALL MAINS OVER EIGHT (8) INCHES IN DIAMETER WILL BE DUCTILE IRON CLASS 52, INCLUDING NIPPLE PIECES. ALL HYDRANT BRANCHES SHALL BE SIX (6) INCH DUCTILE IRON CLASS 52. ALL INTERSECTIONS OF MAINS WILL BE GATED IN THEIR RESPECTIVE DIRECTIONS. NO MAIN GATE WILL EXTEND OVER ONE THOUSAND (1,000) FEET OF EACH OTHER OR SO SPACED AT THE DIRECTION OF THE DEPARTMENT OF PUBLIC WORKS OR FIRE CHIEF. ALL HYDRANTS WILL BE GATED. ALL TAPS TO THE EXISTING PUBLIC SYSTEM WILL SPECIFY A TAPPING SLEEVE AND GATE VALVE. EXCAVATION WILL BE TO A DEPTH THAT PROVIDES A MINIMUM OF FIVE (5) FEET OF COVER OVER THE PIPE. IF THE EXCAVATION IS IN LEDGE, A MINIMUM OF 12-INCH SPACING AROUND THE PIPE WILL BE REQUIRED TO ALLOW FOR SELECTED BACKFILL MATERIAL (SEE TRENCHING DETAILS). IT WILL BE AT THE DISCRETION OF THE DEPARTMENT OF PUBLIC WORKS AS TO THE TYPE OF BEDDING USED AND WILL DEPEND ON THE FIELD CONDITIONS. IN ANY EVENT, IT WILL BE EITHER CRUSHED BANK GRAVEL, SAND BORROW, OR THREE-FOURTHS INCH STONE. NO STONES LARGER THAN THREE (3) INCHES IN DIAMETER MAY BE USED WITHIN THE FIRST FOOT OF BACKFILL OVER THE PIPE. ONCE THE PIPE HAS SUFFICIENT COVER WITH THE SELECTED MATERIAL, NORMAL BACKFILLING MAY PROCEED WITH CARE. JOINTING OF PUSH-ON OR TYTON JOINT CAST IRON WILL BE WITH THE USE OF A COME-ALONG OR BAR. IF A BAR IS USED A BLOCK OF WOOD WILL BE USED BETWEEN IT AND THE PIPE; THE APPLIES FOR HAVING A BACKHOE/EXCAVATOR SET LARGER DIAMETER PIPE, A BLOCK OF WOOD WILL BE INSERTED BETWEEN THE BUCKET AND THE PIPE; IN NO EVENT WILL THERE BE A METAL-TO-METAL DRIVING FORCE TO SET THE PIPE. IF THIS IS NOT STRICTLY COMPLIES WITH THE LENGTH OF THE PIPE WILL BE REMOVED AND A NEW ONE USED IN ITS PLACE.

### MAIN GATE VALVES AND BOXES:

MAIN GATE VALVES SHALL BE OPEN LEFT, IRON BODY, BRONZED MOUNTED, DOUBLE DISC, NON-RISING STEM AS MANUFACTURED BY MUELLER CO. OR APPROVED EQUAL. MAIN GATE BOXES SHALL BE CAST-IRON, SLIDE TYPE WITH AT LEAST SIX (6) INCHES OF ADJUSTMENT AND AT LEAST FIVE (5) FEET LONG. THE COVERS SHALL BE FLUSH, CLOSE-FITTING WITH THE LETTER "W" OR THE WORD "WATER" CAST INTO THE COVER.

### THRUST BLOCKS

ALL PLUGS, CAPS, TEES, BENDS AND HYDRANTS SHALL BE PROVIDED WITH A CONCRETE THRUST BLOCK TO PREVENT MOVEMENT. THE THRUST BLOCK SHALL CONSIST OF A FORMED CONCRETE BACKING AGAINST UNDISTURBED MATERIAL, POURED IN PLACE WITH 3,000 PSI, 1-1/2", 470 CEMENT CONCRETE MASONRY.

### INSPECTIONS

INSPECTION WILL BE PROVIDED BY THE WRENTHAM DEPARTMENT OF PUBLIC WORKS BEFORE ANY BACKFILLING IS DONE. THE DEPARTMENT OF PUBLIC WORKS WATER DIVISION WILL BE NOTIFIED TWENTY-FOUR (24) HOURS IN ADVANCE AND WILL INSPECT THE COMPLETED WORK. THIS METHOD OF OPERATION WILL BE USED FOR HYDRANT INSTALLATION, MAIN TAPS, SERVICE TAPS, TESTING, ETC. IF THE DEPARTMENT OF PUBLIC WORKS FEELS THAT INSUFFICIENT WORKMANSHIP AND CARE IS BEING TAKEN IN THE INSTALLATION, THIS WORK MAY BE TERMINATED UNTIL FURTHER APPROVAL BY THE DEPARTMENT.

### CONNECTIONS

SERVICE CONNECTIONS SHALL HAVE A MINIMUM SIZE OF ONE (1) INCH IN DIAMETER. ALL SERVICE PIPES SHALL BE POLYETHYLENE (CTS) TUBING TYPE K COPPER TUBING. ANY SERVICE PIPE LARGER THAN TWO (2) INCHES AND LESS THAN EIGHT (8) INCHES IN DIAMETER SHALL BE DUCTILE IRON CLASS 52, CEMENT-LINED MECHANICAL JOINT OR PUSH-ON JOINT IN ACCORDANCE WITH A.W.W.A. STANDARDS. ALL NEW MAIN CONNECTIONS WILL BE MADE BY WAY OF DIRECT WET TAP. THE USE OF A TWO-STRAP CORPORATION SADDLE SHALL ONLY BE USED WITH APPROVAL OF ENGINEER (TYPE, SMITH-BLAIR OR MUELLER). A CURB STOP AND BOX SHALL BE COPPER TO COPPER THREAD, OPEN LEFT, AS MANUFACTURED BY FORD. THE SERVICE SHALL BE INSTALLED AT 90° FROM THE ROAD, UNLESS OTHERWISE APPROVED BY THE DEPARTMENT OF PUBLIC WORKS. UNDER NO CIRCUMSTANCES WILL ANY INVERTED KEY CURBS BE INSTALLED IN ANY WATER SYSTEM IN THE TOWN OF WRENTHAM. THE CURB BOX OR SERVICE BOX SHALL BE FOUR-AND-ONE-HALF (4-1/2) TO FIVE-AND-ONE-HALF (5-1/2) FEET, EXTENSION-TYPE, AND COVER FOR SERVICES SHALL BE FIVE (5) FEET ZERO (0) INCHES. A SAND BACKFILL MATERIAL WILL BE CAREFULLY PLACED AROUND THE SERVICE PIPE TO PROTECT IT FROM NORMAL BACKFILL AND COMPACTION.

### TESTING

THE CONTRACTOR SHALL HIRE AN INDEPENDENT TESTING FIRM THAT SPECIALIZES IN WATER LINE TESTING AND DISINFECTIONS OF WATER DISTRIBUTION SYSTEMS APPROVED BY THE DEPARTMENT OF PUBLIC WORKS. THE CONTRACTOR SHALL FURNISH A WATER METER PRESSURE GAUGE, TESTING PLUGS, PUMPS, PIPE CONNECTIONS AND OTHER REQUIRED APPARATUS. THE SECTION OF PIPE TO BE TESTED WILL BE COMPLETELY FILLED WITH WATER AND AIR BLOWN OFF THROUGH A HIGH POINT, SUCH AS A HYDRANT. THE SECTION UNDER TEST WILL BE MAINTAINED FULL AND UNDER PRESSURE AT 200 LBS. FOR A PERIOD OF ONE (1) HOUR. THE LINE SHALL BE FILLED AND TESTED WITHIN ONE (1) TO THREE (3) DAYS AFTER FILLING. ANY FAILURE OF THE VARIOUS PIPELINES, STRUCTURES, VALVES, HYDRANTS AND RELATED ACCESSORIES THAT OCCURS BEFORE FINAL ACCEPTANCE OF THE WORK SHALL BE REPLACED AT THE EXPENSE OF THE CONTRACTOR. A SUCCESSFUL WATER PRESSURE TEST IS NOT TO BE INTERPRETED AS FINAL ACCEPTANCE. THE PRESSURE AND LEAKAGE TEST SHALL CONSIST OF FIRST RAISING THE WATER PRESSURES (BASED ON ELEVATION) TO A PRESSURE IN POUNDS PER SQUARE INCH NUMERICALLY EQUAL TO THE PRESSURE RATING OF THE PIPE. WHILE MAINTAINING THIS PRESSURE, THE CONTRACTOR SHALL MAKE A LEAKAGE TEST BY METERING THE FLOW OF WATER INTO THE PIPE. IF THE AVERAGE LEAKAGE DURING A TWO-HOUR PERIOD EXCEEDS A RATE OF TEN (10) GALLONS PER INCH OF DIAMETER PER TWENTY-FOUR (24) HOUR PER MILE OF PIPELINE, THE SECTION WILL BE CONSIDERED AS HAVING FAILED THE TEST. AFTER TESTING THE PIPELINE IS TO BE DISINFECTED WITH A CHLORINE CONCENTRATION OF APPROXIMATELY FIFTY (50) PARTS PER MILLION PRIOR TO BEING PLACES IN SERVICE. THE INTRODUCTION OF THIS CHLORINE SHALL BE ACCOMPLISHED BY PUMPING OR SIPHONING A CALCIUM HYDROCHLORIDE SOLUTION INTO THE MAIN. THE CHLORINATION WATER IS TO REMAIN IN THE NEW PIPELINE FOR A PERIOD OF TWENTY-FOUR (24) HOURS. DURING THIS PERIOD, PROPER PRECAUTIONS ARE TO BE TAKEN TO PREVENT THIS CHLORINATED WATER FROM FLOWING BACK INTO THE EXISTING SYSTEM. AFTER CHLORINATION AND DE-CHLORINATION A MINIMUM OF (2) BACTERIA SAMPLES ARE TO BE TAKEN TWENTY-FOUR (24) HOURS APART.

* NOTE: SHOULD THERE BE ANY CONFLICT BETWEEN THESE "WATER NOTES" AND THE CONTRACT SPECIFICATIONS SECTION 2900, STANDARD WATER SYSTEM REQUIREMENTS, THEN THE REQUIREMENTS OF SECTION 2900 SHALL PREVAIL.

## CONSTRUCTION NOTES

THE FOLLOWING DESCRIBED MATERIALS AND METHODS AS THEY PERTAIN TO ROAD OPENING WORK. ALL WORK SHALL CONFORM TO THE 1988 STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, AND ALL SUBSEQUENT SUPPLEMENTAL SPECIFICATIONS THERETO.

### BACKFILL MATERIALS (ALL IN ACCORDANCE WITH MASSDOT REQUIREMENTS)

EXCAVATIONS IN THE STREET PAVEMENT AREAS SHALL BE CAREFULLY BACKFILLED WITH LAYERS OF SUITABLE GRAVEL. THE TWELVE (12) INCHES OF BEDDING MATERIAL AROUND PIPES SHALL BE SAND (M1.04.0) FOR WATER, 3/4" CRUSHED STONE (M2.01.0) FOR SEWER, GRAVEL BORROW - TYPE C (M1.03.0) FOR DRAIN OR AS SPECIFIED BY THE OWNER OF THE UTILITY AND APPROVED BY THE DEPARTMENT OF PUBLIC WORKS. BACKFILL MATERIAL SHALL CONSIST OF CONTROLLED DENSITY FILL (CDF) - TYPE 1E OR 2E (M4.08.0) FOR ALL MAJOR ROADWAYS OF THE CITY OR AS DIRECTED BY THE COMMISSIONER OF PUBLIC WORKS.

### COMPACTION OF BACKFILL (ALL IN ACCORDANCE WITH MASSDOT REQUIREMENTS)

BACKFILL SHALL BE UNIFORMLY DISTRIBUTED IN SUCCESSIVE LAYERS, EACH LAYER BEING THOROUGHLY COMPACTED BEFORE THE SUCCEEDING LAYER IS PLACED. THE ENTIRE WIDTH OF THE TRENCH SHALL MECHANICALLY OR HAND TAMPED IN SIX (6) INCH LIFTS, A MINIMUM OF TWO (2) FEET ABOVE THE UTILITY INSTALLATION, AND MECHANICALLY TAMPED THE REMAINDER OF THE FILL IN LIFT DEPTHS NOT GREATER THAN SIX (6) INCHES. THE TOP LAYER OF BACKFILL SHALL BE FOURTEEN (14) INCHES (IN A TEMPORARY TRENCH), AND TWELVE (12) INCHES (IN A PERMANENT TRENCH) OF GRAVEL COMPACTED TO 97% OF MAXIMUM DENSITY.

### GRADING ROLLING AND FINISHING OF TEMPORARY PAVEMENT

PAVEMENT PLACED SHALL BE PLACED AND RAKED TO A UNIFORM SURFACE, ROLLED TO THE REQUIRED THICKNESS AND TO A GRADE THAT WILL MATCH THE EXISTING BITUMINOUS ROAD SURFACE. THE PERMITTEE SHALL MAINTAIN THE SURFACEING AND SHALL PROMPTLY FILL WITH SIMILAR MATERIAL ANY DEPRESSION AND HOLES THAT MAY OCCUR SO AS TO KEEP THE SURFACING IN A SAFE AND SATISFACTORY CONDITION FOR TRAFFIC.

### TEMPORARY PAVEMENT (ALL IN ACCORDANCE WITH MASSDOT REQUIREMENTS)

A TEMPORARY PAVEMENT SHALL BE PLACED ON THE SURFACE OF THE FILL AND THOROUGHLY COMPACTED. A TEMPORARY PAVEMENT SHALL BE CLASS I BITUMINOUS CONCRETE TYPE I-1 THREE (3) INCHES THICK (SEE EXCAVATION TRENCH DETAIL). "COLD PATCH MAY BE ALLOWED IF APPROVED BY THE COMMISSIONER OF PUBLIC WORKS DUE TO ADVERSE WEATHER CONDITIONS. IF PLATES ARE USED THEY SHALL BE RAMPED TO MATCH THE EXISTING PAVEMENT. TEMPORARY PAVING OR STEEL PLATING SHALL IMMEDIATELY FOLLOW THE BACKFILLING OPERATION.

### PERMANENT PAVEMENT (ALL IN ACCORDANCE WITH MASSDOT REQUIREMENTS)

THE FINAL BITUMINOUS CONCRETE SURFACE SHALL NOT BE PLACED ANY EARLIER THAN 65 DAYS OR NO LATER THAN 90 DAYS FROM THE DATE OF COMPLETION OF THE TEMPORARY SURFACE WITHOUT APPROVAL FROM THE COMMISSIONER OF PUBLIC WORKS. THE TEMPORARY PAVEMENT AND SUB-BASE SHALL BE EXCAVATED TO THE GRADE REQUIRED BY THE PERMIT PRIOR TO PLACEMENT OF THE FINAL BITUMINOUS CONCRETE SURFACE. THE BINDER COURSE SHALL NOT BE LESS THAN THE EXISTING ROADWAY BINDER COURSE AND SHALL NOT BE LESS THAN THREE AND ONE-HALF (3-1/2) INCHES IN DEPTH AND THE TOP COURSE ONE AND ONE-HALF (1-1/2) INCHES IN DEPTH. IN SOME INSTANCES, BEYOND A SIMPLE TRENCH EXCAVATION, PAVEMENT DETAILS AND RESURFACING REQUIREMENTS WILL BE INCLUDED AS A SPECIAL CONDITION IN THE PERMIT. SHOULD ANY PERMANENT PAVEMENT SETTLE DURING THE GUARANTEE PERIOD, THE CONTRACTOR SHALL REMOVE AND REPLACE AT NO ADDITIONAL COST TO THE OWNER. PERMANENT PAVEMENT SHALL BE ACTIVELY MAINTAINED IN A SMOOTH AND RIDABLE CONDITION THROUGHOUT THE GUARANTEE PERIOD.

ROUTE 1 WATER MAIN IMPROVEMENTS

(DPW) CONTRACT 2018-003

WRENTHAM, MASSACHUSETTS 02093

WRENTHAM DPW ADDENDUM NO. 1 JANUARY 2017

PREPARED FOR:

Town of Wrentham

79 South Street
Wrentham, Massachusetts 02093

PREPARED BY:

GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com



BASE PLANS AND PROFILES FURNISHED BY:
HANCOCK ASSOCIATES
315 ELM STREET, MARLBOROUGH, MA 01752
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COMMONWEALTH OF MASSACHUSETTS
THOMAS C. SEXTON
CIVIL
No. 34967
REGISTERED PROFESSIONAL ENGINEER

| NO. | BY | APP | DATE | ISSUE/REVISION DESCRIPTION |
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| 2 | MG | TS | 1/30/18 | ADDENDUM NO. 1 |
| 1 | RD | JP | 1/10/18 | DPW COMMENTS |

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| APPRVD. BY: | | CHECK BY: | JP |

NOTES, REFERENCES AND LEGEND

PLOT DATE: Jan 30, 2018 3:47 pm

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| PROJECT NO.: | 20345 |

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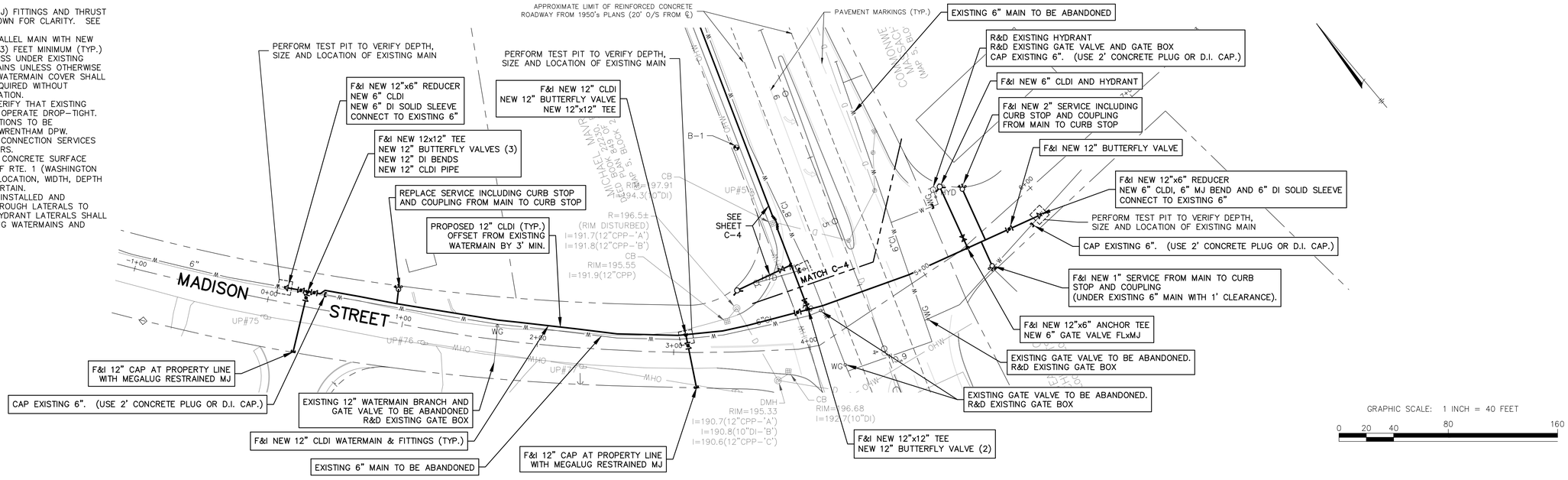
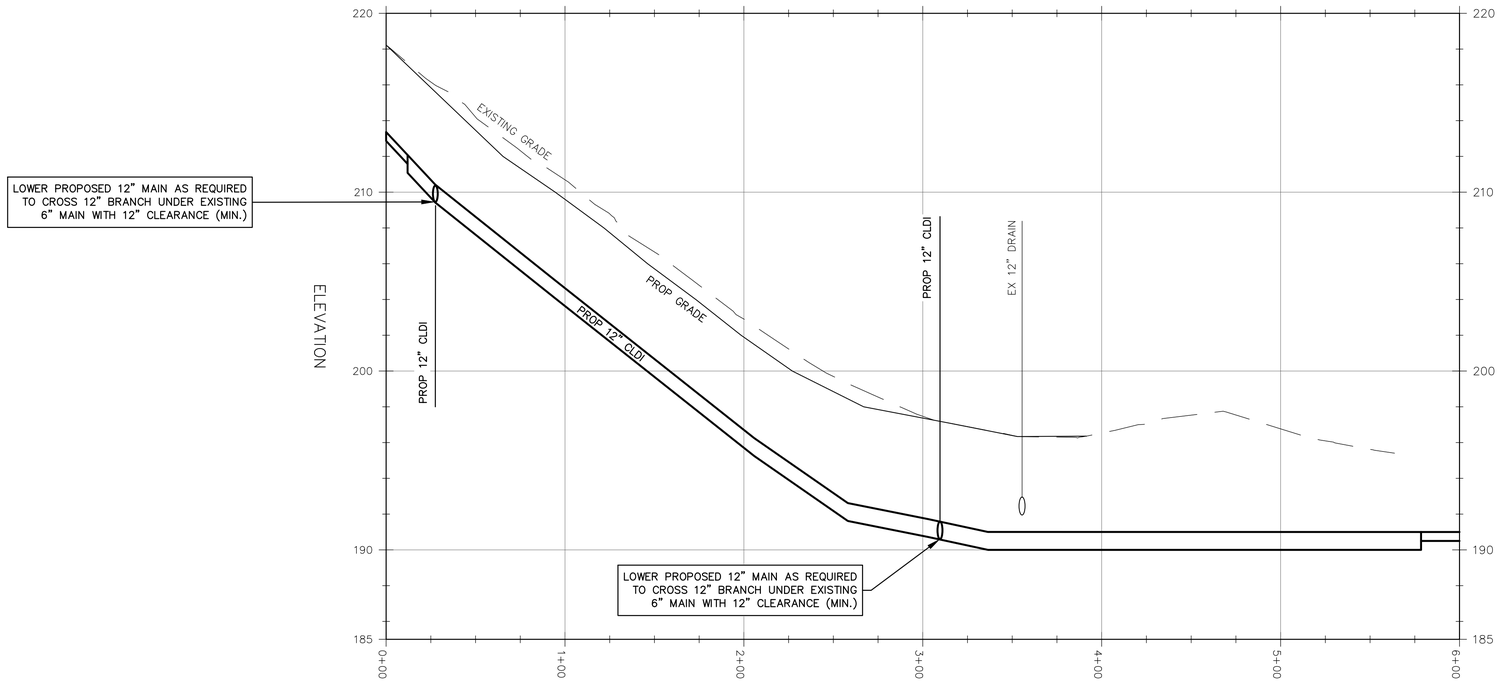
WATERMAIN NOTES:

1. MECHANICAL JOINT (MJ) FITTINGS AND THRUST BLOCKS ARE NOT SHOWN FOR CLARITY. SEE STANDARD DETAILS.
2. OFFSET EXISTING PARALLEL MAIN WITH NEW 12" MAIN BY THREE (3) FEET MINIMUM (TYP.) NEW MAIN SHALL CROSS UNDER EXISTING DRAINS AND WATERMAINS UNLESS OTHERWISE STATED. DEPTH OF WATERMAIN COVER SHALL BE INCREASED AS REQUIRED WITHOUT ADDITIONAL COMPENSATION.
3. WATER DIVISION TO VERIFY THAT EXISTING SHUTOFF GATES WILL OPERATE DROP-TIGHT.
4. FINAL HYDRANT LOCATIONS TO BE FIELD-VERIFIED WITH WRENTHAM DPW.
5. COORDINATE SERVICE CONNECTION SERVICES WITH PROPERTY OWNERS.
6. EXISTING REINFORCED CONCRETE SURFACE BENEATH PORTIONS OF RTE. 1 (WASHINGTON STREET) ROADWAY. LOCATION, WIDTH, DEPTH AND THICKNESS UNCERTAIN.
7. HYDRANTS SHALL BE INSTALLED AND PRESSURE TESTED THROUGH LATERALS TO HYDRANT VALVES. HYDRANT LATERALS SHALL CROSS UNDER EXISTING WATERMAINS AND OTHER UTILITIES.




## MADISON ST PLAN (STATION 0+00 TO 4+00)




## MADISON ST PROFILE (STATION 0+00 TO 4+00)

NOTE:
FINAL INSTALLED DEPTH REQUIREMENTS FOR NEW MAINS SHALL NOT BE BASED ON THIS PROFILE. RATHER, REQUIRED DEPTHS OF NEW MAINS SHALL BE GOVERNED BY MINIMUM DEPTH AND UTILITY CLEARANCE REQUIREMENTS.

GRAPHIC SCALE: 1 INCH = 40 FEET HORIZONTAL
1 INCH = 4 FEET VERTICAL
0 20 40 80 160

# ROUTE 1 WATER MAIN IMPROVEMENTS

(DPW) CONTRACT 2018-003

WRENTHAM, MASSACHUSETTS 02093

WRENTHAM DPW
ADDENDUM NO. 1
JANUARY 2017

PREPARED FOR:

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MADISON ST PLAN AND PROFILE

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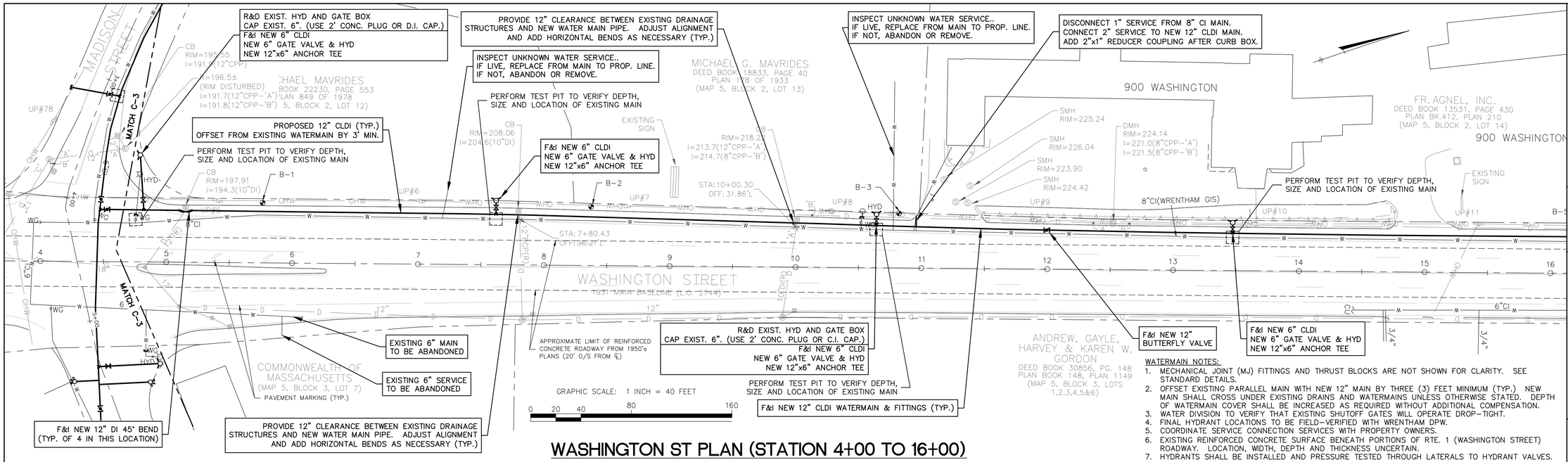
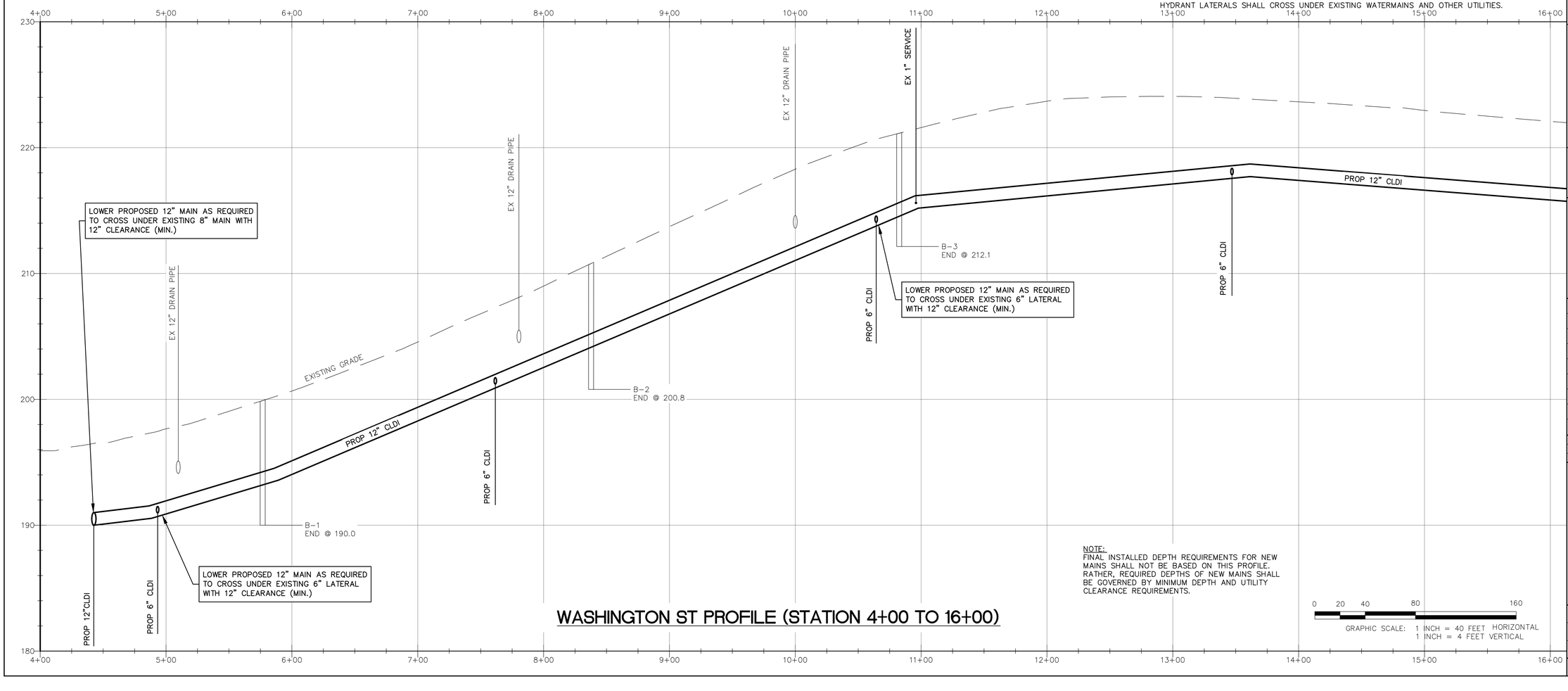



## WASHINGTON ST PLAN (STATION 4+00 TO 16+00)




## WASHINGTON ST PROFILE (STATION 4+00 TO 16+00)

WATERMAIN NOTES:
1. MECHANICAL JOINT (MJ) FITTINGS AND THRUST BLOCKS ARE NOT SHOWN FOR CLARITY. SEE STANDARD DETAILS.
2. OFFSET EXISTING PARALLEL MAIN WITH NEW 12" MAIN BY THREE (3) FEET MINIMUM (TYP.) NEW MAIN SHALL CROSS UNDER EXISTING DRAINS AND WATERMAINS UNLESS OTHERWISE STATED. DEPTH OF WATERMAIN COVER SHALL BE INCREASED AS REQUIRED WITHOUT ADDITIONAL COMPENSATION.
3. WATER DIVISION TO VERIFY THAT EXISTING SHUTOFF GATES WILL OPERATE DROP-TIGHT.
4. FINAL HYDRANT LOCATIONS TO BE FIELD-VERIFIED WITH WRENTHAM DPW.
5. COORDINATE SERVICE CONNECTION SERVICES WITH PROPERTY OWNERS.
6. EXISTING REINFORCED CONCRETE SURFACE BENEATH PORTIONS OF RTE. 1 (WASHINGTON STREET) ROADWAY. LOCATION, WIDTH, DEPTH AND THICKNESS UNCERTAIN.
7. HYDRANTS SHALL BE INSTALLED AND PRESSURE TESTED THROUGH LATERALS TO HYDRANT VALVES. HYDRANT LATERALS SHALL CROSS UNDER EXISTING WATERMAINS AND OTHER UTILITIES.

NOTE:
FINAL INSTALLED DEPTH REQUIREMENTS FOR NEW MAINS SHALL NOT BE BASED ON THIS PROFILE. RATHER, REQUIRED DEPTHS OF NEW MAINS SHALL BE GOVERNED BY MINIMUM DEPTH AND UTILITY CLEARANCE REQUIREMENTS.

GRAPHIC SCALE: 1 INCH = 40 FEET HORIZONTAL
1 INCH = 4 FEET VERTICAL
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# ROUTE 1 WATER MAIN IMPROVEMENTS

## (DPW) CONTRACT 2018-003

WRENTHAM, MASSACHUSETTS 02093

WRENTHAM DPW
ADDENDUM NO. 1
JANUARY 2017

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# WASHINGTON ST PLAN AND PROFILE 4+00-16+00

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| SHEET: | 4 OF 9 |
| PROJECT NO.: | 20345 |

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OFFSET NEW 12"x6" TEE FROM EXISTING 6" BRANCH. TEST & DISINFECT NEW MAIN TO NEW 6" VALVE, THEN INSTALL 6" CLDI PIPE, THEN TIE INTO EXISTING MAIN USING TWO (2) 45° 6" RESTRAINED M.J. BENDS, AND SOLID SLEEVE.

DISCONNECT EXIST. 4" SERVICE FROM EXIST. 8" C.I. MAIN
F&I NEW 12"X4" ANCHOR TEE
NEW 4" GATE VALVE
NEW 4" CLDI PIPE
NEW 4" 90° DI BEND
NEW 4" SOLID SLEEVE COUPLING
R&D EXIST. GATE BOX

INSTALL 2" SERVICE FROM MAIN TO CURB STOP WITH 2"x1" REDUCER AND COUPLINGS FOR CONNECTION TO EXIST. 1" SERVICE

INSPECT UNKNOWN WATER SERVICE. IF LIVE, REPLACE FROM MAIN TO PROP. LINE. IF NOT, ABANDON OR REMOVE.

OFFSET NEW 12"x4" TEE FROM EXISTING 4" BRANCH. TEST & DISINFECT NEW MAIN TO NEW 4" VALVE, INSTALL 4" CLDI PIPE, THEN TIE INTO EXISTING SERVICE USING 90° 4" RESTRAINED M.J. BEND AND 4" COUPLING

R&D EXIST. HYD AND GATE BOX CAP EXIST. 6". (USE 2' CONC. PLUG OR C.I. CAP.)

F&I NEW 6" CLDI
NEW 6" GATE VALVE & HYD
NEW 12"x6" ANCHOR TEE

PERFORM TEST PIT TO VERIFY DEPTH, SIZE AND LOCATION OF EXISTING MAIN

F&I NEW 8" CAP
CAP 8" AT EDGE OF TRENCH

F&I NEW 12" CLDI WATERMAIN & FITTINGS (TYP.)

F&I NEW 6" CLDI
NEW 6" GATE VALVE & HYD
NEW 12"x6" ANCHOR TEE

F&I NEW 12"
BUTTERFLY VALVE

PROPOSED 12" CLDI (TYP.) OFFSET FROM EXISTING WATERMAIN BY 3' MIN.

PERFORM TEST PIT TO VERIFY DEPTH, SIZE AND LOCATION OF EXISTING MAIN

APPROXIMATE LIMIT OF REINFORCED CONCRETE ROADWAY FROM 1950's PLANS (20' O/S FROM ℄)

F&I NEW 12" DI 45° BEND
(TYP. OF 4 IN THIS LOCATION)

F&I NEW 12"x6" TEE
NEW 6" CLDI PIPE
NEW 6" GATE VALVE
NEW 6" DI BENDS
NEW 6" SOLID SLEEVE COUPLING

R&D EXIST. GATE BOX

F&I 1 12" 45° DI BEND (TYP.)

F&I NEW 12"x8" TEE
NEW 8" CLDI PIPE
NEW 8" GATE VALVE
NEW 8" CAP WITH
MEGALUG RESTRAINED MJ

F&I NEW 12"x12" TEE
NEW 12" CLDI PIPE
NEW 12" BUTTERFLY VALVE
NEW 12" DI BENDS
NEW 12" SOLID SLEEVE COUPLING

F&I NEW 12" BUTTERFLY VALVE

OFFSET NEW 12"x12" TEE FROM EXISTING 12" BRANCH. TEST & DISINFECT NEW MAIN TO NEW 12" VALVE, THEN INSTALL 12" CLDI PIPE, THEN TIE INTO EXISTING MAIN USING TWO (2) 45° 12" RESTRAINED M.J. BENDS, AND SOLID SLEEVE.

F&I NEW 6" CLDI
NEW 6" GATE VALVE & HYD
NEW 12"x6" ANCHOR TEE

PERFORM TEST PIT TO VERIFY DEPTH, SIZE AND LOCATION OF EXISTING MAIN

F&I NEW 12" DI 45° BEND
(TYP. OF 4 IN THIS LOCATION)

OFFSET NEW 12"x4" TEE FROM EXISTING 4" BRANCH. TEST & DISINFECT NEW MAIN TO NEW 4" VALVE, INSTALL 4" CLDI PIPE, THEN TIE INTO EXISTING SERVICE USING 90° 4" RESTRAINED M.J. BEND AND 4" SOLID SLEEVE COUPLING

R&D EXIST. HYD AND GATE BOX CAP EXIST. 6". (USE 2' CONC. PLUG OR C.I. CAP.)
EXIST. GATE VALVE TO BE ABANDONED.

R&D EXIST. GATE BOX CAP EXIST. 4". (USE 2' CONC. PLUG OR C.I. CAP.)

DISCONNECT EXIST. 4" SERVICE FROM EXIST. 8" C.I. MAIN
F&I NEW 12"X4" ANCHOR TEE
NEW 4" GATE VALVE
NEW 4" CLDI PIPE
NEW 4" 90° DI BEND
NEW 4" SOLID SLEEVE COUPLING

F&I NEW 12" DI 45° BEND
(TYP. OF 4 IN THIS LOCATION)

INSPECT UNKNOWN WATER SERVICE. IF LIVE, REPLACE FROM MAIN TO PROP. LINE. IF NOT, ABANDON OR REMOVE.

INSTALL 2" SERVICE FROM MAIN TO CURB STOP WITH 2"x1.5" REDUCER AND COUPLINGS FOR CONNECTION TO EXIST. 1.5" SERVICE

PAVEMENT MARKINGS (TYP.)

EXIST. GATE VALVE TO BE ABANDONED.
R&D EXIST. GATE BOX

EXISTING 8" MAIN
TO BE ABANDONED

EXISTING 6" MAIN
TO BE ABANDONED

F&I NEW 6" CLDI
NEW 6" GATE VALVE & HYD
NEW 12"x6" ANCHOR TEE

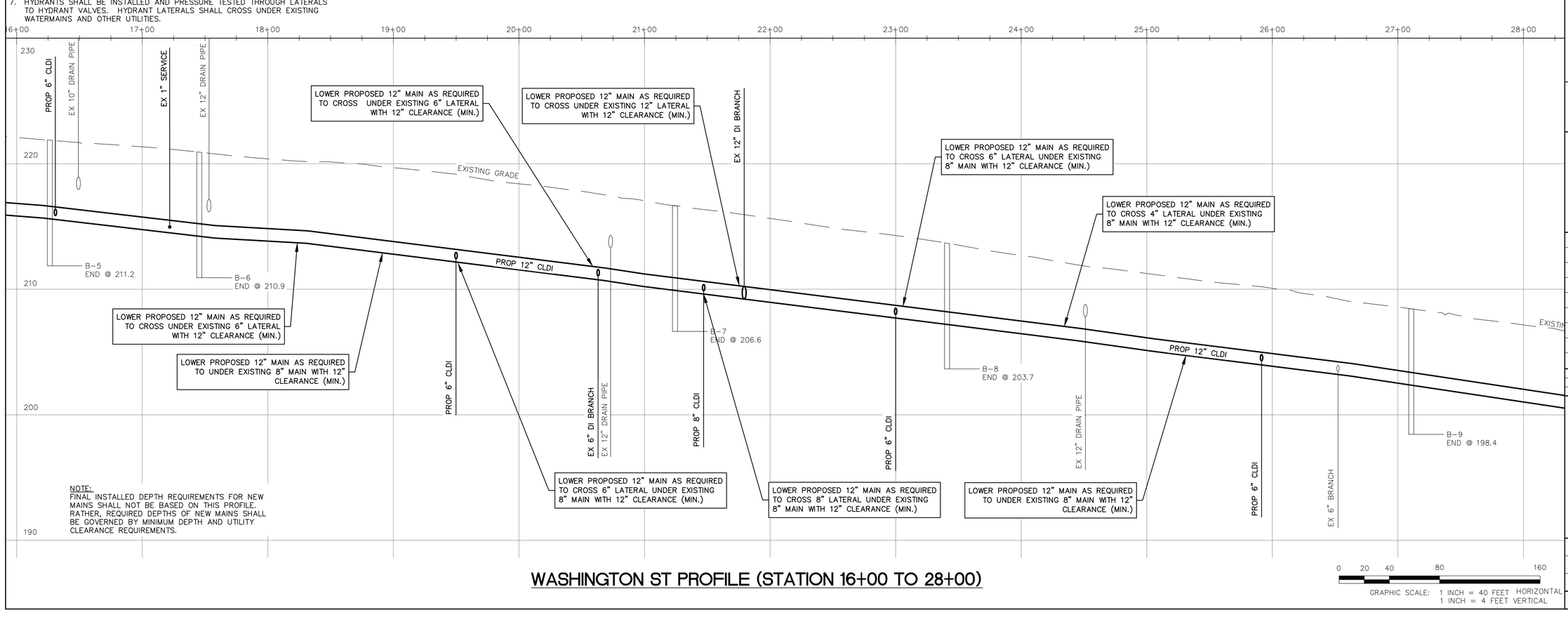
PERFORM TEST PIT TO VERIFY DEPTH, SIZE AND LOCATION OF EXISTING MAIN

PROVIDE 12" CLEARANCE BETWEEN EXISTING DRAINAGE STRUCTURES AND NEW WATER MAIN PIPE. ADJUST ALIGNMENT AND ADD HORIZONTAL BENDS AS NECESSARY (TYP.)

WATERMAIN NOTES:
1. MECHANICAL JOINT (MJ) FITTINGS AND THRUST BLOCKS ARE NOT SHOWN FOR CLARITY. SEE STANDARD DETAILS.
2. OFFSET EXISTING PARALLEL MAIN WITH NEW 12" MAIN BY THREE (3) FEET MINIMUM (TYP.) NEW MAIN SHALL CROSS UNDER EXISTING DRAINS AND WATERMAINS UNLESS OTHERWISE STATED. DEPTH OF WATERMAIN COVER SHALL BE INCREASED AS REQUIRED WITHOUT ADDITIONAL COMPENSATION.
3. WATER DIVISION TO VERIFY THAT EXISTING SHUTOFF GATES WILL OPERATE DROP-TIGHT.
4. FINAL HYDRANT LOCATIONS TO BE FIELD-VERIFIED WITH WRENTHAM DPW.
5. COORDINATE SERVICE CONNECTION SERVICES WITH PROPERTY OWNERS.
6. EXISTING REINFORCED CONCRETE SURFACE BENEATH PORTIONS OF RTE. 1 (WASHINGTON STREET) ROADWAY. LOCATION, WIDTH, DEPTH AND THICKNESS UNCERTAIN.
7. HYDRANTS SHALL BE INSTALLED AND PRESSURE TESTED THROUGH LATERALS TO HYDRANT VALVES. HYDRANT LATERALS SHALL CROSS UNDER EXISTING WATERMAINS AND OTHER UTILITIES.

# WASHINGTON ST PLAN (STATION 16+00 TO 28+00)

GRAPHIC SCALE: 1 INCH = 40 FEET




NOTE:
FINAL INSTALLED DEPTH REQUIREMENTS FOR NEW MAINS SHALL NOT BE BASED ON THIS PROFILE. RATHER, REQUIRED DEPTHS OF NEW MAINS SHALL BE GOVERNED BY MINIMUM DEPTH AND UTILITY CLEARANCE REQUIREMENTS.

# WASHINGTON ST PROFILE (STATION 16+00 TO 28+00)

GRAPHIC SCALE: 1 INCH = 40 FEET HORIZONTAL
1 INCH = 4 FEET VERTICAL

# ROUTE 1 WATER MAIN IMPROVEMENTS

## (DPW) CONTRACT 2018-003

WRENTHAM,
MASSACHUSETTS 02093

WRENTHAM DPW
ADDENDUM NO. 1
JANUARY 2017

PREPARED FOR:

**Town of Wrentham**

79 South Street
Wrentham, Massachusetts 02093

PREPARED BY:


**GZA** GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com




BASE PLANS AND PROFILES FURNISHED BY:
HANCOCK ASSOCIATES
315 ELM STREET, MARLBOROUGH, MA 01752
VOICE (508) 460-1111, FAX (508) 460-1121
WWW.HANCOCKASSOCIATES.COM

COMMONWEALTH OF MASSACHUSETTS
THOMAS C. REXTON
CIVIL
No. 34967
REGISTERED PROFESSIONAL ENGINEER
Thomas C Rexton

| NO. | BY | APP | DATE | ISSUE/REVISION DESCRIPTION |
|---|---|---|---|---|
| 2 | MG | TS | 1/30/18 | ADDENDUM NO. 1 |
| 1 | RD | JP | 1/10/18 | DPW COMMENTS |

| | | | |
|---|---|---|---|
| DATE: | 10/5/2017 | DESIGN BY: | JP |
| SCALE: | AS SHOWN | DRAWN BY: | KP |
| APPRVD. BY: | 1"=40' | CHECK BY: | JP |

# WASHINGTON ST PLAN AND PROFILE 16+00-28+00

PLOT DATE: Jan 30, 2018 3:47 pm

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|---|---|
| DWG: 20345U.dwg | C-5 |
| LAYOUT: C-5 | |
| SHEET: 5 OF 9 | |
| PROJECT NO.: | 20345 |

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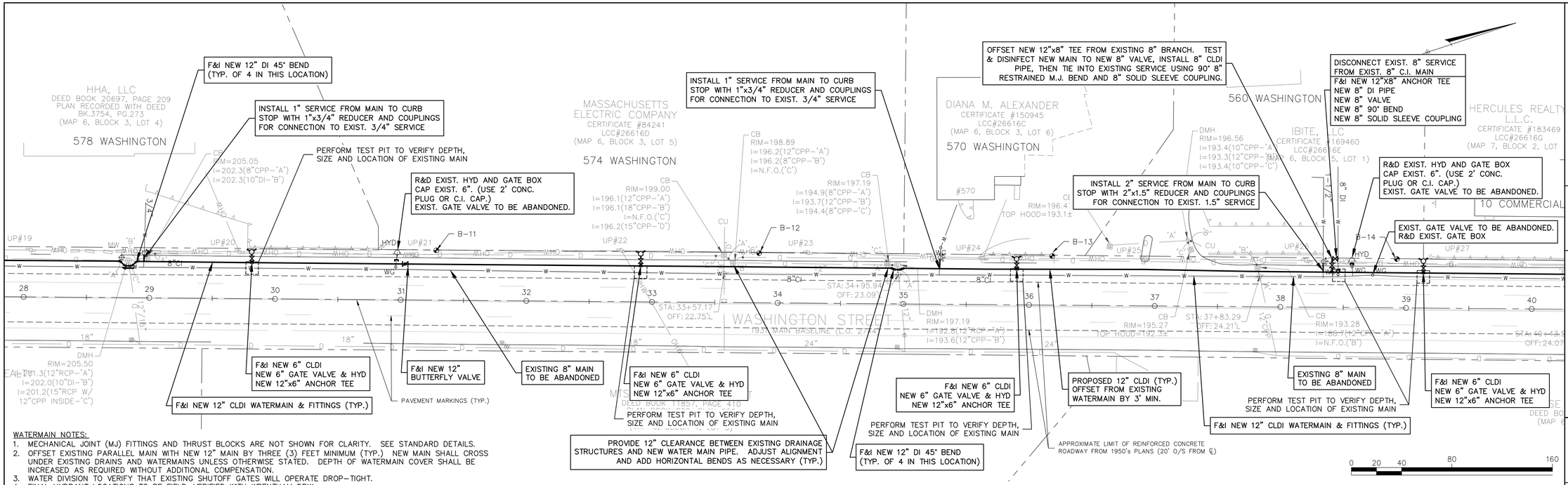


## WASHINGTON ST PLAN (STATION 28+00 TO 40+00)

WATERMAIN NOTES:

1. MECHANICAL JOINT (MJ) FITTINGS AND THRUST BLOCKS ARE NOT SHOWN FOR CLARITY. SEE STANDARD DETAILS.
2. OFFSET EXISTING PARALLEL MAIN WITH NEW 12" MAIN BY THREE (3) FEET MINIMUM (TYP.) NEW MAIN SHALL CROSS UNDER EXISTING DRAINS AND WATERMAINS UNLESS OTHERWISE STATED. DEPTH OF WATERMAIN COVER SHALL BE INCREASED AS REQUIRED WITHOUT ADDITIONAL COMPENSATION.
3. WATER DIVISION TO VERIFY THAT EXISTING SHUTOFF GATES WILL OPERATE DROP-TIGHT.
4. FINAL HYDRANT LOCATIONS TO BE FIELD-VERIFIED WITH WRENTHAM DPW.
5. COORDINATE SERVICE CONNECTION SERVICES WITH PROPERTY OWNERS.
6. EXISTING REINFORCED CONCRETE SURFACE BENEATH PORTIONS OF RTE. 1 (WASHINGTON STREET) ROADWAY. LOCATION, WIDTH, DEPTH AND THICKNESS UNCERTAIN.
7. HYDRANTS SHALL BE INSTALLED AND PRESSURE TESTED THROUGH LATERALS TO HYDRANT VALVES. HYDRANT LATERALS SHALL CROSS UNDER EXISTING WATERMAINS AND OTHER UTILITIES.


## WASHINGTON ST PROFILE (STATION 28+00 TO 40+00)

NOTE:
FINAL INSTALLED DEPTH REQUIREMENTS FOR NEW MAINS SHALL NOT BE BASED ON THIS PROFILE. RATHER, REQUIRED DEPTHS OF NEW MAINS SHALL BE GOVERNED BY MINIMUM DEPTH AND UTILITY CLEARANCE REQUIREMENTS.

# ROUTE 1 WATER MAIN IMPROVEMENTS

(DPW) CONTRACT 2018-003

WRENTHAM, MASSACHUSETTS 02093

WRENTHAM DPW ADDENDUM NO. 1 JANUARY 2017

PREPARED FOR:

Town of Wrentham

79 South Street
Wrentham, Massachusetts 02093

PREPARED BY:

GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com



BASE PLANS AND PROFILES FURNISHED BY:
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THOMAS C. REXTON
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| 2 | MG | TS | 1/30/18 | ADDENDUM NO. 1 |
| 1 | RD | JP | 1/10/18 | DPW COMMENTS |

| | | | |
|---|---|---|---|
| DATE: | 10/5/2017 | DESIGN BY: | JP |
| SCALE: | AS SHOWN | DRAWN BY: | KP |
| APPRVD. BY: | 1"=40' | CHECK BY: | JP |

# WASHINGTON ST PLAN AND PROFILE 28+00-40+00

PLOT DATE: Jan 30, 2018 3:47 pm

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|---|---|
| DWG: | 20345U.dwg |
| LAYOUT: | C-6 |
| SHEET: | 6 OF 9 |
| PROJECT NO.: | 20345 |

C-6

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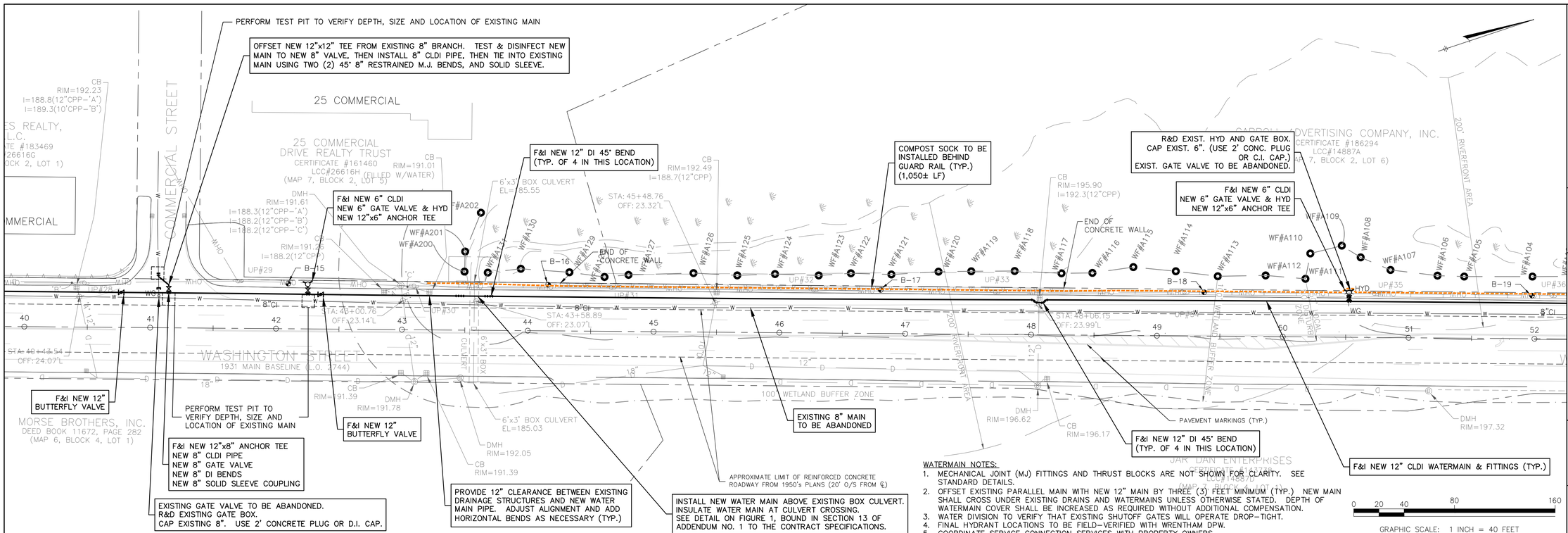


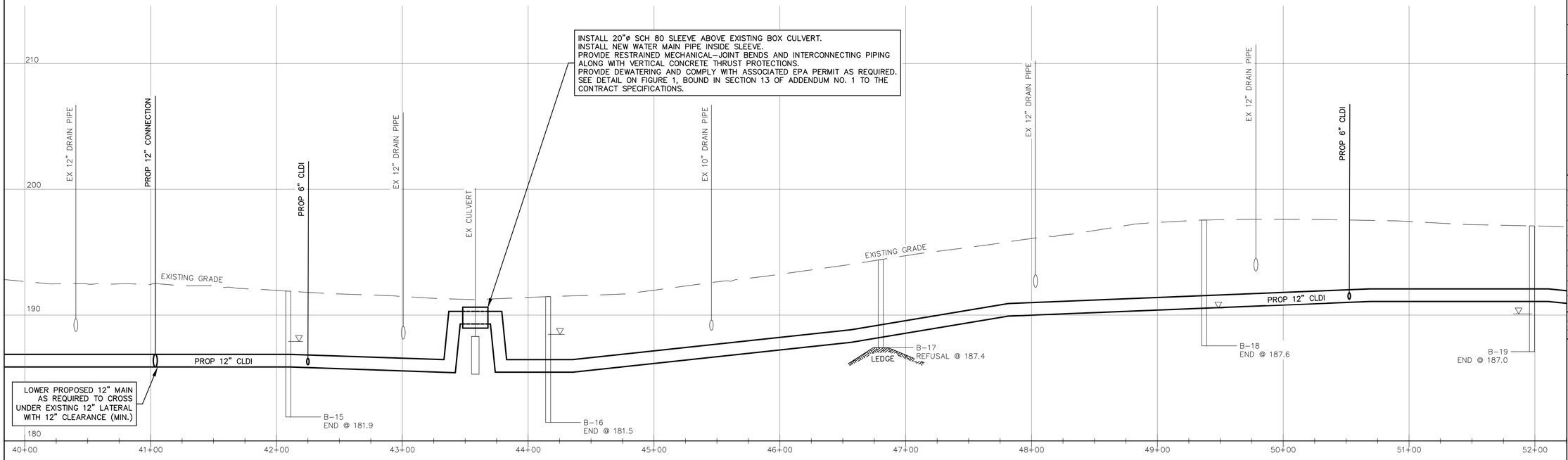

## WASHINGTON ST PLAN (STATION 40+00 TO 52+00)

WATERMAIN NOTES:

1. MECHANICAL JOINT (MJ) FITTINGS AND THRUST BLOCKS ARE NOT SHOWN FOR CLARITY. SEE STANDARD DETAILS.
2. OFFSET EXISTING PARALLEL MAIN WITH NEW 12" MAIN BY THREE (3) FEET MINIMUM (TYP.) NEW MAIN SHALL CROSS UNDER EXISTING DRAINS AND WATERMAINS UNLESS OTHERWISE STATED. DEPTH OF WATERMAIN COVER SHALL BE INCREASED AS REQUIRED WITHOUT ADDITIONAL COMPENSATION.
3. WATER DIVISION TO VERIFY THAT EXISTING SHUTOFF GATES WILL OPERATE DROP-TIGHT.
4. FINAL HYDRANT LOCATIONS TO BE FIELD-VERIFIED WITH WRENTHAM DPW.
5. COORDINATE SERVICE CONNECTION SERVICES WITH PROPERTY OWNERS.
6. EXISTING REINFORCED CONCRETE SURFACE BENEATH PORTIONS OF RTE. 1 (WASHINGTON STREET) ROADWAY. LOCATION, WIDTH, DEPTH AND THICKNESS UNCERTAIN.
7. HYDRANTS SHALL BE INSTALLED AND PRESSURE TESTED THROUGH LATERALS TO HYDRANT VALVES. HYDRANT LATERALS SHALL CROSS UNDER EXISTING WATERMAINS AND OTHER UTILITIES.

0 20 40 80 160

GRAPHIC SCALE: 1 INCH = 40 FEET




## WASHINGTON ST PROFILE (STATION 40+00 TO 52+00)

NOTE:
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0 20 40 80 160

GRAPHIC SCALE: 1 INCH = 40 FEET HORIZONTAL
1 INCH = 4 FEET VERTICAL

# ROUTE 1 WATER MAIN IMPROVEMENTS

(DPW) CONTRACT 2018-003

WRENTHAM, MASSACHUSETTS 02093

WRENTHAM DPW ADDENDUM NO. 1 JANUARY 2017

PREPARED FOR:

Town of Wrentham

79 South Street
Wrentham, Massachusetts 02093

PREPARED BY:

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| APPRVD. BY: | 1"=40' | CHECK BY: | JP |

# WASHINGTON ST PLAN AND PROFILE 40+00-52+00

PLOT DATE: Jan 30, 2018 3:47 pm

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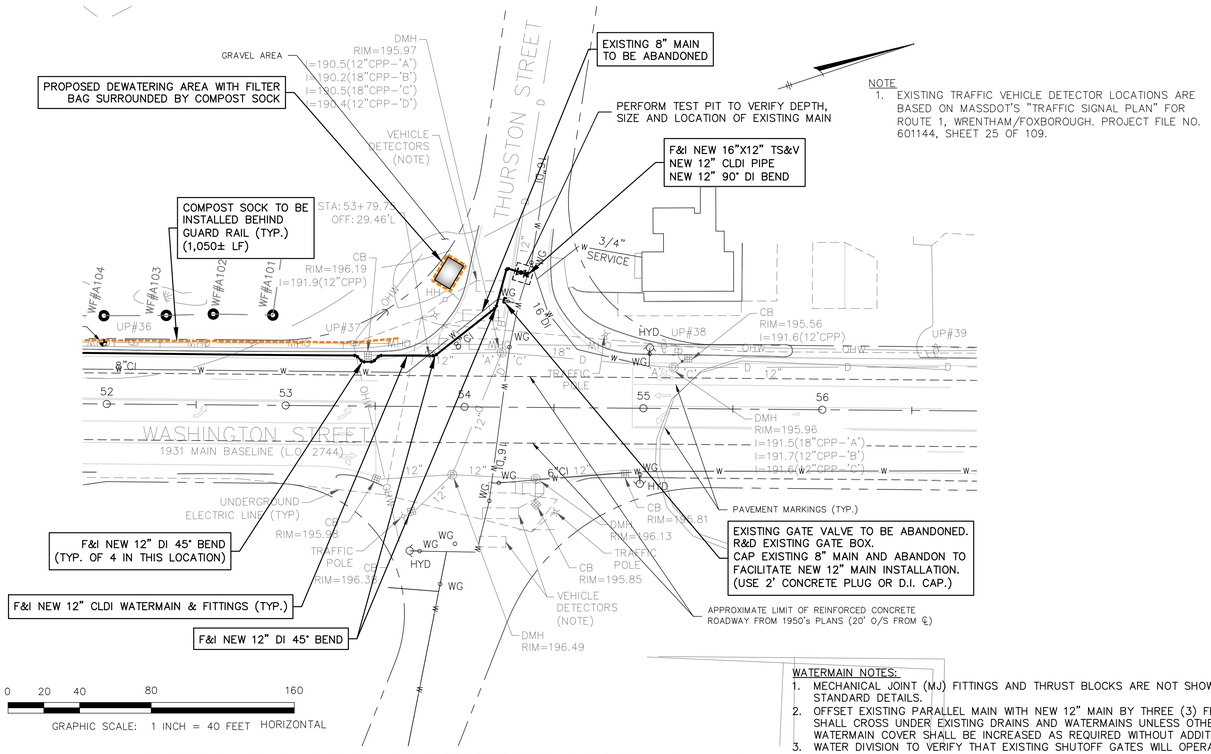
|---|---|
| DWG: | 20345U.dwg |
| LAYOUT: | C-7 |
| SHEET: | 7 OF 9 |
| PROJECT NO.: | 20345 |

C-7

PATH: J:\18\01\20345 - Wrentham DPW On call\Figures-CAD\dwg\




## WASHINGTON ST PLAN (STATION 52+00 TO 54+50)

NOTE
1. EXISTING TRAFFIC VEHICLE DETECTOR LOCATIONS ARE BASED ON MASSDOT'S "TRAFFIC SIGNAL PLAN" FOR ROUTE 1, WRENTHAM/FOXBOROUGH. PROJECT FILE NO. 601144, SHEET 25 OF 109.

WATERMAIN NOTES:
1. MECHANICAL JOINT (MJ) FITTINGS AND THRUST BLOCKS ARE NOT SHOWN FOR CLARITY. SEE STANDARD DETAILS.
2. OFFSET EXISTING PARALLEL MAIN WITH NEW 12" MAIN BY THREE (3) FEET MINIMUM (TYP.) NEW MAIN SHALL CROSS UNDER EXISTING DRAINS AND WATERMAINS UNLESS OTHERWISE STATED. DEPTH OF WATERMAIN COVER SHALL BE INCREASED AS REQUIRED WITHOUT ADDITIONAL COMPENSATION.
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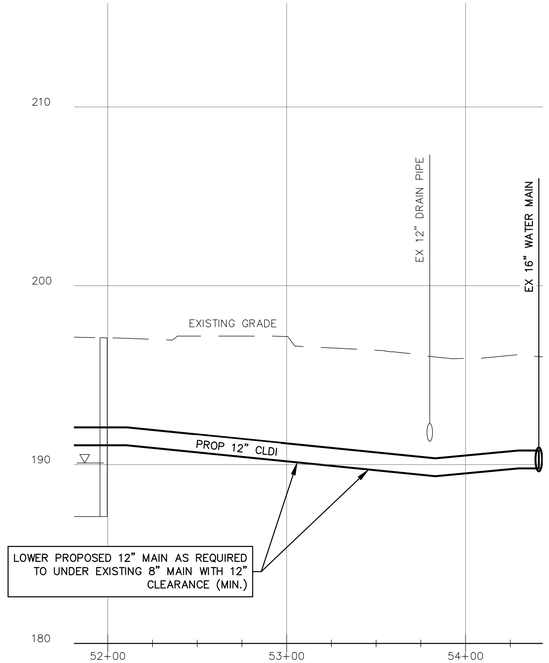
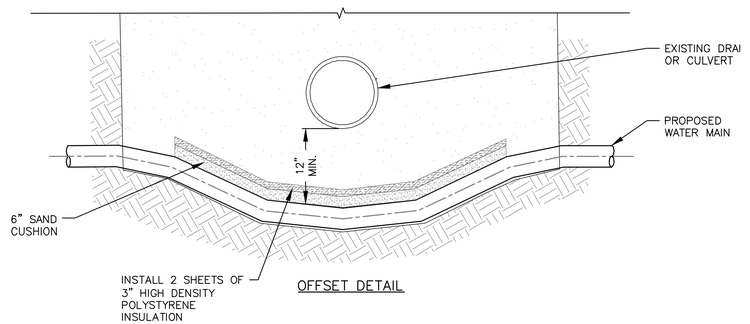
7. HYDRANTS SHALL BE INSTALLED AND PRESSURE TESTED THROUGH LATERALS TO HYDRANT VALVES. HYDRANT LATERALS SHALL CROSS UNDER EXISTING WATERMAINS AND OTHER UTILITIES.



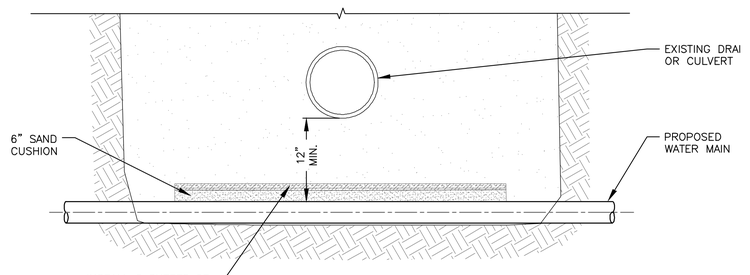

NOTE:
FINAL INSTALLED DEPTH REQUIREMENTS FOR NEW MAINS SHALL NOT BE BASED ON THIS PROFILE. RATHER, REQUIRED DEPTHS OF NEW MAINS SHALL BE GOVERNED BY MINIMUM DEPTH AND UTILITY CLEARANCE REQUIREMENTS.

## WASHINGTON ST PROFILE (STATION 52+00 TO 54+50)

0 20 40 80 160
GRAPHIC SCALE: 1 INCH = 40 FEET HORIZONTAL
1 INCH = 4 FEET VERTICAL



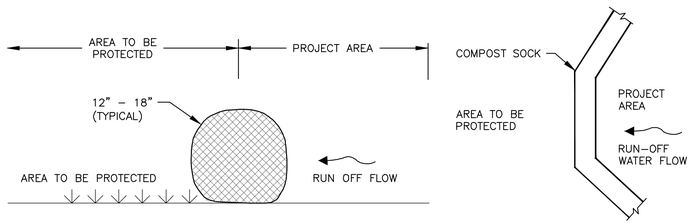

OFFSET DETAIL




TYPICAL DETAIL

WATER MAIN
DRAIN/CULVERT CROSSING
NOT TO SCALE

NOTES:
1. INSULATION AND SAND CUSHION TO EXTEND 8' ON EITHER SIDE OF CROSSING (TYP. BOTH VIEWS)
2. IN THE EVENT OF THE NEED TO EXCAVATE DEEPER THAN INSTALLATION GRADE, TO CROSS A DRAIN/CULVERT, NO FITTINGS ARE TO BE USED WITHOUT CONTRACTORS THRUST RESTRAINT PROPOSAL AND ENGINEER'S WRITTEN APPROVAL.
3. DEPTH ADJUSTMENT WILL BE MADE BY GRADUAL EXCAVATION ADJUSTMENT.
4. ADDITIONAL SAND CUSHION REQUIRED PER TRENCH DETAIL.

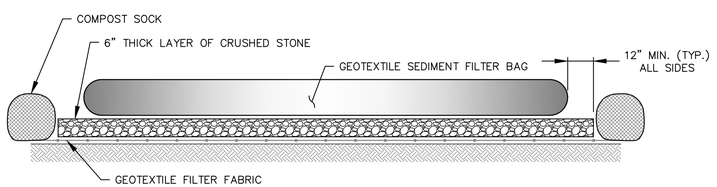



SECTION VIEW

PLAN VIEW

TYPICAL EROSION CONTROL COMPOST SOCK
NOT TO SCALE

NOTES:
1. COMPOST SOCK FILL TO MEET APPLICATION REQUIREMENTS.
2. COMPOST SOCK DEPICTED IS FOR MINIMUM SLOPES. GREATER SLOPES MAY REQUIRE LARGE SOCKS PER THE ENGINEER.
3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY THE ENGINEER.
4. ADDITIONAL MEASURES WILL BE REQUIRED FOR CONSTRUCTION DEWATERING.




DEWATERING AREA DETAIL
NOT TO SCALE

# ROUTE 1 WATER MAIN IMPROVEMENTS

(DPW) CONTRACT 2018-003

WRENTHAM, MASSACHUSETTS 02093

WRENTHAM DPW
ADDENDUM NO. 1
JANUARY 2017

PREPARED FOR:

Town of Wrentham

79 South Street
Wrentham, Massachusetts 02093

PREPARED BY:

GZA GeoEnvironmental, Inc.
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| NO. | BY | APP | DATE | ISSUE/REVISION DESCRIPTION |
|---|---|---|---|---|
| 2 | MG | TS | 1/30/18 | ADDENDUM NO. 1 |
| 1 | RD | JP | 1/10/18 | DPW COMMENTS |

| | | | |
|---|---|---|---|
| DATE: | 10/5/2017 | DESIGN BY: | JP |
| SCALE: | AS SHOWN | DRAWN BY: | KP |
| APPRVD. BY: | 1"=40' | CHECK BY: | JP |

# WASHINGTON ST PLAN AND PROFILE 52+00-54+50

PLOT DATE: Jan 30, 2018 3:47 pm

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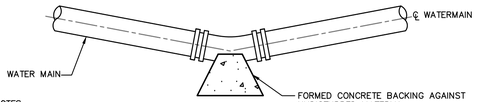
|---|---|
| DWG: | 20345U.dwg |
| LAYOUT: | C-8 |
| SHEET: | 8 OF 9 |

C-8

PROJECT NO.: 20345

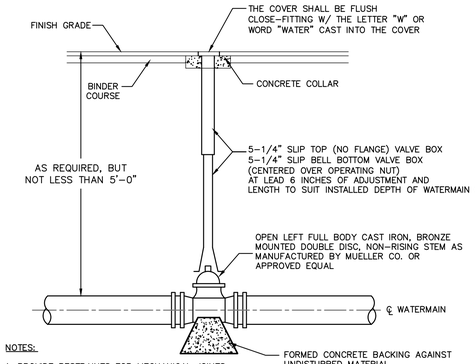
PATH: J:\18\01\20345 - Wrentham DPW On call\Plans-CAD\dwg\

| TABLE OF BEARING AREAS IN SQUARE FEET AGAINST UNDISTURBED MATERIAL FOR WATER MAIN FITTINGS | | | |
|---|---|---|---|
| SIZE OF MAIN (IN) | 45° BEND (S.F.) | TEES & PLUGS | 22 1/2° BEND |
| 8" & LESS | 8 | 10 | 8 |
| 10" – 12" | 22 | 16 | 13 |



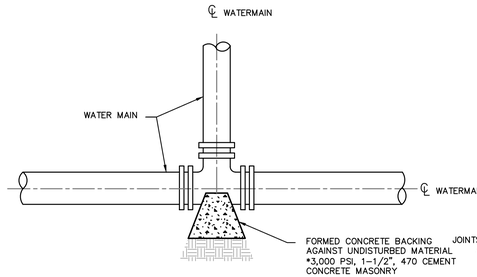

NOTES:
ALL TEES, GATES, PLUGS AND BENDS ARE TO BE CONNECTED WITH MEGALUGS AT BELL JOINTS

## TYPICAL BEND
N.T.S.

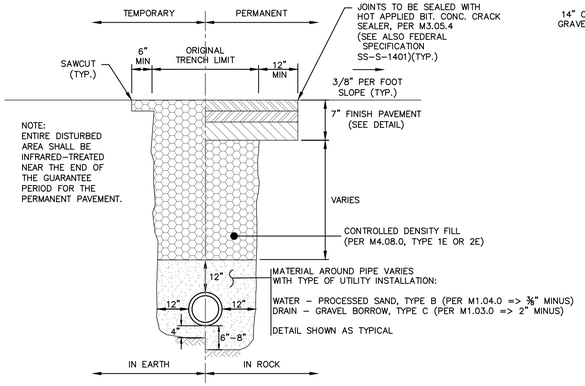



NOTES:
1. PROVIDE RESTRAINTS FOR MECHANICAL JOINTS (MEGALUG, RODS OR APPROVED EQUAL)
2. GATE VALVE MUST CONFORM TO THE LATEST REVISIONS OF AWWA STANDARD C–509

## TYPICAL GATE VALVE OR BUTTERFLY VALVE
N.T.S.

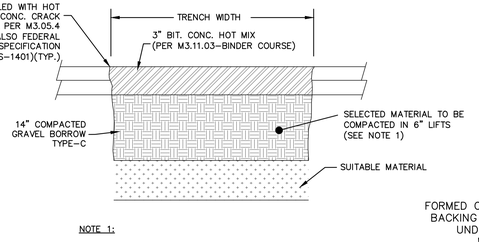



## TEE CONNECTION
N.T.S.



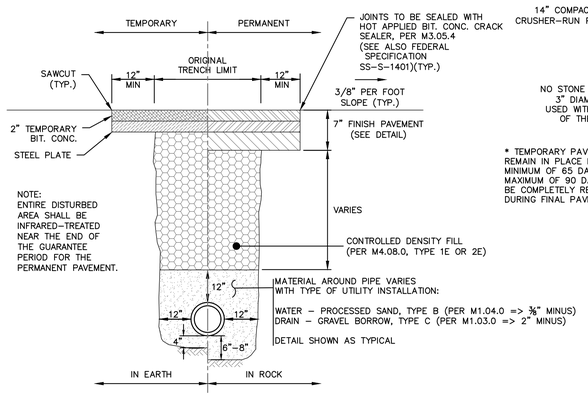

NOTE:
ENTIRE DISTURBED AREA SHALL BE INFRARED–TREATED NEAR THE END OF THE GUARANTEE PERIOD FOR THE PERMANENT PAVEMENT.

## TYPICAL FLOWABLE FILL TRENCH WITHIN MASS DOT ROUTE 1 PAVED SHOULDER ONLY
NTS



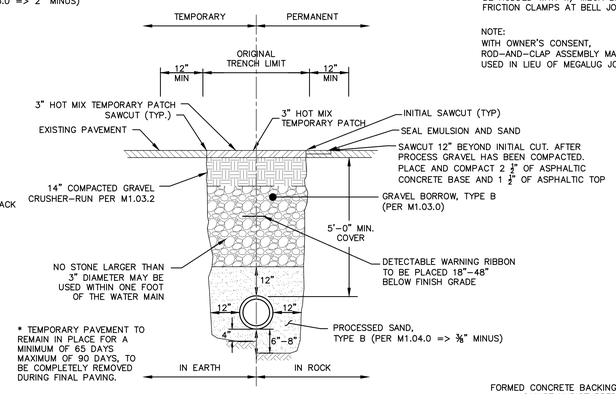

NOTE 1:
COMPACTION EQUIPMENT SHALL MEET OR EXCEED THE MINIMUM REQUIREMENTS TO OBTAIN THE COMPACTION STANDARDS DESCRIBED IN THE CONSTRUCTION NOTES, UNLESS OTHERWISE APPROVED AND SHALL BE AS REQUIRED BY THE MASS DOT HIGHWAY OPENING PERMIT.

## TEMPORARY TRENCH PAVING TYPICAL SECTION
NTS



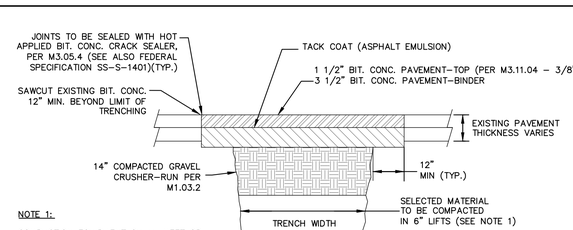

NOTE:
ENTIRE DISTURBED AREA SHALL BE INFRARED–TREATED NEAR THE END OF THE GUARANTEE PERIOD FOR THE PERMANENT PAVEMENT.

## TYPICAL FLOWABLE FILL TRENCH WITHIN MASS DOT ROUTE 1 TRAVELED LANE ONLY
NTS



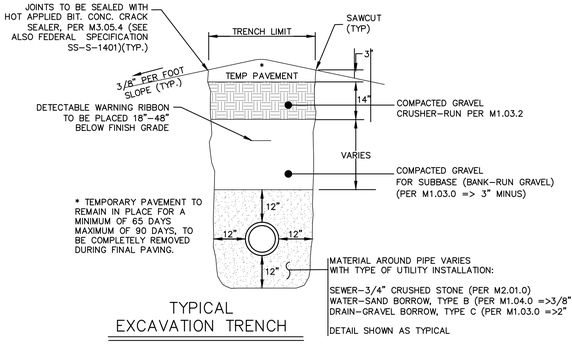

* TEMPORARY PAVEMENT TO REMAIN IN PLACE FOR A MINIMUM OF 65 DAYS MAXIMUM OF 90 DAYS, TO BE COMPLETELY REMOVED DURING FINAL PAVING.

## TYPICAL WATER TRENCH FOR USE OUTSIDE ROUTE 1 ONLY
NTS



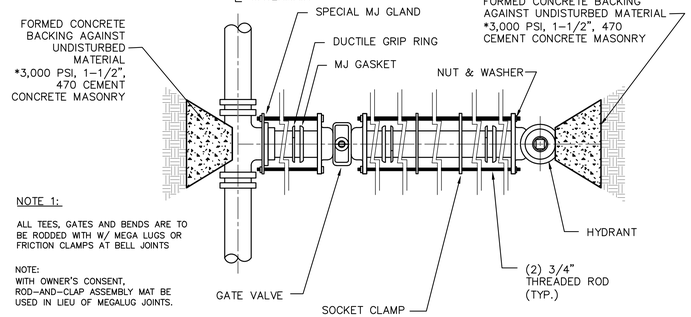

NOTE 1:
COMPACTION EQUIPMENT SHALL MEET OR EXCEED THE MINIMUM REQUIREMENTS TO OBTAIN THE COMPACTION STANDARDS DESCRIBED IN THE CONSTRUCTION NOTES, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER. IN PROXIMITY TO STRUCTURES, A JUMPING JACK COMPACTOR SHALL BE REQUIRED.

## TYPICAL FINAL TRENCH PAVING
NTS




* TEMPORARY PAVEMENT TO REMAIN IN PLACE FOR A MINIMUM OF 65 DAYS MAXIMUM OF 90 DAYS, TO BE COMPLETELY REMOVED DURING FINAL PAVING.

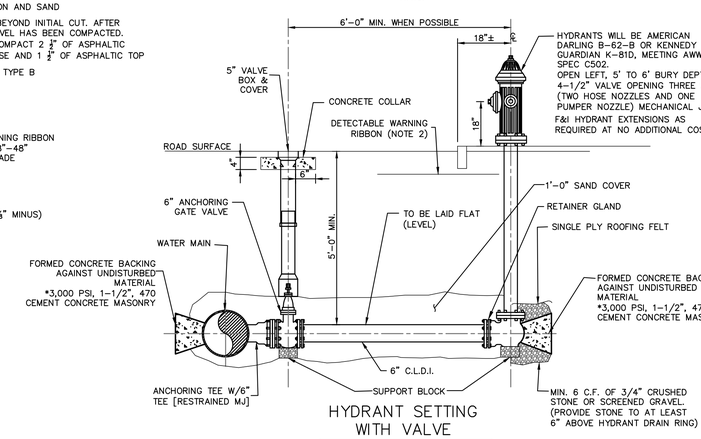
## TYPICAL EXCAVATION TRENCH
NTS




NOTE 1:
ALL TEES, GATES AND BENDS ARE TO BE RODDED WITH W/ MEGA LUGS OR FRICTION CLAMPS AT BELL JOINTS

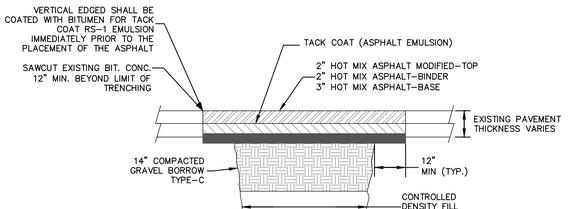
NOTE:
WITH OWNER'S CONSENT, ROD–AND–CLAP ASSEMBLY MAT BE USED IN LIEU OF MEGALUG JOINTS.

## HYDRANT ASSEMBLY VALVE CONNECTION
N.T.S.



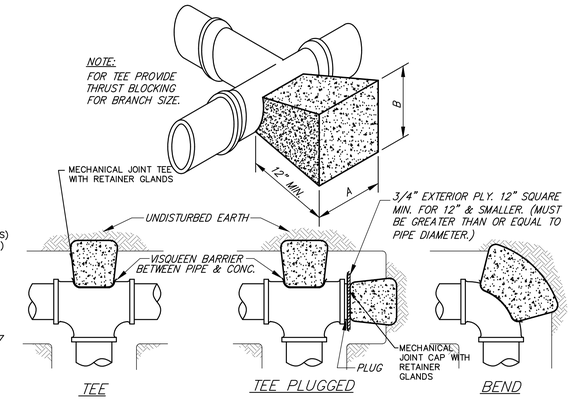

NOTES:
1. PROVIDE HYDRANT AND VALVE JOINTS WITH RESTRAINED MECHANICAL JOINTS (MEGALUG OR APPROVED EQUAL).
2. SUPPORT BLOCKS TO BE CONCRETE MASONRY BLOCKS.
3. ALL VALVES OPEN LEFT.

## HYDRANT SETTING WITH VALVE
N.T.S.




NOTE 1:
COMPACTION EQUIPMENT SHALL MEET OR EXCEED THE MINIMUM REQUIREMENTS TO OBTAIN THE COMPACTION STANDARDS DESCRIBED IN THE CONSTRUCTION NOTES, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER. IN PROXIMITY TO STRUCTURES, A JUMPING JACK COMPACTOR SHALL BE REQUIRED.

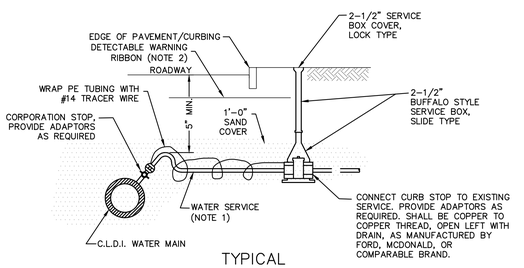
## FINAL TRENCH PAVING WITHIN ROUTE 1 ONLY
NTS




| DIMENSION FOR THRUST BLOCKING | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| FITTING | TEES & PLUGS | | 90° BENDS | | 45° BENDS & "Ys" | | 22 1/2° BENDS | |
| SIZES | A | B | A | B | A | B | A | B |
| 4" | 1'–6" | 1'–6" | 1'–6" | 1'–9" | 1'–3" | 0'–6" | 1'–0" | 0'–6" |
| 6" | 2'–0" | 1'–0" | 2'–0" | 2'–0" | 1'–3" | 1'–6" | 1'–0" | 1'–5" |
| 8" | 2'–0" | 1'–6" | 2'–3" | 2'–3" | 1'–8" | 1'–8" | 1'–0" | 1'–3" |
| 10" | 2'–6" | 2'–3" | 2'–9" | 2'–10" | 2'–3" | 1'–10" | 1'–3" | 2'–0" |
| 12" | 3'–0" | 2'–9" | 3'–6" | 3'–3" | 2'–6" | 2'–4" | 2'–0" | 1'–6" |
| 14" | 3'–5" | 3'–0" | 4'–0" | 3'–8" | 3'–6" | 2'–4" | 2'–0" | 2'–3" |

1. THIS TABLE IS BASED ON 200 P.S.I. MAIN PRESSURE AND 2000 P.S.F. SOIL–BEARING PRESSURE. ADJUST BEARING AREAS IN ACCORDANCE WITH SOIL CONDITIONS AND PRESSURES ENCOUNTERED.
2. USE VISQUEEN BARRIER BETWEEN PIPE AND CONCRETE AS SHOWN IN DETAIL ABOVE.
3. CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 2500 PSI AT 28 DAYS.
4. BLOCKING SIZE/FREQUENCY SHALL BE INCREASED IF REQUIRED BY ENGINEER.

## THRUST BLOCK SCHEDULE
NOT TO SCALE




## TYPICAL SERVICE CONNECTION
N.T.S.

NOTES:
1. WATER SERVICE PIPE SHALL BE 1" MIN POLYETHYLENE (CLASS 3408, 200–PSI, COLOR BLUE) OR 1" MIN TYPE–K COPPER TUBING. SERVICE PIPE OVER 2" SHALL BE DUCTILE IRON.
2. DETECTABLE WARNING RIBBON SHALL BE CLEARLY PRINTED WITH THE WORD "WATER" AND PLACED AT 2 FEET BELOW FINISH GRADE.
3. FLUSH ALL NEW SERVICE LINES PRIOR TO CONNECTION.
4. UPON CONNECTION, REMOVE AND DISPOSE OF OLD SERVICE LINE (FROM CORPORATION VALVE TO CURB STOP), CURB STOP, AND BOX.
5. SERVICE PIPE AND CURB STOP TO BE ENCASED IN 12" MIN SAND.
6. ALL FITTINGS, CONNECTIONS, CORPORATIONS, CURB STOPS AND SERVICE APPURTENANCES SHALL BE SERVICE BRASS AS FOLLOWS: SERVICE BRASS SHALL CONFORM TO AWWA STANDARD C–800 (LATEST REVISION) AND PACK JOINT END CONNECTIONS SHALL CONSIST OF BUNA–N BEVELED GASKET FOR WATERTIGHT SEAL, AN INDEPENDENT, SPLIT–CLAMP LOCKING DEVICE OR STAINLESS STEEL BEVELED GRIPPER SHALL BE INCORPORATED IN THE DESIGN FOR ADDITIONAL RESTRAINT. FORD MUELLER OR McDONALD SERVICE BRASS IS ACCEPTED WITHOUT SUBSTITUTE.

# ROUTE 1 WATER MAIN IMPROVEMENTS

## (DPW) CONTRACT 2018–003

WRENTHAM, MASSACHUSETTS 02093

WRENTHAM DPW ADDENDUM NO. 1 JANUARY 2017

PREPARED FOR:

**Town of Wrentham**

79 South Street
Wrentham, Massachusetts 02093

PREPARED BY:


GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com




BASE PLANS AND PROFILES FURNISHED BY:
HANCOCK ASSOCIATES
315 ELM STREET, MARLBOROUGH, MA 01752
VOICE (508) 460–1111, FAX (508) 460–1121
WWW.HANCOCKASSOCIATES.COM

COMMONWEALTH OF MASSACHUSETTS
THOMAS C. REXTON
CIVIL
No. 34567
REGISTERED PROFESSIONAL ENGINEER
Thomas C Rexton

| NO. | BY | APP | DATE | ISSUE/REVISION DESCRIPTION |
|---|---|---|---|---|
| 2 | MG | TS | 1/30/18 | ADDENDUM NO. 1 |
| 1 | RD | JP | 1/10/18 | DPW COMMENTS |

| | | | |
|---|---|---|---|
| DATE: | 10/5/2017 | DESIGN BY: | JP |
| SCALE: | AS SHOWN | DRAWN BY: | KP |
| APPRVD. BY: | 1"=40' | CHECK BY: | JP |

# SITEWORK DETAILS SHEET

PLOT DATE: Jan 30, 2018 3:47 pm

| | |
|---|---|
| DWG: | 20345U.dwg |
| LAYOUT: | C–9 |
| SHEET: | 9 OF 9 |
| PROJECT NO.: | 20345 |

**C-9**

PATH: J:\18.07\3534 – Wrentham DPW On call\Figures–CAD\dwg\

# ATTACHMENT H

# CONSTRUCITON SPECIFICATION SECTION
# 01567 ENVIRONMENTAL PROTECTION

SECTION 01567

ENVIRONMENTAL PROTECTION

## PART 1. GENERAL

### 1.1 DESCRIPTION

A. The work covered by this section of the specifications consists of furnishing all labor, materials, equipment, and services, and performing all work required for the prevention of environmental pollution during and as a result of construction operations under this contract.

B. All work under this Contract shall be in accordance with the conditions stated herein and in the GENERAL CONDITIONS.

C. All erosion control devices shall be constructed or installed prior to beginning any form of excavation, grading, placement of materials, or general construction.

D. Insofar as possible, construction activities shall be confined to those areas defined by the plans and specifications. All land resources within the project shall be preserved in their present condition or be restored to a condition after completion of construction at least equal to that which existed prior to work.

E. The location of storage areas for equipment and/or materials shall be upon cleared portions of the job site or areas to be cleared, as approved.

F. Adequate measures for erosion and sediment control such as the placement of filter socks around the downstream perimeter of stockpiles shall be employed to protect any downstream areas from siltation.

G. Any water that is pumped and discharged from an excavation shall be filtered by an approved method prior to its discharge into a receiving water or drainage system.

H. The pumped water shall be filtered through filter sock, a vegetative filter strip or a vegetated channel to trap sediment occurring as a result of the construction operations. The vegetated channel shall be constructed such that the discharge flow rate shall not exceed a velocity of more than one foot per second. The sediment shall be cleared from the channel periodically.

I. In order to trap sediment and to prevent sediment from clogging drainage systems, filter sock or straw shall be used as shown on the following detail(s) or as directed by the Owner. Care shall be taken to keep them from breaking apart. The filter socks should be securely staked to prevent overturning, flotation, or displacement. All deposited sediment shall be removed periodically.

J. Where material or debris has washed or flowed into or has been placed in existing watercourses, ditches, drains, pipes or structures, such material or debris shall be entirely removed and satisfactorily disposed of during progress of the work, and the ditches, channels, drains, pipes, structures, and work shall, upon completion of the work, be left in a clean and neat condition.

## PART 2. PRODUCTS

### 2.1 SILT FENCE

A. The silt fence shall consist of a 3-foot wide continuous length sediment control fabric, stitched to a 25-foot wide continuous length support netting, and stapled to preweathered oak posts spaced at a maximum of 7-feet. The oak posts shall be 2-inches by 2-inches by 4-feet 6-inches and shall be tapered. The support netting shall be industrial strength polypropylene. The sediment control fabric should conform to the following properties:

1. Minimum weight of 2.5 oz./sy (ASTM D3776-79)
2. Minimum thickness of 17 mils (ASTM D1777-79)
3. Minimum tear strength of 65 lbs. (ASTM D1117-80)
4. Minimum burst strength of 210 psi (ASTM D3786-80)
5. Minimum coeff. of permeability of 0.0009 cm/sec.
6. Equivalent opening size (EOS) 20 (U.S. Standard Sieve)
7. Water flow rate of 40 gal/min/st.

B. Sediment control fabric shall be non-rotting, acid, and alkali resistant and have sufficient strength and permeability for the purpose intended, including handling and backfilling operations. Fibers shall be low water absorbent. The fiber network must be dimensionally stable and resistant to delamination. The fabric shall be free of any chemical treatment or coating that will reduce its permeability. The fabric shall also be free of any flaws or defects which will alter its physical properties. Torn or punctured fabrics shall not be used. For each specific use, only commercially available fabric which is certified in writing by the manufacturer for the purpose intended shall be used. The Contractor shall submit a two-foot square sample of each type of fabric to be used, along with technical data sheet and certified test reports. The Owner reserves the right to reject any fabric which he deems unsatisfactory for a specific use. The brand name shall be labeled on the fabric or the fabric container.

C. Fabrics which are susceptible to damage from sunlight or heat shall be so identified by suitable warning information on the packaging material. Fabrics susceptible to sunlight damage shall not be used in any installations where exposure to light will exceed 30 days, unless specifically authorized in writing by the Owner.

### 2.2 CATCH BASIN SILT FILTERING SYSTEM

A. Silt filtering system for catch basins accepting drainage from the site shall be Siltsack as manufactured by ACF Environmental Inc. Richmond, VA. and distributed by A. H. Harris, or approved equal.

1. Manufactured to fit opening of catch basins or drop inlet.
2. Two dump straps attached to the bottom to facilitate emptying the sack.
3. Lifting loops as an integral part of the Siltsack to be used in lifting the Siltsack from the basin.
4. A restraint cord approximately halfway up the sack to keep the sides away from the catch basin walls.

5. Manufactured from woven polypropylene fabric with the following properties:

| | | |
|---|---|---|
| a. | Grab Tensile | ASTM D-4632 300 lbs. |
| b. | Grab Elongation | ASTM D-4632 20% |
| c. | Puncture | ASTM D-4833 120 lbs. |
| d. | Mullen Burst | ASTM D-3786 800 psi. |
| e. | Trapezoid Tear | ASTM D-4533 120 lbs. |
| f. | Apparent Opng. | ASTM D-4751 40 US Sieve |
| g. | Flow Rate | ASTM D-4491 40 gpm/sf |

2.3 FILTER SOCKS

A. Compost used for the Filter Sock shall be weed free and derived from a well-decomposed source of organic matter. The compost shall be produced using an aerobic composting process meeting CFR 503 regulations, including time and temperature data indicating effective weed seed, pathogen and insect larvae kill. The compost shall be free of any refuse, contaminates or other materials toxic to plant growth. Non-composted products will not be accepted. Test methods for the items below should follow USCC TMECC guidelines for laboratory procedures:

1. pH - 5A-8.0 in accordance with TMECC 04.11-A, "Electrometric pH Determinations for Compost".
2. Particle size - 99% passing a 2" sieve and a minimum of 60% greater than the 3/8" sieve, in accordance with TMECC 02.02-B, "Sample Sieving for Aggregate Size Classification".
3. Moisture content of less than 60% in accordance with standardized test methods for moisture determination.
4. Material shall be relatively free (< 1% by dry weight) of inert or foreign man made materials.
5. A sample shall be submitted to the engineer for approval prior to being used and must comply with all local, state and federal regulations.

B. Filter socks shall be as manufactured by Silt Sock Erosion Control Products, Inc. or approved equal. The sock shall be installed where indicated or specified in the Contract Documents.

PART 3. EXECUTION

3.1 NOTIFICATION

A. The Owner will notify the Contractor in writing of any non-compliance with the foregoing provisions. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails to act promptly, the Owner may order stoppage of all or part of the work until satisfactorily corrective action has been taken. No claim for an extension of time or for excess costs or damage incurred by the Contractor as a result of time lost due to any stop orders shall be made unless it was later determined that the Contractor was in compliance.

3.2 AREAS OF CONSTRUCTION ACTIVITY

A. Insofar as possible, the Contractor shall confine his construction activities to those areas defined by the plans and specifications. All land resources within the project boundaries under this contract shall be preserved in their present condition or be restored to a condition after completion of construction at least equal to that which existed prior to work under this contract.

3.3 PROTECTION OF WATER RESOURCES

A. The Contractor shall not pollute streams, wetlands, or ponds with fuels, oils, bitumens, calcium chloride, acids, or harmful materials. It is the Contractor's responsibility to comply with all applicable Federal, State, County and Municipal laws regarding pollution of rivers, wetlands, and streams.

B. Special measures should be taken to insure against spillage of any pollutants into public waters.

3.4 LOCATION OF STORAGE AREAS

A. The location of the Contractor's storage areas for equipment and/or materials shall be upon portions of the job site and shall require written approval of the Owner. Plans showing storage facilities for equipment and materials shall be submitted for approval of the Owner.

B. Adequate measures for erosion and sediment control, such as the placement of filter sock or straw around the downstream perimeter of stockpiles, shall be employed to protect any downstream areas from siltation.

C. The Owner may designate a particular area or areas where the Contractor may store materials used in his operations.

3.5 DISCHARGE OF DEWATERING OPERATIONS

A. Any water that is pumped and discharged from an excavation as part of the Contractor's water handling shall be filtered by an approved method prior to its discharge into a receiving water or drainage system.

B. The pumped water shall be filtered through filter sock, a vegetative filter strip or a vegetated channel to trap sediment occurring as a result of the construction operations. The vegetated channel shall be constructed such that the discharge flow rate shall not exceed a velocity of more than 1 foot per second. The sediment shall be cleared from the channel periodically.

3.6 PROTECTION OF AIR RESOURCES

A. During the progress of work, the Contractor shall conduct his operations and maintain the area of his activities, including sweeping and sprinkling of water as necessary, so as to minimize the creation and dispersion of dust.

1. If the Engineer decides that it is necessary to use calcium chloride for more effective dust control, then the Contractor shall furnish and apply the material as directed.

2. Calcium chloride shall be commercial grade, furnished in 100-pound, 5-ply bags, stored under weatherproof cover and stacked alternately for ventilation.

3. Application for dust control shall be at the rate of about 1/2 pound per square yard per application.

B. Burning of rubbish and waste material on the site shall not be permitted.

3.7 SEPARATION AND REPLACEMENT OF TOPSOIL

A. Topsoil shall be carefully removed and separately stored to be used again as directed. The topsoil shall be stored in an area acceptable to the Owner and adequate measures shall be employed to prevent erosion of said material.

3.8 FILTER SOCK

A. To trap sediment and to prevent sediment from clogging drainage systems, filter socks shall be used where indicated on the drawings or where directed by the Owner. Care shall be taken to keep them from breaking apart. The filter socks should be securely staked to prevent overturning, flotation, or displacement. All deposited sediment shall be removed periodically.

B. Filter socks shall be maintained or replaced until they are no longer necessary for the program intended or are ordered removed by the Owner.

3.9 SILT FENCE

A. Where indicated on the drawings or where directed by the Owner, the Contractor shall erect and maintain a temporary silt fence. The silt fence shall be used specifically to contain sediment from runoff water and to minimize environmental damage caused by construction.

B. The 4.5 foot oak posts shall be driven so that 2-feet remain above the ground. A 6-inch by 6-inch trench shall then be excavated at the base of the fence for the purpose of laying, backfilling and tamping, a minimum of 6-inches of the filter fabric.

C. The Contractor shall remove the trapped sediment as soon as it reaches a depth of 1-foot or when directed by the Owner.

D. The silt fence systems will be completely removed from the project at the completion of the project, unless specifically authorized by the Owner to be left in place.

3.10 INITIAL SEQUENCE OF CONSTRUCTION ACTIVITIES AND PRELIMINARY DRAINAGE CONTROL

A. Prior to beginning any dewatering, excavation or filling, the Contractor shall perform the following sequence of implementation of sedimentation and siltation control measures.

1. Perform all necessary work to install all anticipated sedimentation barriers including but not necessarily limited to haybales, siltation fences, filtration dams, siltation sumps, sedimentation tanks and other items as necessary. Provide all necessary sedimentation and siltation control measures as required by the Engineer, Town, and regulatory agencies, to minimize sedimentation or siltation from occurring beyond the immediate limits of work.

2. In addition to initial sedimentation and siltation control set-up measures, take additional steps as necessary to minimize sedimentation and siltation within work areas and eliminate sedimentation and siltation outside of work areas throughout the conduct of the Work at no additional cost to the Town. These shall include, but not be limited to, stabilized construction entrances and other such measures.

3. Damaged or loose haybales and siltation fence or other control measures shall be replaced as necessary to maintain their function of controlling sedimentation and siltation. Damaged or broken temporary siltation sumps or other items installed for sedimentation and siltation control shall be replaced immediately.

4. Remove any accumulation of silt or soil build up behind haybales, silt fences, filter socks or siltation dams, as it occurs. Remove accumulations of silt and soil build up from siltation sumps, sedimentation basins and silt traps as necessary to properly maintain their function.

B. Following periodic cleaning of all sedimentation controls and upon completion of the use of the controls, the accumulated sediment shall be allowed to dry prior to transporting to on-site disposal locations designated by the Engineer. Costs of said disposal shall be included as part of the lump sum price stated on the Form for Bid. Accumulated sediment shall be disposed of by incorporation into topsoil or pipe backfill, as judged appropriate by the Engineer, and placement on-site.

C. The Contractor shall repair any damage resulting from sedimentation or siltation and related activities and restore property to its prior condition at no additional cost to the Town.

3.11 ADDITIONAL EROSION AND SEDIMENTATION CONTROLS

A. The Engineer shall make periodic inspections of the site and shall advise the Contractor of the need for additional erosion and sedimentation controls necessary to meet the performance standards of this Section.

B. Additional erosion and sedimentation control necessary to deal with transient conditions on the site, such as following the placement of topsoil but prior to the establishment of grass cover, shall be provided by the Contractor as needed and at no additional cost to the Owner.

3.12 INSPECTION AND MAINTENANCE

A. Throughout the entire duration of the Contract (including periods when no actual site work is being conducted), the Contractor shall perform weekly inspections of erosion and sediment control installations. Additional inspections shall be required immediately after each rain event exceeding one-quarter (0.25) inch in any single storm. The Contractor shall develop a checklist to assist with periodic inspection and maintenance and shall keep completed copies of the checklist for each inspection on file along with the SWPPP.

END OF SECTION

# ATTACHMENT I

# CONSTRUCTION SPECIFICATION SECTION
# 02140 DEWATERING

# SECTION 02140

# DEWATERING

## PART 1 - GENERAL

### 1.1 DESCRIPTION

A. Work included: Furnish, operate and maintain, as incidental to the project, dewatering equipment for the control, collection and disposal of ground and surface water where necessary to complete the work.

### 1.2 QUALITY ASURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experiences in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. The Contractor shall conduct all work in a first-class workman like manner, and he/she shall reasonable and appropriate care and skill in the performance of the work under this Section.

### 1.3 SUBMITTALS

A. Ten days prior to the commencement of any work, Contractor shall file for record with the Engineer, the Contractor's plan for dewatering, including proposed areas for drainage disposal.

B. Include in the Dewatering Plan, the following:
1. Types and sizes of ground water control systems to be used, including backup power and equipment.
2. Provisions for water treatment and disposal to meet the requirements of all applicable rules, regulations and the Wrentham Conservation Commission Order of Conditions
3. Provisions for prevention of transport of silt to the wetland areas, ditches and/or streams.
4. All calculations required to demonstrate the effectiveness of the dewatering system.
5. Location plan showing discharge piping, dewatering bag location(s) and all other discharge components.

C. Receipt by the Engineer of the Contractor's plan for dewatering shall not obligate the Engineer or Owner for the sufficiency of the Contractor's plan. The Contractor shall be solely responsible for the means, methods and adequacy of the dewatering system.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Piping, electrical power, plumbing equipment and all other materials and equipment required to provide dewatering of excavations shall be suitable for the intended purposes. Standby pumping units shall be maintained at the site to be used in case of failure of the primary pumping units.

B. Dewatering Bag for Water Piping Trench Dewatering
1. Each bag shall have a flow capacity greater than 500 GPM.
2. Each bag shall have a sediment capacity greater than 36 cu/ft. or 1.3 cu/yds and 4,320 lbs.
3. Bag material shall be Non-woven, polypropylene geotextile and meet the following properties:

| | | |
|---|---|---|
| a. | Grab Tensile (lbs) | 205 |
| b. | Elongation (%) | 50 |
| c. | Trapezoid Tear (lbs) | 85 |
| d. | Puncture (lbs) | 130 |
| e. | Mullen Burst (psi) | 400 |
| f. | A.O.S. (U.S. Sieve No.)/Microns | 80/180 |
| g. | UV stability (strength retained % after 500 hours) | 70 |
| h. | Weight ($oz/yd^2$) | 8 |
| i. | Flow ($gpm/ft^2$) | 90 |

4. Bag shall be as manufactured by US Fabrics, Inc., Cincinnati, Ohio, or equal.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. General:
1. Keep excavations and site construction areas free from standing water.
2. Thoroughly brace or otherwise protect against floatation all pipelines and structures which are not stable.
3. Collect water entering the excavation from surface runoff in shallow ditches around the perimeter of the excavation, drain to sumps and pump from the excavation to maintain a bottom free from standing water.
4. Conduct dewatering in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation. Construct well or sump installations with proper sand and silt filters to prevent drawing of finer grained soil from the surrounding ground.

5. Take all additional precautions to prevent uplift of any structure during construction.

6. If the material at the bottom of the trench becomes unstable due to an inadequate dewatering system installed by the Contractor, and additional depth of excavation and bedding material is required, this additional work will not be eligible for payment and shall be done at the Contractor's expense.

B. Well point System: (applied as required)
1. Where appropriate, pit excavations and trenches shall be dewatered by an efficient well point system to drain the soil and prevent saturated soil from flowing into the excavated area.
2. Well points shall be of the type designed for dewatering work. Screens shall be sized to prevent pumping of finer grained soils.
3. Pumping units shall be capable of maintaining sufficient suction to handle large volumes of air and water at the same time.
4. Install and maintain one groundwater observation well inside the excavation to measure the groundwater level to ensure conformance with the requirements of these Specifications. Construction will not be allowed until the Engineer is satisfied that the above provisions are met.

C. Trench Dewatering: (applied as required)
1. Contractor shall design, install and operate a sump type trench dewatering system to maintain the water level one (1) foot below pipe grade.
2. Contractor shall excavate only a portion of the trench to establish the sump at the appropriate depth and will not complete the trench excavation until the groundwater has been controlled below the proposed pipe grade.

D. Dewatering Bag Installation for Pit Excavation and Trench Dewatering
1. Install on a slope so incoming water flows downhill through the dewatering bag.
2. Secure neck of the dewatering bag tightly to the discharge hose.
3. Each dewatering pump must be connected to a dewatering bag.
4. To increase efficiency of filtration, place the bag on crushed stone or a hay bale bed.
5. Bag will be considered full when it can no longer efficiently filter sediment or pass water at a reasonable rate.
6. Use of excessive flow rates or overfilling the dewatering bag may cause ruptures of the bag or failure of the hose straps.

E. Disposal of Water
1. Dispose of water pumped or drained from the construction site in a suitable manner to avoid the transport of sand or silt to the wetlands, ditches or streams, public nuisance, injury to public health, damage to public and private property and damage to the work completed or in progress.

2. Direct drainage so that flow or seepage back into the excavated area will be prevented.
3. The pump discharge from well point system shall be run through a temporary settling area constructed by the Contractor prior to discharge.
4. The pump discharge from trench sump dewatering system shall go to a dewatering silt bag.
5. Do not place the dewatering bags within a bordering vegetated wetland.
6. Monitor the effluent from sedimentation basins. Limit the turbidity to no more than 15 NTU.
7. Contractor is responsible for all treatment options necessary to attain the discharge requirement including but not limited to decant basins, siltation collection rough collection bags, chemicals and chemical treatment equipment and conventional treatment chemicals for equipment.

F. Damage

1. Any damage resulting from the dewatering operations or the failure of the Contractor to maintain the work in a suitably dry condition shall be repaired by the Contractor at no additional costs to the Owner.
2. The Contractor shall be totally responsible for compliance with standard local, state and federal environmental requirements.

END OF SECTION