

N-0998-11-13
December 1, 2017
Updated April 2, 2019

Ms. Shauna Little
United States Environmental Protection Agency – Region 1
1 Congress Street, Suite 1100
Boston, Massachusetts 02114-2023

Re: **Submittal of Notice of Intent (NOI) Remediation General Permit (RGP)
Construction Dewatering
Lower Mystic River Dam to the Amelia Earhart Dam
Medford, Massachusetts 01890
MAG910761**

Dear Ms. Little:

On behalf of NSTAR Electric Company d/b/a Eversource Energy (Eversource), Tighe & Bond, Inc. (Tighe & Bond) has prepared this Notice of Intent (NOI) application for a National Pollutant Discharge Elimination System (NPDES) Remediation General Permit (RGP) for the proposed construction dewatering activities conducted during installation of a new below grade electric transmission line and associated manholes along Winthrop Street, South Street, Main Street and Mystic Avenue in Medford and Somerville, to the border with the City of Boston (the Site). A copy of the NOI is included in Appendix A. The limits of the Site are shown on the Aerial Dewatering Site Plan (Figure 1) and the Massachusetts Geographic Information Systems (MassGIS) Priority Resource Map (Figure 2) in Appendix B.

The purpose of this NOI is to facilitate the change in operator status from the existing contractor, BOND Brothers to the new operator, McCourt Construction (Mccourt). A Notice of Termination for the former operator (Bond Brothers) has been filed.

As there is a need to treat and discharge water generated from the construction dewatering activities, the enclosed NOI form provides required information on general Site conditions, proposed treatment systems, discharge locations, receiving water, and laboratory analytical results from pre-discharge sampling and surface water sampling. The proposed treatment systems are shown on Figure 3 (Process Flow Diagram) in Appendix B. The excavation dewatering and discharge of treated groundwater are scheduled to resume in April 2019 and end in December 2020.

Dewatered groundwater at the Site will be treated by a groundwater treatment system before being discharged to on-Site catch basins and into a stormwater drainage system managed by the City of Medford. All stormwater drainage systems subject to this RGP discharge to the Mystic River upstream the Amelia Earhart Dam. Post treatment discharge rates will range from 25 gallons per minute (GPM) to 350 GPM.

Project Background

The overall project involves the installation of 7.7 miles of new electric transmission line and 19 manholes between Mystic Substation 250 in Charlestown, Massachusetts to the Woburn Substation 211 in Woburn Massachusetts. The proposed electrical transmission line trench will measure approximately three feet wide and will be installed at an approximate depth of five feet below ground surface (BGS). The manholes will be approximately 10 feet wide, by

25 feet long and 10 feet deep. Initial pre-characterization efforts have indicated that the average depth to groundwater at the Site is approximately seven feet BGS. Property uses along the project route are mixed commercial and residential.

This RGP Permit Application is for the discharge of treated groundwater to the Medford stormwater drainage system, other RGP NOIs are being filed concurrently for discharge of treated groundwater to alternative surface waters.

MCP History

During the pre-construction soil assessment activities, concentrations of lead and polycyclic aromatic hydrocarbons (PAHs) were detected in soil samples B-52, B-65, B-66, B-70, B-76 MH-17 and MH-18 above the respective Massachusetts Department of Environmental Protection (MassDEP) Reportable Concentration (RCS-1/RCS-2) values.

On September 14, 2017, Tighe & Bond, on behalf of Eversource, submitted a Utility-related Abatement Measure (URAM) Notification Report to MassDEP under Release Tracking Number (RTN) 3-34457. The URAM Notification Report dated September 12, 2017, details measures implemented to manage excess soils and groundwater generated during the installation of the new underground electric transmission line and electric manholes along Mystic Ave. URAM Status Reports Nos 1 through 3 were submitted on January 10, 2018, July 17, 2018 and January 10, 2019 respectively. Boundaries of the URAM are shown on Figure 1 in Appendix B.

Groundwater Characterization

To characterize groundwater along the proposed route of construction, groundwater samples were collected from groundwater monitoring wells MW-102 and MW-103 in January 2017 and MW-15 and MW-17 in September 2017. The groundwater samples were submitted for laboratory analysis for Environmental Protection Agency (EPA) RGP parameters. The laboratory analytical results are summarized in Table 1 included in Appendix E. A copy of the laboratory analytical report is included in Appendix F. Laboratory analytical results were compared to the RGP Technology Based Effluent Limitations (TBEL) and Water Quality Based Effluent Limit (WQBEL).

Contaminants of concern are analytes that exceeded either the TBEL or WQBEL. Contaminants of concern detected in at least one of the monitoring wells MW-102, MW-103, MW-505A, MW-15 and MW-17 include, group I PAHs, iron, ammonia, chloride and total suspended solids (TSS). Since these monitoring wells were installed either adjacent to or within a roadway, chloride detected in groundwater samples is likely associated with road salting during the winter months.

Receiving Water Characterization

Mystic River (waterbody identification MA71-02) after the Lower Mystic Dam and before the Amelia Earhart Dam, is classified as a Class B impaired water body and is listed in the 303(d) Impaired Waterbodies Document. According to the United States Geologic Survey's StreamStats online application, the 7Q10 value at Mystic River was calculated at 2.16 million gallons per day (MGD).

As required by the NPDES RGP surface water samples were collected prior to discharging and analyzed for contaminants of concern that were present in the effluent samples from the monitoring wells discussed above. Surface water samples were collected in November 2017 and sent for laboratory analysis of metals detected in the groundwater samples,

ammonia, hexavalent chromium, pH and hardness. Four surface water samples were collected along the Mystic River within a quarter mile of potential outfall locations and are shown on Figure 1 (Aerial Dewatering Site Plan) in Appendix B.

Treatment Systems

Dewatered groundwater at the Site will be treated by a mobile or stationary treatment system before being discharged to on-Site catch basins and into a stormwater drainage system managed by either the City of Medford, or the Massachusetts Department of Transportation (MassDOT). A list of the proposed stormwater outfall, including location, latitude/longitude coordinates, municipality and system owner is provided in Appendix A.

Mobile Treatment System

Depending on the level of treatment required and discharge flow rate, the mobile treatment system will be mounted on either a 24 or 48-foot mobile trailer. The mounted treatment system could consist of a weir tank, particulate filter units, bag filters and/or granular activated carbon (GAC)/clay filter. Based on effluent monitoring results, the treatment system or flow rate will be modified to comply with the effluent limits.

Flow Rate (GPM)	Proposed Treatment System
0-50	TSS treatment via a silt/pipe sock or bag filter
50-150	24-foot trailer with particulate filter units, bag filters and/or GAC/clay filter
150-350	48-foot trailer weir tank, particulate filter units, bag filters and/or GAC/clay filter

Stationary Treatment System

The stationary treatment system could be composed of one or two 10,000-gallon fractionation tanks, one sand filter unit and two particulate filters, two GAC filters, resin units and two clay vessels. Groundwater will be pumped from the excavation into a tanker truck and transported to the laydown yard located at 42 Linden Street, Medford, Massachusetts. From the tank truck, the groundwater will be pumped into the fractionation tanks and then through a sand filter and particulate filter for the removal of solids, into the GAC filters and clay vessels to remove organics, and then through a particulate filter to remove any residual solids. Major components which may be added to the original treatment system include a flocculent tube, two safety vapor tanks (fractionation tanks), one anionic resin vessel and one catatonic resin vessel (ion exchange resins).

The stormwater outfall locations between the lower Mystic Lake Dam and the Amelia Earhart Dam that will discharge treated groundwater from the mobile treatment system to the Mystic River. The outfall locations for the mobile and stationary treatment systems are shown on Figure 1 (Aerial Dewatering Site Plan) in Appendix B. As required, the City of Medford, City of Somerville, and MassDOT will be notified of the potential discharge activities and permission will be obtained prior to commencement of discharge.

Best Management Practices Plan

Tighe & Bond designed a Best Management Practices Plan (BMPP) for the groundwater extraction and treatment systems for the Site. The BMPP meeting the requirement of the RGP will be developed and implemented upon initiation of the discharge.

Owner and Operator

Owner

NSTAR Electric Company
d/b/a Eversource
Dean S. Bebis
247 Station Drive
Westwood, MA 02090

Operator

McCourt Construction
Steve Kolodko
60 K Street
Boston, MA 02127

Notice of Intent

Preparation of this NOI has included a review of the literature pertaining to Areas of Critical Environmental Concern (ACEC), Endangered Species Act (ESA), and the National Historic Preservation Act (NHPA), as documented below:

- Review of a MassGIS Priority Resources Map, Figure 2, shows the Site is not within an ACEC;
- Review of the "Federally Listed Endangered and Threatened Species in Massachusetts" (Appendix C) found that there are two listed species in Middlesex County. The first species is the whorled pogonia which prefers forest habitat, and the second species is the northern long-eared bat, which prefers mines and caves in the winter and forested habitats in the summer. The small whorled pogonia is found in the Groton area while the northern long-eared bat is found statewide. As the Site is not in Groton, the small whorled pogonia will not be affected from construction activities or from the proposed discharges. The project area consists of an asphalt roadway that borders a residential area. No vegetation will be disturbed during construction activities. As a result, it is the opinion of Tighe & Bond that the habitats for northern long-eared bat will not be disturbed during construction activities. Additionally, the discharge is to the Mystic River which is not a habitat where the northern long-eared bat exists.
- According to United States Fish and Wildlife Services (USFWS) Information, Planning and Conservation (IPaC) tool there are no critical habitats within the Site. USFWS confirmed there are no critical habitats in the area and confirmed permit eligibility meets "Criterion A."
 - Additionally, according to the MassGIS Priority Resource Map, no NHESP Priority Habitats for Rare Species or Estimated Habitats for Rare Wildlife, were present within half a mile downstream of the discharge location. Therefore, permit eligibility meets "Criterion A."
- An electronic review of the Massachusetts Cultural Resource Information System database (Appendix D), made available through the Massachusetts Historical Commission, found several historical areas along Winthrop Street, South Street, Main Street and a portion of Mystic Ave in Medford, Massachusetts. Discharges and discharge related activities do not have the potential to cause effects on these historic properties as the discharge activities are limited to the roadway and will go through already existing drainage systems. Therefore, permit eligibility meets "Criterion B."
- Groundwater samples were collected from on-Site groundwater monitoring wells MW-102 and MW-103, in January 2017 and MW-15 and MW-17 in September 2017. The groundwater samples were submitted for laboratory analysis for RGP parameters. The laboratory analytical results are summarized in the Table 1 included in Appendix E. A copy of the laboratory analytical report is included in Appendix F. Laboratory analytical results were compared to the RGP TBEL and WQBEL.

- Surface water samples were collected from Mystic River within a quarter mile of the potential outfall locations in November 2017. The surface water samples were submitted for laboratory analysis of RGP parameters that were detected in the effluent samples. The laboratory analytical results are summarized in the Table 2 included in Appendix E. A copy of the laboratory analytical report is included in Appendix F.

Based on the critical low flow (7Q10) value of the receiving water, 2.16 MGD and the proposed maximum discharge rate of up to 350 GPM (0.504 MGD), a dilution factor of 5.29 was established for this permit and was verified by the Massachusetts Department of Environmental Protection (MassDEP) on November 29, 2017 and included Appendix E. The 7Q10 value was calculated using the United States Geologic Survey's StreamStats online application, and the dilution factor was calculated as instructed by the EPA *Dilution Factor and Effluent Limitation Calculations for Massachusetts*, Appendix V.

The proposed treatment systems have been designed to reduce contaminants of concern to below the applicable effluent limits. Effluent compliance monitoring will be conducted on a monthly and the effluent samples submitted to a Massachusetts environmental laboratory for iron, Group I PAHs, TSS and pH analyses. Additionally, the flow rate, pH and turbidity levels will be monitored in the field and recorded.

If you need any additional information or assistance on this project, please do not hesitate to contact Bryan Gammons at (508) 304-6366 at your convenience.

Very truly yours,

TIGHE & BOND, INC.



Bryan O. Gammons
Senior Environmental Scientist



Gary W.T. Hedman, LSP
Project Manager

Enclosures

Copy: Michael Zylich, Eversource
Dean Bebis, Eversource
Steve Kolodko, McCourt Construction
MassDEP, Division of Watershed Management
MassDEP, Boston

List of Appendices

Appendix A	Notice of Intent
Appendix B	Figures
Appendix C	Federally Endangered Species in Massachusetts, USFWS Consultation Letter
Appendix D	Massachusetts Cultural Resources Information System Report
Appendix E	MassDEP Dilution Factor Confirmation WQBEL Calculations Groundwater Summary Table 1 Surface Water Summary Table 2
Appendix F	Laboratory Analytical Results

List of Figures

Figure 1	Aerial Dewatering Site Plan
Figure 2	MassDEP Priority Resource Map
Figure 3	Process Flow Diagrams

APPENDIX A

II. Suggested Format for the Remediation General Permit Notice of Intent (NOI)

A. General site information:

1. Name of site:	Site address: Street: <table border="1" data-bbox="888 475 1950 557"> <tr> <td data-bbox="888 475 1591 557">City:</td><td data-bbox="1591 475 1722 557">State:</td><td data-bbox="1722 475 1950 557">Zip:</td></tr> </table>	City:	State:	Zip:									
City:	State:	Zip:											
2. Site owner Owner is (check one): ☐ Federal ☐ State/Tribal ☐ Private ☐ Other; if so, specify:	<table border="1"> <tr> <td colspan="3" data-bbox="888 557 1950 630">Contact Person:</td></tr> <tr> <td data-bbox="888 630 1461 698">Telephone:</td><td colspan="2" data-bbox="1461 630 1950 698">Email:</td></tr> <tr> <td colspan="3" data-bbox="888 698 1950 800">Mailing address: Street:</td></tr> <tr> <td data-bbox="888 800 1591 878">City:</td><td data-bbox="1591 800 1722 878">State:</td><td data-bbox="1722 800 1950 878">Zip:</td></tr> </table>	Contact Person:			Telephone:	Email:		Mailing address: Street:			City:	State:	Zip:
Contact Person:													
Telephone:	Email:												
Mailing address: Street:													
City:	State:	Zip:											
3. Site operator, if different than owner	<table border="1"> <tr> <td colspan="3" data-bbox="888 878 1950 938">Contact Person:</td></tr> <tr> <td data-bbox="888 938 1461 998">Telephone:</td><td colspan="2" data-bbox="1461 938 1950 998">Email:</td></tr> <tr> <td colspan="3" data-bbox="888 998 1950 1101">Mailing address: Street:</td></tr> <tr> <td data-bbox="888 1101 1591 1154">City:</td><td data-bbox="1591 1101 1722 1154">State:</td><td data-bbox="1722 1101 1950 1154">Zip:</td></tr> </table>	Contact Person:			Telephone:	Email:		Mailing address: Street:			City:	State:	Zip:
Contact Person:													
Telephone:	Email:												
Mailing address: Street:													
City:	State:	Zip:											
4. NPDES permit number assigned by EPA: NPDES permit is (check all that apply): ☐ RGP ☐ DGP ☐ CGP ☐ MSGP ☐ Individual NPDES permit ☐ Other; if so, specify:	5. Other regulatory program(s) that apply to the site (check all that apply): <table border="0"> <tr> <td data-bbox="888 1214 1461 1282">☐ MA Chapter 21e; list RTN(s):</td><td data-bbox="1461 1214 1950 1282">☐ CERCLA</td></tr> <tr> <td data-bbox="888 1282 1461 1351">☐ NH Groundwater Management Permit or Groundwater Release Detection Permit:</td><td data-bbox="1461 1282 1950 1351">☐ UIC Program</td></tr> <tr> <td></td><td data-bbox="1461 1351 1950 1398">☐ POTW Pretreatment</td></tr> <tr> <td></td><td data-bbox="1461 1398 1950 1458">☐ CWA Section 404</td></tr> </table>	☐ MA Chapter 21e; list RTN(s):	☐ CERCLA	☐ NH Groundwater Management Permit or Groundwater Release Detection Permit:	☐ UIC Program		☐ POTW Pretreatment		☐ CWA Section 404				
☐ MA Chapter 21e; list RTN(s):	☐ CERCLA												
☐ NH Groundwater Management Permit or Groundwater Release Detection Permit:	☐ UIC Program												
	☐ POTW Pretreatment												
	☐ CWA Section 404												

B. Receiving water information:

1. Name of receiving water(s):	Waterbody identification of receiving water(s):	Classification of receiving water(s):
Receiving water is (check any that apply): ☐ Outstanding Resource Water ☐ Ocean Sanctuary ☐ territorial sea ☐ Wild and Scenic River		
2. Has the operator attached a location map in accordance with the instructions in B, above? (check one): ☐ Yes ☐ No Are sensitive receptors present near the site? (check one): ☐ Yes ☐ No If yes, specify:		
3. Indicate if the receiving water(s) is listed in the State's Integrated List of Waters (i.e., CWA Section 303(d)). Include which designated uses are impaired, and any pollutants indicated. Also, indicate if a final TMDL is available for any of the indicated pollutants. For more information, contact the appropriate State as noted in Part 4.6 of the RGP.		
4. Indicate the seven day-ten-year low flow (7Q10) of the receiving water determined in accordance with the instructions in Appendix V for sites located in Massachusetts and Appendix VI for sites located in New Hampshire.		
5. Indicate the requested dilution factor for the calculation of water quality-based effluent limitations (WQBELs) determined in accordance with the instructions in Appendix V for sites in Massachusetts and Appendix VI for sites in New Hampshire.		
6. Has the operator received confirmation from the appropriate State for the 7Q10 and dilution factor indicated? (check one): ☐ Yes ☐ No If yes, indicate date confirmation received:		
7. Has the operator attached a summary of receiving water sampling results as required in Part 4.2 of the RGP in accordance with the instruction in Appendix VIII? (check one): ☐ Yes ☐ No		

C. Source water information:

1. Source water(s) is (check any that apply):			
☐ Contaminated groundwater Has the operator attached a summary of influent sampling results as required in Part 4.2 of the RGP in accordance with the instruction in Appendix VIII? (check one): ☐ Yes ☐ No	☐ Contaminated surface water Has the operator attached a summary of influent sampling results as required in Part 4.2 of the RGP in accordance with the instruction in Appendix VIII? (check one): ☐ Yes ☐ No	☐ The receiving water	☐ Potable water; if so, indicate municipality or origin: ☐ Other; if so, specify:
		☐ A surface water other than the receiving water; if so, indicate waterbody:	

2. Source water contaminants:	
a. For source waters that are contaminated groundwater or contaminated surface water, indicate are any contaminants present that are not included in the RGP? (check one): ☐ Yes ☐ No If yes, indicate the contaminant(s) and the maximum concentration present in accordance with the instructions in Appendix VIII.	b. For a source water that is a surface water other than the receiving water, potable water or other, indicate any contaminants present at the maximum concentration in accordance with the instructions in Appendix VIII? (check one): ☐ Yes ☐ No
3. Has the source water been previously chlorinated or otherwise contains residual chlorine? (check one): ☐ Yes ☐ No	

D. Discharge information

1.The discharge(s) is a(n) (check any that apply): ☐ Existing discharge ☐ New discharge ☐ New source	
Outfall(s):	Outfall location(s): (Latitude, Longitude)
Discharges enter the receiving water(s) via (check any that apply): ☐ Direct discharge to the receiving water ☐ Indirect discharge, if so, specify: ☐ A private storm sewer system ☐ A municipal storm sewer system If the discharge enters the receiving water via a private or municipal storm sewer system: Has notification been provided to the owner of this system? (check one): ☐ Yes ☐ No Has the operator has received permission from the owner to use such system for discharges? (check one): ☐ Yes ☐ No, if so, explain, with an estimated timeframe for obtaining permission: Has the operator attached a summary of any additional requirements the owner of this system has specified? (check one): ☐ Yes ☐ No	
Provide the expected start and end dates of discharge(s) (month/year):	
Indicate if the discharge is expected to occur over a duration of: ☐ less than 12 months ☐ 12 months or more ☐ is an emergency discharge	
Has the operator attached a site plan in accordance with the instructions in D, above? (check one): ☐ Yes ☐ No	

2. Activity Category: (check all that apply)	3. Contamination Type Category: (check all that apply)	
☐ I – Petroleum-Related Site Remediation ☐ II – Non-Petroleum-Related Site Remediation ☐ III – Contaminated Site Dewatering ☐ IV – Dewatering of Pipelines and Tanks ☐ V – Aquifer Pump Testing ☐ VI – Well Development/Rehabilitation ☐ VII – Collection Structure Dewatering/Remediation ☐ VIII – Dredge-Related Dewatering	a. If Activity Category I or II: (check all that apply) ☐ A. Inorganics ☐ B. Non-Halogenated Volatile Organic Compounds ☐ C. Halogenated Volatile Organic Compounds ☐ D. Non-Halogenated Semi-Volatile Organic Compounds ☐ E. Halogenated Semi-Volatile Organic Compounds ☐ F. Fuels Parameters	
	b. If Activity Category III, IV, V, VI, VII or VIII: (check either G or H)	
	<table border="1"> <tr> <td data-bbox="970 800 1419 873">☐ G. Sites with Known Contamination</td><td data-bbox="1419 800 2003 873">☐ H. Sites with Unknown Contamination</td></tr> </table>	☐ G. Sites with Known Contamination
☐ G. Sites with Known Contamination	☐ H. Sites with Unknown Contamination	
<table border="1"> <tr> <td data-bbox="970 873 1419 1409"> c. If Category III-G, IV-G, V-G, VI-G, VII-G or VIII-G: (check all that apply) ☐ A. Inorganics ☐ B. Non-Halogenated Volatile Organic Compounds ☐ C. Halogenated Volatile Organic Compounds ☐ D. Non-Halogenated Semi-Volatile Organic Compounds ☐ E. Halogenated Semi-Volatile Organic Compounds ☐ F. Fuels Parameters </td><td data-bbox="1419 873 2003 1409"> d. If Category III-H, IV-H, V-H, VI-H, VII-H or VIII-H Contamination Type Categories A through F apply </td></tr> </table>	c. If Category III-G, IV-G, V-G, VI-G, VII-G or VIII-G: (check all that apply) ☐ A. Inorganics ☐ B. Non-Halogenated Volatile Organic Compounds ☐ C. Halogenated Volatile Organic Compounds ☐ D. Non-Halogenated Semi-Volatile Organic Compounds ☐ E. Halogenated Semi-Volatile Organic Compounds ☐ F. Fuels Parameters	d. If Category III-H, IV-H, V-H, VI-H, VII-H or VIII-H Contamination Type Categories A through F apply
c. If Category III-G, IV-G, V-G, VI-G, VII-G or VIII-G: (check all that apply) ☐ A. Inorganics ☐ B. Non-Halogenated Volatile Organic Compounds ☐ C. Halogenated Volatile Organic Compounds ☐ D. Non-Halogenated Semi-Volatile Organic Compounds ☐ E. Halogenated Semi-Volatile Organic Compounds ☐ F. Fuels Parameters	d. If Category III-H, IV-H, V-H, VI-H, VII-H or VIII-H Contamination Type Categories A through F apply	

MAG910000
NHG910000

4. Influent and Effluent Characteristics

[illegible]

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
C. Halogenated VOCs									
Carbon Tetrachloride								4.4 µg/L	
1,2 Dichlorobenzene								600 µg/L	---
1,3 Dichlorobenzene								320 µg/L	---
1,4 Dichlorobenzene								5.0 µg/L	---
Total dichlorobenzene								763 µg/L in NH	---
1,1 Dichloroethane								70 µg/L	---
1,2 Dichloroethane								5.0 µg/L	---
1,1 Dichloroethylene								3.2 µg/L	---
Ethylene Dibromide								0.05 µg/L	---
Methylene Chloride								4.6 µg/L	---
1,1,1 Trichloroethane								200 µg/L	---
1,1,2 Trichloroethane								5.0 µg/L	---
Trichloroethylene								5.0 µg/L	---
Tetrachloroethylene								5.0 µg/L	
cis-1,2 Dichloroethylene								70 µg/L	---
Vinyl Chloride								2.0 µg/L	---
D. Non-Halogenated SVOCs									
Total Phthalates								190 µg/L	
Diethylhexyl phthalate								101 µg/L	
Total Group I PAHs								1.0 µg/L	---
Benzo(a)anthracene								As Total PAHs	
Benzo(a)pyrene									
Benzo(b)fluoranthene									
Benzo(k)fluoranthene									
Chrysene									
Dibenzo(a,h)anthracene									
Indeno(1,2,3-cd)pyrene									

[illegible]

E. Treatment system information

1. Indicate the type(s) of treatment that will be applied to effluent prior to discharge: (check all that apply) ☐ Adsorption/Absorption ☐ Advanced Oxidation Processes ☐ Air Stripping ☐ Granulated Activated Carbon (“GAC”)/Liquid Phase Carbon Adsorption ☐ Ion Exchange ☐ Precipitation/Coagulation/Flocculation ☐ Separation/Filtration ☐ Other; if so, specify:	
2. Provide a written description of all treatment system(s) or processes that will be applied to the effluent prior to discharge. Identify each major treatment component (check any that apply): ☐ Fractionation tanks ☐ Equalization tank ☐ Oil/water separator ☐ Mechanical filter ☐ Media filter ☐ Chemical feed tank ☐ Air stripping unit ☐ Bag filter ☐ Other; if so, specify: Indicate if either of the following will occur (check any that apply): ☐ Chlorination ☐ De-chlorination	
3. Provide the design flow capacity in gallons per minute (gpm) of the most limiting component. Indicate the most limiting component: Is use of a flow meter feasible? (check one): ☐ Yes ☐ No, if so, provide justification:	
Provide the proposed maximum effluent flow in gpm.	
Provide the average effluent flow in gpm.	
If Activity Category IV applies, indicate the estimated total volume of water that will be discharged:	
4. Has the operator attached a schematic of flow in accordance with the instructions in E, above? (check one): ☐ Yes ☐ No	

F. Chemical and additive information

1. Indicate the type(s) of chemical or additive that will be applied to effluent prior to discharge or that may otherwise be present in the discharge(s): (check all that apply)

☐ Algaecides/biocides ☐ Antifoams ☐ Coagulants ☐ Corrosion/scale inhibitors ☐ Disinfectants ☐ Flocculants ☐ Neutralizing agents ☐ Oxidants ☐ Oxygen ☐ scavengers ☐ pH conditioners ☐ Bioremedial agents, including microbes ☐ Chlorine or chemicals containing chlorine ☐ Other; if so, specify:

2. Provide the following information for each chemical/additive, using attachments, if necessary:

- a. Product name, chemical formula, and manufacturer of the chemical/additive;
- b. Purpose or use of the chemical/additive or remedial agent;
- c. Material Safety Data Sheet (MSDS) and Chemical Abstracts Service (CAS) Registry number for each chemical/additive;
- d. The frequency (hourly, daily, etc.), duration (hours, days), quantity (maximum and average), and method of application for the chemical/additive;
- e. Any material compatibility risks for storage and/or use including the control measures used to minimize such risks; and
- f. If available, the vendor's reported aquatic toxicity (NOAEL and/or LC50 in percent for aquatic organism(s)).

3. Has the operator attached an explanation which demonstrates that the addition of such chemicals/additives may be authorized under this general permit in accordance with the instructions in F, above? (check one): ☐ Yes ☐ No; if no, has the operator attached data that demonstrates each of the 126 priority pollutants in CWA Section 307(a) and 40 CFR Part 423.15(j)(1) are non-detect in discharges with the addition of the proposed chemical/additive? (check one): ☐ Yes ☐ No

G. Endangered Species Act eligibility determination

1. Indicate under which criterion the discharge(s) is eligible for coverage under this general permit:

- ☐ **FWS Criterion A:** No endangered or threatened species or critical habitat are in proximity to the discharges or related activities or come in contact with the “action area”.
- ☐ **FWS Criterion B:** Formal or informal consultation with the FWS under section 7 of the ESA resulted in either a no jeopardy opinion (formal consultation) or a written concurrence by FWS on a finding that the discharges and related activities are “not likely to adversely affect” listed species or critical habitat (informal consultation). Has the operator completed consultation with FWS? (check one): ☐ Yes ☐ No; if no, is consultation underway? (check one): ☐ Yes ☐ No
- ☐ **FWS Criterion C:** Using the best scientific and commercial data available, the effect of the discharges and related activities on listed species and critical habitat have been evaluated. Based on those evaluations, a determination is made by EPA, or by the operator and affirmed by EPA, that the discharges and related activities will have “no effect” on any federally threatened or endangered listed species or designated critical habitat under the jurisdiction of the FWS. This determination was made by: (check one) ☐ the operator ☐ EPA ☐ Other; if so, specify:

- ☐ **NMFS Criterion:** A determination made by EPA is affirmed by the operator that the discharges and related activities will have “no effect” or are “not likely to adversely affect” any federally threatened or endangered listed species or critical habitat under the jurisdiction of NMFS and will not result in any take of listed species. Has the operator previously completed consultation with NMFS? (check one): ☐ Yes ☐ No

2. Has the operator attached supporting documentation of ESA eligibility in accordance with the instructions in Appendix I, and G, above? (check one): ☐ Yes ☐ No

Does the supporting documentation include any written concurrence or finding provided by the Services? (check one): ☐ Yes ☐ No; if yes, attach.

H. National Historic Preservation Act eligibility determination

1. Indicate under which criterion the discharge(s) is eligible for coverage under this general permit:

- ☐ **Criterion A:** No historic properties are present. The discharges and discharge-related activities (e.g., BMPs) do not have the potential to cause effects on historic properties.
- ☐ **Criterion B:** Historic properties are present. Discharges and discharge related activities do not have the potential to cause effects on historic properties.
- ☐ **Criterion C:** Historic properties are present. The discharges and discharge-related activities have the potential to have an effect or will have an adverse effect on historic properties.

2. Has the operator attached supporting documentation of NHPA eligibility in accordance with the instructions in H, above? (check one): ☐ Yes ☐ No

Does the supporting documentation include any written agreement with the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (TPHO), or other tribal representative that outlines measures the operator will carry out to mitigate or prevent any adverse effects on historic properties? (check one): ☐ Yes ☐ No

I. Supplemental information

Describe any supplemental information being provided with the NOI. Include attachments if required or otherwise necessary.

Has the operator attached data, including any laboratory case narrative and chain of custody used to support the application? (check one): ☐ Yes ☐ No

Has the operator attached the certification requirement for the Best Management Practices Plan (BMPP)? (check one): ☐ Yes ☐ No

J. Certification requirement

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated 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, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

BMPP certification statement: A BMPP meeting the requirements of this general permit will be developed and implemented upon initiation of discharge.

Notification provided to the appropriate State, including a copy of this NOI, if required.

Check one: Yes ☒ No ☐

Notification provided to the municipality in which the discharge is located, including a copy of this NOI, if requested.

Check one: Yes ☒ No ☐

Notification provided to the owner of a private or municipal storm sewer system, if such system is used for site discharges, including a copy of this NOI, if requested.

Check one: Yes ☒ No ☐ NA ☐

Permission obtained from the owner of a private or municipal storm sewer system, if such system is used for site discharges. If yes, attach additional conditions. If no, attach explanation and timeframe for obtaining permission.

Check one: Yes ☒ No ☐ NA ☐

Notification provided to the owner/operator of the area associated with activities covered by an additional discharge permit(s). Additional discharge permit is (check one): ☐ RGP ☐ DGP ☐ CGP ☐ MSGP ☐ Individual NPDES permit ☐ Other; if so, specify:

Check one: Yes ☐ No ☐ NA ☒

Signature: _____

Date: _____

Print Name and Title: **Steve Kolodko**

MAG910000
NHG910000

Appendix IV – Part 1 – NOI
Page 24 of 24

J. Certification requirement

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated 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, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

BMPP certification statement: A BMPP meeting the requirements of this general permit will be developed and implemented upon initiation of discharge.

Notification provided to the appropriate State, including a copy of this NOI, if required. Check one: Yes ☒ No ☐

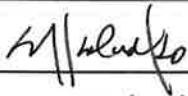
Notification provided to the municipality in which the discharge is located, including a copy of this NOI, if requested. Check one: Yes ☒ No ☐

Notification provided to the owner of a private or municipal storm sewer system, if such system is used for site discharges, including a copy of this NOI, if requested. Check one: Yes ☒ No ☐ NA ☐

Permission obtained from the owner of a private or municipal storm sewer system, if such system is used for site discharges. If yes, attach additional conditions. If no, attach explanation and timeframe for obtaining permission. Check one: Yes ☒ No ☐ NA ☐

Notification provided to the owner/operator of the area associated with activities covered by an additional discharge permit(s). Additional discharge permit is (check one): ☐ RGP ☐ DGP ☐ CGP ☐ MSGP ☐ Individual NPDES permit Check one: Yes ☐ No ☐ NA ☒
☐ Other; if so, specify:

Signature:



Date:

4/05/2019

Print Name and Title: Steve Kolodko

J. Certification requirement

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated 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, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A BMPP meeting the requirements of this general permit will be developed and implemented upon
BMPP certification statement: initiation of discharge.

Notification provided to the appropriate State, including a copy of this NOI, if required. Check one: Yes ☒ No ☐

Notification provided to the municipality in which the discharge is located, including a copy of this NOI, if requested. Check one: Yes ☒ No ☐

Notification provided to the owner of a private or municipal storm sewer system, if such system is used for site discharges, including a copy of this NOI, if requested. Check one: Yes ☒ No ☐ NA ☐

Permission obtained from the owner of a private or municipal storm sewer system, if such system is used for site discharges. If yes, attach additional conditions. If no, attach explanation and timeframe for obtaining permission. Check one: Yes ☒ No ☐ NA ☐

Notification provided to the owner/operator of the area associated with activities covered by an additional discharge permit(s). Additional discharge permit is (check one): ☐ RGP ☐ DGP ☐ CGP ☐ MSGP ☐ Individual NPDES permit Check one: Yes ☐ No ☐ NA ☒
☐ Other; if so, specify:

Signature:



Date: 4/3/19

Print Name and Title: Dean S. Bebis - Environmental Specialist

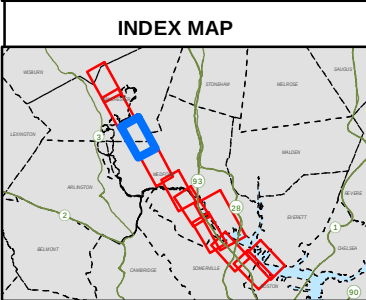
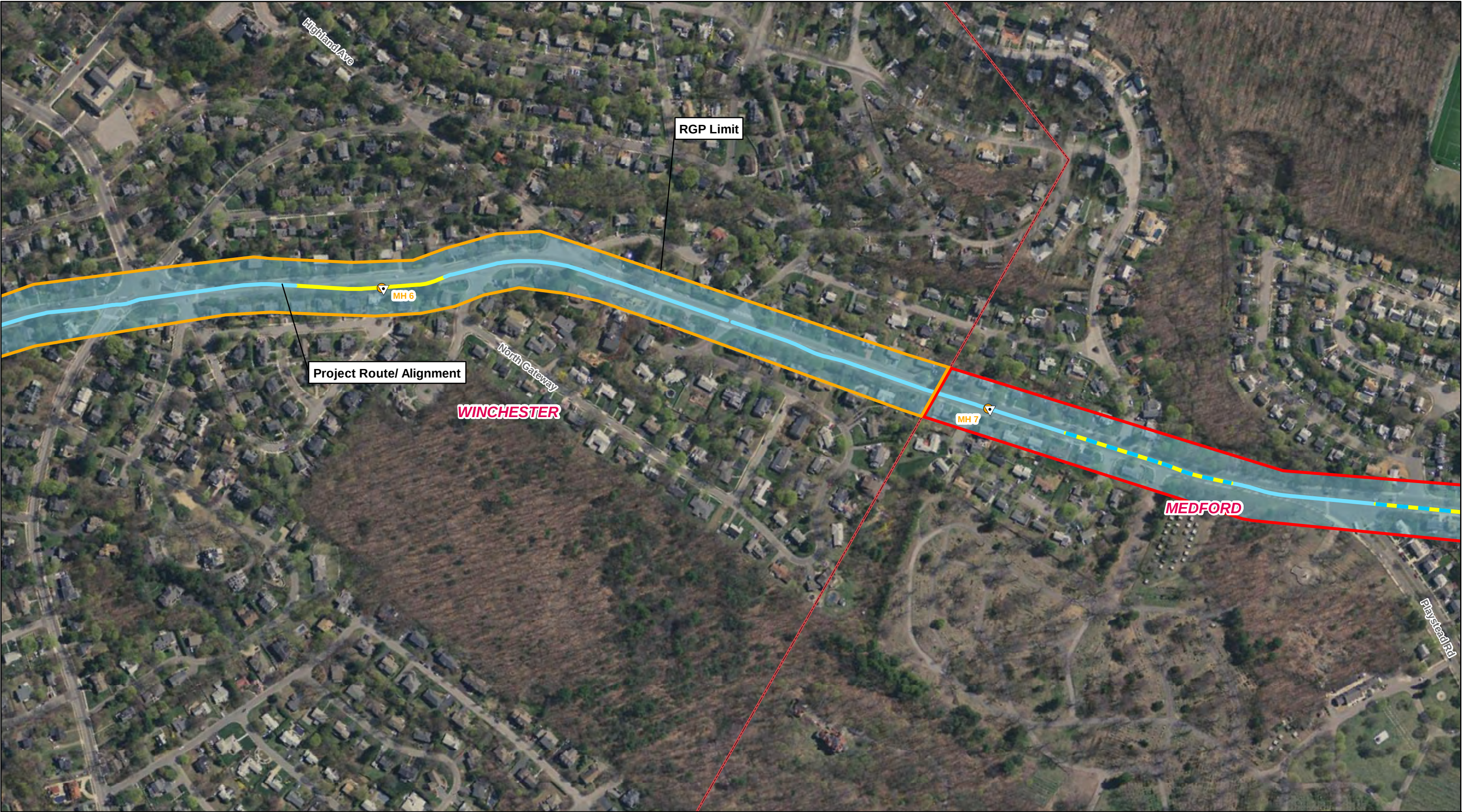
Note that Dean S. Bebis is signing on behalf of NSTAR Electric Company d/b/a Eversource Energy and not individually

Eversource – Mystic to Woburn 115 kV Transmission Line

Mystic River Outfall Summary

Lower Mystic River to Amelia Earhart Dam

Outfall Location	Latitude	Longitude	Municipality	Jurisdiction
Mystic River at Winthrop Street	42.417885	-71.118161	Medford	Medford
Mystic River at South Street	42.417607	-71.117774	Medford	Medford
Mystic River at 4054 Mystic Valley Parkway	42.404058	-71.086283	Medford	Medford
Two Penny Brook Outfall at 170 Mystic Avenue	42.410702	-71.103739	Medford	MassDOT
Winter Brook Out at 291 Mystic Avenue	42.404810	-71.100970	Medford	MassDOT
Mystic River at Mystic Valley Parkway	42.405623	-71.096701	Medford	MassDOT
Mystic River at Shore Drive	42.398615	-71.08590	Somerville	Somerville
Mystic River at Fellsway	42.398249	-71.083513	Somerville	Somerville



Legend

● Test Pit Location	▲ Approximate Outfall Location	▭ RGP Boundaires Aberjona River	Soil Type Type A Type B Type C1 Type C2 Type D1 Type E
▲ Geotech Boring	● Proposed Manhole	▭ RGP Boundaires Mystic River Crossing	
● Geotech Boring/ Monitoring Well	● Existing Manhole	▭ RGP Boundaries Mystic River after Amelia Earhart Dam	
● River Sediment Sample	● Surface Water Sample	▭ RGP Boundary Winter Pond	
● MA DEP AUL Site	▭ Municipal Boundary		
	→ MWRA Sewer Pipe		
	▭ Laydown Yard		

Map Notes:
Basemap: 2013-2014 Orthophotographs, MassGIS
The information/data provided in this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation or parcel level analysis. The maps should not be used for construction purposes.

1 in = 300 ft

0 150 300 600 Feet

**New 115 kV Transmission Line
Woburn Substation to Mystic Substation**

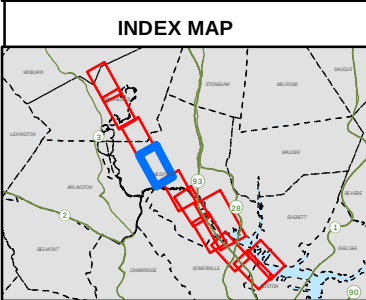
Figure 1: Aerial Dewatering Site Plan

Mapsheet 01 of 07

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Legend

● Test Pit Location	▲ Approximate Outfall Location	▭ RGP Boundaires Aberjona River	Soil Type — Type A — Type B — Type C1 — Type C2 — Type D1 — Type E
▲ Geotech Boring	● Proposed Manhole	▭ RGP Boundaires Mystic River Crossing	
● Geotech Boring/ Monitoring Well	● Existing Manhole	▭ RGP Boundaires Mystic River after Amelia Earhart Dam	
● River Sediment Sample	● Surface Water Sample	▭ RGP Boundary Winter Pond	
● MA DEP AUL Site	▭ Municipal Boundary		
	→ MWRA Sewer Pipe		
	▭ Laydown Yard		

Map Notes:
Basemap: 2013-2014 Orthophotographs, MassGIS
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1 in = 300 ft

0 150 300 600 Feet

**New 115 kV Transmission Line
Woburn Substation to Mystic Substation**

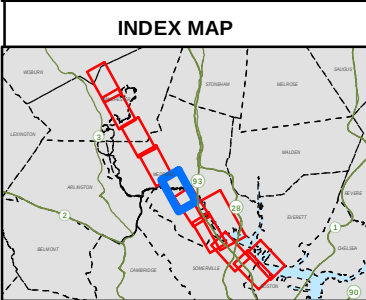
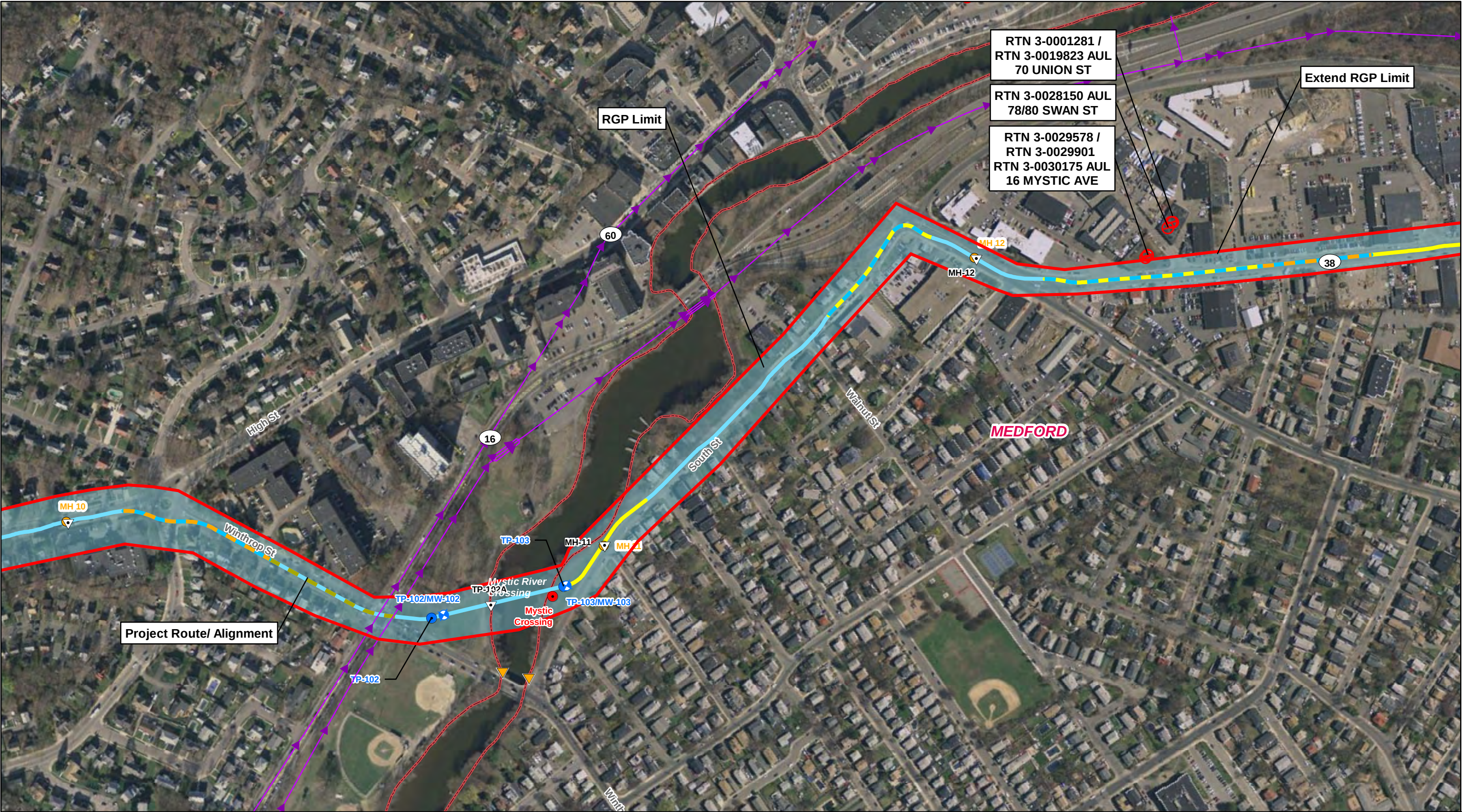
Figure 1: Aerial Dewatering Site Plan

Mapsheet 02 of 07

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Legend

● Test Pit Location	▲ Approximate Outfall Location	▭ RGP Boundaries Aberjona River	Soil Type — Type A — Type B — Type C1 — Type C2 — Type D1 — Type E
▲ Geotech Boring	● Proposed Manhole	▭ RGP Boundaries Mystic River Crossing	
● Geotech Boring/ Monitoring Well	● Existing Manhole	▭ RGP Boundaries Mystic River after Amelia Earhart Dam	
● River Sediment Sample	● Surface Water Sample	▭ RGP Boundary Winter Pond	
⊘ MA DEP AUL Site	▭ Municipal Boundary		
	— MWRA Sewer Pipe		
	▭ Laydown Yard		

Map Notes:
Basemap: 2013-2014 Orthophotographs, MassGIS
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1 in = 300 ft
0 150 300 600 Feet

**New 115 kV Transmission Line
Woburn Substation to Mystic Substation**

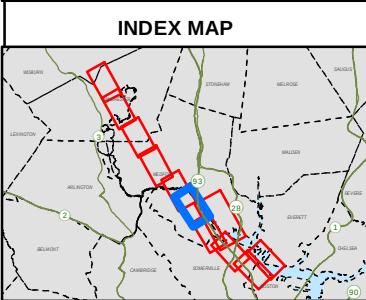
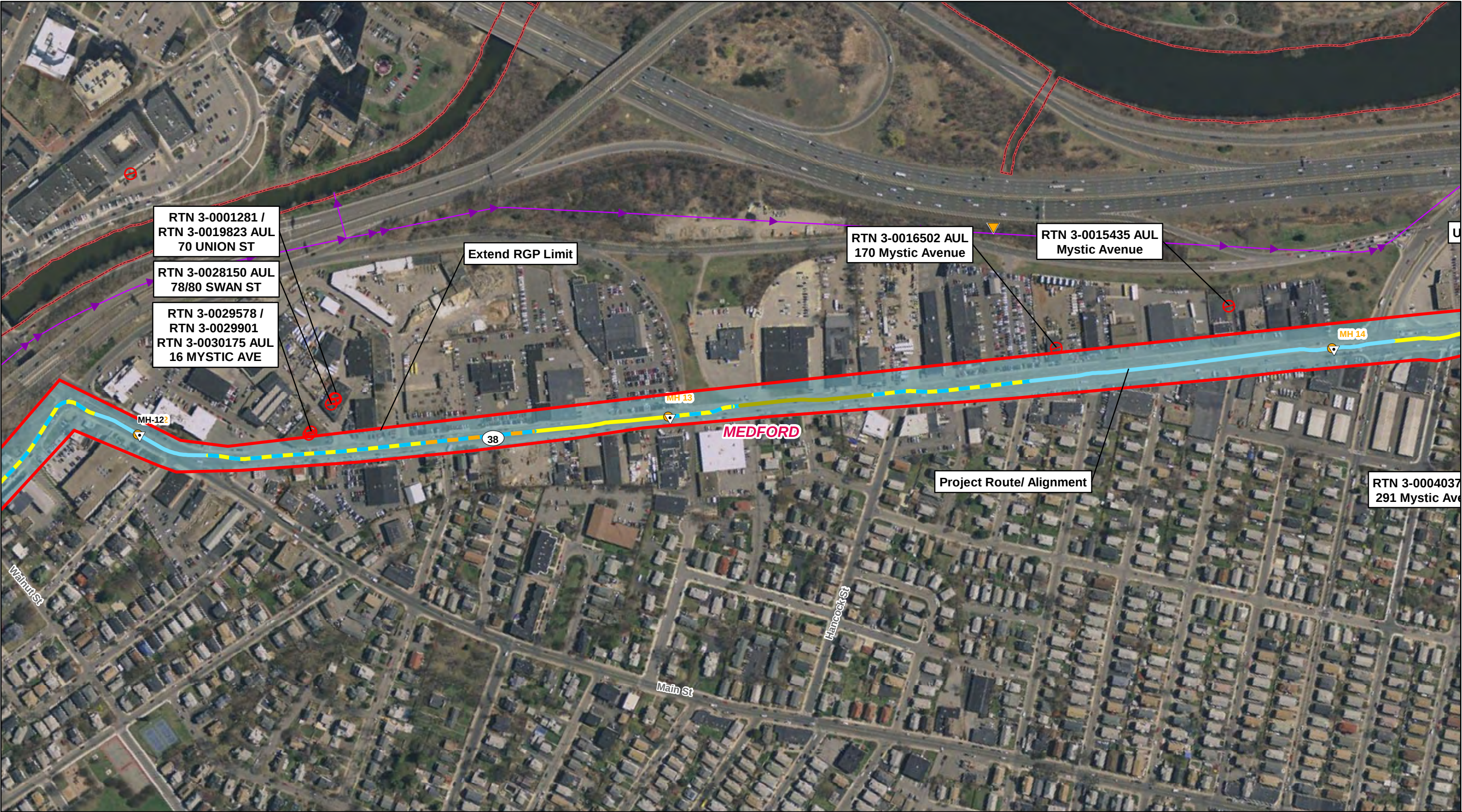
Figure 1: Aerial Dewatering Site Plan

Mapsheet 03 of 04

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Legend

● Test Pit Location	▲ Approximate Outfall Location	▭ RGP Boundaires Aberjona River	■ Soil Type
▲ Geotech Boring	● Proposed Manhole	▭ RGP Boundaires Mystic River Crossing	■ Type A
● Geotech Boring/ Monitoring Well	● Existing Manhole	▭ RGP Boundaires Mystic River after Amelia Earhart Dam	■ Type B
● River Sediment Sample	● Surface Water Sample	▭ RGP Boundary Winter Pond	■ Type C1
● MA DEP AUL Site	▭ Municipal Boundary		■ Type C2
	→ MWRA Sewer Pipe		■ Type D1
	▭ Laydown Yard		■ Type E

Map Notes:
Basemap: 2013-2014 Orthophotographs, MassGIS
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1 in = 300 ft

0 150 300 600 Feet

New 115 kV Transmission Line
Woburn Substation to Mystic Substation

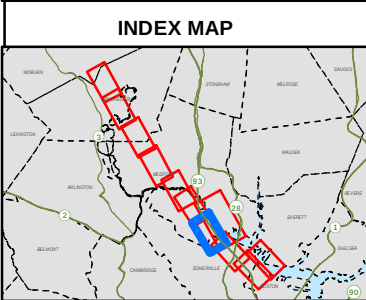
Figure 1: Aerial Dewatering Site Plan

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Legend

● Test Pit Location	▲ Approximate Outfall Location	▭ RGP Boundaires Aberjona River	Soil Type
▲ Geotech Boring	● Proposed Manhole	▭ RGP Boundaires Mystic River Crossing	— Type A
● Geotech Boring/ Monitoring Well	● Existing Manhole	▭ RGP Boundaires Mystic River after Amelia Earhart Dam	— Type B
● River Sediment Sample	● Surface Water Sample	▭ RGP Boundary Winter Pond	— Type C1
⊘ MA DEP AUL Site	▭ Municipal Boundary		— Type C2
	— MWRA Sewer Pipe		— Type D1
	▭ Laydown Yard		— Type E

Map Notes:
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1 in = 300 ft

0 150 300 600 Feet

**New 115 kV Transmission Line
Woburn Substation to Mystic Substation**

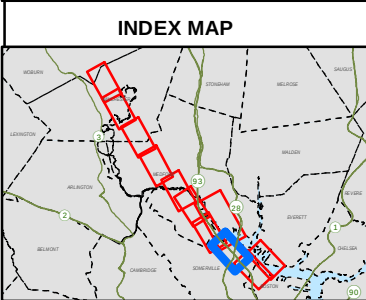
Figure 1: Aerial Dewatering Site Plan

Mapsheet 05 of 07

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Legend

● Test Pit Location	▲ Approximate Outfall Location	▭ RGP Boundaires Aberjona River	Soil Type
▲ Geotech Boring	● Proposed Manhole	▭ RGP Boundaires Mystic River Crossing	— Type A
● Geotech Boring/ Monitoring Well	● Existing Manhole	▭ RGP Boundaires Mystic River after Amelia Earhart Dam	— Type B
● River Sediment Sample	● Surface Water Sample	▭ RGP Boundary Winter Pond	— Type C1
● MA DEP AUL Site	▭ Municipal Boundary		— Type C2
	— MWRA Sewer Pipe		— Type D1
	▭ Laydown Yard		— Type E

Map Notes:
Basemap: 2013-2014 Orthophotographs, MassGIS
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1 in = 300 ft

0 150 300 600 Feet

**New 115 kV Transmission Line
Woburn Substation to Mystic Substation**

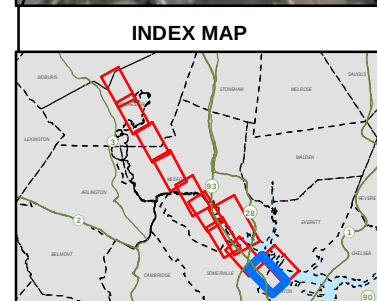
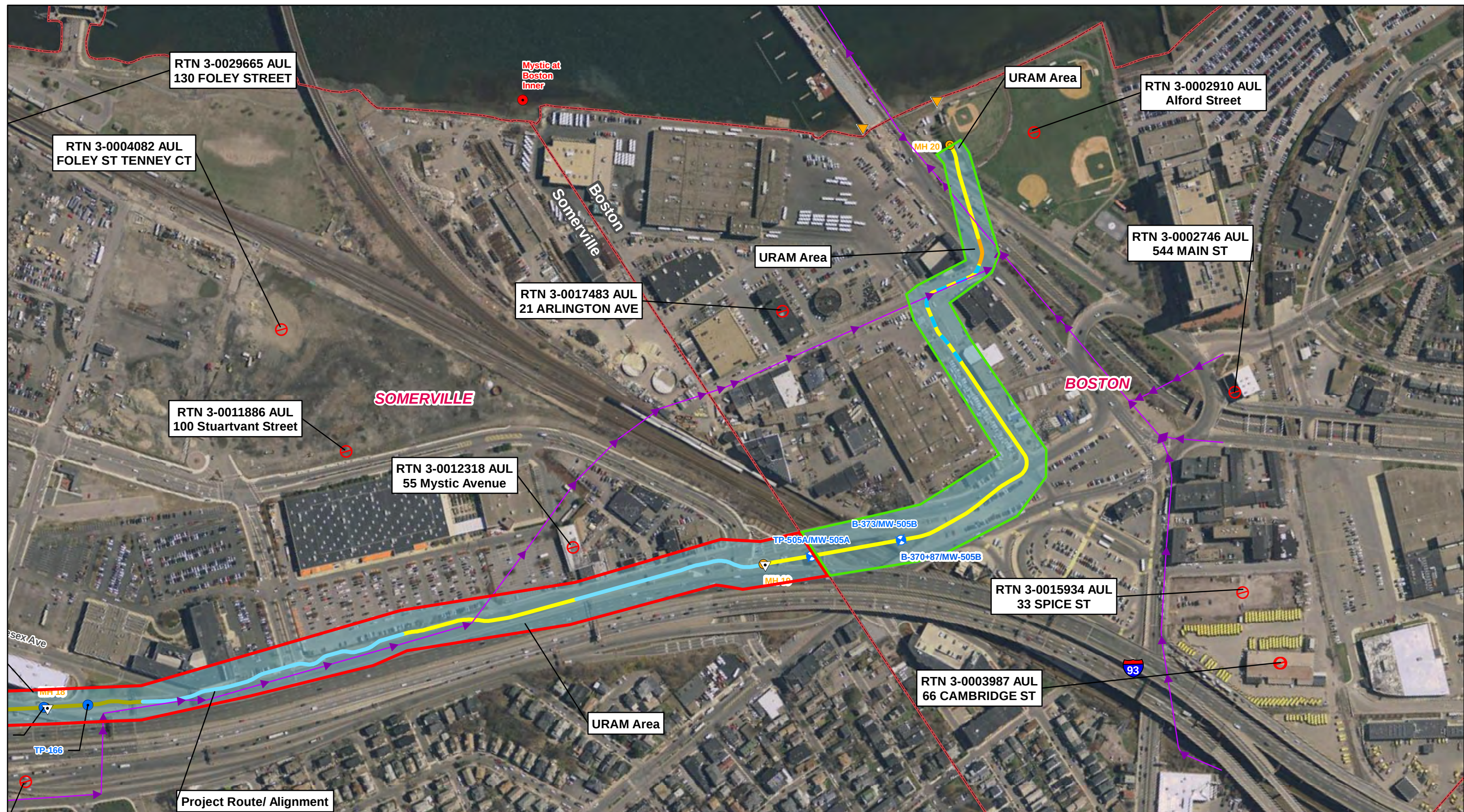
Figure 1: Aerial Dewatering Site Plan

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Legend

- Test Pit Location
- Geotech Boring
- Geotech Boring/ Monitoring Well
- River Sediment Sample
- MA DEP AUL Site
- Approximate Outfall Location
- Proposed Manhole
- Existing Manhole
- Surface Water Sample
- Municipal Boundary
- MWRA Sewer Pipe
- Laydown Yard
- RGP Boundaires Aberjona River
- RGP Boundaires Mystic River Crossing
- RGP Boundaries Mystic River after Amelia Earhart Dam
- RGP Boundary Winter Pond
- Soil Type
 - Type A
 - Type B
 - Type C1
 - Type C2
 - Type D1
 - Type E

Map Notes:
Basemap: 2013-2014 Orthophotographs, MassGIS
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1 in = 300 ft

0 150 300 600 Feet

**New 115 kV Transmission Line
Woburn Substation to Mystic Substation**

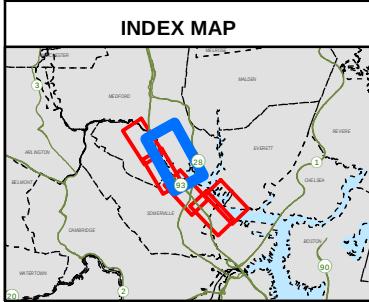
Figure 1: Aerial Dewatering Site Plan

Mapsheet 07 of 07

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Legend

- MA DEP AUL Site
- Discharging Outfall
- Geotech Boring/ Monitoring Well
- Proposed Manhole
- Existing Manhole
- Laydown Yard
- Route Alignment
- Existing Mystic River Crossing
- MassDOT Jurisdiction
- URAM
- RGP Limit
- Municipal Boundary

Map Notes:
Basemap: 2013-2014 Orthophotographs, MassGIS
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1 in = 467 ft

0 150 300 600 Feet

**New 115 kV Transmission Line
Woburn Substation to Mystic
Substation**

Dewatering Plan

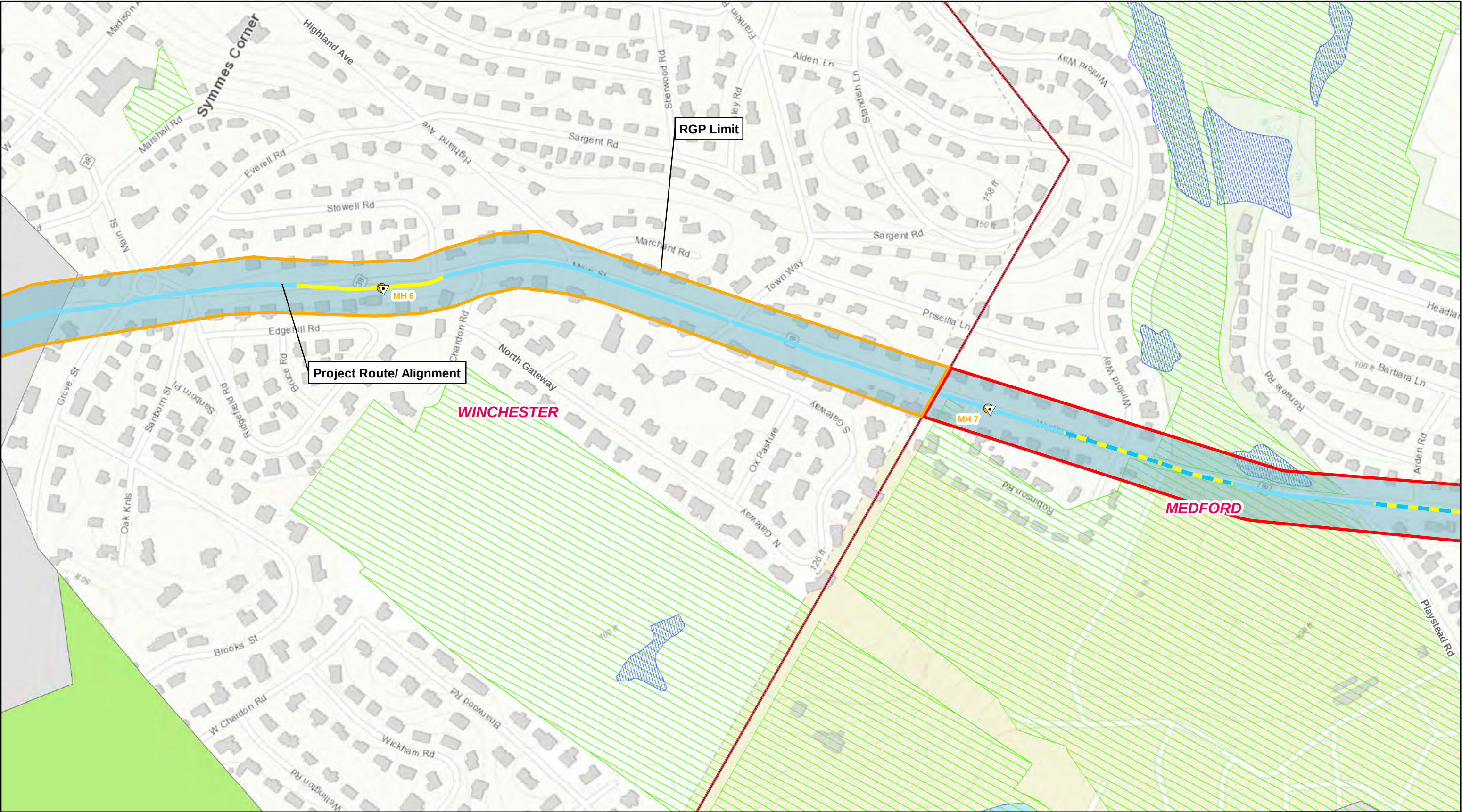
Mapsheet 06 of 06

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Environmental Services Div.

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October 2017



INDEX MAP

Legend

Test Pit Location	Approximate Outfall Location	Soil Type	RGP Boundaries Aberjona River	MassDEP Inland Wetlands
Geotech Boring	Proposed Manhole	Type A	RGP Boundaries Mystic River Crossing	MassDEP Coastal Wetlands
Geotech Boring/ Monitoring Well	Existing Manhole	Type B	RGP Boundaries Mystic River after Amelia Earhart Dam	Protected and Recreational Open Space
River Sediment Sample	Surface Water Sample	Type C1	RGP Boundary Winter Pond	Public Surface Water Supply (PSWS)
MA DEP AUL Site	Municipal Boundary	Type C2	DEP Approved Wellhead Protection Area (Zone II)	Water Bodies
	MWRA Sewer Pipe	Type D1	DEP Interim Wellhead Protection Area (IWPA)	High Yield Non Potential Drinking Water Source
	Laydown Yard	Type E		Medium Yield Non Potential Drinking Water Source
				Potentially Productive Medium Yield Aquifer
				Potentially Productive High Yield Aquifer

Map Notes:
Basemap: 2013-2014 Orthophotographs, MassGIS
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1 in = 300 ft

0 150 300 600 Feet

**New 115 kV Transmission Line
Woburn Substation to Mystic Substation**

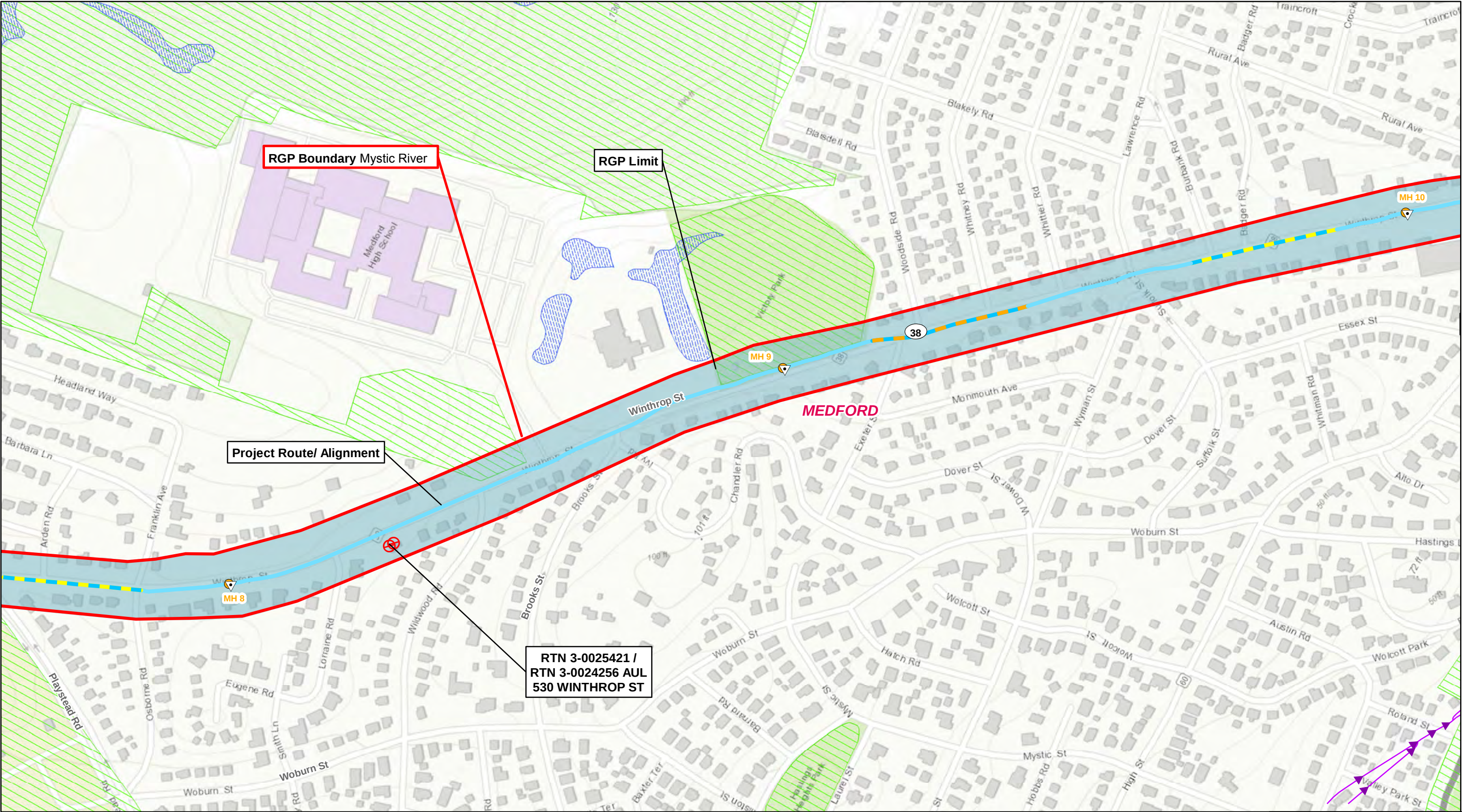
Figure 2: Priority Resource Map

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INDEX MAP

Legend

Test Pit Location	Approximate Outfall Location	Soil Type	RGP Boundaries Aberjona River	MassDEP Inland Wetlands
Geotech Boring	Proposed Manhole	Type A	RGP Boundaries Mystic River Crossing	MassDEP Coastal Wetlands
Geotech Boring/ Monitoring Well	Existing Manhole	Type B	RGP Boundaries Mystic River after Amelia Earhart Dam	Protected and Recreational Open Space
River Sediment Sample	Surface Water Sample	Type C1	RGP Boundary Winter Pond	Public Surface Water Supply (PSWS)
MA DEP AUL Site	Municipal Boundary	Type C2	DEP Approved Wellhead Protection Area (Zone II)	Water Bodies
	MWRA Sewer Pipe	Type D1	DEP Interim Wellhead Protection Area (IWPA)	High Yield Non Potential Drinking Water Source
	Laydown Yard	Type E		Medium Yield Non Potential Drinking Water Source
				Potentially Productive Medium Yield Aquifer
				Potentially Productive High Yield Aquifer

Map Notes:
Basemap: 2013-2014 Orthophotographs, MassGIS
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1 in = 300 ft

0 150 300 600 Feet

**New 115 kV Transmission Line
Woburn Substation to Mystic Substation**

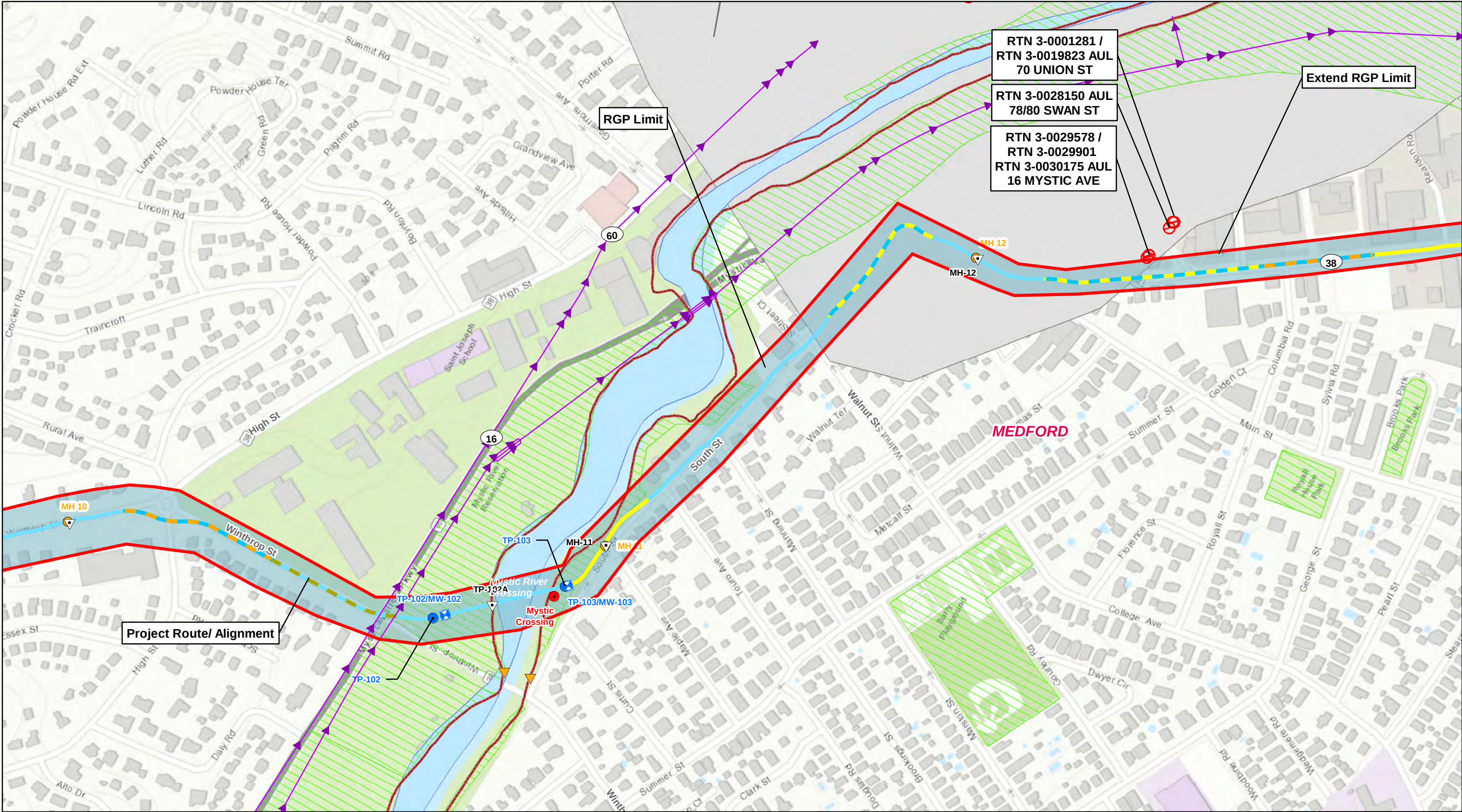
Figure 2: Priority Resource Map

Mapsheet 02 of 07

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INDEX MAP

Legend

Test Pit Location	Approximate Outfall Location	Soil Type
Geotech Boring	Proposed Manhole	Type A
Geotech Boring/ Monitoring Well	Existing Manhole	Type B
River Sediment Sample	Surface Water Sample	Type C1
MA DEP AUL Site	Municipal Boundary	Type C2
	MWRA Sewer Pipe	Type D1
	Laydown Yard	Type E

RGP Boundaries Aberjona River	MassDEP Inland Wetlands
RGP Boundaries Mystic River Crossing	MassDEP Coastal Wetlands
RGP Boundaries Mystic River after Amelia Earhart Dam	Protected and Recreational Open Space
RGP Boundary Winter Pond	Public Surface Water Supply (PSWS)
DEP Approved Wellhead Protection Area (Zone II)	Water Bodies
DEP Interim Wellhead Protection Area (IWPA)	High Yield Non Potential Drinking Water Source
	Medium Yield Non Potential Drinking Water Source
	Potentially Productive Medium Yield Aquifer
	Potentially Productive High Yield Aquifer

Map Notes:
Basemap: 2013-2014 Orthophotographs, MassGIS
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1 in = 300 ft

0 150 300 600 Feet

**New 115 kV Transmission Line
Woburn Substation to Mystic Substation**

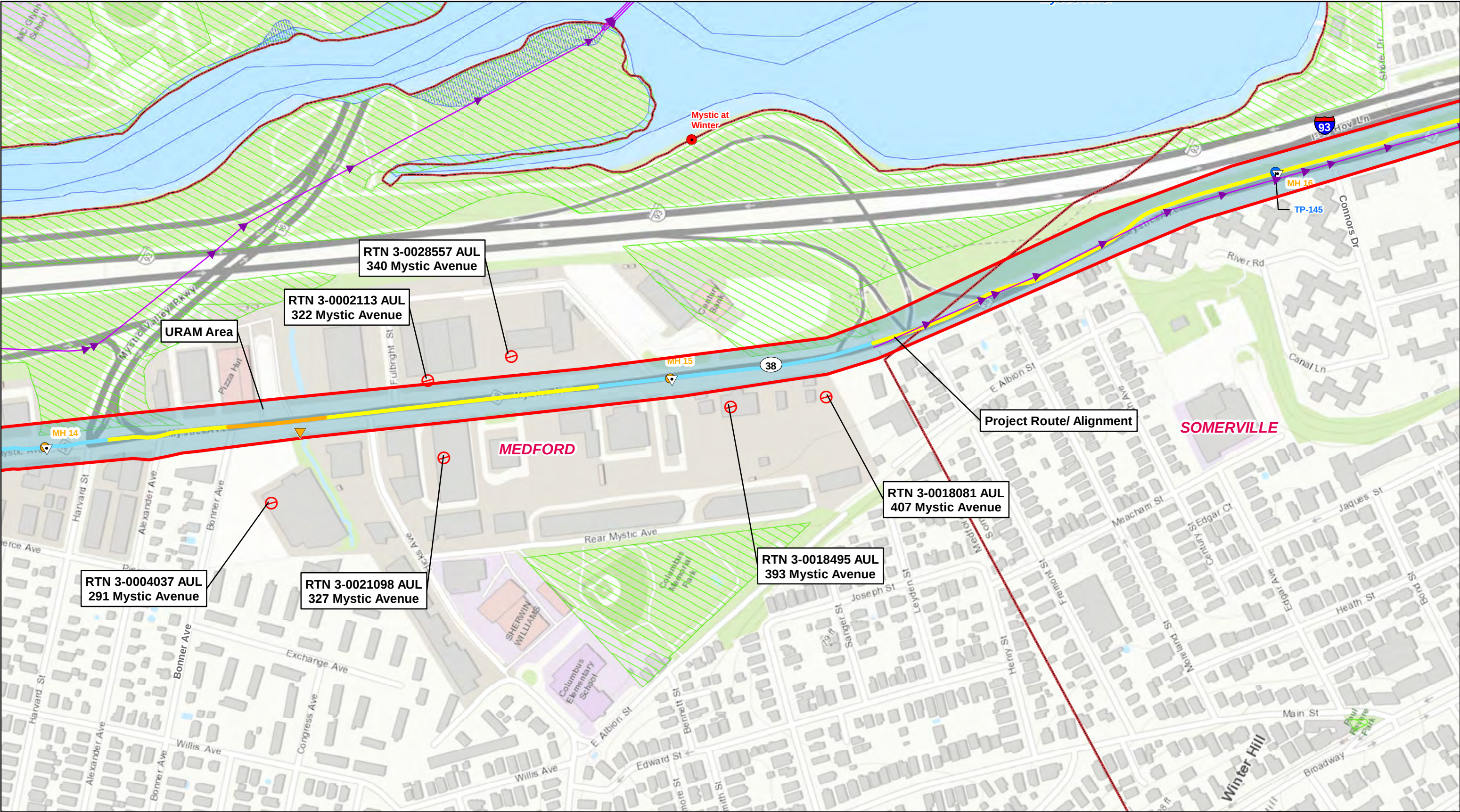
Figure 2: Priority Resource Map

Mapsheet 03 of 04

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INDEX MAP

Legend

Test Pit Location	Approximate Outfall Location	Soil Type	RGPA Boundaries Aberjona River	MassDEP Inland Wetlands
Geotech Boring	Proposed Manhole	Type A	RGPA Boundaries Mystic River Crossing	MassDEP Coastal Wetlands
Geotech Boring/ Monitoring Well	Existing Manhole	Type B	RGPA Boundaries Mystic River after Amelia Earhart Dam	Protected and Recreational Open Space
River Sediment Sample	Surface Water Sample	Type C1	RGPA Boundary Winter Pond	Public Surface Water Supply (PSWS)
MA DEP AUL Site	Municipal Boundary	Type C2	DEP Approved Wellhead Protection Area (Zone II)	Water Bodies
	MWRA Sewer Pipe	Type D1	DEP Interim Wellhead Protection Area (IWPA)	High Yield Non Potential Drinking Water Source
	Laydown Yard	Type E		Medium Yield Non Potential Drinking Water Source
				Potentially Productive Medium Yield Aquifer
				Potentially Productive High Yield Aquifer

Map Notes:
Basemap: 2013-2014 Orthophotographs, MassGIS
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1 in = 300 ft

0 150 300 600 Feet

**New 115 kV Transmission Line
Woburn Substation to Mystic Substation**

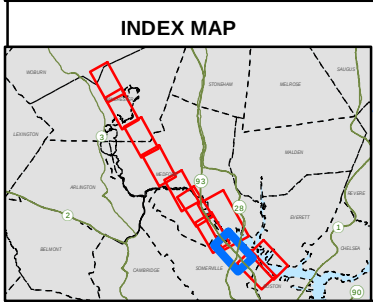
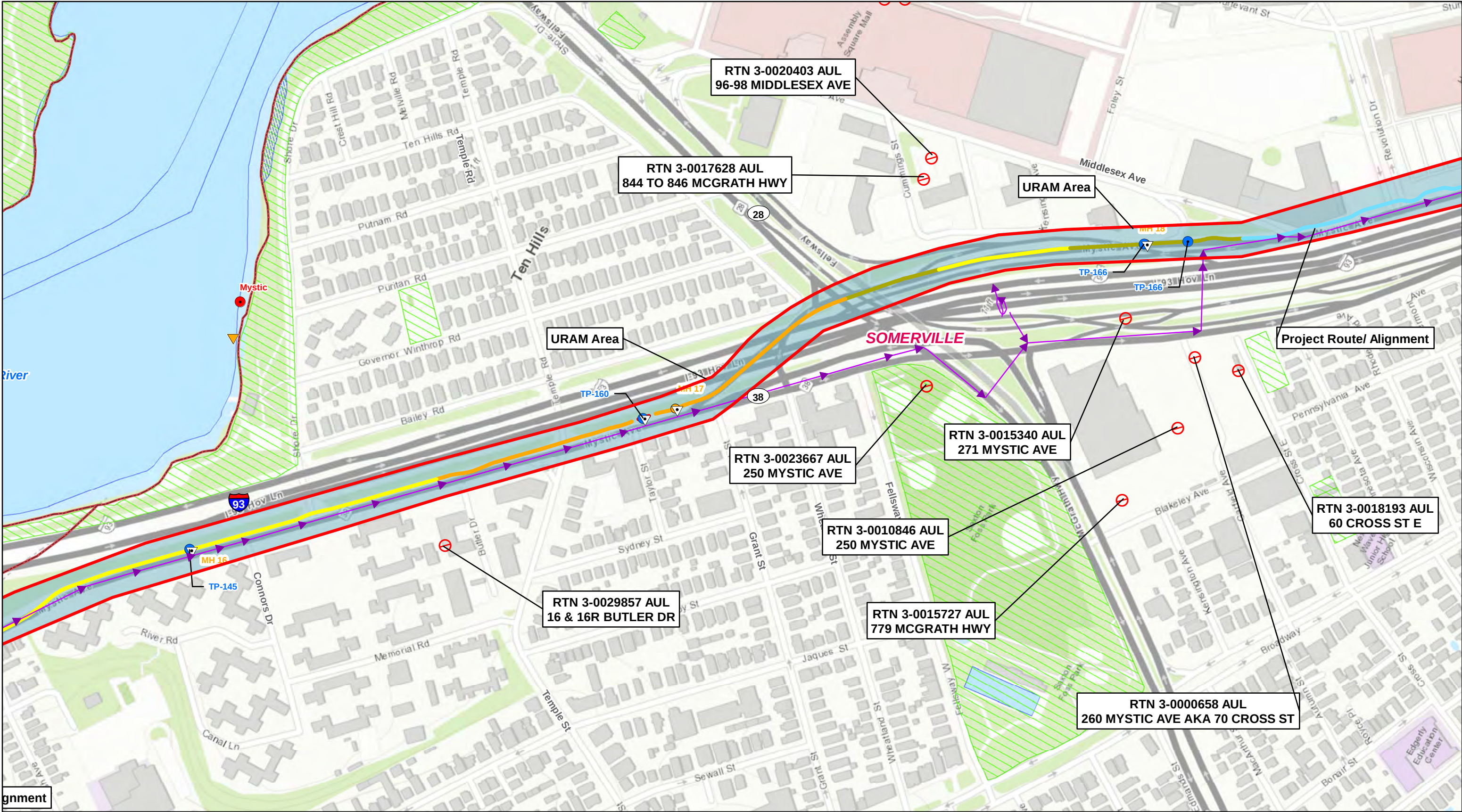
Figure 2: Priority Resource Map

Mapsheets 05 of 07

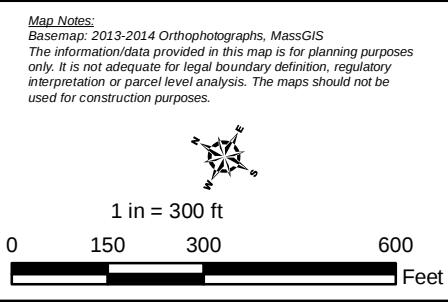
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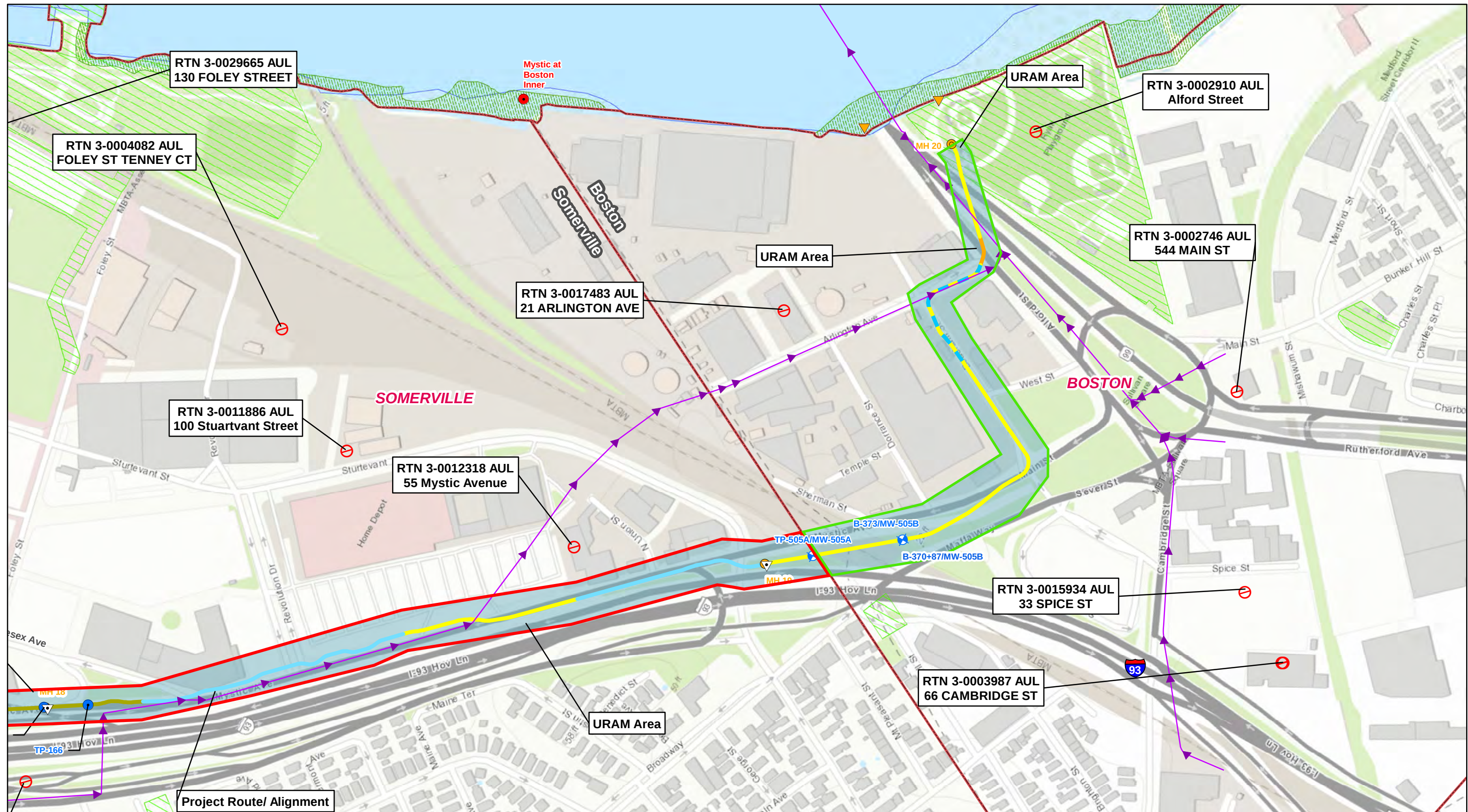
Legend		Soil Type		Map Notes	
	Test Pit Location		Type A		RGP Boundaries Aberjona River
	Geotech Boring		Type B		RGP Boundaries Mystic River Crossing
	Geotech Boring/ Monitoring Well		Type C1		RGP Boundaries Mystic River after Amelia Earhart Dam
	River Sediment Sample		Type C2		RGP Boundary Winter Pond
	MA DEP AUL Site		Type D1		DEP Approved Wellhead Protection Area (Zone II)
	Approximate Outfall Location		Type D2		DEP Interim Wellhead Protection Area (IWPA)
	Proposed Manhole		Type E		MassDEP Inland Wetlands
	Existing Manhole				MassDEP Coastal Wetlands
	Surface Water Sample				Protected and Recreational Open Space
	Municipal Boundary				Public Surface Water Supply (PSWS)
	MWRA Sewer Pipe				Water Bodies
	Laydown Yard				High Yield Non Potential Drinking Water Source
					Medium Yield Non Potential Drinking Water Source
					Potentially Productive Medium Yield Aquifer
					Potentially Productive High Yield Aquifer



New 115 kV Transmission Line
Woburn Substation to Mystic
Substation

Figure 2: Priority Resource Map





INDEX MAP

Legend

- Test Pit Location - Geotech Boring - Geotech Boring/ Monitoring Well - River Sediment Sample - MA DEP AUL Site	- Approximate Outfall Location - Proposed Manhole - Existing Manhole - Surface Water Sample - Municipal Boundary - MWRA Sewer Pipe - Laydown Yard	Soil Type - Type A - Type B - Type C1 - Type C2 - Type D1 - Type E	- RGP Boundaries Aberjona River - RGP Boundaries Mystic River Crossing - RGP Boundaries Mystic River after Amelia Earhart Dam - RGP Boundary Winter Pond - DEP Approved Wellhead Protection Area (Zone II) - DEP Interim Wellhead Protection Area (IWPA)	- MassDEP Inland Wetlands - MassDEP Coastal Wetlands - Protected and Recreational Open Space - Public Surface Water Supply (PSWS) - Water Bodies - High Yield Non Potential Drinking Water Source - Medium Yield Non Potential Drinking Water Source - Potentially Productive Medium Yield Aquifer - Potentially Productive High Yield Aquifer
--	---	--	---	--

Map Notes:
 Basemap: 2013-2014 Orthophotographs, MassGIS
 The information/data provided in this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation or parcel level analysis. The maps should not be used for construction purposes.

**New 115 kV Transmission Line
Woburn Substation to Mystic Substation**

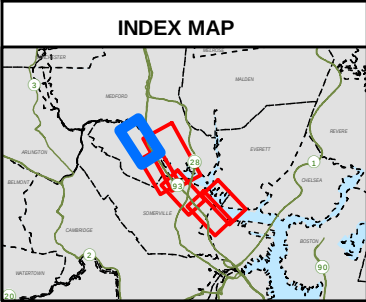
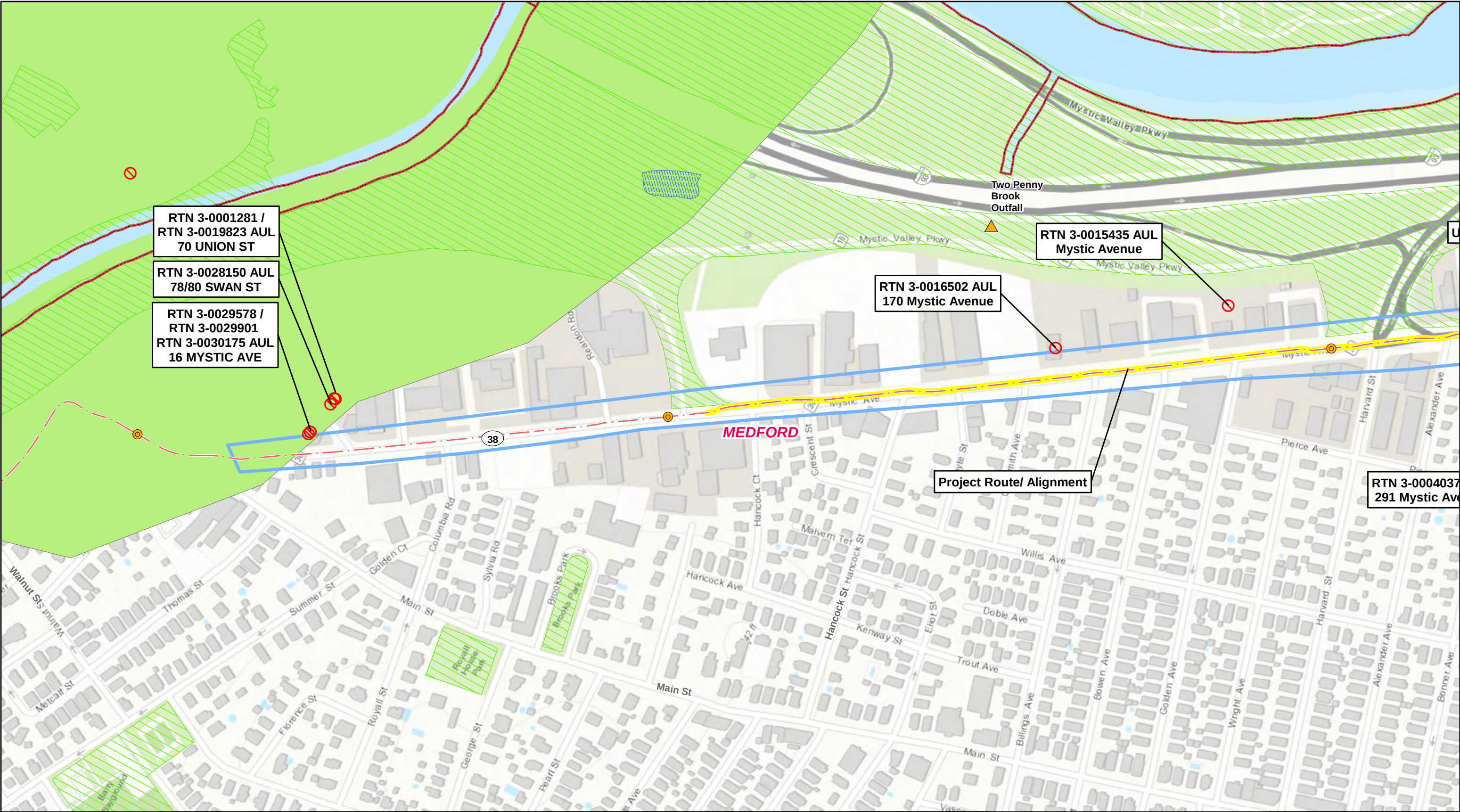
Figure 2: Priority Resource Map

Mapsheets 07 of 07

EVERSOURCE ENERGY

Tighe & Bond
Engineers | Environmental Specialists

November 2017



Legend

RGP Limit	MassDOT Jurisdiction	Protected and Recreational Open Space
Laydown Yard	Existing Mystic River Crossing	MassDEP Inland Wetlands
MA DEP AUL Site	URAM	MassDEP Coastal Wetlands
Discharging Outfall	Municipal Boundary	Water Bodies
Proposed Manhole	DEP Approved Wellhead Protection Area (Zone II)	Potentially Productive Medium Yield Aquifer
Existing Manhole	DEP Interim Wellhead Protection Area (IWPA)	Potentially Productive High Yield Aquifer
Route Alignment		

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1 in = 300 ft

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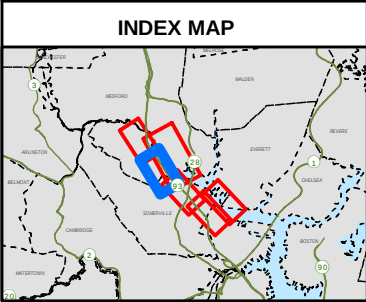
New 115 kV Transmission Line
Woburn Substation to Mystic Substation

Dewatering Plan
Priority Resources

Mapsheets 01 of 05

Environmental Services Div. Engineers | Environmental Specialists

October 2017



Legend

RGP Limit	MassDOT Jurisdiction	Protected and Recreational Open Space
Laydown Yard	Existing Mystic River Crossing	MassDEP Inland Wetlands
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**New 115 kV Transmission Line
Woburn Substation to Mystic
Substation**

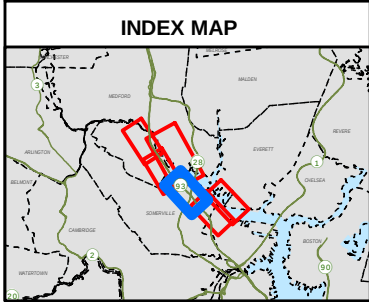
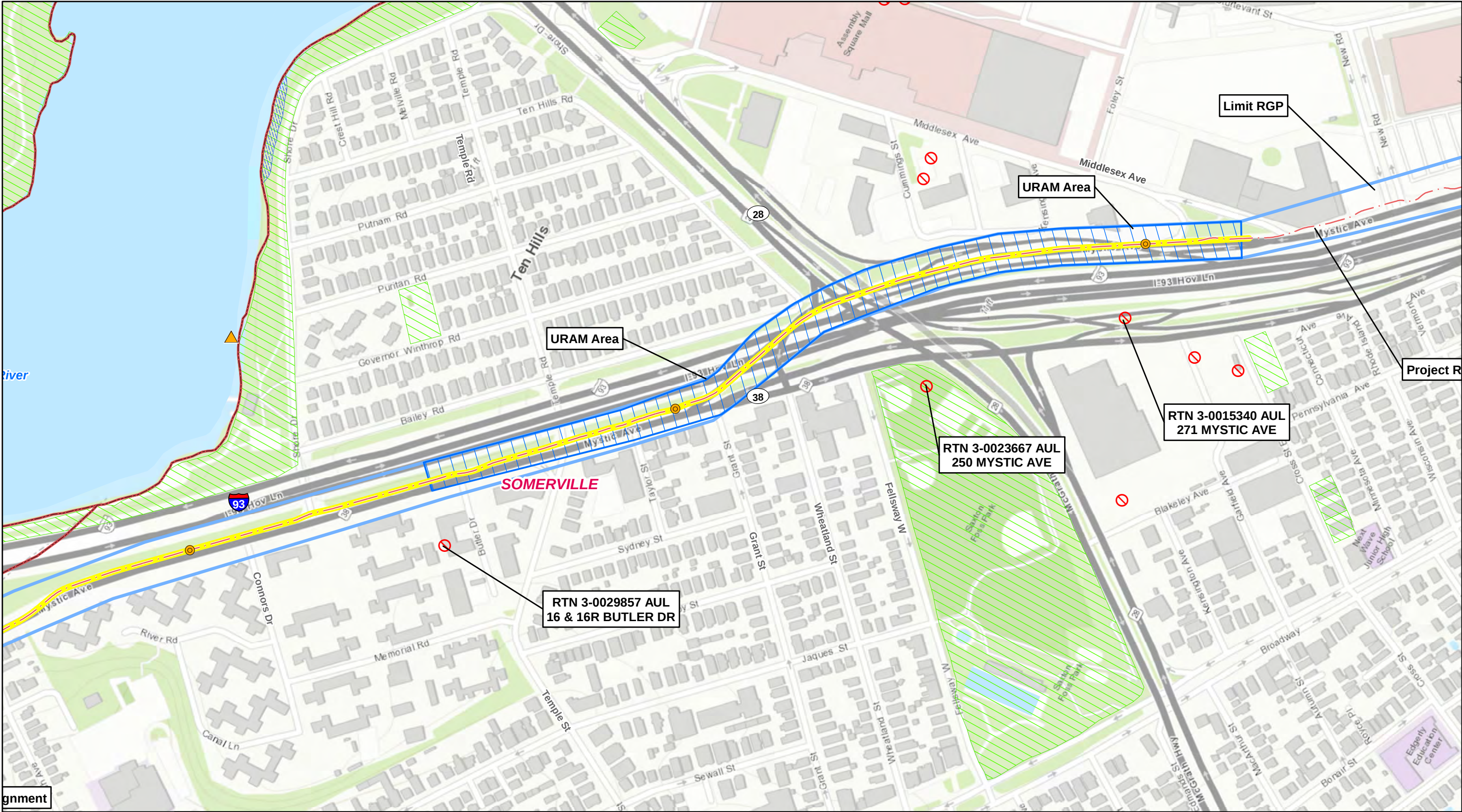
**Dewatering Plan
Priority Resources**

Mapsheets 02 of 05

**EVERSOURCE
ENERGY**

Environmental Services Div. Engineers | Environmental Specialists

October 2017



Legend

RGP Limit	MassDOT Jurisdiction	Protected and Recreational Open Space
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New 115 kV Transmission Line
Woburn Substation to Mystic Substation

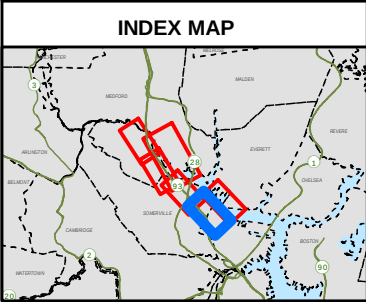
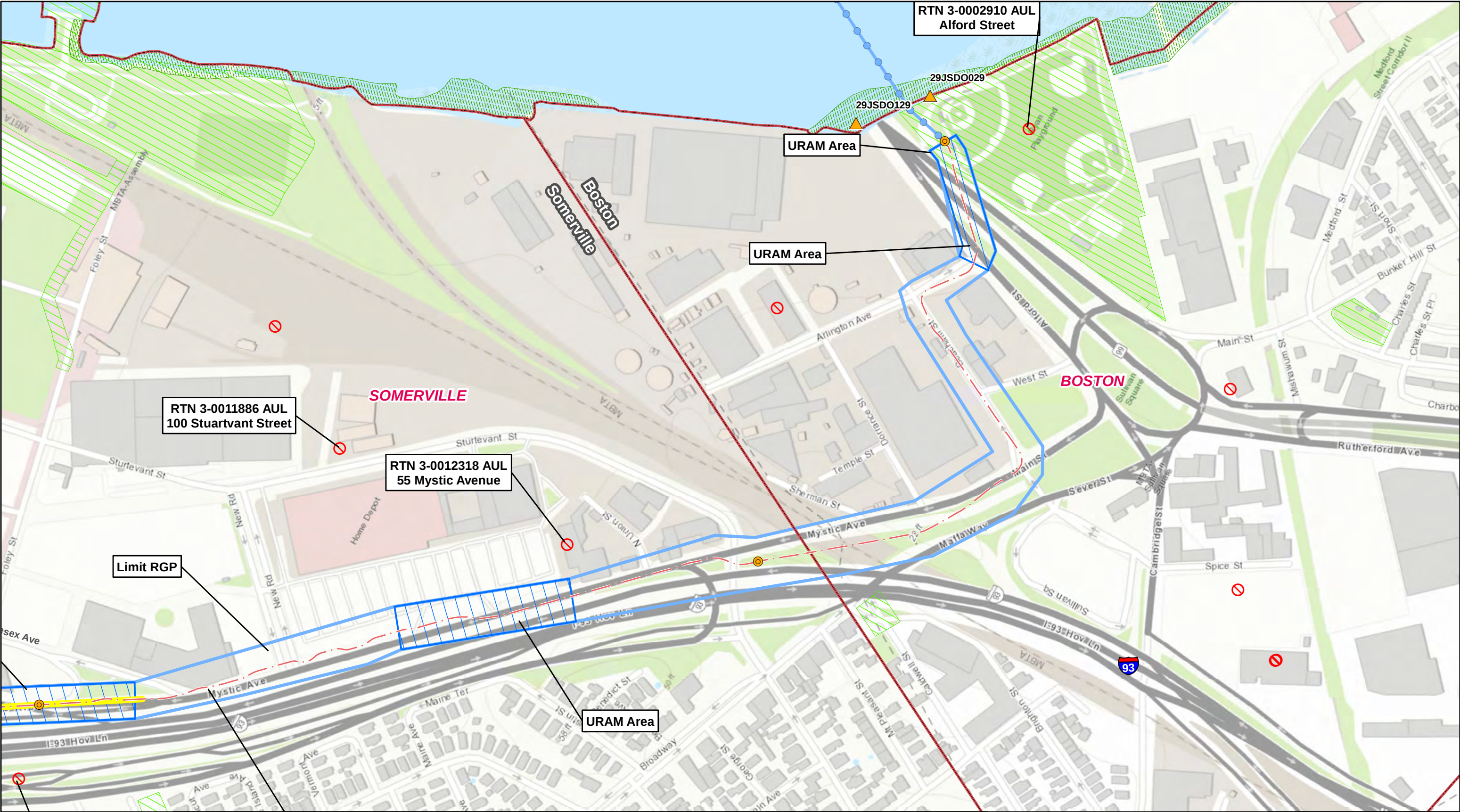
Dewatering Plan
Priority Resources

Mapsheet 03 of 05

EVERSOURCE
ENERGY

Environmental Services Div. Engineers | Environmental Specialists

October 2017



Legend

RGP Limit	MassDOT Jurisdiction	Protected and Recreational Open Space
Laydown Yard	Existing Mystic River Crossing	MassDEP Inland Wetlands
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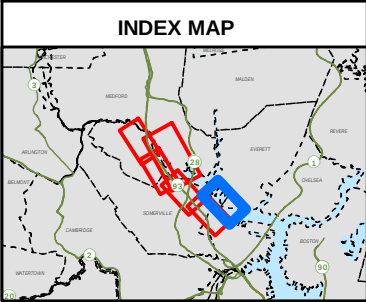
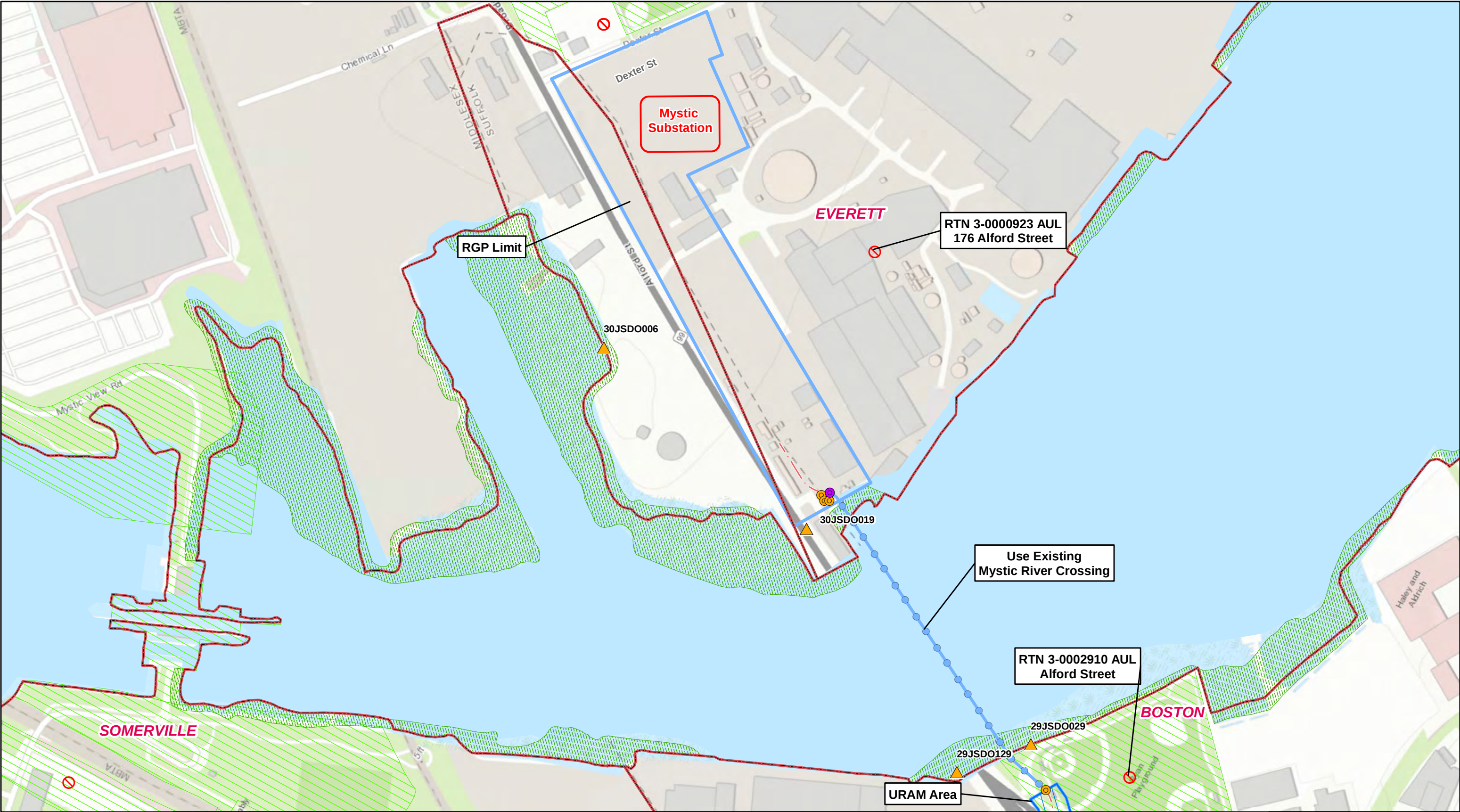
New 115 kV Transmission Line
Woburn Substation to Mystic
Substation

Dewatering Plan
Priority Resources

Mapsheet 04 of 05

Environmental Services Div. Engineers | Environmental Specialists

October 2017



Legend

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1 in = 300 ft

New 115 kV Transmission Line
Woburn Substation to Mystic Substation

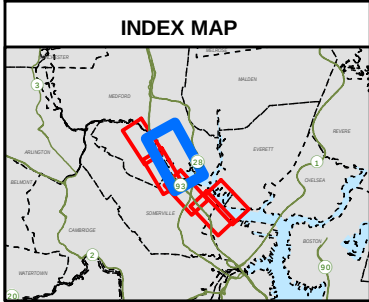
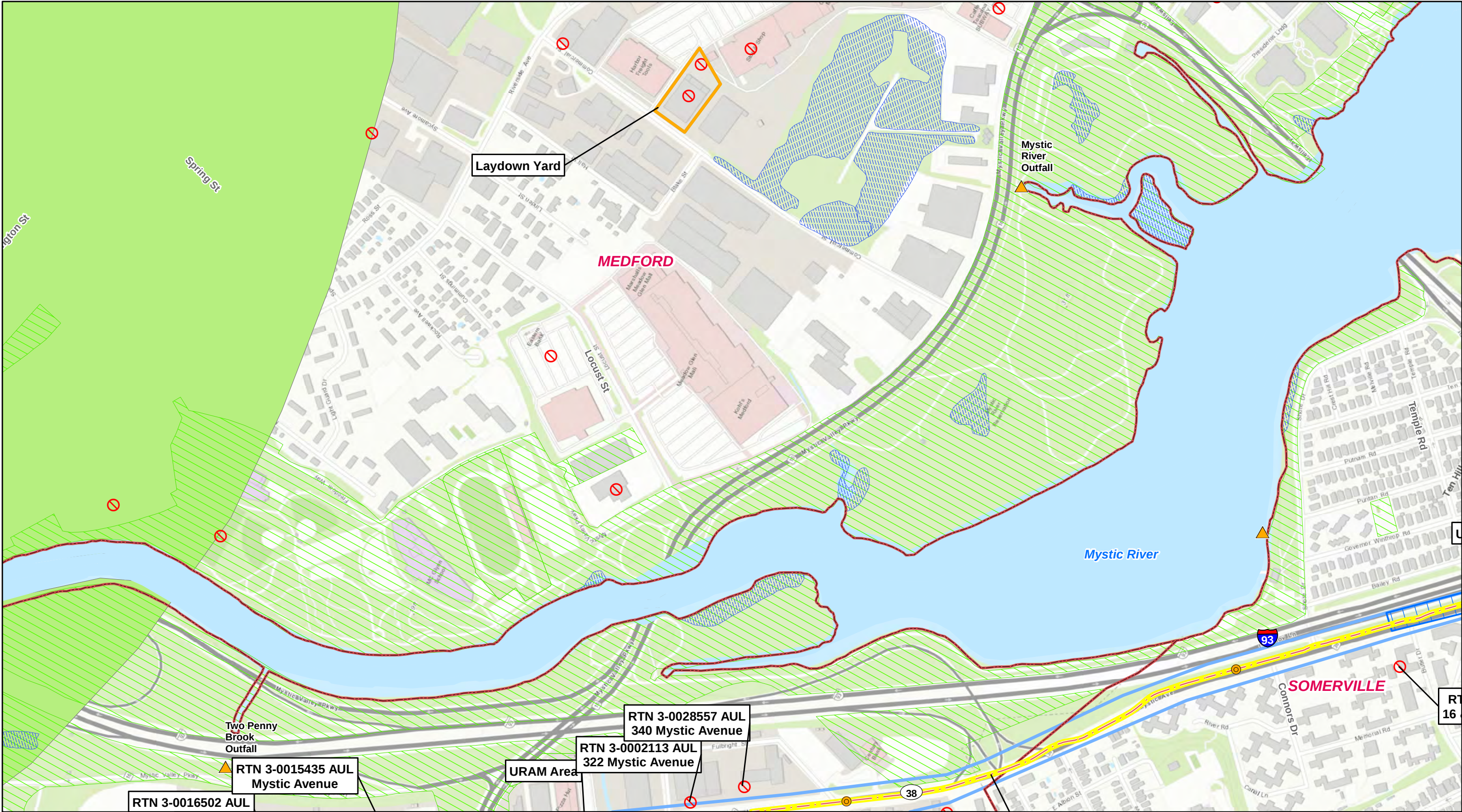
Dewatering Plan
Priority Resources

Mapsheet 05 of 06

EVERSOURCE
ENERGY

Environmental Services Div. Engineers | Environmental Specialists

October 2017



Legend

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**New 115 kV Transmission Line
Woburn Substation to Mystic Substation**

**Dewatering Plan
Priority Resources**

Mapsheet 06 of 06

EVERSOURCE ENERGY

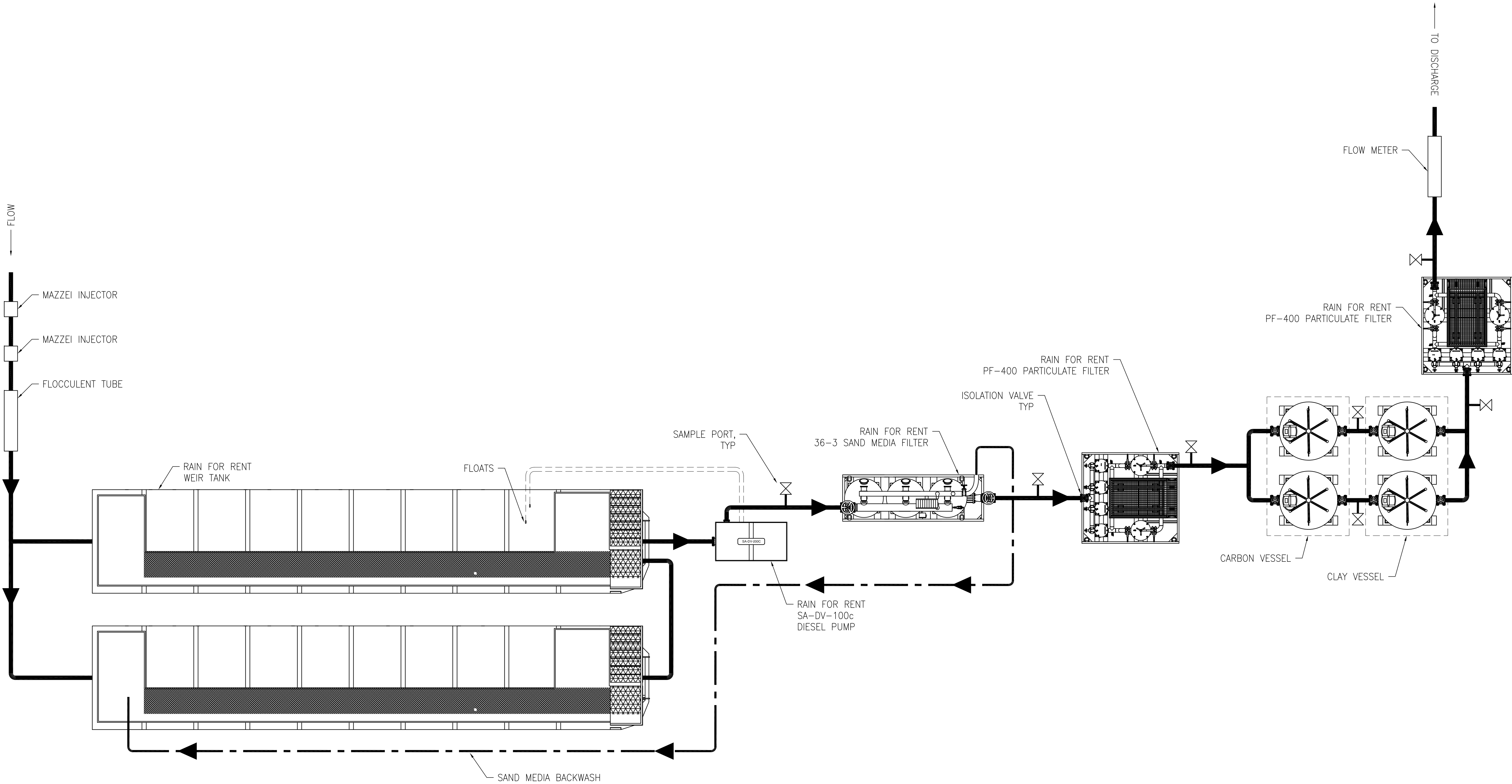
Environmental Services Div. Engineers | Environmental Specialists

October 2017

REV.NO.	DESCRIPTION	PREVIOUS DWG	BY	DATE
1				

Figure 3.1 Process Flow Diagram

ITEM	QTY.	REF.	DESCRIPTION



PLAN VIEW

FILTRATION
LAYOUT

BOND BROTHERS
350 GPM

Rain for Rent
Engineering



3404 STATE ROAD, P.O. BOX 2248 BAKERSFIELD, CA 93303

01-15043-02-01



CONFIDENTIAL

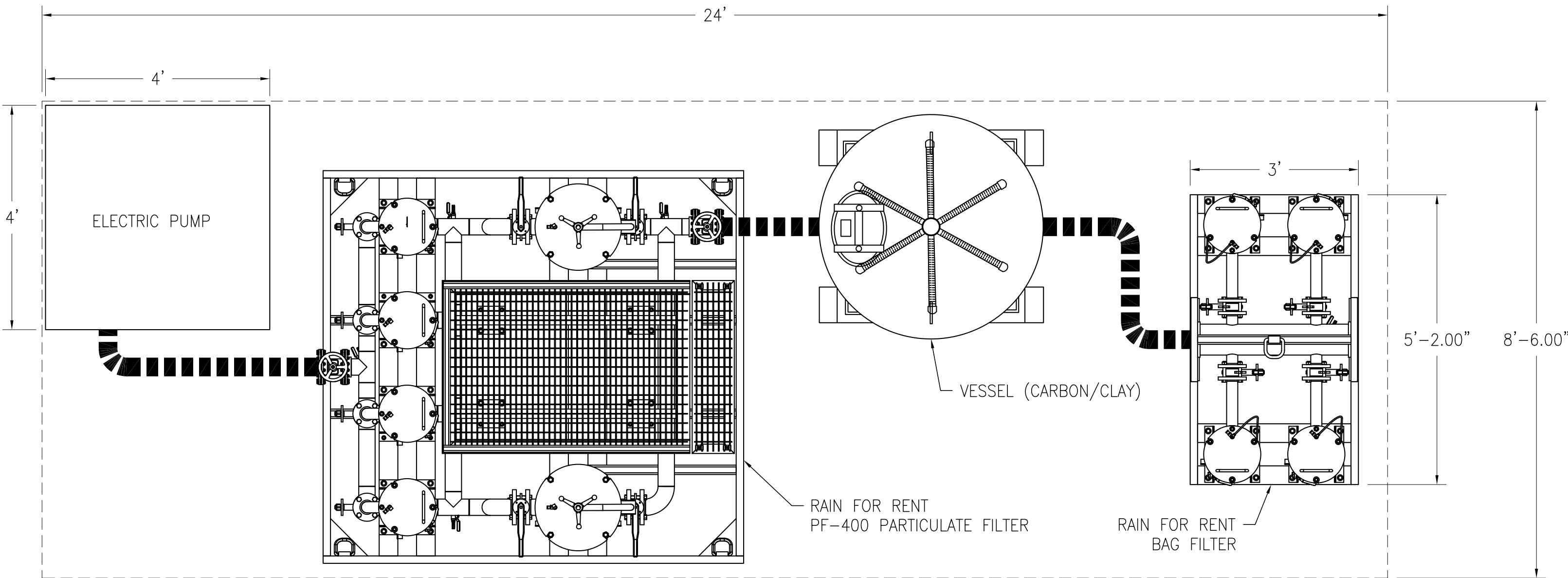
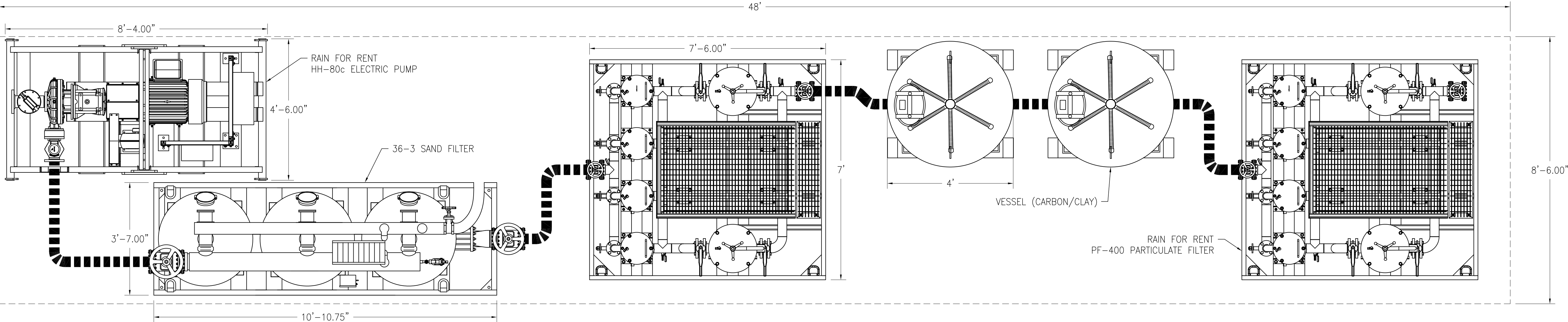
RAIN FOR RENT INFORMATION NUMBER
232101-17

1 SHEET OF 1

REV.NO.	DESCRIPTION	PREVIOUS DWG	BY	DATE
1				

Figure 3.2 Process Flow Diagram

ITEM	QTY.	REF.	DESCRIPTION



CONCEPT

BOND BROTHERS

Rain for Rent
Engineering



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01-15043-02-01



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RAIN FOR RENT INFORMATION NUMBER 232101-17

1 SHEET OF 1

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APPENDIX C

**FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES
IN MASSACHUSETTS**

COUNTY	SPECIES	FEDERAL STATUS	GENERAL LOCATION/HABITAT	TOWNS
Essex	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Gloucester, Essex and Manchester
	Piping Plover	Threatened	Coastal Beaches	Gloucester, Essex, Ipswich, Rowley, Revere, Newbury, Newburyport and Salisbury
	Red Knot ¹	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Franklin	Northeastern bulrush	Endangered	Wetlands	Montague, Warwick
	Dwarf wedgemussel	Endangered	Mill River	Whately
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Hampshire	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Hadley
	Puritan tiger beetle	Threatened	Sandy beaches along the Connecticut River	Northampton and Hadley
	Dwarf wedgemussel	Endangered	Rivers and Streams.	Hatfield, Amherst and Northampton
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Hampden	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Southwick
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Middlesex	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Groton
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Nantucket	Piping Plover	Threatened	Coastal Beaches	Nantucket
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	Nantucket
	American burying beetle	Endangered	Upland grassy meadows	Nantucket
	Red Knot ¹	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide



United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
<http://www.fws.gov/newengland>



In Reply Refer To:
Consultation Code: 05E1NE00-2019-SLI-1327
Event Code: 05E1NE00-2019-E-03091
Project Name: Mystic to Woburn

April 05, 2019

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
-

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2019-SLI-1327

Event Code: 05E1NE00-2019-E-03091

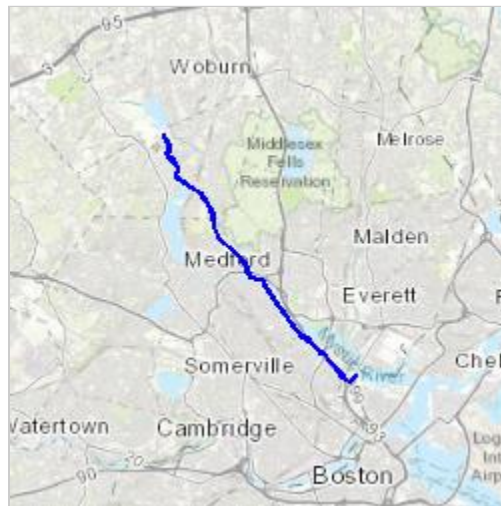
Project Name: Mystic to Woburn

Project Type: TRANSMISSION LINE

Project Description: An underground electrical transmission line is being installed to improve the electrical reliability to the Boston area.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/42.423878380041806N71.12109519406037W>



Counties: Middlesex, MA | Suffolk, MA

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

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

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

APPENDIX D

Massachusetts Cultural Resource Information System

MACRIS

MACRIS Search Results

Search Criteria: Town(s): Medford,Somerville; Street Name: Mystic Ave; Resource Type(s): Area, Building, Burial Ground, Object, Structure;

Inv. No.	Property Name	Street	Town	Year
MDF.571	Hall, Benjamin House	29 Mystic Ave	Medford	c 1965
MDF.34		41 Mystic Ave	Medford	1752
MDF.578		45 Mystic Ave	Medford	c 1900
MDF.584		67 Mystic Ave	Medford	c 1958
MDF.585		71 Mystic Ave	Medford	c 1900
MDF.587		73 Mystic Ave	Medford	c 1945
MDF.588		81 Mystic Ave	Medford	c 1945
MDF.590		93 Mystic Ave	Medford	c 1955
MDF.591		101 Mystic Ave	Medford	c 1953
SMV.943	Foss Park	Fellsway West	Somerville	
SMV.1336		Mystic Ave	Somerville	c 1960
SMV.754	Williams Table and Lumber Company	356 Mystic Ave	Somerville	c 1888
SMV.1288		500 Mystic Ave	Somerville	c 2000
SMV.1289		500 Mystic Ave	Somerville	c 1999
SMV.1290		500 Mystic Ave	Somerville	c 1960
SMV.1291		500 Mystic Ave	Somerville	c 1900
SMV.1287		708 Mystic Ave	Somerville	c 1991
SMV.1286		712 Mystic Ave	Somerville	c 1900



20 Black Brook Road
Aquinnah, MA 02535

Tribal Historic Preservation Office
Wampanoag Tribe of Gay Head (Aquinnah)

Office (508)645-9265
Fax (508)645-3790

April 5, 2017

Daniel P. Rukakoski
53 South Hampton Road
Westfield, MA, 01085-5308
DPRukakoski@tighebond.com
Re: Mystic-Woburn Transmission Line Project N-099811-04(5200)

Dear Daniel P. Rukakoski,

The Wampanoag Tribe of Gay Head (Aquinnah) (WTGHA) Tribal Historic Preservation Office (THPO) has received notification of your project form dated. Once reviewed we will notify you of further action which may include any of the following;

- No further comments on the project
- An initial site visit will be scheduled
- Monitoring will be required at a rate of \$55.00 per hour in addition to mileage at the current federal rate paid by the proponent (Third party consultants must provide proponent billing information)
- Any archeological surveying may be monitored and requires two weeks advance notice of said survey.

Should you have any questions or concerns please feel free to contact me at bettina@wampanoagtribe.net
The THPO department would like to thank you for adhering to the Section 106 regulations of the National Historic Preservation Act.

In the spirit of Preservation,

Bettina M. Washington

Bettina M. Washington
Tribal Historic Preservation Officer



The COMMONWEALTH OF MASSACHUSETTS
BOARD OF UNDERWATER ARCHAEOLOGICAL RESOURCES
EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
251 Causeway Street, Suite 800, Boston, MA 02114-2136
Tel. (617) 626-1141 Fax (617) 626-1240 Web Site: www.mass.gov/eea/agencies/czm/buar/

March 29, 2017

Mr. Daniel P. Rukakoski
Tighe & Bond, Inc.
53 Southampton Road
Westfield, MA 01085-5308

RE: Mystic-Woburn Transmission Line Project, Bacon Street, Aberjona River, Winchester, MA

Dear Mr. Rukakoski,

The staff of the Massachusetts Board of Underwater Archaeological Resources has reviewed the above referenced project's SHPO/THPO Notification Form and supporting materials submitted by Tighe & Bond, Inc., on behalf of Evesource Energy. We offer the following comments.

The Board has conducted a preliminary review of its files and secondary literature sources to identify known and potential submerged cultural resources in the proposed project area. No record of any underwater archaeological resources was found. The Board notes, however, the area may be generally archaeologically sensitive given its riparian landscape and associated features. The topographical setting is strongly associated with the presence of prehistoric archaeological deposits. However, much of the Aberjona River has undergone extensive prior disturbance and land modification activities (dredging, channelization, landscaping, etc.) which have significantly reduced integrity and/or preservation for submerged cultural resources. The Board finds the project unlikely to adversely affect submerged cultural resources.

However, should heretofore-unknown submerged cultural resources be encountered during the course of the project, the Board expects that the project's sponsor will take steps to limit adverse affects and notify the Board and the Massachusetts Historical Commission, as well as other appropriate agencies, immediately in accordance with the Board's *Policy Guidance for the Discovery of Unanticipated Archaeological Resources*.

The Board appreciates the opportunity to provide these comments as part of the review process. Should you have any questions regarding this letter, please do not hesitate to contact me at the address above, by email at victor.mastone@state.ma.us, or by telephone at (617) 626-1141.

Sincerely,

A handwritten signature in blue ink, appearing to read "Victor T. Mastone".

Victor T. Mastone
Director

/vtm

Cc: Brona Simon, MHC
Ramona Peters, MWT (via email attachment)
Bettina Washington, WTGH/A (via email attachment)

Sent: Wednesday, November 29, 2017 4:41 PM

To: Michael E. Martin <MEMartin@tigheBond.com>

Cc: Ruan, Xiaodan (DEP) <xiaodan.ruan@state.ma.us>

Subject: RE: Eversource - Mystic to Woburn RGP Dilution Factors

Hi Michael,

The 7Q10s and the dilution factor calculations that you provided are correct. The receiving waters (Mystic and Aberjona rivers) are not Outstanding Resource Waters so you are all set with MassDEP.



Engineers | Environmental Specialists

Eversource Project Mystic-Woburn Transmission Project US EPA RGP Dilution Factor Calculations

Receiving Water	Effluent Discharge Flow (MGD)	7Q10 Flow (MGD)	Dilution Factor
Mystic River	0.504	2.16	5.29
Aberjona River	0.504	0.968	2.92

$$DF = \frac{QD + QS}{QD}$$

Where:

DF = Dilution Factor

QD = Effluent Discharge Flow Rate (MGD)

QS = 7Q10 Stream Flow Rate (MGD)

MGD = Million Gallons per Day

Please let me know if you have any further questions.

Cathy

Enter number values in green boxes below

Enter values in the units specified

↓	
2.16	Q _R = Enter upstream flow in MGD
0.504	Q _R = Enter discharge flow in MGD
2.16	Downstream 7Q10

Enter a dilution factor, if other than zero

↓	
5.29	

Enter values in the units specified

↓	
426	C _d = Enter influent hardness in mg/L CaCO ₃
221	C _s = Enter receiving water hardness in mg/L CaCO ₃

Enter **receiving water** concentrations in the units specified

↓	
7.46	pH in Standard Units
17.4	Temperature in °C
0.45	Ammonia in mg/L
221	Hardness in mg/L CaCO ₃
0	Salinity in ppt
0	Antimony in µg/L
0	Arsenic in µg/L
0	Cadmium in µg/L
0	Chromium III in µg/L
0	Chromium VI in µg/L
0	Copper in µg/L
274	Iron in µg/L
0	Lead in µg/L
0	Mercury in µg/L
0	Nickel in µg/L
0	Selenium in µg/L
0	Silver in µg/L
11.1	Zinc in µg/L

Enter **influent** concentrations in the units specified

↓	
0	TRC in µg/L
9.09	Ammonia in mg/L
0	Antimony in µg/L
0	Arsenic in µg/L
0.26	Cadmium in µg/L
14	Chromium III in µg/L
0	Chromium VI in µg/L
41.9	Copper in µg/L
32000	Iron in µg/L
73.7	Lead in µg/L
0	Mercury in µg/L
16.3	Nickel in µg/L
0	Selenium in µg/L
0	Silver in µg/L
77.5	Zinc in µg/L
0	Cyanide in µg/L
0	Phenol in µg/L
0	Carbon Tetrachloride in µg/L
0	Tetrachloroethylene in µg/L
8.62	Total Phthalates in µg/L
8.12	Diethylhexylphthalate in µg/L
0.07	Benzo(a)anthracene in µg/L
0.08	Benzo(a)pyrene in µg/L
0.12	Benzo(b)fluoranthene in µg/L
0	Benzo(k)fluoranthene in µg/L
0.08	Chrysene in µg/L
0	Dibenzo(a,h)anthracene in µg/L
0.08	Indeno(1,2,3-cd)pyrene in µg/L
29.2	Methyl-tert butyl ether in µg/L

Notes:

Freshwater: Q_R equal to the 7Q10; enter alternate Q_R if approved by the State; enter 0 if no dilution factor approved

Saltwater (estuarine and marine): enter Q_R if approved by the State; enter 0 if no entry

Discharge flow is equal to the design flow or 1 MGD, whichever is less

Only if approved by State as the entry for Q_d; leave 0 if no entry

Saltwater (estuarine and marine): only if approved by the State

Leave 0 if no entry

Freshwater only

pH, temperature, and ammonia required for all discharges

Hardness required for freshwater

Salinity required for saltwater (estuarine and marine)

Metals required for all discharges if present and if dilution factor is > 1

Enter 0 if non-detect or testing not required

if >1 sample, enter maximum

if >10 samples, may enter 95th percentile

Enter 0 if non-detect or testing not required

Dilution Factor	5.3					
A. Inorganics	TBEL applies if bolded	WQBEL applies if bolded	Compliance Level applies if shown			
Ammonia	Report	mg/L	---			
Chloride	Report	µg/L	---			
Total Residual Chlorine	0.2	mg/L	47	µg/L	50	µg/L
Total Suspended Solids	30	mg/L	---			
Antimony	206	µg/L	2743	µg/L		
Arsenic	104	µg/L	43	µg/L		
Cadmium	10.2	µg/L	2.7482	µg/L		
Chromium III	323	µg/L	958.5	µg/L		
Chromium VI	323	µg/L	49.0	µg/L		
Copper	242	µg/L	108.1	µg/L		
Iron	5000	µg/L	3111	µg/L		
Lead	160	µg/L	60.04	µg/L		
Mercury	0.739	µg/L	3.88	µg/L		
Nickel	1450	µg/L	598.7	µg/L		
Selenium	235.8	µg/L	21.4	µg/L		
Silver	35.1	µg/L	120.2	µg/L		
Zinc	420	µg/L	1329.7	µg/L		
Cyanide	178	mg/L	22.3	µg/L	---	µg/L
B. Non-Halogenated VOCs						
Total BTEX	100	µg/L	---			
Benzene	5.0	µg/L	---			
1,4 Dioxane	200	µg/L	---			
Acetone	7970	µg/L	---			
Phenol	1,080	µg/L	1286	µg/L		
C. Halogenated VOCs						
Carbon Tetrachloride	4.4	µg/L	6.9	µg/L		
1,2 Dichlorobenzene	600	µg/L	---			
1,3 Dichlorobenzene	320	µg/L	---			
1,4 Dichlorobenzene	5.0	µg/L	---			
Total dichlorobenzene	---	µg/L	---			
1,1 Dichloroethane	70	µg/L	---			
1,2 Dichloroethane	5.0	µg/L	---			
1,1 Dichloroethylene	3.2	µg/L	---			
Ethylene Dibromide	0.05	µg/L	---			
Methylene Chloride	4.6	µg/L	---			
1,1,1 Trichloroethane	200	µg/L	---			
1,1,2 Trichloroethane	5.0	µg/L	---			
Trichloroethylene	5.0	µg/L	---			
Tetrachloroethylene	5.0	µg/L	14.1	µg/L		
cis-1,2 Dichloroethylene	70	µg/L	---			
Vinyl Chloride	2.0	µg/L	---			
D. Non-Halogenated SVOCs						
Total Phthalates	190	µg/L	---	µg/L		
Diethylhexyl phthalate	101	µg/L	9.4	µg/L		
Total Group I Polycyclic Aromatic Hydrocarbons	1.0	µg/L	---			
Benzo(a)anthracene	1.0	µg/L	0.0163	µg/L	0.1	µg/L
Benzo(a)pyrene	1.0	µg/L	0.0163	µg/L	0.1	µg/L
Benzo(b)fluoranthene	1.0	µg/L	0.0163	µg/L	0.1	µg/L
Benzo(k)fluoranthene	1.0	µg/L	0.0163	µg/L	---	µg/L
Chrysene	1.0	µg/L	0.0163	µg/L	0.1	µg/L
Dibenzo(a,h)anthracene	1.0	µg/L	0.0163	µg/L	---	µg/L
Indeno(1,2,3-cd)pyrene	1.0	µg/L	0.0163	µg/L	0.1	µg/L
Total Group II Polycyclic Aromatic Hydrocarbons	100	µg/L	---			
Naphthalene	20	µg/L	---			
E. Halogenated SVOCs						
Total Polychlorinated Biphenyls	0.000064	µg/L	---		0.5	µg/L
Pentachlorophenol	1.0	µg/L	---			
F. Fuels Parameters						
Total Petroleum Hydrocarbons	5.0	mg/L	---			
Ethanol	Report	mg/L	---			
Methyl-tert-Butyl Ether	70	µg/L	86	µg/L		
tert-Butyl Alcohol	120	µg/L	---			
tert-Amyl Methyl Ether	90	µg/L	---			

TABLE 1
Groundwater Results - Lower Mystic Dam to Amelia Earhart Dam
Eversource: Woburn - Mystic

				Mystic River Crossing			
Analytical Test	Sample Identification	Effluent Limitation	Average Concentration	MW-102A	MW-102A FF	MW-103	MW-103 FF
	Sample Date			1/10/2017	1/10/2017	1/10/2017	1/10/2017
TPH - mg/L	TPH	5	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
Total PAHs Group I - ug/L	Benzo(a)Anthracene	0.0163/0.1 ⁽¹⁾	0.05	ND (0.05)	ND (0.05)	0.04	ND (0.05)
	Benzo(a)Pyrene	0.0163/0.1 ⁽¹⁾	0.05	ND (0.05)	ND (0.05)	0.03	ND (0.05)
	Benzo(b)Fluoranthene	0.0163/0.1 ⁽¹⁾	0.06	ND (0.05)	ND (0.05)	0.05	ND (0.05)
	Benzo(k)Fluoranthene	1.0/0.1 ⁽¹⁾	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
	Chrysene	0.0163/0.1 ⁽¹⁾	0.05	ND (0.05)	ND (0.05)	0.04	ND (0.05)
	Dibenzo(a,h)Anthracene	1.0/0.1 ⁽¹⁾	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
	Indeno(1,2,3-cd)Pyrene	0.0163/0.1 ⁽¹⁾	0.05	ND (0.05)	ND (0.05)	0.03	ND (0.05)
	Total PAHs Group I	1.0	0.12	ND	ND	0.19	ND
Total PAHs Group II - ug/L	Acenaphthene	NE	0.20	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)
	Acenaphthylene	NE	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)
	Anthracene	NE	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)
	Benzo(ghi)Perylene	NE	0.17	ND (0.19)	ND (0.19)	0.03	ND (0.19)
	Fluoranthene	NE	0.17	ND (0.19)	ND (0.19)	0.06	ND (0.19)
	Fluorene	NE	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)
	Naphthalene	20	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)
	Phenanthrene	NE	ND (0.19)	ND (0.19)	ND (0.19)	0.04	ND (0.19)
	Pyrene	NE	ND (0.19)	ND (0.19)	ND (0.19)	0.06	ND (0.19)
	Total PAHs Group II	100	0.195	ND	ND	0.19	ND
Phthalates - ug/L	Butylbenzylphthalate	NE	1.4	0.67	0.31	0.30	0.52
	Bis (2-Ethylhexyl) Phthalate	101	4.1	5.67	8.12	3.49	6.24
	Diethylphthalate	NE	1.4	0.27	0.19	0.19	0.82
	Di-n-butylphthalate	NE	2.1	ND (2.34)	ND (2.34)	ND (2.34)	0.45
	Di-n-octylphthalate	NE	2.1	0.3	ND (2.34)	ND (2.34)	ND (2.34)
	Total Phthalates	190	4.6	6.91	8.62	3.98	8.03
SVOCs - ug/L	Pentachlorophenol	1.0	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)
	All Other SVOCs	NE	ND (c/s)	< c/s	< c/s	< c/s	< c/s
Metals- ug/L	Antimony	206	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
	Arsenic	104	11.725	20.6	17.9	22.1	21.2
	Barium	NE	77.85	126	81.1	48.8	55.5
	Beryllium	NE	0.98	1.8	1.0	0.5	0.6
	Cadmium	10.2	0.14	0.07	ND (0.2)	0.05	0.06
	Chromium	323	6.05	13.9	5.2	5.3	5.7
	Chromium III	323	10.5	14.0	ND (10)	ND (10)	ND (10)
	Lead	60.04	14.95	15.5	2.8	9.7	8.9
	Mercury	0.739	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
	Nickel	1,450	6.01	16.3	5.3	4.7	5.8
	Selenium	235.8	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
	Silver	35.1	ND (0.10)	ND (0.10)	ND (0.1)	ND (0.1)	ND (0.1)
	Thallium	NE	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)
	Vanadium	NE	12.5	23.6	9.4	7.8	9.1
	Zinc	420	38.1	56.9	25.3	36.7	33.6
	Iron	3,111	13,289	21,300	12,300	5,460	6,630
	Copper	242	14.5	41.9	10	12.7	18.2
Ethanol - ug/L	Ethanol	Report	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
1,2-Dibromothane - ug/L	1,2-Dibromothane (EDB)	0.05	ND (0.015)	ND (0.015)	ND (0.015)	ND (0.015)	ND (0.015)
1,4-Dioxane - ug/L	1,4-Dioxane	200	0.323	ND (500)	ND (500)	ND (500)	ND (500)
PCB - ug/L	Aroclor-1016	NE	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)
	Aroclor-1221	NE	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)
	Aroclor-1232	NE	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)
	Aroclor-1242	NE	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)
	Aroclor-1248	NE	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)
	Aroclor-1254	NE	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)
	Aroclor-1260	NE	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)
	Aroclor-1262	NE	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)
	Aroclor-1268	NE	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)
	Total PCBs	0.000064/0.5 ⁽¹⁾	ND	ND	ND	ND	ND
VOCs - ug/L	tert-Butyl Alcohol (TBA)	120	30	ND (25.0)	ND (25.0)	ND (25.0)	ND (25.0)
	tert-Amyl Methyl Ether (TAME)	90	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	Napthalene	20	0.6	0.6	0.3	ND (1.0)	ND (1.0)
	Carbon Tetrachloride	4.4	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	1,2 Dichlorobenzene (o-DCB)	600	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	1,3 Dichlorobenzene (m-DCB)	320	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	1,4 Dicholorbenzene (p-DCB)	5.0	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	1,1 Dichloroethane (DCA)	70.0	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	1,2 Dichloroethane (DCA)	5.0	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	1,1 Dichloroethene (DCE)	3.2	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	sec-Butylbenzene	NE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	tert-Butyl Ethyl Ether (TBEE)	NE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	cis-1,2 Dichloroethene (DCE)	70	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	Methylene Chloride	4.6	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
	Tetrachloroethene (PCE)	5.0	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	1,1,1 Trichloro-ethane (TCA)	200	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	1,1,2 Trichloro-ethane (TCA)	5.0	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	Trichloroethene (TCE)	5.0	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	Methyl tert-Butyl Ether (MtBE)	70	7.55	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	Acetone	7,970	3.00	3.0	ND (10)	ND (10)	ND (1.0)
	Vinyl Chloride	2.0	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
BTEX - ug/L	Benzene	5.0	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	Toluene	NE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	Ethylbenzene	NE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	Total Xylenes	NE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	Total BTEX	100	ND	ND	ND	ND	ND
Classical Chemistry	Chloride (mg/L)	Report	1,004	320	1,300	730	740
	Ammonia (mg/L)	Report	3.44	3.17	3.18	0.24	0.28
	Hardness (ug/L)	-	320,200	426,000	-	-	-
	Hexavalent Chromium (ug/L)	323	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
	Total Cyanide (ug/L)	178	ND (5.00)	ND (5.00)	ND (5.00)	ND (5.00)	ND (5.00)
	Phenols (ug/L)	1,080	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)
	Total Residual Chlorine (ug/L)	47/50 ⁽¹⁾	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
	Total Suspended Solids (ug/L)	30,000	2,400,051	1,200,000	6,920,000	9,520,000	1,560,000

Notes:
1: The second standard is the compliance level
VOCs = Volatile Organic Compounds
SVOCs = Semi-Volatile Organic Compounds
TPH = Total Petroleum Hydrocarbons
PCBs = Polychlorinated biphenyls
mg/L= milligrams per kilogram (ppm)
ug/L= micrograms per kilogram (ppb)
< xx = not detected above the indicated laboratory method detection limit
c/s = compound specific
NE = Not Established
NA = Not Analyzed
ND = Not Detected
* - Effluent limits calculated using the US EPA's Dilution Factor and Effluent Limitation Calculations for Massachusetts Form (Appendix V)
Red text = exceeds RGP limit
Italics = Reporting Limit Exceeds RGP Limit
Red text = exceeds RGP limit
FW- Freshwater

TABLE 1
Groundwater Results - Lower Mystic Dam to Amelia Earhart Dam
Eversource: Woburn - Mystic

Analytical Test	Sample Identification Sample Date	Effluent Limitation	Average Concentration	Mystic Ave			
				MW-15	MW-15F	MW-17	MW-17F
				9/14/2017	9/14/2017	9/15/2017	9/15/2017
TPH - mg/L	TPH	5	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
Total PAHs Group I - ug/L	Benzo(a)Anthracene	0.0163/0.1 ⁽¹⁾	0.05	ND(0.05)	ND(0.05)	0.07	ND(0.05)
	Benzo(a)Pyrene	0.0163/0.1 ⁽¹⁾	0.05	ND(0.05)	ND(0.05)	0.08	ND(0.05)
	Benzo(b)Fluoranthene	0.0163/0.1 ⁽¹⁾	0.06	ND(0.05)	ND(0.05)	0.12	ND(0.05)
	Benzo(k)Fluoranthene	1.0/0.1 ⁽¹⁾	ND (0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)
	Chrysene	0.0163/0.1 ⁽¹⁾	0.05	ND(0.05)	ND(0.05)	0.08	ND(0.05)
	Dibenzo(a,h)Anthracene	1.0/0.1 ⁽¹⁾	ND (0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)
	Indeno(1,2,3-cd)Pyrene	0.0163/0.1 ⁽¹⁾	0.05	ND(0.05)	ND(0.05)	0.08	ND(0.05)
	Total PAHs Group I	1.0	0.12	ND	ND	0.43	ND
Total PAHs Group II - ug/L	Acenaphthene	NE	0.20	ND(0.19)	ND(0.19)	0.23	ND(0.19)
	Acenaphthylene	NE	ND (0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)
	Anthracene	NE	ND (0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)
	Benzo(ghi)Perylene	NE	0.17	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)
	Fluoranthene	NE	0.17	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)
	Fluorene	NE	ND (0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)
	Naphthalene	20	ND (0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)
	Phenanthrene	NE	ND (0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)
	Pyrene	NE	ND (0.19)	ND(0.19)	ND(0.19)	ND(0.19)	ND(0.19)
	Total PAHs Group II	100	0.195	ND	ND	0.23	ND
Phthalates - ug/L	Butylbenzylphthalate	NE	1.4	ND(2.34)	ND(2.34)	ND(2.34)	ND(2.34)
	Bis (2-Ethylhexyl) Phthalate	101	4.1	ND(1.87)	ND(1.87)	2.27	ND(1.87)
	Diethylphthalate	NE	1.4	ND(2.34)	ND(2.34)	ND(2.34)	ND(2.34)
	Di-n-butylphthalate	NE	2.1	ND(2.34)	ND(2.34)	ND(2.34)	ND(2.34)
	Di-n-octylphthalate	NE	2.1	ND(2.34)	ND(2.34)	ND(2.34)	ND(2.34)
	Total Phthalates	190	4.6	ND	ND	2.27	ND
SVOCs - ug/L	Pentachlorophenol	1.0	ND (0.84)	ND(0.84)	ND(0.84)	ND(0.84)	ND(0.84)
	All Other SVOCs	NE	ND (c/s)	<c/s	<c/s	<c/s	<c/s
Metals- ug/L	Antimony	206	ND (2.0)	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)
	Arsenic	104	11.725	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)
	Barium	NE	77.85	-	-	-	-
	Beryllium	NE	0.98	-	-	-	-
	Cadmium	10.2	0.14	ND (0.15)	ND (0.15)	ND (0.15)	0.26
	Chromium	323	6.05	ND (4.0)	ND (4.0)	ND (4.0)	6.3
	Chromium III	323	10.5	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)
	Lead	60.04	14.95	ND (3.0)	ND (3.0)	ND (3.0)	73.7
	Mercury	0.739	ND (0.20)	ND (0.200)	ND (0.200)	ND (0.200)	ND (0.200)
	Nickel	1,450	6.01	ND (4.0)	ND (4.0)	ND (4.0)	ND (4.0)
	Selenium	235.8	ND (2.0)	ND (6.0)	ND (6.0)	ND (6.0)	ND (6.0)
	Silver	35.1	ND (0.10)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	Thallium	NE	ND (1.2)	-	-	-	-
	Vanadium	NE	12.5	-	-	-	-
	Zinc	420	38.1	ND (10.0)	ND (10.0)	ND (10.0)	77.5
	Iron	3,111	13,289	7,750	5,970	14,900	32,000
	Copper	242	14.5	ND (2.0)	ND (2.0)	2.2	26.7
Ethanol - ug/L	Ethanol	Report	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
1,2-Dibromothane - ug/L	1,2-Dibromothane (EDB)	0.05	ND (0.015)	ND (0.015)	ND (0.015)	ND (0.015)	ND (0.015)
1,4-Dioxane - ug/L	1,4-Dioxane	200	0.323	0.396	0.397	ND (0.250)	ND (0.250)
PCB - ug/L	Aroclor-1016	NE	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)
	Aroclor-1221	NE	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)
	Aroclor-1232	NE	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)
	Aroclor-1242	NE	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)
	Aroclor-1248	NE	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)
	Aroclor-1254	NE	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)
	Aroclor-1260	NE	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)
	Aroclor-1262	NE	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)
	Aroclor-1268	NE	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)	ND (0.09)
	Total PCBs	0.000064/0.5 ⁽¹⁾	ND	ND	ND	ND	ND
VOCs - ug/L	tert-Butyl Alcohol (TBA)	120	30	45.7	40.9	ND (25.0)	ND (25.0)
	tert-Amyl Methyl Ether (TAME)	90	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
	Napthalene	20	0.6	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	Carbon Tetrachloride	4.4	ND (1.0)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)
	1,2 Dichlorobenzene (o-DCB)	600	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	1,3 Dichlorobenzene (m-DCB)	320	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	1,4 Dichlorobenzene (p-DCB)	5.0	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	1,1 Dichloroethane (DCA)	70.0	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	1,2 Dichloroethane (DCA)	5.0	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	1,1 Dichloroethene (DCE)	3.2	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	sec-Butylbenzene	NE	ND (1.0)	-	-	-	-
	tert-Butyl Ethyl Ether (TBEE)	NE	ND (1.0)	-	-	-	-
	cis-1,2 Dichloroethene (DCE)	70	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	Methylene Chloride	4.6	ND (2.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	Tetrachloroethene (PCE)	5.0	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	1,1,1 Trichloro-ethane (TCA)	200	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	1,1,2 Trichloro-ethane (TCA)	5.0	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	Trichloroethene (TCE)	5.0	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	Methyl tert-Butyl Ether (MtBE)	70	7.55	29.2	26.2	ND (0.5)	ND (0.5)
	Acetone	7,970	3.00	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
	Vinyl Chloride	2.0	ND (1.0)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
BTEX - ug/L	Benzene	5.0	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	Toluene	NE	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	Ethylbenzene	NE	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	Total Xylenes	NE	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
	Total BTEX	100	ND	ND	ND	ND	ND
Classical Chemistry	Chloride (mg/L)	Report	1,004	902	536	1,730	1,770
	Ammonia (mg/L)	Report	3.44	9.09	8.21	1.56	1.76
	Hardness (ug/L)	-	320,200	309,000	322,000	277,000	267,000
	Hexavalent Chromium (ug/L)	323	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
	Total Cyanide (ug/L)	178	ND (5.00)	ND (5.00)	ND (5.00)	ND (5.00)	ND (5.00)
	Phenols (ug/L)	1,080	ND (100)	ND (100)	ND (100)	ND (100)	ND (100)
	Total Residual Chlorine (ug/L)	47/50 ⁽¹⁾	ND (10)	ND (20)	ND (20)	ND (20)	ND (20)
	Total Suspended Solids (ug/L)	30,000	2,400,051	13	8	65	318

Notes:

1: The second standard is the compliance level

VOCs = Volatile Organic Compounds

SVOCs = Semi-Volatile Organic Compounds

TPH = Total Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

mg/L= milligrams per kilogram (ppm)

ug/L= micrograms per kilogram (ppb)

< xx = not detected above the indicated laboratory method detection limit

c/s = compound specific

NE = Not Established

NA = Not Analyzed

ND = Not Detected

* - Effluent limits calculated using the US EPA's Dilution Factor and Effluent Limitation Calculations for Massachusetts Form

Red text = exceeds RGP limit

Italics = Reporting Limit Exceeds RGP Limit

Red text = exceeds RGP limit

FW- Freshwater

TABLE 2

Surface Water Results

Eversource: Woburn - Mystic

Analytical Test	Sample Identification	Effluent Limitation	Mystic Crossing	Mystic at Winter	Mystic	Mystic at Laydown
	Sample Date		11/15/2017	11/15/2017	11/15/2017	11/15/2017
Metals (ug/L)	Arsenic	104	ND(2.5)	ND(2.5)	ND(2.5)	ND(5)
	Cadmium	10.2	ND(2)	ND(2)	ND(2)	ND(10)
	Chromium	NE	ND(4)	ND(4)	ND(4)	ND(20)
	Chromium III	323	ND(10)	ND(10)	ND(10)	ND(20)
	Copper	242	ND(2)	ND(2)	ND(2)	ND(10)
	Iron	3,111	134	251	121	274
	Lead	60.04	ND(4)	ND(4)	ND(4)	ND(2)
	Nickel	1,450	ND(4)	ND(4)	ND(4)	ND(20)
	Silver	35.1	NA	NA	NA	NA
	Zinc	420	11.1	10.9	10.2	ND(50)
Classical Chemistry	Ammonia as N (mg/L)	Report	0.35	0.45	0.27	0.28
	Hexavalent Chromium (ug/L)	323	ND(10)	ND(10)	ND(10)	ND(10)
	pH	NE	7.13	7.25	7.36	7.46
	Hardness (ug/L)	NE	147,000	184,000	181,000	221,000

Notes:

mg/L= milligrams per kilogram (ppm)

ug/L= micrograms per kilogram (ppb)

NE = Not Established

NA = Not Analyzed

ND = Not Detected

~ - Effluent limits from NPDES General Permit for Remediation Activity

Discharges DRAFT at

<https://www3.epa.gov/region1/npdes/remediation/2016DraftPermit.pdf>

APPENDIX F



CERTIFICATE OF ANALYSIS

Michael Martin
Tighe & Bond
4 Barlows Landing Road, Unit 15
Pocasset, MA 02559

RE: Woburn to Mystic - RGP/MCP (N-0998)
ESS Laboratory Work Order Number: 1701176

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 4:59 pm, Jan 20, 2017

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 tandards, 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.

Subcontracted Analvses

RI Analytical Laboratories, Inc. - Warwick, Chloride
RI



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701176

SAMPLE RECEIPT

The following samples were received on January 10, 2017 for the analyses specified on the enclosed Chain of Custody Record.

To achieve CAM compliance for MCP data, ESS Laboratory has reviewed all QA/QC Requirements and Performance Standards listed in each method. Holding times and preservation have also been reviewed. All CAM requirements have been performed and achieved unless noted in the project narrative.

Each method has been set-up in the laboratory to reach required MCP standards. The methods for aqueous VOA and Soil Methanol VOA have known limitations for certain analytes. The regulatory standards may not be achieved due to these limitations. In addition, for all methods, matrix interferences, dilutions, and %Solids may elevate method reporting limits above regulatory standards. ESS Laboratory can provide, upon request, a Data Checker (regulatory standard comparison spreadsheet) electronic deliverable which will highlight these exceedances.

Question I: All samples for VOA and SVOA were analyzed for a subset of the required MCP list per the client's request.

<u>Lab Number</u>	<u>Sample Name</u>	<u>Matrix</u>	<u>Analysis</u>
1701176-01	MW-102A	Ground Water	§, 1664A, 2540D, 420.1, 4500 CN CE, 4500 NH3 G, 4500-CI E, 6010C, 7010, 7196A, 7470A, 8011, 8015, 8082A, 8260B, 8270D SIM
1701176-02	MW-102A FF	Ground Water	§, 1664A, 2540D, 420.1, 4500 CN CE, 4500 NH3 G, 4500-CI E, 6010C, 7010, 7196A, 7470A, 8011, 8015, 8082A, 8260B, 8270D SIM
1701176-03	MW-103	Ground Water	§, 1664A, 2540D, 420.1, 4500 CN CE, 4500 NH3 G, 4500-CI E, 6010C, 7010, 7196A, 7470A, 8011, 8015, 8082A, 8260B, 8270D SIM
1701176-04	MW-103 FF	Ground Water	§, 1664A, 2540D, 420.1, 4500 CN CE, 4500 NH3 G, 4500-CI E, 6010C, 7010, 7196A, 7470A, 8011, 8015, 8082A, 8260B, 8270D SIM



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701176

PROJECT NARRATIVE

8260B Volatile Organic Compounds

1701176-01 [Present in Method Blank \(B\).](#)

Naphthalene

1701176-02 [Present in Method Blank \(B\).](#)

Naphthalene

8270D(SIM) Semi-Volatile Organic Compounds

1701176-01 [Present in Method Blank \(B\).](#)

bis(2-Ethylhexyl)phthalate , Butylbenzylphthalate , Di-n-octylphthalate

1701176-02 [Present in Method Blank \(B\).](#)

bis(2-Ethylhexyl)phthalate , Butylbenzylphthalate

1701176-03 [Present in Method Blank \(B\).](#)

bis(2-Ethylhexyl)phthalate , Butylbenzylphthalate

1701176-04 [Present in Method Blank \(B\).](#)

bis(2-Ethylhexyl)phthalate , Butylbenzylphthalate

C7A0148-TUN1 [Benzidine tailing factor >2.](#)

CA71116-BS1 [Blank Spike recovery is above upper control limit \(B+\).](#)

bis(2-Ethylhexyl)phthalate (146% @ 40-140%)

CA71116-BSD1 [Blank Spike recovery is above upper control limit \(B+\).](#)

bis(2-Ethylhexyl)phthalate (143% @ 40-140%)

CA71116-BSD1 [Relative percent difference for duplicate is outside of criteria \(D+\).](#)

Naphthalene (21% @ 20%)

Total Metals

1701176-01 [Present in Method Blank \(B\).](#)

Zinc

1701176-02 [Present in Method Blank \(B\).](#)

Zinc

1701176-03 [Present in Method Blank \(B\).](#)

Zinc

1701176-04 [Present in Method Blank \(B\).](#)

Zinc

No other observations noted.

End of Project Narrative.



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701176

DATA USABILITY LINKS

[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](#)

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: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701176

MassDEP Analytical Protocol Certification Form

MADEP RTN: _____

This form provides certification for the following data set: **1701176-01 through 1701176-04**

Matrices: (X) Ground Water/Surface Water () Soil/Sediment () Drinking Water () Air () Other: _____

CAM Protocol (check all that apply below):

(X) 8260 VOC CAM II A	(X) 7470/7471 Hg CAM III B	() MassDEP VPH CAM IV A	() 8081 Pesticides CAM V B	(X) 7196 Hex Cr CAM VI B	() MassDEP APH CAM IX A
(X) 8270 SVOC CAM II B	(X) 7010 Metals CAM III C	() MassDEP EPH CAM IV B	() 8151 Herbicides CAM V C	() 8330 Explosives CAM VIII A	() TO-15 VOC CAM IX B
(X) 6010 Metals CAM III A	() 6020 Metals CAM III D	(X) 8082 PCB CAM V A	() 6860 Perchlorate CAM VIII B	(X) 9014 Total Cyanide/PAC CAM VI A	

Affirmative responses to questions A through F are required for "Presumptive Certainty" status

- | | | |
|---|---|----------------|
| A | Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times? | Yes (X) No () |
| B | Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed? | Yes (X) No () |
| C | Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances? | Yes (X) No () |
| D | Does the laboratory report comply with all the reporting requirements specified in the CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"? | Yes (X) No () |
| E | a. VPH, EPH, APH and TO-15 only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). | Yes () No () |
| | b. APH and TO-15 Methods only: Was the complete analyte list reported for each method? | Yes () No () |
| F | Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)? | Yes (X) No () |

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

- | | | |
|---|---|-----------------|
| G | Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocols(s)?
<i>Data User Note: Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.</i> | Yes (X) No ()* |
| H | Were all QC performance standards specified in the CAM protocol(s) achieved? | Yes () No (X)* |
| I | Were results reported for the complete analyte list specified in the selected CAM protocol(s)? | Yes () No (X)* |

****All negative responses must be addressed in an attached laboratory narrative.***

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Laurel Stoddard
Printed Name: Laurel Stoddard

Date: January 20, 2017
Position: Laboratory Director



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-102A
Date Sampled: 01/10/17 12:30
Percent Solids: N/A

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-01
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (2.0)	0.2	7010		1	KJK	01/13/17 6:54	50	10	CA71104
Arsenic	20.6 (6.0)	0.5	7010		3	KJK	01/13/17 4:53	50	10	CA71104
Barium	126 (10.0)	0.6	6010C		1	BJV	01/12/17 12:55	50	10	CA71104
Beryllium	1.8 (0.2)	0.04	6010C		1	BJV	01/12/17 12:55	50	10	CA71104
Cadmium	J 0.07 (0.2)	0.01	7010		1	KJK	01/13/17 16:32	50	10	CA71104
Chromium	13.9 (4.0)	0.6	6010C		1	BJV	01/12/17 12:55	50	10	CA71104
Chromium III	14 (10)		6010C		1	JLK	01/12/17 12:55	1	1	[CALC]
Copper	41.9 (2.0)	0.8	6010C		1	BJV	01/12/17 12:55	50	10	CA71104
Iron	21300 (20.0)	4.6	6010C		1	BJV	01/12/17 12:55	50	10	CA71104
Lead	15.5 (3.0)	0.6	7010		3	KJK	01/13/17 1:15	50	10	CA71104
Mercury	ND (0.20)	0.12	7470A		1	MJV	01/13/17 12:20	20	40	CA71110
Nickel	16.3 (4.0)	0.4	6010C		1	BJV	01/12/17 12:55	50	10	CA71104
Selenium	ND (2.0)	0.3	7010		1	KJK	01/12/17 17:15	50	10	CA71104
Silver	ND (0.1)	0.03	7010		1	KJK	01/13/17 20:07	50	10	CA71104
Thallium	ND (1.2)	0.7	7010		3	KJK	01/12/17 21:54	50	10	CA71104
Vanadium	23.6 (4.0)	0.4	6010C		1	BJV	01/12/17 12:55	50	10	CA71104
Zinc	B 56.9 (10.0)	1.8	6010C		1	BJV	01/12/17 12:55	50	10	CA71104



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-102A
Date Sampled: 01/10/17 12:30
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: SMR
Prepared: 1/12/17 12:18
Cleanup Method: 3665A

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.09)	0.03	8082A		1	01/13/17 1:49		CA71203
Aroclor 1221	ND (0.09)	0.03	8082A		1	01/13/17 1:49		CA71203
Aroclor 1232	ND (0.09)	0.03	8082A		1	01/13/17 1:49		CA71203
Aroclor 1242	ND (0.09)	0.03	8082A		1	01/13/17 1:49		CA71203
Aroclor 1248	ND (0.09)	0.03	8082A		1	01/13/17 1:49		CA71203
Aroclor 1254	ND (0.09)	0.03	8082A		1	01/13/17 1:49		CA71203
Aroclor 1260	ND (0.09)	0.03	8082A		1	01/13/17 1:49		CA71203
Aroclor 1262	ND (0.09)	0.03	8082A		1	01/13/17 1:49		CA71203
Aroclor 1268	ND (0.09)	0.03	8082A		1	01/13/17 1:49		CA71203

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	47 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	47 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	64 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	74 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-102A
Date Sampled: 01/10/17 12:30
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

8260B Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1-Trichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 13:10	C7A0139	CA71120
1,1,2-Trichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 13:10	C7A0139	CA71120
1,1-Dichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 13:10	C7A0139	CA71120
1,1-Dichloroethene	ND (1.0)	0.3	8260B		1	01/11/17 13:10	C7A0139	CA71120
1,2-Dibromoethane	ND (1.0)	0.2	8260B		1	01/11/17 13:10	C7A0139	CA71120
1,2-Dichlorobenzene	ND (1.0)	0.1	8260B		1	01/11/17 13:10	C7A0139	CA71120
1,2-Dichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 13:10	C7A0139	CA71120
1,3-Dichlorobenzene	ND (1.0)	0.2	8260B		1	01/11/17 13:10	C7A0139	CA71120
1,4-Dichlorobenzene	ND (1.0)	0.1	8260B		1	01/11/17 13:10	C7A0139	CA71120
1,4-Dioxane - Screen	ND (500)	190	8260B		1	01/11/17 13:10	C7A0139	CA71120
Acetone	J 3.0 (10.0)	2.7	8260B		1	01/11/17 13:10	C7A0139	CA71120
Benzene	ND (1.0)	0.1	8260B		1	01/11/17 13:10	C7A0139	CA71120
Carbon Tetrachloride	ND (1.0)	0.1	8260B		1	01/11/17 13:10	C7A0139	CA71120
cis-1,2-Dichloroethene	ND (1.0)	0.2	8260B		1	01/11/17 13:10	C7A0139	CA71120
Ethylbenzene	ND (1.0)	0.1	8260B		1	01/11/17 13:10	C7A0139	CA71120
Methyl tert-Butyl Ether	ND (1.0)	0.3	8260B		1	01/11/17 13:10	C7A0139	CA71120
Methylene Chloride	ND (2.0)	0.2	8260B		1	01/11/17 13:10	C7A0139	CA71120
Naphthalene	B, J 0.6 (1.0)	0.2	8260B		1	01/11/17 13:10	C7A0139	CA71120
Tertiary-amyl methyl ether	ND (1.0)	0.2	8260B		1	01/11/17 13:10	C7A0139	CA71120
Tertiary-butyl Alcohol	ND (25.0)	10.0	8260B		1	01/11/17 13:10	C7A0139	CA71120
Tetrachloroethene	ND (1.0)	0.2	8260B		1	01/11/17 13:10	C7A0139	CA71120
Toluene	ND (1.0)	0.1	8260B		1	01/11/17 13:10	C7A0139	CA71120
Trichloroethene	ND (1.0)	0.2	8260B		1	01/11/17 13:10	C7A0139	CA71120
Vinyl Chloride	ND (1.0)	0.2	8260B		1	01/11/17 13:10	C7A0139	CA71120
Xylene O	ND (1.0)	0.1	8260B		1	01/11/17 13:10	C7A0139	CA71120
Xylene P,M	ND (2.0)	0.2	8260B		1	01/11/17 13:10	C7A0139	CA71120

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>91 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>92 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>96 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>105 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-102A
Date Sampled: 01/10/17 12:30
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: VSC
Prepared: 1/11/17 15:35

8270D(SIM) Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Acenaphthene	ND (0.19)	0.04	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Acenaphthylene	ND (0.19)	0.03	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Anthracene	ND (0.19)	0.03	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Benzo(a)anthracene	ND (0.05)	0.01	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Benzo(a)pyrene	ND (0.05)	0.01	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Benzo(b)fluoranthene	ND (0.05)	0.02	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Benzo(g,h,i)perylene	ND (0.19)	0.02	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Benzo(k)fluoranthene	ND (0.05)	0.02	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
bis(2-Ethylhexyl)phthalate	B 5.67 (2.34)	0.19	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Butylbenzylphthalate	B, J 0.67 (2.34)	0.19	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Chrysene	ND (0.05)	0.01	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Dibenzo(a,h)Anthracene	ND (0.05)	0.02	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Diethylphthalate	J 0.27 (2.34)	0.19	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Dimethylphthalate	ND (2.34)	0.19	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Di-n-butylphthalate	ND (2.34)	0.19	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Di-n-octylphthalate	B, J 0.30 (2.34)	0.19	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Fluoranthene	ND (0.19)	0.02	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Fluorene	ND (0.19)	0.03	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Indeno(1,2,3-cd)Pyrene	ND (0.05)	0.02	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Naphthalene	ND (0.19)	0.04	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Pentachlorophenol	ND (0.84)	0.30	8270D SIM		1	01/18/17 20:12	C7A0148	CA71116
Phenanthrene	ND (0.19)	0.04	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116
Pyrene	ND (0.19)	0.02	8270D SIM		1	01/12/17 7:21	C7A0148	CA71116

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	41 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	104 %		15-110
<i>Surrogate: 2-Fluorobiphenyl</i>	71 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	69 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	96 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-102A
Date Sampled: 01/10/17 12:30
Percent Solids: N/A

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-01
Sample Matrix: Ground Water

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Ammonia as N	3.17 (0.10)		4500 NH3 G		1	JLK	01/16/17 16:47	mg/L	CA71301
Chloride	320 (10.0)		§		1	SUB	01/12/17 14:50	mg/L	CA71735
Hexavalent Chromium	ND (10)		7196A		1	JLK	01/10/17 21:30	ug/L	CA71051
Phenols	ND (100)	30	420.1		1	JLK	01/13/17 17:00	ug/L	CA71336
Total Cyanide (LL)	ND (5.00)	1.80	4500 CN CE		1	EEM	01/12/17 12:45	ug/L	CA71217
Total Petroleum Hydrocarbon	ND (5)		1664A		1	CRR	01/13/17 16:40	mg/L	CA71136
Total Residual Chlorine	ND (10)		4500-Cl E		1	JLK	01/10/17 20:58	ug/L	CA71052
Total Suspended Solids	120000 (10000)		2540D		1	MJV	01/12/17 16:22	ug/L	CA71227



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-102A
Date Sampled: 01/10/17 12:30
Percent Solids: N/A
Initial Volume: 35
Final Volume: 2
Extraction Method: 504/8011

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: JXS
Prepared: 1/13/17 12:00

8011 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,2-Dibromoethane	ND (0.015)	0.005	8011		1	JXS	01/13/17 15:45		CA71322
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>					
<i>Surrogate: Pentachloroethane</i>		106 %		30-150					



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-102A
Date Sampled: 01/10/17 12:30
Percent Solids: N/A
Initial Volume: 1
Final Volume: 1
Extraction Method: No Prep

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-01
Sample Matrix: Ground Water
Units: mg/L
Analyst: DPS
Prepared: 1/12/17 14:30

Alcohol Scan by GC/FID

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Ethanol	ND (10)		8015		1	DPS	01/12/17 21:15		CA71246



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-102A FF
Date Sampled: 01/10/17 12:50
Percent Solids: N/A

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-02
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (2.0)	0.2	7010		1	KJK	01/13/17 7:00	50	10	CA71104
Arsenic	17.9 (6.0)	0.5	7010		3	KJK	01/13/17 4:59	50	10	CA71104
Barium	81.1 (10.0)	0.6	6010C		1	BJV	01/12/17 13:00	50	10	CA71104
Beryllium	1.0 (0.2)	0.04	6010C		1	BJV	01/12/17 13:00	50	10	CA71104
Cadmium	ND (0.2)	0.01	7010		1	KJK	01/13/17 16:38	50	10	CA71104
Chromium	5.2 (4.0)	0.6	6010C		1	BJV	01/12/17 13:00	50	10	CA71104
Chromium III	ND (10)		6010C		1	JLK	01/12/17 13:00	1	1	[CALC]
Copper	10.0 (2.0)	0.8	6010C		1	BJV	01/12/17 13:00	50	10	CA71104
Iron	12300 (20.0)	4.6	6010C		1	BJV	01/12/17 13:00	50	10	CA71104
Lead	J 2.8 (3.0)	0.6	7010		3	KJK	01/13/17 1:20	50	10	CA71104
Mercury	ND (0.20)	0.12	7470A		1	MJV	01/13/17 12:22	20	40	CA71110
Nickel	5.3 (4.0)	0.4	6010C		1	BJV	01/12/17 13:00	50	10	CA71104
Selenium	ND (2.0)	0.3	7010		1	KJK	01/12/17 17:21	50	10	CA71104
Silver	ND (0.1)	0.03	7010		1	KJK	01/13/17 20:12	50	10	CA71104
Thallium	ND (1.2)	0.7	7010		3	KJK	01/12/17 21:59	50	10	CA71104
Vanadium	9.4 (4.0)	0.4	6010C		1	BJV	01/12/17 13:00	50	10	CA71104
Zinc	B 25.3 (10.0)	1.8	6010C		1	BJV	01/12/17 13:00	50	10	CA71104



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-102A FF
Date Sampled: 01/10/17 12:50
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: SMR
Prepared: 1/12/17 12:18
Cleanup Method: 3665A

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.09)	0.03	8082A		1	01/13/17 2:08		CA71203
Aroclor 1221	ND (0.09)	0.03	8082A		1	01/13/17 2:08		CA71203
Aroclor 1232	ND (0.09)	0.03	8082A		1	01/13/17 2:08		CA71203
Aroclor 1242	ND (0.09)	0.03	8082A		1	01/13/17 2:08		CA71203
Aroclor 1248	ND (0.09)	0.03	8082A		1	01/13/17 2:08		CA71203
Aroclor 1254	ND (0.09)	0.03	8082A		1	01/13/17 2:08		CA71203
Aroclor 1260	ND (0.09)	0.03	8082A		1	01/13/17 2:08		CA71203
Aroclor 1262	ND (0.09)	0.03	8082A		1	01/13/17 2:08		CA71203
Aroclor 1268	ND (0.09)	0.03	8082A		1	01/13/17 2:08		CA71203

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	51 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	49 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	65 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	79 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-102A FF
Date Sampled: 01/10/17 12:50
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

8260B Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1-Trichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 13:36	C7A0139	CA71120
1,1,2-Trichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 13:36	C7A0139	CA71120
1,1-Dichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 13:36	C7A0139	CA71120
1,1-Dichloroethene	ND (1.0)	0.3	8260B		1	01/11/17 13:36	C7A0139	CA71120
1,2-Dibromoethane	ND (1.0)	0.2	8260B		1	01/11/17 13:36	C7A0139	CA71120
1,2-Dichlorobenzene	ND (1.0)	0.1	8260B		1	01/11/17 13:36	C7A0139	CA71120
1,2-Dichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 13:36	C7A0139	CA71120
1,3-Dichlorobenzene	ND (1.0)	0.2	8260B		1	01/11/17 13:36	C7A0139	CA71120
1,4-Dichlorobenzene	ND (1.0)	0.1	8260B		1	01/11/17 13:36	C7A0139	CA71120
1,4-Dioxane - Screen	ND (500)	190	8260B		1	01/11/17 13:36	C7A0139	CA71120
Acetone	ND (10.0)	2.7	8260B		1	01/11/17 13:36	C7A0139	CA71120
Benzene	ND (1.0)	0.1	8260B		1	01/11/17 13:36	C7A0139	CA71120
Carbon Tetrachloride	ND (1.0)	0.1	8260B		1	01/11/17 13:36	C7A0139	CA71120
cis-1,2-Dichloroethene	ND (1.0)	0.2	8260B		1	01/11/17 13:36	C7A0139	CA71120
Ethylbenzene	ND (1.0)	0.1	8260B		1	01/11/17 13:36	C7A0139	CA71120
Methyl tert-Butyl Ether	ND (1.0)	0.3	8260B		1	01/11/17 13:36	C7A0139	CA71120
Methylene Chloride	ND (2.0)	0.2	8260B		1	01/11/17 13:36	C7A0139	CA71120
Naphthalene	B, J 0.3 (1.0)	0.2	8260B		1	01/11/17 13:36	C7A0139	CA71120
Tertiary-amyl methyl ether	ND (1.0)	0.2	8260B		1	01/11/17 13:36	C7A0139	CA71120
Tertiary-butyl Alcohol	ND (25.0)	10.0	8260B		1	01/11/17 13:36	C7A0139	CA71120
Tetrachloroethene	ND (1.0)	0.2	8260B		1	01/11/17 13:36	C7A0139	CA71120
Toluene	ND (1.0)	0.1	8260B		1	01/11/17 13:36	C7A0139	CA71120
Trichloroethene	ND (1.0)	0.2	8260B		1	01/11/17 13:36	C7A0139	CA71120
Vinyl Chloride	ND (1.0)	0.2	8260B		1	01/11/17 13:36	C7A0139	CA71120
Xylene O	ND (1.0)	0.1	8260B		1	01/11/17 13:36	C7A0139	CA71120
Xylene P,M	ND (2.0)	0.2	8260B		1	01/11/17 13:36	C7A0139	CA71120

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>91 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>89 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>96 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>105 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-102A FF
Date Sampled: 01/10/17 12:50
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: VSC
Prepared: 1/11/17 15:35

8270D(SIM) Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Acenaphthene	ND (0.19)	0.04	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Acenaphthylene	ND (0.19)	0.03	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Anthracene	ND (0.19)	0.03	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Benzo(a)anthracene	ND (0.05)	0.01	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Benzo(a)pyrene	ND (0.05)	0.01	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Benzo(b)fluoranthene	ND (0.05)	0.02	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Benzo(g,h,i)perylene	ND (0.19)	0.02	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Benzo(k)fluoranthene	ND (0.05)	0.02	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
bis(2-Ethylhexyl)phthalate	B 8.12 (2.34)	0.19	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Butylbenzylphthalate	B, J 0.31 (2.34)	0.19	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Chrysene	ND (0.05)	0.01	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Dibenzo(a,h)Anthracene	ND (0.05)	0.02	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Diethylphthalate	J 0.19 (2.34)	0.19	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Dimethylphthalate	ND (2.34)	0.19	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Di-n-butylphthalate	ND (2.34)	0.19	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Di-n-octylphthalate	ND (2.34)	0.19	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Fluoranthene	ND (0.19)	0.02	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Fluorene	ND (0.19)	0.03	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Indeno(1,2,3-cd)Pyrene	ND (0.05)	0.02	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Naphthalene	ND (0.19)	0.04	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Pentachlorophenol	ND (0.84)	0.30	8270D SIM		1	01/18/17 21:02	C7A0148	CA71116
Phenanthrene	ND (0.19)	0.04	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116
Pyrene	ND (0.19)	0.02	8270D SIM		1	01/12/17 8:10	C7A0148	CA71116

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	<i>35 %</i>		<i>30-130</i>
<i>Surrogate: 2,4,6-Tribromophenol</i>	<i>91 %</i>		<i>15-110</i>
<i>Surrogate: 2-Fluorobiphenyl</i>	<i>61 %</i>		<i>30-130</i>
<i>Surrogate: Nitrobenzene-d5</i>	<i>61 %</i>		<i>30-130</i>
<i>Surrogate: p-Terphenyl-d14</i>	<i>80 %</i>		<i>30-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-102A FF
Date Sampled: 01/10/17 12:50
Percent Solids: N/A

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-02
Sample Matrix: Ground Water

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Ammonia as N	3.18 (0.10)		4500 NH3 G		1	JLK	01/16/17 16:48	mg/L	CA71301
Chloride	1300 (50.0)		§		1	SUB	01/12/17 14:50	mg/L	CA71735
Hexavalent Chromium	ND (10)		7196A		1	JLK	01/10/17 21:30	ug/L	CA71051
Phenols	ND (100)	30	420.1		1	JLK	01/13/17 17:00	ug/L	CA71336
Total Cyanide (LL)	ND (5.00)	1.80	4500 CN CE		1	EEM	01/12/17 12:45	ug/L	CA71217
Total Petroleum Hydrocarbon	ND (5)		1664A		1	CRR	01/16/17 14:42	mg/L	CA71306
Total Residual Chlorine	ND (10)		4500-Cl E		1	JLK	01/10/17 20:58	ug/L	CA71052
Total Suspended Solids	692000 (20000)		2540D		1	MJV	01/12/17 16:22	ug/L	CA71227



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-102A FF
Date Sampled: 01/10/17 12:50
Percent Solids: N/A
Initial Volume: 35
Final Volume: 2
Extraction Method: 504/8011

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: JXS
Prepared: 1/13/17 12:00

8011 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,2-Dibromoethane	ND (0.015)	0.005	8011		1	JXS	01/13/17 17:10		CA71322
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>					
<i>Surrogate: Pentachloroethane</i>		<i>110 %</i>		<i>30-150</i>					



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-102A FF
Date Sampled: 01/10/17 12:50
Percent Solids: N/A
Initial Volume: 1
Final Volume: 1
Extraction Method: No Prep

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-02
Sample Matrix: Ground Water
Units: mg/L
Analyst: DPS
Prepared: 1/12/17 14:30

Alcohol Scan by GC/FID

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Ethanol	ND (10)		8015		1	DPS	01/13/17 15:53		CA71246



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-103
Date Sampled: 01/10/17 13:50
Percent Solids: N/A

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-03
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (2.0)	0.2	7010		1	KJK	01/13/17 7:05	50	10	CA71104
Arsenic	22.1 (6.0)	0.5	7010		3	KJK	01/13/17 5:16	50	10	CA71104
Barium	48.8 (10.0)	0.6	6010C		1	BJV	01/12/17 13:06	50	10	CA71104
Beryllium	0.5 (0.2)	0.04	6010C		1	BJV	01/12/17 13:06	50	10	CA71104
Cadmium	J 0.05 (0.2)	0.01	7010		1	KJK	01/13/17 16:44	50	10	CA71104
Chromium	5.3 (4.0)	0.6	6010C		1	BJV	01/12/17 13:06	50	10	CA71104
Chromium III	ND (10)		6010C		1	JLK	01/12/17 13:06	1	1	[CALC]
Copper	12.7 (2.0)	0.8	6010C		1	BJV	01/12/17 13:06	50	10	CA71104
Iron	5460 (20.0)	4.6	6010C		1	BJV	01/12/17 13:06	50	10	CA71104
Lead	9.7 (3.0)	0.6	7010		3	KJK	01/13/17 1:26	50	10	CA71104
Mercury	ND (0.20)	0.12	7470A		1	MJV	01/13/17 12:24	20	40	CA71110
Nickel	4.7 (4.0)	0.4	6010C		1	BJV	01/12/17 13:06	50	10	CA71104
Selenium	ND (2.0)	0.3	7010		1	KJK	01/12/17 17:26	50	10	CA71104
Silver	ND (0.1)	0.03	7010		1	KJK	01/13/17 20:29	50	10	CA71104
Thallium	ND (1.2)	0.7	7010		3	KJK	01/12/17 22:05	50	10	CA71104
Vanadium	7.8 (4.0)	0.4	6010C		1	BJV	01/12/17 13:06	50	10	CA71104
Zinc	B 36.7 (10.0)	1.8	6010C		1	BJV	01/12/17 13:06	50	10	CA71104



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-103
Date Sampled: 01/10/17 13:50
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: SMR
Prepared: 1/12/17 12:18
Cleanup Method: 3665A

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.09)	0.03	8082A		1	01/13/17 2:28		CA71203
Aroclor 1221	ND (0.09)	0.03	8082A		1	01/13/17 2:28		CA71203
Aroclor 1232	ND (0.09)	0.03	8082A		1	01/13/17 2:28		CA71203
Aroclor 1242	ND (0.09)	0.03	8082A		1	01/13/17 2:28		CA71203
Aroclor 1248	ND (0.09)	0.03	8082A		1	01/13/17 2:28		CA71203
Aroclor 1254	ND (0.09)	0.03	8082A		1	01/13/17 2:28		CA71203
Aroclor 1260	ND (0.09)	0.03	8082A		1	01/13/17 2:28		CA71203
Aroclor 1262	ND (0.09)	0.03	8082A		1	01/13/17 2:28		CA71203
Aroclor 1268	ND (0.09)	0.03	8082A		1	01/13/17 2:28		CA71203

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	<i>84 %</i>		<i>30-150</i>
<i>Surrogate: Decachlorobiphenyl [2C]</i>	<i>82 %</i>		<i>30-150</i>
<i>Surrogate: Tetrachloro-m-xylene</i>	<i>80 %</i>		<i>30-150</i>
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	<i>98 %</i>		<i>30-150</i>



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-103
Date Sampled: 01/10/17 13:50
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

8260B Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1-Trichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 14:02	C7A0139	CA71120
1,1,2-Trichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 14:02	C7A0139	CA71120
1,1-Dichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 14:02	C7A0139	CA71120
1,1-Dichloroethene	ND (1.0)	0.3	8260B		1	01/11/17 14:02	C7A0139	CA71120
1,2-Dibromoethane	ND (1.0)	0.2	8260B		1	01/11/17 14:02	C7A0139	CA71120
1,2-Dichlorobenzene	ND (1.0)	0.1	8260B		1	01/11/17 14:02	C7A0139	CA71120
1,2-Dichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 14:02	C7A0139	CA71120
1,3-Dichlorobenzene	ND (1.0)	0.2	8260B		1	01/11/17 14:02	C7A0139	CA71120
1,4-Dichlorobenzene	ND (1.0)	0.1	8260B		1	01/11/17 14:02	C7A0139	CA71120
1,4-Dioxane - Screen	ND (500)	190	8260B		1	01/11/17 14:02	C7A0139	CA71120
Acetone	ND (10.0)	2.7	8260B		1	01/11/17 14:02	C7A0139	CA71120
Benzene	ND (1.0)	0.1	8260B		1	01/11/17 14:02	C7A0139	CA71120
Carbon Tetrachloride	ND (1.0)	0.1	8260B		1	01/11/17 14:02	C7A0139	CA71120
cis-1,2-Dichloroethene	ND (1.0)	0.2	8260B		1	01/11/17 14:02	C7A0139	CA71120
Ethylbenzene	ND (1.0)	0.1	8260B		1	01/11/17 14:02	C7A0139	CA71120
Methyl tert-Butyl Ether	ND (1.0)	0.3	8260B		1	01/11/17 14:02	C7A0139	CA71120
Methylene Chloride	ND (2.0)	0.2	8260B		1	01/11/17 14:02	C7A0139	CA71120
Naphthalene	ND (1.0)	0.2	8260B		1	01/11/17 14:02	C7A0139	CA71120
Tertiary-amyl methyl ether	ND (1.0)	0.2	8260B		1	01/11/17 14:02	C7A0139	CA71120
Tertiary-butyl Alcohol	ND (25.0)	10.0	8260B		1	01/11/17 14:02	C7A0139	CA71120
Tetrachloroethene	ND (1.0)	0.2	8260B		1	01/11/17 14:02	C7A0139	CA71120
Toluene	ND (1.0)	0.1	8260B		1	01/11/17 14:02	C7A0139	CA71120
Trichloroethene	ND (1.0)	0.2	8260B		1	01/11/17 14:02	C7A0139	CA71120
Vinyl Chloride	ND (1.0)	0.2	8260B		1	01/11/17 14:02	C7A0139	CA71120
Xylene O	ND (1.0)	0.1	8260B		1	01/11/17 14:02	C7A0139	CA71120
Xylene P,M	ND (2.0)	0.2	8260B		1	01/11/17 14:02	C7A0139	CA71120

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>91 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>90 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>97 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>105 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-103
Date Sampled: 01/10/17 13:50
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: VSC
Prepared: 1/11/17 15:35

8270D(SIM) Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Acenaphthene	ND (0.19)	0.04	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Acenaphthylene	ND (0.19)	0.03	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Anthracene	ND (0.19)	0.03	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Benzo(a)anthracene	J 0.04 (0.05)	0.01	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Benzo(a)pyrene	J 0.03 (0.05)	0.01	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Benzo(b)fluoranthene	0.05 (0.05)	0.02	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Benzo(g,h,i)perylene	J 0.03 (0.19)	0.02	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Benzo(k)fluoranthene	ND (0.05)	0.02	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
bis(2-Ethylhexyl)phthalate	B 3.49 (2.34)	0.19	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Butylbenzylphthalate	B, J 0.30 (2.34)	0.19	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Chrysene	J 0.04 (0.05)	0.01	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Dibenzo(a,h)Anthracene	ND (0.05)	0.02	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Diethylphthalate	J 0.19 (2.34)	0.19	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Dimethylphthalate	ND (2.34)	0.19	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Di-n-butylphthalate	ND (2.34)	0.19	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Di-n-octylphthalate	ND (2.34)	0.19	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Fluoranthene	J 0.06 (0.19)	0.02	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Fluorene	ND (0.19)	0.03	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Indeno(1,2,3-cd)Pyrene	J 0.03 (0.05)	0.02	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Naphthalene	ND (0.19)	0.04	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Pentachlorophenol	ND (0.84)	0.30	8270D SIM		1	01/18/17 21:52	C7A0148	CA71116
Phenanthrene	J 0.04 (0.19)	0.04	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116
Pyrene	J 0.06 (0.19)	0.02	8270D SIM		1	01/12/17 8:59	C7A0148	CA71116

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	<i>47 %</i>		<i>30-130</i>
<i>Surrogate: 2,4,6-Tribromophenol</i>	<i>98 %</i>		<i>15-110</i>
<i>Surrogate: 2-Fluorobiphenyl</i>	<i>73 %</i>		<i>30-130</i>
<i>Surrogate: Nitrobenzene-d5</i>	<i>80 %</i>		<i>30-130</i>
<i>Surrogate: p-Terphenyl-d14</i>	<i>92 %</i>		<i>30-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-103
Date Sampled: 01/10/17 13:50
Percent Solids: N/A

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-03
Sample Matrix: Ground Water

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Ammonia as N	0.24 (0.10)		4500 NH3 G		1	JLK	01/16/17 16:49	mg/L	CA71301
Chloride	730 (20.0)		§		1	SUB	01/12/17 15:05	mg/L	CA71735
Hexavalent Chromium	ND (10)		7196A		1	JLK	01/10/17 21:30	ug/L	CA71051
Phenols	ND (100)	30	420.1		1	JLK	01/13/17 17:00	ug/L	CA71336
Total Cyanide (LL)	ND (5.00)	1.80	4500 CN CE		1	EEM	01/12/17 12:45	ug/L	CA71217
Total Petroleum Hydrocarbon	ND (5)		1664A		1	CRR	01/16/17 14:42	mg/L	CA71306
Total Residual Chlorine	ND (10)		4500-Cl E		1	JLK	01/10/17 20:58	ug/L	CA71052
Total Suspended Solids	952000 (20000)		2540D		1	MJV	01/12/17 16:22	ug/L	CA71227



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-103
Date Sampled: 01/10/17 13:50
Percent Solids: N/A
Initial Volume: 35
Final Volume: 2
Extraction Method: 504/8011

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: JXS
Prepared: 1/13/17 12:00

8011 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,2-Dibromoethane	ND (0.015)	0.005	8011		1	JXS	01/13/17 17:39		CA71322

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Pentachloroethane</i>	<i>106 %</i>		<i>30-150</i>



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-103
Date Sampled: 01/10/17 13:50
Percent Solids: N/A
Initial Volume: 1
Final Volume: 1
Extraction Method: No Prep

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-03
Sample Matrix: Ground Water
Units: mg/L
Analyst: DPS
Prepared: 1/12/17 14:30

Alcohol Scan by GC/FID

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Ethanol	ND (10)		8015		1	DPS	01/13/17 16:11		CA71246



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-103 FF
Date Sampled: 01/10/17 14:15
Percent Solids: N/A

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-04
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (2.0)	0.2	7010		1	KJK	01/13/17 7:34	50	10	CA71104
Arsenic	21.2 (6.0)	0.5	7010		3	KJK	01/13/17 5:22	50	10	CA71104
Barium	55.5 (10.0)	0.6	6010C		1	BJV	01/12/17 13:11	50	10	CA71104
Beryllium	0.6 (0.2)	0.04	6010C		1	BJV	01/12/17 13:11	50	10	CA71104
Cadmium	J 0.06 (0.2)	0.01	7010		1	KJK	01/13/17 16:50	50	10	CA71104
Chromium	5.7 (4.0)	0.6	6010C		1	BJV	01/12/17 13:11	50	10	CA71104
Chromium III	ND (10)		6010C		1	JLK	01/12/17 13:11	1	1	[CALC]
Copper	18.2 (2.0)	0.8	6010C		1	BJV	01/12/17 13:11	50	10	CA71104
Iron	6630 (20.0)	4.6	6010C		1	BJV	01/12/17 13:11	50	10	CA71104
Lead	8.9 (3.0)	0.6	7010		3	KJK	01/13/17 1:31	50	10	CA71104
Mercury	ND (0.20)	0.12	7470A		1	MJV	01/13/17 12:26	20	40	CA71110
Nickel	5.8 (4.0)	0.4	6010C		1	BJV	01/12/17 13:11	50	10	CA71104
Selenium	ND (2.0)	0.3	7010		1	KJK	01/12/17 17:32	50	10	CA71104
Silver	ND (0.1)	0.03	7010		1	KJK	01/13/17 20:35	50	10	CA71104
Thallium	ND (1.2)	0.7	7010		3	KJK	01/12/17 22:11	50	10	CA71104
Vanadium	9.1 (4.0)	0.4	6010C		1	BJV	01/12/17 13:11	50	10	CA71104
Zinc	B 33.6 (10.0)	1.8	6010C		1	BJV	01/12/17 13:11	50	10	CA71104



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-103 FF
Date Sampled: 01/10/17 14:15
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-04
Sample Matrix: Ground Water
Units: ug/L
Analyst: SMR
Prepared: 1/12/17 12:18
Cleanup Method: 3665A

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.09)	0.03	8082A		1	01/13/17 2:46		CA71203
Aroclor 1221	ND (0.09)	0.03	8082A		1	01/13/17 2:46		CA71203
Aroclor 1232	ND (0.09)	0.03	8082A		1	01/13/17 2:46		CA71203
Aroclor 1242	ND (0.09)	0.03	8082A		1	01/13/17 2:46		CA71203
Aroclor 1248	ND (0.09)	0.03	8082A		1	01/13/17 2:46		CA71203
Aroclor 1254	ND (0.09)	0.03	8082A		1	01/13/17 2:46		CA71203
Aroclor 1260	ND (0.09)	0.03	8082A		1	01/13/17 2:46		CA71203
Aroclor 1262	ND (0.09)	0.03	8082A		1	01/13/17 2:46		CA71203
Aroclor 1268	ND (0.09)	0.03	8082A		1	01/13/17 2:46		CA71203

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	52 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	50 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	68 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	83 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-103 FF
Date Sampled: 01/10/17 14:15
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-04
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

8260B Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1-Trichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 14:29	C7A0139	CA71120
1,1,2-Trichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 14:29	C7A0139	CA71120
1,1-Dichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 14:29	C7A0139	CA71120
1,1-Dichloroethene	ND (1.0)	0.3	8260B		1	01/11/17 14:29	C7A0139	CA71120
1,2-Dibromoethane	ND (1.0)	0.2	8260B		1	01/11/17 14:29	C7A0139	CA71120
1,2-Dichlorobenzene	ND (1.0)	0.1	8260B		1	01/11/17 14:29	C7A0139	CA71120
1,2-Dichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 14:29	C7A0139	CA71120
1,3-Dichlorobenzene	ND (1.0)	0.2	8260B		1	01/11/17 14:29	C7A0139	CA71120
1,4-Dichlorobenzene	ND (1.0)	0.1	8260B		1	01/11/17 14:29	C7A0139	CA71120
1,4-Dioxane - Screen	ND (500)	190	8260B		1	01/11/17 14:29	C7A0139	CA71120
Acetone	ND (10.0)	2.7	8260B		1	01/11/17 14:29	C7A0139	CA71120
Benzene	ND (1.0)	0.1	8260B		1	01/11/17 14:29	C7A0139	CA71120
Carbon Tetrachloride	ND (1.0)	0.1	8260B		1	01/11/17 14:29	C7A0139	CA71120
cis-1,2-Dichloroethene	ND (1.0)	0.2	8260B		1	01/11/17 14:29	C7A0139	CA71120
Ethylbenzene	ND (1.0)	0.1	8260B		1	01/11/17 14:29	C7A0139	CA71120
Methyl tert-Butyl Ether	ND (1.0)	0.3	8260B		1	01/11/17 14:29	C7A0139	CA71120
Methylene Chloride	ND (2.0)	0.2	8260B		1	01/11/17 14:29	C7A0139	CA71120
Naphthalene	ND (1.0)	0.2	8260B		1	01/11/17 14:29	C7A0139	CA71120
Tertiary-amyl methyl ether	ND (1.0)	0.2	8260B		1	01/11/17 14:29	C7A0139	CA71120
Tertiary-butyl Alcohol	ND (25.0)	10.0	8260B		1	01/11/17 14:29	C7A0139	CA71120
Tetrachloroethene	ND (1.0)	0.2	8260B		1	01/11/17 14:29	C7A0139	CA71120
Toluene	ND (1.0)	0.1	8260B		1	01/11/17 14:29	C7A0139	CA71120
Trichloroethene	ND (1.0)	0.2	8260B		1	01/11/17 14:29	C7A0139	CA71120
Vinyl Chloride	ND (1.0)	0.2	8260B		1	01/11/17 14:29	C7A0139	CA71120
Xylene O	ND (1.0)	0.1	8260B		1	01/11/17 14:29	C7A0139	CA71120
Xylene P,M	ND (2.0)	0.2	8260B		1	01/11/17 14:29	C7A0139	CA71120

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>92 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>89 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>98 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>104 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-103 FF
Date Sampled: 01/10/17 14:15
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-04
Sample Matrix: Ground Water
Units: ug/L
Analyst: VSC
Prepared: 1/11/17 15:35

8270D(SIM) Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Acenaphthene	ND (0.19)	0.04	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Acenaphthylene	ND (0.19)	0.03	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Anthracene	ND (0.19)	0.03	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Benzo(a)anthracene	ND (0.05)	0.01	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Benzo(a)pyrene	ND (0.05)	0.01	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Benzo(b)fluoranthene	ND (0.05)	0.02	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Benzo(g,h,i)perylene	ND (0.19)	0.02	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Benzo(k)fluoranthene	ND (0.05)	0.02	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
bis(2-Ethylhexyl)phthalate	B 6.24 (2.34)	0.19	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Butylbenzylphthalate	B, J 0.52 (2.34)	0.19	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Chrysene	ND (0.05)	0.01	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Dibenzo(a,h)Anthracene	ND (0.05)	0.02	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Diethylphthalate	J 0.82 (2.34)	0.19	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Dimethylphthalate	ND (2.34)	0.19	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Di-n-butylphthalate	J 0.45 (2.34)	0.19	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Di-n-octylphthalate	ND (2.34)	0.19	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Fluoranthene	ND (0.19)	0.02	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Fluorene	ND (0.19)	0.03	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Indeno(1,2,3-cd)Pyrene	ND (0.05)	0.02	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Naphthalene	ND (0.19)	0.04	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Pentachlorophenol	ND (0.84)	0.30	8270D SIM		1	01/18/17 22:41	C7A0148	CA71116
Phenanthrene	ND (0.19)	0.04	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116
Pyrene	ND (0.19)	0.02	8270D SIM		1	01/12/17 9:49	C7A0148	CA71116

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	43 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	91 %		15-110
<i>Surrogate: 2-Fluorobiphenyl</i>	66 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	67 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	86 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-103 FF
Date Sampled: 01/10/17 14:15
Percent Solids: N/A

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-04
Sample Matrix: Ground Water

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Ammonia as N	0.28 (0.10)		4500 NH3 G		1	JLK	01/16/17 17:17	mg/L	CA71301
Chloride	740 (20.0)		§		1	SUB	01/12/17 15:19	mg/L	CA71735
Hexavalent Chromium	ND (10)		7196A		1	JLK	01/10/17 21:30	ug/L	CA71051
Phenols	ND (100)	30	420.1		1	JLK	01/13/17 17:00	ug/L	CA71336
Total Cyanide (LL)	ND (5.00)	1.80	4500 CN CE		1	EEM	01/12/17 12:45	ug/L	CA71217
Total Petroleum Hydrocarbon	ND (5)		1664A		1	CRR	01/16/17 14:42	mg/L	CA71306
Total Residual Chlorine	ND (10)		4500-Cl E		1	JLK	01/10/17 20:58	ug/L	CA71052
Total Suspended Solids	1560000 (20000)		2540D		1	MJV	01/12/17 16:22	ug/L	CA71227



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-103 FF
Date Sampled: 01/10/17 14:15
Percent Solids: N/A
Initial Volume: 35
Final Volume: 2
Extraction Method: 504/8011

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-04
Sample Matrix: Ground Water
Units: ug/L
Analyst: JXS
Prepared: 1/13/17 12:00

8011 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,2-Dibromoethane	ND (0.015)	0.005	8011		1	JXS	01/13/17 18:07		CA71322
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>					
<i>Surrogate: Pentachloroethane</i>		118 %		30-150					



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-103 FF
Date Sampled: 01/10/17 14:15
Percent Solids: N/A
Initial Volume: 1
Final Volume: 1
Extraction Method: No Prep

ESS Laboratory Work Order: 1701176
ESS Laboratory Sample ID: 1701176-04
Sample Matrix: Ground Water
Units: mg/L
Analyst: DPS
Prepared: 1/12/17 14:30

Alcohol Scan by GC/FID

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Ethanol	ND (10)		8015		1	DPS	01/13/17 16:34		CA71246



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701176

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CA71051 - [CALC]

Blank

Chromium III	ND	10	ug/L
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LCS

Chromium III	ND		ug/L
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LCS Dup

Chromium III	ND		ug/L
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Batch CA71104 - 3005A

Blank

Barium	ND	50.0	ug/L
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Beryllium	ND	1.0	ug/L
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Chromium	ND	20.0	ug/L
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Copper	ND	10.0	ug/L
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Iron	ND	100	ug/L
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Nickel	ND	20.0	ug/L
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Vanadium	ND	20.0	ug/L
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Zinc	16.5	50.0	ug/L	J
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Blank

Antimony	ND	5.0	ug/L
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Arsenic	ND	5.0	ug/L
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Barium	ND	25.0	ug/L
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Beryllium	ND	0.5	ug/L
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Cadmium	ND	0.5	ug/L
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Chromium	ND	10.0	ug/L
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Chromium III	ND	10	ug/L
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Copper	ND	5.0	ug/L
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Iron	ND	50.0	ug/L
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Lead	ND	2.5	ug/L
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Nickel	ND	10.0	ug/L
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Selenium	ND	5.0	ug/L
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Silver	ND	0.2	ug/L
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Thallium	ND	1.0	ug/L
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Vanadium	ND	10.0	ug/L
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Zinc	ND	25.0	ug/L
------	----	------	------

Blank

Antimony	ND	2.0	ug/L
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Arsenic	ND	2.0	ug/L
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Barium	ND	10.0	ug/L
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Beryllium	ND	0.2	ug/L
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Cadmium	ND	0.2	ug/L
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Chromium	ND	4.0	ug/L
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Chromium III	ND	4	ug/L
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Copper	ND	2.0	ug/L
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Iron	6.0	20.0	ug/L	J
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Lead	ND	1.0	ug/L
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CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701176

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CA71104 - 3005A

Nickel	ND	4.0	ug/L							
Selenium	ND	2.0	ug/L							
Silver	ND	0.1	ug/L							
Thallium	ND	0.4	ug/L							
Vanadium	ND	4.0	ug/L							
Zinc	2.2	10.0	ug/L							J

LCS

Barium	477	50.0	ug/L	500.0		95	80-120			
Beryllium	46.8	1.0	ug/L	50.00		94	80-120			
Chromium	476	20.0	ug/L	500.0		95	80-120			
Copper	478	10.0	ug/L	500.0		96	80-120			
Iron	2680	100	ug/L	2500		107	80-120			
Nickel	481	20.0	ug/L	500.0		96	80-120			
Vanadium	475	20.0	ug/L	500.0		95	80-120			
Zinc	463	50.0	ug/L	500.0		93	80-120			

LCS

Antimony	252	125	ug/L	250.0		101	80-120			
Arsenic	256	125	ug/L	250.0		102	80-120			
Barium	235	25.0	ug/L	250.0		94	80-120			
Beryllium	23.2	0.5	ug/L	25.00		93	80-120			
Cadmium	122	250	ug/L	125.0		98	80-120			J
Chromium	234	10.0	ug/L	250.0		94	80-120			
Chromium III	234	10	ug/L							
Copper	232	5.0	ug/L	250.0		93	80-120			
Iron	1140	50.0	ug/L	1250		91	80-120			
Lead	272	62.5	ug/L	250.0		109	80-120			
Nickel	237	10.0	ug/L	250.0		95	80-120			
Selenium	546	125	ug/L	500.0		109	80-120			
Silver	116	2.5	ug/L	125.0		93	80-120			
Silver	117	25.0	ug/L	125.0		94	80-120			
Thallium	275	25.0	ug/L	250.0		110	80-120			
Vanadium	234	10.0	ug/L	250.0		93	80-120			
Zinc	227	25.0	ug/L	250.0		91	80-120			

LCS

Antimony	93.5	50.0	ug/L	100.0		94	80-120			
Arsenic	108	50.0	ug/L	100.0		108	80-120			
Barium	96.8	10.0	ug/L	100.0		97	80-120			
Beryllium	9.5	0.2	ug/L	10.00		95	80-120			
Cadmium	47.7	100	ug/L	50.00		95	80-120			J
Chromium	96.6	4.0	ug/L	100.0		97	80-120			
Chromium III	97.0	4	ug/L							
Copper	97.1	2.0	ug/L	100.0		97	80-120			
Iron	483	20.0	ug/L	500.0		97	80-120			
Lead	108	25.0	ug/L	100.0		108	80-120			
Nickel	96.3	4.0	ug/L	100.0		96	80-120			



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701176

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CA71104 - 3005A

Selenium	222	50.0	ug/L	200.0		111	80-120			
Silver	40.5	10.0	ug/L	50.00		81	80-120			
Thallium	109	10.0	ug/L	100.0		109	80-120			
Vanadium	97.4	4.0	ug/L	100.0		97	80-120			
Zinc	96.1	10.0	ug/L	100.0		96	80-120			

LCS Dup

Barium	467	50.0	ug/L	500.0		93	80-120	2	20	
Beryllium	45.6	1.0	ug/L	50.00		91	80-120	3	20	
Chromium	465	20.0	ug/L	500.0		93	80-120	2	20	
Copper	472	10.0	ug/L	500.0		94	80-120	1	20	
Iron	2350	100	ug/L	2500		94	80-120	13	20	
Nickel	476	20.0	ug/L	500.0		95	80-120	1	20	
Vanadium	466	20.0	ug/L	500.0		93	80-120	2	20	
Zinc	452	50.0	ug/L	500.0		90	80-120	2	20	

LCS Dup

Antimony	252	125	ug/L	250.0		101	80-120	0.03	20	
Arsenic	260	125	ug/L	250.0		104	80-120	2	20	
Barium	247	25.0	ug/L	250.0		99	80-120	5	20	
Beryllium	24.2	0.5	ug/L	25.00		97	80-120	5	20	
Cadmium	120	250	ug/L	125.0		96	80-120	2	20	J
Chromium	247	10.0	ug/L	250.0		99	80-120	5	20	
Chromium III	247	10	ug/L							
Copper	244	5.0	ug/L	250.0		98	80-120	5	20	
Iron	1190	50.0	ug/L	1250		95	80-120	4	20	
Lead	270	62.5	ug/L	250.0		108	80-120	0.8	20	
Nickel	246	10.0	ug/L	250.0		98	80-120	4	20	
Selenium	541	125	ug/L	500.0		108	80-120	0.9	20	
Silver	118	25.0	ug/L	125.0		95	80-120	0.8	20	
Silver	122	2.5	ug/L	125.0		98	80-120	5	20	
Thallium	275	25.0	ug/L	250.0		110	80-120	0.03	20	
Vanadium	246	10.0	ug/L	250.0		98	80-120	5	20	
Zinc	239	25.0	ug/L	250.0		96	80-120	5	20	

LCS Dup

Antimony	99.0	50.0	ug/L	100.0		99	80-120	6	20	
Arsenic	108	50.0	ug/L	100.0		108	80-120	0.3	20	
Barium	93.7	10.0	ug/L	100.0		94	80-120	3	20	
Beryllium	9.1	0.2	ug/L	10.00		91	80-120	4	20	
Cadmium	50.8	100	ug/L	50.00		102	80-120	6	20	J
Chromium	93.0	4.0	ug/L	100.0		93	80-120	4	20	
Chromium III	93.0	4	ug/L							
Copper	93.0	2.0	ug/L	100.0		93	80-120	4	20	
Iron	462	20.0	ug/L	500.0		92	80-120	4	20	
Lead	108	25.0	ug/L	100.0		108	80-120	0.1	20	
Nickel	92.0	4.0	ug/L	100.0		92	80-120	4	20	
Selenium	225	50.0	ug/L	200.0		113	80-120	1	20	



CERTIFICATE OF ANALYSIS

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ESS Laboratory Work Order: 1701176

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CA71104 - 3005A

Silver	40.7	10.0	ug/L	50.00		81	80-120	0.4	20	
Thallium	112	10.0	ug/L	100.0		112	80-120	3	20	
Vanadium	93.4	4.0	ug/L	100.0		93	80-120	4	20	
Zinc	92.1	10.0	ug/L	100.0		92	80-120	4	20	

Batch CA71110 - 245.1/7470A

Blank

Mercury	ND	0.20	ug/L							
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LCS

Mercury	6.33	0.20	ug/L	6.000		105	80-120			
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LCS Dup

Mercury	6.18	0.20	ug/L	6.000		103	80-120	2	20	
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8082A Polychlorinated Biphenyls (PCB)

Batch CA71203 - 3510C

Blank

Aroclor 1016	ND	0.05	ug/L							
Aroclor 1221	ND	0.05	ug/L							
Aroclor 1232	ND	0.05	ug/L							
Aroclor 1242	ND	0.05	ug/L							
Aroclor 1248	ND	0.05	ug/L							
Aroclor 1254	ND	0.05	ug/L							
Aroclor 1260	ND	0.05	ug/L							
Aroclor 1262	ND	0.05	ug/L							
Aroclor 1268	ND	0.05	ug/L							

Surrogate: Decachlorobiphenyl	0.0373		ug/L	0.05000		75	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0338		ug/L	0.05000		68	30-150			
Surrogate: Tetrachloro-m-xylene	0.0282		ug/L	0.05000		56	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0363		ug/L	0.05000		73	30-150			

LCS

Aroclor 1016	0.92	0.05	ug/L	1.000		92	40-140			
Aroclor 1260	0.84	0.05	ug/L	1.000		84	40-140			

Surrogate: Decachlorobiphenyl	0.0407		ug/L	0.05000		81	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0384		ug/L	0.05000		77	30-150			
Surrogate: Tetrachloro-m-xylene	0.0345		ug/L	0.05000		69	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0394		ug/L	0.05000		79	30-150			

LCS Dup

Aroclor 1016	0.98	0.05	ug/L	1.000		98	40-140	5	20	
Aroclor 1260	0.86	0.05	ug/L	1.000		86	40-140	3	20	

Surrogate: Decachlorobiphenyl	0.0477		ug/L	0.05000		95	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0448		ug/L	0.05000		90	30-150			
Surrogate: Tetrachloro-m-xylene	0.0388		ug/L	0.05000		78	30-150			



CERTIFICATE OF ANALYSIS

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8082A Polychlorinated Biphenyls (PCB)

Batch CA71203 - 3510C

Surrogate: Tetrachloro-m-xylene [2C] 0.0449 ug/L 0.05000 90 30-150

8260B Volatile Organic Compounds

Batch CA71120 - 5030B

Blank

1,1,1-Trichloroethane	ND	1.0	ug/L						
1,1,2-Trichloroethane	ND	1.0	ug/L						
1,1-Dichloroethane	ND	1.0	ug/L						
1,1-Dichloroethene	ND	1.0	ug/L						
1,2-Dibromoethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	1.0	ug/L						
1,2-Dichloroethane	ND	1.0	ug/L						
1,3-Dichlorobenzene	ND	1.0	ug/L						
1,4-Dichlorobenzene	ND	1.0	ug/L						
1,4-Dioxane - Screen	ND	500	ug/L						
Acetone	ND	10.0	ug/L						
Benzene	ND	1.0	ug/L						
Carbon Tetrachloride	ND	1.0	ug/L						
cis-1,2-Dichloroethene	ND	1.0	ug/L						
Ethylbenzene	ND	1.0	ug/L						
Methyl tert-Butyl Ether	ND	1.0	ug/L						
Methylene Chloride	ND	2.0	ug/L						
Naphthalene	0.7	1.0	ug/L						J
Tertiary-amyl methyl ether	ND	1.0	ug/L						
Tertiary-butyl Alcohol	ND	25.0	ug/L						
Tetrachloroethene	ND	1.0	ug/L						
Toluene	ND	1.0	ug/L						
Trichloroethene	ND	1.0	ug/L						
Vinyl Chloride	ND	1.0	ug/L						
Xylene O	ND	1.0	ug/L						
Xylene P,M	ND	2.0	ug/L						
Surrogate: 1,2-Dichloroethane-d4	22.8		ug/L	25.00		91	70-130		
Surrogate: 4-Bromofluorobenzene	22.4		ug/L	25.00		90	70-130		
Surrogate: Dibromofluoromethane	24.8		ug/L	25.00		99	70-130		
Surrogate: Toluene-d8	25.6		ug/L	25.00		102	70-130		

LCS

1,1,1-Trichloroethane	9.4		ug/L	10.00		94	70-130		
1,1,2-Trichloroethane	9.4		ug/L	10.00		94	70-130		
1,1-Dichloroethane	9.5		ug/L	10.00		95	70-130		
1,1-Dichloroethene	10.5		ug/L	10.00		105	70-130		
1,2-Dibromoethane	10.1		ug/L	10.00		101	70-130		
1,2-Dichlorobenzene	9.6		ug/L	10.00		96	70-130		
1,2-Dichloroethane	9.2		ug/L	10.00		92	70-130		
1,3-Dichlorobenzene	9.7		ug/L	10.00		97	70-130		



CERTIFICATE OF ANALYSIS

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8260B Volatile Organic Compounds

Batch CA71120 - 5030B

1,4-Dichlorobenzene	9.3		ug/L	10.00		93	70-130			
1,4-Dioxane - Screen	0.0		ug/L	200.0			0-332			
Acetone	45.2		ug/L	50.00		90	70-130			
Benzene	9.8		ug/L	10.00		98	70-130			
Carbon Tetrachloride	10.0		ug/L	10.00		100	70-130			
cis-1,2-Dichloroethene	9.9		ug/L	10.00		99	70-130			
Ethylbenzene	8.3		ug/L	10.00		83	70-130			
Methyl tert-Butyl Ether	9.0		ug/L	10.00		90	70-130			
Methylene Chloride	9.9		ug/L	10.00		99	70-130			
Naphthalene	11.6		ug/L	10.00		116	70-130			
Tertiary-amyl methyl ether	8.6		ug/L	10.00		86	70-130			
Tertiary-butyl Alcohol	48.2		ug/L	50.00		96	70-130			
Tetrachloroethene	7.7		ug/L	10.00		77	70-130			
Toluene	9.2		ug/L	10.00		92	70-130			
Trichloroethene	9.6		ug/L	10.00		96	70-130			
Vinyl Chloride	10.3		ug/L	10.00		103	70-130			
Xylene O	8.4		ug/L	10.00		84	70-130			
Xylene P,M	16.8		ug/L	20.00		84	70-130			
Surrogate: 1,2-Dichloroethane-d4	23.0		ug/L	25.00		92	70-130			
Surrogate: 4-Bromofluorobenzene	23.6		ug/L	25.00		94	70-130			
Surrogate: Dibromofluoromethane	25.2		ug/L	25.00		101	70-130			
Surrogate: Toluene-d8	26.4		ug/L	25.00		106	70-130			

LCS Dup

1,1,1-Trichloroethane	9.0		ug/L	10.00		90	70-130	5	25	
1,1,2-Trichloroethane	8.7		ug/L	10.00		87	70-130	7	25	
1,1-Dichloroethane	9.0		ug/L	10.00		90	70-130	5	25	
1,1-Dichloroethene	9.7		ug/L	10.00		97	70-130	8	25	
1,2-Dibromoethane	9.4		ug/L	10.00		94	70-130	7	25	
1,2-Dichlorobenzene	9.0		ug/L	10.00		90	70-130	6	25	
1,2-Dichloroethane	8.5		ug/L	10.00		85	70-130	8	25	
1,3-Dichlorobenzene	9.5		ug/L	10.00		95	70-130	3	25	
1,4-Dichlorobenzene	9.0		ug/L	10.00		90	70-130	4	25	
1,4-Dioxane - Screen	0.0		ug/L	200.0			0-332		200	
Acetone	42.2		ug/L	50.00		84	70-130	7	25	
Benzene	9.4		ug/L	10.00		94	70-130	4	25	
Carbon Tetrachloride	9.5		ug/L	10.00		95	70-130	5	25	
cis-1,2-Dichloroethene	9.3		ug/L	10.00		93	70-130	6	25	
Ethylbenzene	8.3		ug/L	10.00		83	70-130	0.5	25	
Methyl tert-Butyl Ether	8.6		ug/L	10.00		86	70-130	5	25	
Methylene Chloride	9.6		ug/L	10.00		96	70-130	4	25	
Naphthalene	10.4		ug/L	10.00		104	70-130	11	25	
Tertiary-amyl methyl ether	8.0		ug/L	10.00		80	70-130	8	25	
Tertiary-butyl Alcohol	48.1		ug/L	50.00		96	70-130	0.2	25	
Tetrachloroethene	7.5		ug/L	10.00		75	70-130	3	25	
Toluene	8.7		ug/L	10.00		87	70-130	6	25	



CERTIFICATE OF ANALYSIS

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8260B Volatile Organic Compounds

Batch CA71120 - 5030B

Trichloroethene	9.0		ug/L	10.00		90	70-130	7	25	
Vinyl Chloride	9.6		ug/L	10.00		96	70-130	7	25	
Xylene O	8.3		ug/L	10.00		83	70-130	2	25	
Xylene P,M	16.8		ug/L	20.00		84	70-130	0.6	25	
Surrogate: 1,2-Dichloroethane-d4	22.5		ug/L	25.00		90	70-130			
Surrogate: 4-Bromofluorobenzene	24.0		ug/L	25.00		96	70-130			
Surrogate: Dibromofluoromethane	24.4		ug/L	25.00		98	70-130			
Surrogate: Toluene-d8	26.1		ug/L	25.00		104	70-130			

8270D(SIM) Semi-Volatile Organic Compounds

Batch CA71116 - 3510C

Blank

Acenaphthene	ND	0.20	ug/L							
Acenaphthylene	ND	0.20	ug/L							
Anthracene	ND	0.20	ug/L							
Benzo(a)anthracene	ND	0.05	ug/L							
Benzo(a)pyrene	ND	0.05	ug/L							
Benzo(b)fluoranthene	ND	0.05	ug/L							
Benzo(g,h,i)perylene	ND	0.20	ug/L							
Benzo(k)fluoranthene	ND	0.05	ug/L							
bis(2-Ethylhexyl)phthalate	2.37	2.50	ug/L							J
Butylbenzylphthalate	0.32	2.50	ug/L							J
Chrysene	ND	0.05	ug/L							
Dibenzo(a,h)Anthracene	ND	0.05	ug/L							
Diethylphthalate	ND	2.50	ug/L							
Dimethylphthalate	ND	2.50	ug/L							
Di-n-butylphthalate	ND	2.50	ug/L							
Di-n-octylphthalate	0.26	2.50	ug/L							J
Fluoranthene	ND	0.20	ug/L							
Fluorene	ND	0.20	ug/L							
Indeno(1,2,3-cd)Pyrene	ND	0.05	ug/L							
Naphthalene	ND	0.20	ug/L							
Pentachlorophenol	ND	0.90	ug/L							
Phenanthrene	ND	0.20	ug/L							
Pyrene	ND	0.20	ug/L							
Surrogate: 1,2-Dichlorobenzene-d4	0.791		ug/L	2.500		32	30-130			
Surrogate: 2,4,6-Tribromophenol	2.97		ug/L	3.750		79	15-110			
Surrogate: 2-Fluorobiphenyl	1.22		ug/L	2.500		49	30-130			
Surrogate: Nitrobenzene-d5	1.42		ug/L	2.500		57	30-130			
Surrogate: p-Terphenyl-d14	2.24		ug/L	2.500		90	30-130			

LCS

Acenaphthene	2.51	0.20	ug/L	4.000		63	40-140			
Acenaphthylene	2.18	0.20	ug/L	4.000		54	40-140			
Anthracene	2.90	0.20	ug/L	4.000		73	40-140			
Benzo(a)anthracene	3.23	0.05	ug/L	4.000		81	40-140			



CERTIFICATE OF ANALYSIS

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8270D(SIM) Semi-Volatile Organic Compounds

Batch CA71116 - 3510C

Benzo(a)pyrene	3.24	0.05	ug/L	4.000		81	40-140			
Benzo(b)fluoranthene	3.19	0.05	ug/L	4.000		80	40-140			
Benzo(g,h,i)perylene	3.23	0.20	ug/L	4.000		81	40-140			
Benzo(k)fluoranthene	3.07	0.05	ug/L	4.000		77	40-140			
bis(2-Ethylhexyl)phthalate	5.83	2.50	ug/L	4.000		146	40-140			B+
Butylbenzylphthalate	4.39	2.50	ug/L	4.000		110	40-140			
Chrysene	3.47	0.05	ug/L	4.000		87	40-140			
Dibenzo(a,h)Anthracene	3.03	0.05	ug/L	4.000		76	40-140			
Diethylphthalate	3.24	2.50	ug/L	4.000		81	40-140			
Dimethylphthalate	2.93	2.50	ug/L	4.000		73	40-140			
Di-n-butylphthalate	3.33	2.50	ug/L	4.000		83	40-140			
Di-n-octylphthalate	3.99	2.50	ug/L	4.000		100	40-140			
Fluoranthene	3.28	0.20	ug/L	4.000		82	40-140			
Fluorene	2.81	0.20	ug/L	4.000		70	40-140			
Indeno(1,2,3-cd)Pyrene	3.14	0.05	ug/L	4.000		78	40-140			
Naphthalene	1.61	0.20	ug/L	4.000		40	40-140			
Pentachlorophenol	3.98	0.90	ug/L	4.000		100	30-130			
Phenanthrene	2.88	0.20	ug/L	4.000		72	40-140			
Pyrene	3.64	0.20	ug/L	4.000		91	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	0.754		ug/L	2.500		30	30-130			
Surrogate: 2,4,6-Tribromophenol	3.65		ug/L	3.750		97	15-110			
Surrogate: 2-Fluorobiphenyl	1.40		ug/L	2.500		56	30-130			
Surrogate: Nitrobenzene-d5	1.40		ug/L	2.500		56	30-130			
Surrogate: p-Terphenyl-d14	2.48		ug/L	2.500		99	30-130			

LCS Dup

Acenaphthene	2.99	0.20	ug/L	4.000		75	40-140	17	20	
Acenaphthylene	2.57	0.20	ug/L	4.000		64	40-140	17	20	
Anthracene	3.10	0.20	ug/L	4.000		77	40-140	7	20	
Benzo(a)anthracene	3.32	0.05	ug/L	4.000		83	40-140	3	20	
Benzo(a)pyrene	3.40	0.05	ug/L	4.000		85	40-140	5	20	
Benzo(b)fluoranthene	3.48	0.05	ug/L	4.000		87	40-140	9	20	
Benzo(g,h,i)perylene	3.43	0.20	ug/L	4.000		86	40-140	6	20	
Benzo(k)fluoranthene	3.32	0.05	ug/L	4.000		83	40-140	8	20	
bis(2-Ethylhexyl)phthalate	5.73	2.50	ug/L	4.000		143	40-140	2	20	B+
Butylbenzylphthalate	4.62	2.50	ug/L	4.000		115	40-140	5	20	
Chrysene	3.63	0.05	ug/L	4.000		91	40-140	4	20	
Dibenzo(a,h)Anthracene	3.20	0.05	ug/L	4.000		80	40-140	6	20	
Diethylphthalate	3.59	2.50	ug/L	4.000		90	40-140	10	20	
Dimethylphthalate	3.31	2.50	ug/L	4.000		83	40-140	12	20	
Di-n-butylphthalate	3.49	2.50	ug/L	4.000		87	40-140	5	20	
Di-n-octylphthalate	4.22	2.50	ug/L	4.000		105	40-140	6	20	
Fluoranthene	3.40	0.20	ug/L	4.000		85	40-140	4	20	
Fluorene	3.20	0.20	ug/L	4.000		80	40-140	13	20	
Indeno(1,2,3-cd)Pyrene	3.35	0.05	ug/L	4.000		84	40-140	6	20	
Naphthalene	1.98	0.20	ug/L	4.000		49	40-140	21	20	D+



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701176

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D(SIM) Semi-Volatile Organic Compounds

Batch CA71116 - 3510C

Pentachlorophenol	4.13	0.90	ug/L	4.000		103	30-130	4	20	
Phenanthrene	3.03	0.20	ug/L	4.000		76	40-140	5	20	
Pyrene	3.76	0.20	ug/L	4.000		94	40-140	3	20	
Surrogate: 1,2-Dichlorobenzene-d4	0.979		ug/L	2.500		39	30-130			
Surrogate: 2,4,6-Tribromophenol	3.78		ug/L	3.750		101	15-110			
Surrogate: 2-Fluorobiphenyl	1.67		ug/L	2.500		67	30-130			
Surrogate: Nitrobenzene-d5	1.73		ug/L	2.500		69	30-130			
Surrogate: p-Terphenyl-d14	2.55		ug/L	2.500		102	30-130			

Classical Chemistry

Batch CA71051 - General Preparation

Blank										
Hexavalent Chromium	ND	10	ug/L							
LCS										
Hexavalent Chromium	0.5		mg/L	0.4998		98	90-110			
LCS Dup										
Hexavalent Chromium	0.5		mg/L	0.4998		99	90-110	0.1	20	

Batch CA71052 - General Preparation

Blank										
Total Residual Chlorine	ND	10	ug/L							
LCS										
Total Residual Chlorine	2		mg/L	1.800		100	85-115			

Batch CA71136 - General Preparation

Blank										
Total Petroleum Hydrocarbon	ND	5	mg/L							
LCS										
Total Petroleum Hydrocarbon	14	5	mg/L	19.38		74	66-114			

Batch CA71217 - TCN Prep

Blank										
Total Cyanide (LL)	ND	5.00	ug/L							
LCS										
Total Cyanide (LL)	21.2	5.00	ug/L	20.06		106	90-110			
LCS										
Total Cyanide (LL)	150	5.00	ug/L	150.4		100	90-110			
LCS Dup										
Total Cyanide (LL)	149	5.00	ug/L	150.4		99	90-110	0.4	20	

Batch CA71227 - General Preparation

Blank										
Total Suspended Solids	ND	5000	ug/L							
LCS										
Total Suspended Solids	66		mg/L	68.70		96	80-120			



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701176

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Classical Chemistry

Batch CA71301 - NH4 Prep

Blank

Ammonia as N	ND	0.10	mg/L							
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LCS

Ammonia as N	0.10	0.10	mg/L	0.09994		98	80-120			
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LCS

Ammonia as N	1.11	0.10	mg/L	0.9994		112	80-120			
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Batch CA71306 - General Preparation

Blank

Total Petroleum Hydrocarbon	ND	5	mg/L							
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LCS

Total Petroleum Hydrocarbon	15	5	mg/L	19.38		78	66-114			
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Batch CA71336 - General Preparation

Blank

Phenols	ND	100	ug/L							
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LCS

Phenols	116	100	ug/L	100.0		116	80-120			
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LCS

Phenols	997	100	ug/L	1000		100	80-120			
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8011 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane

Batch CA71322 - 504/8011

Blank

1,2-Dibromoethane	ND	0.015	ug/L							
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1,2-Dibromoethane [2C]	ND	0.015	ug/L							
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Surrogate: Pentachloroethane

0.162		ug/L	0.2000		81	30-150
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Surrogate: Pentachloroethane [2C]

0.151		ug/L	0.2000		76	30-150
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LCS

1,2-Dibromoethane	0.200	0.015	ug/L	0.2000		100	60-140
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1,2-Dibromoethane [2C]	0.190	0.015	ug/L	0.2000		95	70-130
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Surrogate: Pentachloroethane

0.167		ug/L	0.2000		83	30-150
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Surrogate: Pentachloroethane [2C]

0.162		ug/L	0.2000		81	30-150
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LCS

1,2-Dibromoethane	0.084	0.015	ug/L	0.08000		105	60-140
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1,2-Dibromoethane [2C]	0.057	0.015	ug/L	0.08000		72	70-130
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Surrogate: Pentachloroethane

0.0704		ug/L	0.08000		88	30-150
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Surrogate: Pentachloroethane [2C]

0.0674		ug/L	0.08000		84	30-150
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Alcohol Scan by GC/FID

Batch CA71246 - No Prep



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701176

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Alcohol Scan by GC/FID

Batch CA71246 - No Prep

Blank

Ethanol	ND	10	mg/L							
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LCS

Ethanol	948	10	mg/L	1000		95	60-140			
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LCS Dup

Ethanol	854	10	mg/L	1000		85	60-140	10	30	
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CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701176

Notes and Definitions

U	Analyte included in the analysis, but not detected
J	Reported between MDL and MRL
D+	Relative percent difference for duplicate is outside of criteria (D+).
D	Diluted.
BT	Benzidine tailing factor >2.
B+	Blank Spike recovery is above upper control limit (B+).
B	Present in Method Blank (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



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701176

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/meedc/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>

LABORATORY REPORT

ESS Laboratory
Attn: Mr. Shawn Morrell
185 Frances Avenue
Cranston, RI 02910-2211

Date Received: 1/11/2017
Date Reported: 1/17/2017
P.O. Number B02406

Work Order #: 1701-00774

Project Name: PROJECT #1701176

Enclosed are the analytical results and Chain of Custody for your project referenced above. The sample(s) were analyzed by our Warwick, RI laboratory unless noted otherwise. When applicable, indication of sample analysis at our Hudson, MA laboratory and/or subcontracted results are noted and subcontracted reports are enclosed in their entirety.

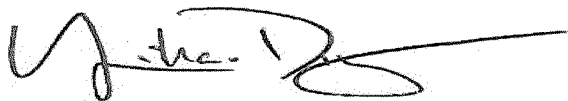
All samples were analyzed within the established guidelines of US EPA approved methods with all requirements met, unless otherwise noted at the end of a given sample's analytical results or in a case narrative.

The Detection Limit is defined as the lowest level that can be reliably achieved during routine laboratory conditions.

These results only pertain to the samples submitted for this Work Order # and this report shall not be reproduced except in its entirety.

We certify that the following results are true and accurate to the best of our knowledge. If you have questions or need further assistance, please contact our Customer Service Department.

Approved by:



Yihai Ding
Technical Director

Laboratory Certification Numbers (as applicable to sample's origin state):

Warwick RI * RI LAI00033, MA M-RI015, CT PH-0508, ME RI00015, NH 2070, NY 11726
Hudson MA * M-MA1117, RI LAO00319

41 Illinois Avenue, Warwick, RI 02888
Phone: 401.737.8500 Fax: 401.738.1970

www.rianalytical.com

131 Coolidge Street, Suite 105, Hudson, MA 01749
Phone: 978.568.0041 Fax: 978.568.0078

R.I. Analytical Laboratories, Inc.

Laboratory Report

ESS Laboratory

Work Order #: 1701-00774

Project Name: PROJECT #1701176

Sample Number: 001
Sample Description: 1701176-01
Sample Type : GRAB
Sample Date / Time : 1/10/2017 @ 12:30

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE/TIME ANALYZED	ANALYST
Chloride	320	10	mg/l	EPA 300.0	1/12/2017 14:36	TAS

Sample Number: 002
Sample Description: 1701176-02
Sample Type : GRAB
Sample Date / Time : 1/10/2017 @ 12:50

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE/TIME ANALYZED	ANALYST
Chloride	1300	50	mg/l	EPA 300.0	1/12/2017 14:50	TAS

Sample Number: 003
Sample Description: 1701176-03
Sample Type : GRAB
Sample Date / Time : 1/10/2017 @ 13:50

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE/TIME ANALYZED	ANALYST
Chloride	730	20	mg/l	EPA 300.0	1/12/2017 15:05	TAS

Sample Number: 004
Sample Description: 1701176-04
Sample Type : GRAB
Sample Date / Time : 1/10/2017 @ 14:15

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE/TIME ANALYZED	ANALYST
Chloride	740	20	mg/l	EPA 300.0	1/12/2017 15:19	TAS



ESS Laboratory
1701-00774
1/17/17

-Method Blanks Results-

Parameter	Units	Results	Date Analyzed
Chloride	mg/l	<1.0	1/11/2017

-LCS/LCS Duplicate Data Results-

Parameter	Spike Conc	LCS Conc	LCS % Rec	LCS Dup Conc	LCS DUP % Rec	% RPD	Date Analyzed
Chloride	10.0	9.86	99				1/12/2017

CHAIN OF CUSTODY

DUE1/17/17

Regulatory State: **MA** RI CT NH NJ NY ME Other _____

	MA-MCP	Navy	USACE	CT DEP	Other	RGP
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h2log-1027

Report Method Blank & Laboratory Control Sample Results

Page 50 of 55

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Tighe & Bond - KPB/TB/MM
 Shipped/Delivered Via: ESS Courier

ESS Project ID: 1701176
 Date Received: 1/10/2017
 Project Due Date: 1/17/2017
 Days for Project: 5 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: 1.1 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: 1-4
 Analysis: Chloride
 TAT: 5 day

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	98108	Yes	No	Yes	VOA Vial - HCl	HCl	
01	98109	Yes	No	Yes	VOA Vial - HCl	HCl	
01	98110	Yes	No	Yes	VOA Vial - HCl	HCl	
01	98120	Yes	NA	Yes	VOA Vial - Unpres	NP	
01	98121	Yes	NA	Yes	VOA Vial - Unpres	NP	
01	98122	Yes	NA	Yes	VOA Vial - Unpres	NP	
01	98129	Yes	NA	Yes	1L Amber - Unpres	NP	
01	98130	Yes	NA	Yes	1L Amber - Unpres	NP	
01	98137	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
01	98138	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
01	98142	Yes	NA	Yes	1L Poly - Unpres	NP	
01	98146	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4	
01	98150	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	
01	98154	Yes	NA	Yes	250 mL Poly - NaOH	NaOH	pH > 12
01	98158	Yes	NA	Yes	250 mL Poly - Unpres	NP	2L 1/14/17 2036
01	98162	Yes	NA	Yes	250 mL Poly - Unpres	NP	
02	98105	Yes	No	Yes	VOA Vial - HCl	HCl	
02	98106	Yes	No	Yes	VOA Vial - HCl	HCl	
02	98107	Yes	No	Yes	VOA Vial - HCl	HCl	
02	98117	Yes	NA	Yes	VOA Vial - Unpres	NP	
02	98118	Yes	NA	Yes	VOA Vial - Unpres	NP	
02	98119	Yes	NA	Yes	VOA Vial - Unpres	NP	
02	98127	Yes	NA	Yes	1L Amber - Unpres	NP	
02	98128	Yes	NA	Yes	1L Amber - Unpres	NP	

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Tighe & Bond - KPB/TB/MM

ESS Project ID: 1701176

Date Received: 1/10/2017

02	98135	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
02	98136	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
02	98141	Yes	NA	Yes	1L Poly - Unpres	NP	
02	98145	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4	
02	98149	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	
02	98153	Yes	NA	Yes	250 mL Poly - NaOH	NaOH	pH > 12 RL 1/10/17 2036
02	98157	Yes	NA	Yes	250 mL Poly - Unpres	NP	
02	98161	Yes	NA	Yes	250 mL Poly - Unpres	NP	
03	98102	Yes	No	Yes	VOA Vial - HCl	HCl	
03	98103	Yes	No	Yes	VOA Vial - HCl	HCl	
03	98104	Yes	No	Yes	VOA Vial - HCl	HCl	
03	98114	Yes	NA	Yes	VOA Vial - Unpres	NP	
03	98115	Yes	NA	Yes	VOA Vial - Unpres	NP	
03	98116	Yes	NA	Yes	VOA Vial - Unpres	NP	
03	98125	Yes	NA	Yes	1L Amber - Unpres	NP	
03	98126	Yes	NA	Yes	1L Amber - Unpres	NP	
03	98133	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
03	98134	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
03	98140	Yes	NA	Yes	1L Poly - Unpres	NP	
03	98144	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4	
03	98148	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	
03	98152	Yes	NA	Yes	250 mL Poly - NaOH	NaOH	pH > 12 RL 1/10/17 2036
03	98156	Yes	NA	Yes	250 mL Poly - Unpres	NP	
03	98160	Yes	NA	Yes	250 mL Poly - Unpres	NP	
04	98099	Yes	No	Yes	VOA Vial - HCl	HCl	
04	98100	Yes	No	Yes	VOA Vial - HCl	HCl	
04	98101	Yes	No	Yes	VOA Vial - HCl	HCl	
04	98111	Yes	NA	Yes	VOA Vial - Unpres	NP	
04	98112	Yes	NA	Yes	VOA Vial - Unpres	NP	
04	98113	Yes	NA	Yes	VOA Vial - Unpres	NP	
04	98123	Yes	NA	Yes	1L Amber - Unpres	NP	
04	98124	Yes	NA	Yes	1L Amber - Unpres	NP	
04	98131	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
04	98132	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
04	98139	Yes	NA	Yes	1L Poly - Unpres	NP	
04	98143	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4	
04	98147	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	
04	98151	Yes	NA	Yes	250 mL Poly - NaOH	NaOH	pH > 12 RL 1/10/17 2036
04	98155	Yes	NA	Yes	250 mL Poly - Unpres	NP	
04	98159	Yes	NA	Yes	250 mL Poly - Unpres	NP	

2nd Review

Are barcode labels on correct containers?

Yes / No

Completed

By: [Signature]

Date & Time: 1/10/17 2037

Reviewed

By: [Signature]

Date & Time: 1/10/17 2043

Delivered

By: [Signature]

1/10/17 2043

CERTIFICATE OF ANALYSIS

Michael Martin
Tighe & Bond
4 Barlows Landing Road, Unit 15
Pocasset, MA 02559

RE: Woburn to Mystic - RGP (N-0998-11-13)
ESS Laboratory Work Order Number: 1709460

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 5:37 pm, Sep 26, 2017

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: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1709460

SAMPLE RECEIPT

The following samples were received on September 15, 2017 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 lab that is able to achieve this limit. The data for Ethanol has been reported using our current method reporting limit.

<u>Lab Number</u>	<u>Sample Name</u>	<u>Matrix</u>	<u>Analysis</u>
1709460-01	MW-15	Ground Water	1664A, 200.7, 245.1, 2540D, 300.0, 3113B, 350.1, 3500Cr B-2009, 420.1, 4500 CN CE, 4500Cl D, 504.1, 524.2, 608, 625 SIM, 8270D SIM, ASTM D3695
1709460-02	MW-15F	Ground Water	1664A, 200.7, 245.1, 2540D, 300.0, 3113B, 350.1, 3500Cr B-2009, 420.1, 4500 CN CE, 4500Cl D, 504.1, 524.2, 608, 625 SIM, 8270D SIM, ASTM D3695
1709460-03	MW-17	Ground Water	1664A, 200.7, 245.1, 2540D, 300.0, 3113B, 350.1, 3500Cr B-2009, 420.1, 4500 CN CE, 4500Cl D, 504.1, 524.2, 608, 625 SIM, 8270D SIM, ASTM D3695
1709460-04	MW-17F	Ground Water	1664A, 200.7, 245.1, 2540D, 300.0, 3113B, 350.1, 3500Cr B-2009, 420.1, 4500 CN CE, 4500Cl D, 504.1, 524.2, 608, 625 SIM, 8270D SIM, ASTM D3695



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1709460

PROJECT NARRATIVE

625(SIM) Semi-Volatile Organic Compounds

1709460-01 Surrogate recovery(ies) above upper control limit (S+).
2,4,6-Tribromophenol (244% @ 15-110%)

1709460-02 Surrogate recovery(ies) above upper control limit (S+).
2,4,6-Tribromophenol (245% @ 15-110%)

1709460-03 Surrogate recovery(ies) above upper control limit (S+).
2,4,6-Tribromophenol (189% @ 15-110%)

1709460-04 Surrogate recovery(ies) above upper control limit (S+).
2,4,6-Tribromophenol (180% @ 15-110%)

C7I0284-CCV1 Continuing Calibration %Diff/Drift is above control limit (CD+).
2,4,6-Tribromophenol (57% @ 20%), Di-n-octylphthalate (31% @ 20%)

C7I0284-TUN1 Benzidine tailing factor >2.

C7I0284-TUN1 Pentachlorophenol tailing factor > 2.

CI71812-BS2 Blank Spike recovery is above upper control limit (B+).
2,4,6-Tribromophenol (173% @ 15-110%)

CI71812-BSD2 Blank Spike recovery is above upper control limit (B+).
2,4,6-Tribromophenol (199% @ 15-110%)

8270D(SIM) Semi-Volatile Organic Compounds w/ Isotope Dilution

C7I0298-TUN1 Benzidine tailing factor >2.

Classical Chemistry

1709460-01 The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.

1709460-02 The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.

1709460-03 The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.

1709460-04 The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.

Total Metals

CI71971-BSD1 Blank Spike recovery is above upper control limit (B+).
Lead (116% @ 85-115%)

No other observations noted.

End of Project Narrative.



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1709460

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](#)

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: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-15
Date Sampled: 09/14/17 21:00
Percent Solids: N/A

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-01
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 245.1/7470A

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (10.0)		200.7		1	KJK	09/20/17 21:42	50	10	CI71971
Arsenic	ND (3.0)		3113B		3	KJK	09/21/17 9:26	50	10	CI71971
Cadmium	ND (0.15)		3113B		3	KJK	09/21/17 23:35	50	10	CI71971
Chromium	ND (4.0)		200.7		1	KJK	09/20/17 21:42	50	10	CI71971
Chromium III	ND (10.0)		200.7		1	JLK	09/20/17 21:42	1	1	[CALC]
Copper	ND (2.0)		200.7		1	KJK	09/26/17 8:55	100	20	CI72503
Hardness	309000 (165)		200.7		1	KJK	09/20/17 21:42	1	1	[CALC]
Iron	7750 (20.0)		200.7		1	KJK	09/20/17 21:42	50	10	CI71971
Lead	ND (3.0)		3113B		3	KJK	09/21/17 17:53	50	10	CI71971
Mercury	ND (0.200)		245.1		1	MJV	09/19/17 0:15	20	40	CI71847
Nickel	ND (4.0)		200.7		1	KJK	09/20/17 21:42	50	10	CI71971
Selenium	ND (6.0)		3113B		3	KJK	09/21/17 12:37	50	10	CI71971
Silver	ND (1.0)		200.7		1	KJK	09/20/17 21:42	50	10	CI71971
Zinc	ND (10.0)		200.7		1	KJK	09/20/17 21:42	50	10	CI71971



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-15
Date Sampled: 09/14/17 21:00
Percent Solids: N/A
Initial Volume: 25
Final Volume: 25
Extraction Method: 524.2

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: DMC

524.2 Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1-Trichloroethane	ND (0.5)		524.2		1	09/19/17 14:59	C7I0303	CI71930
1,1,2-Trichloroethane	ND (0.5)		524.2		1	09/19/17 14:59	C7I0303	CI71930
1,1-Dichloroethane	ND (0.5)		524.2		1	09/19/17 14:59	C7I0303	CI71930
1,1-Dichloroethene	ND (0.5)		524.2		1	09/19/17 14:59	C7I0303	CI71930
1,2-Dichlorobenzene	ND (0.5)		524.2		1	09/19/17 14:59	C7I0303	CI71930
1,2-Dichloroethane	ND (0.5)		524.2		1	09/19/17 14:59	C7I0303	CI71930
1,3-Dichlorobenzene	ND (0.5)		524.2		1	09/19/17 14:59	C7I0303	CI71930
1,4-Dichlorobenzene	ND (0.5)		524.2		1	09/19/17 14:59	C7I0303	CI71930
Acetone	ND (5.0)		524.2		1	09/19/17 14:59	C7I0303	CI71930
Benzene	ND (0.5)		524.2		1	09/19/17 14:59	C7I0303	CI71930
Carbon Tetrachloride	ND (0.3)		524.2		1	09/19/17 14:59	C7I0303	CI71930
cis-1,2-Dichloroethene	ND (0.5)		524.2		1	09/19/17 14:59	C7I0303	CI71930
Ethylbenzene	ND (0.5)		524.2		1	09/19/17 14:59	C7I0303	CI71930
Methyl tert-Butyl Ether	29.2 (0.5)		524.2		1	09/19/17 14:59	C7I0303	CI71930
Methylene Chloride	ND (0.5)		524.2		1	09/19/17 14:59	C7I0303	CI71930
Naphthalene	ND (0.5)		524.2		1	09/19/17 14:59	C7I0303	CI71930
Tertiary-amyl methyl ether	ND (1.0)		524.2		1	09/19/17 14:59	C7I0303	CI71930
Tertiary-butyl Alcohol	45.7 (25.0)		524.2		1	09/19/17 14:59	C7I0303	CI71930
Tetrachloroethene	ND (0.5)		524.2		1	09/19/17 14:59	C7I0303	CI71930
Toluene	ND (0.5)		524.2		1	09/19/17 14:59	C7I0303	CI71930
Trichloroethene	ND (0.5)		524.2		1	09/19/17 14:59	C7I0303	CI71930
Vinyl Chloride	ND (0.2)		524.2		1	09/19/17 14:59	C7I0303	CI71930
Xylene O	ND (0.5)		524.2		1	09/19/17 14:59	C7I0303	CI71930
Xylene P,M	ND (0.5)		524.2		1	09/19/17 14:59	C7I0303	CI71930

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	<i>120 %</i>		<i>80-120</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>99 %</i>		<i>80-120</i>



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-15
Date Sampled: 09/14/17 21:00
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: CAD
Prepared: 9/19/17 10:08

608 Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.09)		608		1	09/19/17 11:36		CI71810
Aroclor 1221	ND (0.09)		608		1	09/19/17 11:36		CI71810
Aroclor 1232	ND (0.09)		608		1	09/19/17 11:36		CI71810
Aroclor 1242	ND (0.09)		608		1	09/19/17 11:36		CI71810
Aroclor 1248	ND (0.09)		608		1	09/19/17 11:36		CI71810
Aroclor 1254	ND (0.09)		608		1	09/19/17 11:36		CI71810
Aroclor 1260	ND (0.09)		608		1	09/19/17 11:36		CI71810
Aroclor 1262	ND (0.09)		608		1	09/19/17 11:36		CI71810
Aroclor 1268	ND (0.09)		608		1	09/19/17 11:36		CI71810

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	69 %		30-150
Surrogate: Decachlorobiphenyl [2C]	77 %		30-150
Surrogate: Tetrachloro-m-xylene	74 %		30-150
Surrogate: Tetrachloro-m-xylene [2C]	77 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-15
Date Sampled: 09/14/17 21:00
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 9/18/17 15:21

625(SIM) Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Acenaphthene	ND (0.19)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Acenaphthylene	ND (0.19)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Anthracene	ND (0.19)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Benzo(a)anthracene	ND (0.05)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Benzo(a)pyrene	ND (0.05)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Benzo(b)fluoranthene	ND (0.05)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Benzo(g,h,i)perylene	ND (0.19)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Benzo(k)fluoranthene	ND (0.05)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
bis(2-Ethylhexyl)phthalate	ND (1.87)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Butylbenzylphthalate	ND (2.34)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Chrysene	ND (0.05)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Dibenzo(a,h)Anthracene	ND (0.05)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Diethylphthalate	ND (2.34)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Dimethylphthalate	ND (2.34)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Di-n-butylphthalate	ND (2.34)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Di-n-octylphthalate	ND (2.34)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Fluoranthene	ND (0.19)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Fluorene	ND (0.19)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Indeno(1,2,3-cd)Pyrene	ND (0.05)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Naphthalene	ND (0.19)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Pentachlorophenol	ND (0.84)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Phenanthrene	ND (0.19)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812
Pyrene	ND (0.19)		625 SIM		1	09/19/17 0:35	C7I0284	CI71812

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	62 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	244 %	S+	15-110
<i>Surrogate: 2-Fluorobiphenyl</i>	84 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	93 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	79 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-15
Date Sampled: 09/14/17 21:00
Percent Solids: N/A
Initial Volume: 500
Final Volume: 0.5
Extraction Method: 3535A

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: VSC
Prepared: 9/18/17 18:00

8270D(SIM) Semi-Volatile Organic Compounds w/ Isotope Dilution

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,4-Dioxane	0.396 (0.250)		8270D SIM		1	09/19/17 10:35	C710291	CI71856

	<u>%Recovery</u>	<u>Qualifier</u>	<u>Limits</u>
Surrogate: 1,4-Dioxane-d8	39 %		15-115



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-15
Date Sampled: 09/14/17 21:00
Percent Solids: N/A

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-01
Sample Matrix: Ground Water

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Ammonia as N	9.09 (0.50)		350.1		5	JLK	09/18/17 20:04	mg/L	CI71804
Chloride	902 (250)		300.0		500	EEM	09/19/17 13:44	mg/L	CI71909
Hexavalent Chromium	ND (10.0)		3500Cr B-2009		1	JLK	09/15/17 20:49	ug/L	CI71551
Phenols	ND (100)		420.1		1	JLK	09/18/17 19:45	ug/L	CI71841
Total Cyanide (LL)	ND (5.00)		4500 CN CE		1	EEM	09/19/17 12:35	ug/L	CI71910
Total Petroleum Hydrocarbon	ND (5)		1664A		1	LAB	09/19/17 16:25	mg/L	CI71830
Total Residual Chlorine	ND (20.0)		4500Cl D		1	JLK	09/15/17 21:35	ug/L	CI71549
Total Suspended Solids	13 (5)		2540D		1	JLK	09/19/17 20:52	mg/L	CI71946



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-15
Date Sampled: 09/14/17 21:00
Percent Solids: N/A
Initial Volume: 35
Final Volume: 2
Extraction Method: 504/8011

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 9/20/17 10:10

504.1 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,2-Dibromoethane	ND (0.015)		504.1		1	09/20/17 13:07		CI72021

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Pentachloroethane</i>	83 %		30-150
<i>Surrogate: Pentachloroethane [2C]</i>	67 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-15
Date Sampled: 09/14/17 21:00
Percent Solids: N/A
Initial Volume: 1
Final Volume: 1
Extraction Method: No Prep

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-01
Sample Matrix: Ground Water
Units: mg/L
Analyst: ZLC
Prepared: 9/19/17 9:18

Alcohol Scan by GC/FID

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Ethanol	ND (10)		ASTM D3695		1	ZLC	09/19/17 13:29		CI71906



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-15F
Date Sampled: 09/14/17 22:00
Percent Solids: N/A

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-02
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 245.1/7470A

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (10.0)		200.7		1	KJK	09/20/17 21:47	50	10	CI71971
Arsenic	ND (3.0)		3113B		3	KJK	09/21/17 9:32	50	10	CI71971
Cadmium	ND (0.15)		3113B		3	KJK	09/21/17 23:47	50	10	CI71971
Chromium	ND (4.0)		200.7		1	KJK	09/20/17 21:47	50	10	CI71971
Chromium III	ND (10.0)		200.7		1	JLK	09/20/17 21:47	1	1	[CALC]
Copper	ND (2.0)		200.7		1	KJK	09/26/17 9:01	100	20	CI72503
Hardness	322000 (165)		200.7		1	KJK	09/20/17 21:47	1	1	[CALC]
Iron	5970 (20.0)		200.7		1	KJK	09/20/17 21:47	50	10	CI71971
Lead	ND (3.0)		3113B		3	KJK	09/21/17 17:58	50	10	CI71971
Mercury	ND (0.200)		245.1		1	MJV	09/19/17 0:17	20	40	CI71847
Nickel	ND (4.0)		200.7		1	KJK	09/20/17 21:47	50	10	CI71971
Selenium	ND (6.0)		3113B		3	KJK	09/21/17 12:43	50	10	CI71971
Silver	ND (1.0)		200.7		1	KJK	09/20/17 21:47	50	10	CI71971
Zinc	ND (10.0)		200.7		1	KJK	09/20/17 21:47	50	10	CI71971



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-15F
Date Sampled: 09/14/17 22:00
Percent Solids: N/A
Initial Volume: 25
Final Volume: 25
Extraction Method: 524.2

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: DMC

524.2 Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1-Trichloroethane	ND (0.5)		524.2		1	09/18/17 18:36	C7I0274	CI71838
1,1,2-Trichloroethane	ND (0.5)		524.2		1	09/18/17 18:36	C7I0274	CI71838
1,1-Dichloroethane	ND (0.5)		524.2		1	09/18/17 18:36	C7I0274	CI71838
1,1-Dichloroethene	ND (0.5)		524.2		1	09/18/17 18:36	C7I0274	CI71838
1,2-Dichlorobenzene	ND (0.5)		524.2		1	09/18/17 18:36	C7I0274	CI71838
1,2-Dichloroethane	ND (0.5)		524.2		1	09/18/17 18:36	C7I0274	CI71838
1,3-Dichlorobenzene	ND (0.5)		524.2		1	09/18/17 18:36	C7I0274	CI71838
1,4-Dichlorobenzene	ND (0.5)		524.2		1	09/18/17 18:36	C7I0274	CI71838
Acetone	ND (5.0)		524.2		1	09/18/17 18:36	C7I0274	CI71838
Benzene	ND (0.5)		524.2		1	09/18/17 18:36	C7I0274	CI71838
Carbon Tetrachloride	ND (0.3)		524.2		1	09/18/17 18:36	C7I0274	CI71838
cis-1,2-Dichloroethene	ND (0.5)		524.2		1	09/18/17 18:36	C7I0274	CI71838
Ethylbenzene	ND (0.5)		524.2		1	09/18/17 18:36	C7I0274	CI71838
Methyl tert-Butyl Ether	26.2 (0.5)		524.2		1	09/18/17 18:36	C7I0274	CI71838
Methylene Chloride	ND (0.5)		524.2		1	09/18/17 18:36	C7I0274	CI71838
Naphthalene	ND (0.5)		524.2		1	09/18/17 18:36	C7I0274	CI71838
Tertiary-amyl methyl ether	ND (1.0)		524.2		1	09/18/17 18:36	C7I0274	CI71838
Tertiary-butyl Alcohol	40.9 (25.0)		524.2		1	09/18/17 18:36	C7I0274	CI71838
Tetrachloroethene	ND (0.5)		524.2		1	09/18/17 18:36	C7I0274	CI71838
Toluene	ND (0.5)		524.2		1	09/18/17 18:36	C7I0274	CI71838
Trichloroethene	ND (0.5)		524.2		1	09/18/17 18:36	C7I0274	CI71838
Vinyl Chloride	ND (0.2)		524.2		1	09/18/17 18:36	C7I0274	CI71838
Xylene O	ND (0.5)		524.2		1	09/18/17 18:36	C7I0274	CI71838
Xylene P,M	ND (0.5)		524.2		1	09/18/17 18:36	C7I0274	CI71838

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	<i>111 %</i>		<i>80-120</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>101 %</i>		<i>80-120</i>



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-15F
Date Sampled: 09/14/17 22:00
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: CAD
Prepared: 9/19/17 10:08

608 Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.09)		608		1	09/19/17 11:54		CI71810
Aroclor 1221	ND (0.09)		608		1	09/19/17 11:54		CI71810
Aroclor 1232	ND (0.09)		608		1	09/19/17 11:54		CI71810
Aroclor 1242	ND (0.09)		608		1	09/19/17 11:54		CI71810
Aroclor 1248	ND (0.09)		608		1	09/19/17 11:54		CI71810
Aroclor 1254	ND (0.09)		608		1	09/19/17 11:54		CI71810
Aroclor 1260	ND (0.09)		608		1	09/19/17 11:54		CI71810
Aroclor 1262	ND (0.09)		608		1	09/19/17 11:54		CI71810
Aroclor 1268	ND (0.09)		608		1	09/19/17 11:54		CI71810

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: Decachlorobiphenyl	84 %		30-150
Surrogate: Decachlorobiphenyl [2C]	94 %		30-150
Surrogate: Tetrachloro-m-xylene	74 %		30-150
Surrogate: Tetrachloro-m-xylene [2C]	76 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-15F
Date Sampled: 09/14/17 22:00
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 9/18/17 15:21

625(SIM) Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Acenaphthene	ND (0.19)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Acenaphthylene	ND (0.19)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Anthracene	ND (0.19)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Benzo(a)anthracene	ND (0.05)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Benzo(a)pyrene	ND (0.05)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Benzo(b)fluoranthene	ND (0.05)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Benzo(g,h,i)perylene	ND (0.19)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Benzo(k)fluoranthene	ND (0.05)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
bis(2-Ethylhexyl)phthalate	ND (1.87)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Butylbenzylphthalate	ND (2.34)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Chrysene	ND (0.05)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Dibenzo(a,h)Anthracene	ND (0.05)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Diethylphthalate	ND (2.34)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Dimethylphthalate	ND (2.34)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Di-n-butylphthalate	ND (2.34)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Di-n-octylphthalate	ND (2.34)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Fluoranthene	ND (0.19)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Fluorene	ND (0.19)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Indeno(1,2,3-cd)Pyrene	ND (0.05)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Naphthalene	ND (0.19)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Pentachlorophenol	ND (0.84)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Phenanthrene	ND (0.19)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812
Pyrene	ND (0.19)		625 SIM		1	09/19/17 1:22	C7I0284	CI71812

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	68 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	245 %	S+	15-110
<i>Surrogate: 2-Fluorobiphenyl</i>	88 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	99 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	89 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-15F
Date Sampled: 09/14/17 22:00
Percent Solids: N/A
Initial Volume: 500
Final Volume: 0.5
Extraction Method: 3535A

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: VSC
Prepared: 9/18/17 18:00

8270D(SIM) Semi-Volatile Organic Compounds w/ Isotope Dilution

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,4-Dioxane	0.397 (0.250)		8270D SIM		1	09/19/17 11:09	C710291	CI71856

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: 1,4-Dioxane-d8	31 %		15-115



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-15F
Date Sampled: 09/14/17 22:00
Percent Solids: N/A

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-02
Sample Matrix: Ground Water

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Ammonia as N	8.21 (0.50)		350.1		5	JLK	09/18/17 20:04	mg/L	CI71804
Chloride	536 (250)		300.0		500	EEM	09/19/17 14:01	mg/L	CI71909
Hexavalent Chromium	ND (10.0)		3500Cr B-2009		1	JLK	09/15/17 20:49	ug/L	CI71551
Phenols	ND (100)		420.1		1	JLK	09/18/17 19:45	ug/L	CI71841
Total Cyanide (LL)	ND (5.00)		4500 CN CE		1	EEM	09/19/17 12:35	ug/L	CI71910
Total Petroleum Hydrocarbon	ND (5)		1664A		1	LAB	09/19/17 16:25	mg/L	CI71830
Total Residual Chlorine	ND (20.0)		4500Cl D		1	JLK	09/15/17 21:35	ug/L	CI71549
Total Suspended Solids	8 (5)		2540D		1	JLK	09/19/17 20:52	mg/L	CI71946



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-15F
Date Sampled: 09/14/17 22:00
Percent Solids: N/A
Initial Volume: 35
Final Volume: 2
Extraction Method: 504/8011

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 9/20/17 10:10

504.1 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,2-Dibromoethane	ND (0.015)		504.1		1	09/20/17 13:34		CI72021

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Pentachloroethane</i>	75 %		30-150
<i>Surrogate: Pentachloroethane [2C]</i>	60 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-15F
Date Sampled: 09/14/17 22:00
Percent Solids: N/A
Initial Volume: 1
Final Volume: 1
Extraction Method: No Prep

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-02
Sample Matrix: Ground Water
Units: mg/L
Analyst: ZLC
Prepared: 9/19/17 9:18

Alcohol Scan by GC/FID

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Ethanol	ND (10)		ASTM D3695		1	ZLC	09/19/17 14:15		CI71906



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-17
Date Sampled: 09/15/17 00:00
Percent Solids: N/A

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-03
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 245.1/7470A

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (10.0)		200.7		1	KJK	09/20/17 21:53	50	10	CI71971
Arsenic	ND (3.0)		3113B		3	KJK	09/21/17 9:37	50	10	CI71971
Cadmium	ND (0.15)		3113B		3	KJK	09/21/17 23:52	50	10	CI71971
Chromium	ND (4.0)		200.7		1	KJK	09/20/17 21:53	50	10	CI71971
Chromium III	ND (10.0)		200.7		1	JLK	09/20/17 21:53	1	1	[CALC]
Copper	2.2 (2.0)		200.7		1	KJK	09/26/17 9:06	100	20	CI72503
Hardness	277000 (499)		200.7		5	KJK	09/21/17 17:54	1	1	[CALC]
Iron	14900 (20.0)		200.7		1	KJK	09/20/17 21:53	50	10	CI71971
Lead	ND (3.0)		3113B		3	KJK	09/21/17 18:16	50	10	CI71971
Mercury	ND (0.200)		245.1		1	MJV	09/19/17 0:20	20	40	CI71847
Nickel	ND (4.0)		200.7		1	KJK	09/20/17 21:53	50	10	CI71971
Selenium	ND (6.0)		3113B		3	KJK	09/21/17 12:54	50	10	CI71971
Silver	ND (1.0)		200.7		1	KJK	09/20/17 21:53	50	10	CI71971
Zinc	ND (10.0)		200.7		1	KJK	09/20/17 21:53	50	10	CI71971



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-17
Date Sampled: 09/15/17 00:00
Percent Solids: N/A
Initial Volume: 25
Final Volume: 25
Extraction Method: 524.2

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: DMC

524.2 Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1-Trichloroethane	ND (0.5)		524.2		1	09/18/17 19:10	C7I0274	CI71838
1,1,2-Trichloroethane	ND (0.5)		524.2		1	09/18/17 19:10	C7I0274	CI71838
1,1-Dichloroethane	ND (0.5)		524.2		1	09/18/17 19:10	C7I0274	CI71838
1,1-Dichloroethene	ND (0.5)		524.2		1	09/18/17 19:10	C7I0274	CI71838
1,2-Dichlorobenzene	ND (0.5)		524.2		1	09/18/17 19:10	C7I0274	CI71838
1,2-Dichloroethane	ND (0.5)		524.2		1	09/18/17 19:10	C7I0274	CI71838
1,3-Dichlorobenzene	ND (0.5)		524.2		1	09/18/17 19:10	C7I0274	CI71838
1,4-Dichlorobenzene	ND (0.5)		524.2		1	09/18/17 19:10	C7I0274	CI71838
Acetone	ND (5.0)		524.2		1	09/18/17 19:10	C7I0274	CI71838
Benzene	ND (0.5)		524.2		1	09/18/17 19:10	C7I0274	CI71838
Carbon Tetrachloride	ND (0.3)		524.2		1	09/18/17 19:10	C7I0274	CI71838
cis-1,2-Dichloroethene	ND (0.5)		524.2		1	09/18/17 19:10	C7I0274	CI71838
Ethylbenzene	ND (0.5)		524.2		1	09/18/17 19:10	C7I0274	CI71838
Methyl tert-Butyl Ether	ND (0.5)		524.2		1	09/18/17 19:10	C7I0274	CI71838
Methylene Chloride	ND (0.5)		524.2		1	09/18/17 19:10	C7I0274	CI71838
Naphthalene	ND (0.5)		524.2		1	09/18/17 19:10	C7I0274	CI71838
Tertiary-amyl methyl ether	ND (1.0)		524.2		1	09/18/17 19:10	C7I0274	CI71838
Tertiary-butyl Alcohol	ND (25.0)		524.2		1	09/18/17 19:10	C7I0274	CI71838
Tetrachloroethene	ND (0.5)		524.2		1	09/18/17 19:10	C7I0274	CI71838
Toluene	ND (0.5)		524.2		1	09/18/17 19:10	C7I0274	CI71838
Trichloroethene	ND (0.5)		524.2		1	09/18/17 19:10	C7I0274	CI71838
Vinyl Chloride	ND (0.2)		524.2		1	09/18/17 19:10	C7I0274	CI71838
Xylene O	ND (0.5)		524.2		1	09/18/17 19:10	C7I0274	CI71838
Xylene P,M	ND (0.5)		524.2		1	09/18/17 19:10	C7I0274	CI71838

	<u>%Recovery</u>	<u>Qualifier</u>	<u>Limits</u>
Surrogate: 1,2-Dichlorobenzene-d4	112 %		80-120
Surrogate: 4-Bromofluorobenzene	104 %		80-120



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-17
Date Sampled: 09/15/17 00:00
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: CAD
Prepared: 9/19/17 10:08

608 Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.09)		608		1	09/19/17 12:13		CI71810
Aroclor 1221	ND (0.09)		608		1	09/19/17 12:13		CI71810
Aroclor 1232	ND (0.09)		608		1	09/19/17 12:13		CI71810
Aroclor 1242	ND (0.09)		608		1	09/19/17 12:13		CI71810
Aroclor 1248	ND (0.09)		608		1	09/19/17 12:13		CI71810
Aroclor 1254	ND (0.09)		608		1	09/19/17 12:13		CI71810
Aroclor 1260	ND (0.09)		608		1	09/19/17 12:13		CI71810
Aroclor 1262	ND (0.09)		608		1	09/19/17 12:13		CI71810
Aroclor 1268	ND (0.09)		608		1	09/19/17 12:13		CI71810

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	65 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	70 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	80 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	85 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-17
Date Sampled: 09/15/17 00:00
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 9/18/17 15:21

625(SIM) Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Acenaphthene	0.23 (0.19)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Acenaphthylene	ND (0.19)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Anthracene	ND (0.19)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Benzo(a)anthracene	0.07 (0.05)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Benzo(a)pyrene	0.08 (0.05)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Benzo(b)fluoranthene	0.12 (0.05)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Benzo(g,h,i)perylene	ND (0.19)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Benzo(k)fluoranthene	ND (0.05)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
bis(2-Ethylhexyl)phthalate	2.27 (1.87)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Butylbenzylphthalate	ND (2.34)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Chrysene	0.08 (0.05)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Dibenzo(a,h)Anthracene	ND (0.05)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Diethylphthalate	ND (2.34)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Dimethylphthalate	ND (2.34)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Di-n-butylphthalate	ND (2.34)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Di-n-octylphthalate	ND (2.34)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Fluoranthene	ND (0.19)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Fluorene	ND (0.19)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Indeno(1,2,3-cd)Pyrene	0.08 (0.05)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Naphthalene	ND (0.19)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Pentachlorophenol	ND (0.84)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Phenanthrene	ND (0.19)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812
Pyrene	ND (0.19)		625 SIM		1	09/19/17 2:11	C7I0284	CI71812

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: 1,2-Dichlorobenzene-d4	62 %		30-130
Surrogate: 2,4,6-Tribromophenol	189 %	S+	15-110
Surrogate: 2-Fluorobiphenyl	82 %		30-130
Surrogate: Nitrobenzene-d5	89 %		30-130
Surrogate: p-Terphenyl-d14	76 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-17
Date Sampled: 09/15/17 00:00
Percent Solids: N/A
Initial Volume: 500
Final Volume: 0.5
Extraction Method: 3535A

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 9/19/17 15:30

8270D(SIM) Semi-Volatile Organic Compounds w/ Isotope Dilution

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,4-Dioxane	ND (0.250)		8270D SIM		1	09/20/17 1:12	C710298	CI71953

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,4-Dioxane-d8</i>	41 %		15-115



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-17
Date Sampled: 09/15/17 00:00
Percent Solids: N/A

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-03
Sample Matrix: Ground Water

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Ammonia as N	1.56 (0.10)		350.1		1	JLK	09/18/17 18:57	mg/L	CI71804
Chloride	1730 (500)		300.0		1000	EEM	09/19/17 14:17	mg/L	CI71909
Hexavalent Chromium	ND (10.0)		3500Cr B-2009		1	JLK	09/15/17 20:49	ug/L	CI71551
Phenols	ND (100)		420.1		1	JLK	09/18/17 19:45	ug/L	CI71841
Total Cyanide (LL)	ND (5.00)		4500 CN CE		1	EEM	09/19/17 12:35	ug/L	CI71910
Total Petroleum Hydrocarbon	ND (5)		1664A		1	LAB	09/19/17 16:25	mg/L	CI71830
Total Residual Chlorine	ND (20.0)		4500Cl D		1	JLK	09/15/17 21:35	ug/L	CI71549
Total Suspended Solids	65 (5)		2540D		1	JLK	09/19/17 20:52	mg/L	CI71946



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-17
Date Sampled: 09/15/17 00:00
Percent Solids: N/A
Initial Volume: 35
Final Volume: 2
Extraction Method: 504/8011

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 9/20/17 15:05

504.1 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,2-Dibromoethane	ND (0.015)		504.1		1	09/20/17 15:32		CI72021

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Pentachloroethane</i>	58 %		30-150
<i>Surrogate: Pentachloroethane [2C]</i>	64 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-17
Date Sampled: 09/15/17 00:00
Percent Solids: N/A
Initial Volume: 1
Final Volume: 1
Extraction Method: No Prep

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-03
Sample Matrix: Ground Water
Units: mg/L
Analyst: ZLC
Prepared: 9/19/17 9:18

Alcohol Scan by GC/FID

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Ethanol	ND (10)		ASTM D3695		1	ZLC	09/19/17 15:23		CI71906



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-17F
Date Sampled: 09/15/17 01:00
Percent Solids: N/A

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-04
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 245.1/7470A

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (10.0)		200.7		1	KJK	09/20/17 22:08	50	10	CI71971
Arsenic	ND (3.0)		3113B		3	KJK	09/21/17 9:49	50	10	CI71971
Cadmium	0.26 (0.15)		3113B		3	KJK	09/21/17 23:58	50	10	CI71971
Chromium	6.3 (4.0)		200.7		1	KJK	09/20/17 22:08	50	10	CI71971
Chromium III	ND (10.0)		200.7		1	JLK	09/20/17 22:08	1	1	[CALC]
Copper	26.7 (4.0)		200.7		1	KJK	09/20/17 22:08	50	10	CI71971
Hardness	267000 (165)		200.7		1	KJK	09/20/17 22:08	1	1	[CALC]
Iron	32000 (20.0)		200.7		1	KJK	09/20/17 22:08	50	10	CI71971
Lead	73.7 (15.0)		3113B		15	KJK	09/21/17 18:45	50	10	CI71971
Mercury	ND (0.200)		245.1		1	MJV	09/19/17 0:22	20	40	CI71847
Nickel	ND (4.0)		200.7		1	KJK	09/20/17 22:08	50	10	CI71971
Selenium	ND (6.0)		3113B		3	KJK	09/21/17 13:00	50	10	CI71971
Silver	ND (1.0)		200.7		1	KJK	09/20/17 22:08	50	10	CI71971
Zinc	77.5 (10.0)		200.7		1	KJK	09/20/17 22:08	50	10	CI71971



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-17F
Date Sampled: 09/15/17 01:00
Percent Solids: N/A
Initial Volume: 25
Final Volume: 25
Extraction Method: 524.2

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-04
Sample Matrix: Ground Water
Units: ug/L
Analyst: DMC

524.2 Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1-Trichloroethane	ND (0.5)		524.2		1	09/18/17 19:45	C7I0274	CI71838
1,1,2-Trichloroethane	ND (0.5)		524.2		1	09/18/17 19:45	C7I0274	CI71838
1,1-Dichloroethane	ND (0.5)		524.2		1	09/18/17 19:45	C7I0274	CI71838
1,1-Dichloroethene	ND (0.5)		524.2		1	09/18/17 19:45	C7I0274	CI71838
1,2-Dichlorobenzene	ND (0.5)		524.2		1	09/18/17 19:45	C7I0274	CI71838
1,2-Dichloroethane	ND (0.5)		524.2		1	09/18/17 19:45	C7I0274	CI71838
1,3-Dichlorobenzene	ND (0.5)		524.2		1	09/18/17 19:45	C7I0274	CI71838
1,4-Dichlorobenzene	ND (0.5)		524.2		1	09/18/17 19:45	C7I0274	CI71838
Acetone	ND (5.0)		524.2		1	09/18/17 19:45	C7I0274	CI71838
Benzene	ND (0.5)		524.2		1	09/18/17 19:45	C7I0274	CI71838
Carbon Tetrachloride	ND (0.3)		524.2		1	09/18/17 19:45	C7I0274	CI71838
cis-1,2-Dichloroethene	ND (0.5)		524.2		1	09/18/17 19:45	C7I0274	CI71838
Ethylbenzene	ND (0.5)		524.2		1	09/18/17 19:45	C7I0274	CI71838
Methyl tert-Butyl Ether	ND (0.5)		524.2		1	09/18/17 19:45	C7I0274	CI71838
Methylene Chloride	ND (0.5)		524.2		1	09/18/17 19:45	C7I0274	CI71838
Naphthalene	ND (0.5)		524.2		1	09/18/17 19:45	C7I0274	CI71838
Tertiary-amyl methyl ether	ND (1.0)		524.2		1	09/18/17 19:45	C7I0274	CI71838
Tertiary-butyl Alcohol	ND (25.0)		524.2		1	09/18/17 19:45	C7I0274	CI71838
Tetrachloroethene	ND (0.5)		524.2		1	09/18/17 19:45	C7I0274	CI71838
Toluene	ND (0.5)		524.2		1	09/18/17 19:45	C7I0274	CI71838
Trichloroethene	ND (0.5)		524.2		1	09/18/17 19:45	C7I0274	CI71838
Vinyl Chloride	ND (0.2)		524.2		1	09/18/17 19:45	C7I0274	CI71838
Xylene O	ND (0.5)		524.2		1	09/18/17 19:45	C7I0274	CI71838
Xylene P,M	ND (0.5)		524.2		1	09/18/17 19:45	C7I0274	CI71838

	<u>%Recovery</u>	<u>Qualifier</u>	<u>Limits</u>
Surrogate: 1,2-Dichlorobenzene-d4	118 %		80-120
Surrogate: 4-Bromofluorobenzene	103 %		80-120



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-17F
Date Sampled: 09/15/17 01:00
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-04
Sample Matrix: Ground Water
Units: ug/L
Analyst: CAD
Prepared: 9/19/17 10:08

608 Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.09)		608		1	09/19/17 12:32		CI71810
Aroclor 1221	ND (0.09)		608		1	09/19/17 12:32		CI71810
Aroclor 1232	ND (0.09)		608		1	09/19/17 12:32		CI71810
Aroclor 1242	ND (0.09)		608		1	09/19/17 12:32		CI71810
Aroclor 1248	ND (0.09)		608		1	09/19/17 12:32		CI71810
Aroclor 1254	ND (0.09)		608		1	09/19/17 12:32		CI71810
Aroclor 1260	ND (0.09)		608		1	09/19/17 12:32		CI71810
Aroclor 1262	ND (0.09)		608		1	09/19/17 12:32		CI71810
Aroclor 1268	ND (0.09)		608		1	09/19/17 12:32		CI71810

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	98 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	107 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	81 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	81 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-17F
Date Sampled: 09/15/17 01:00
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-04
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 9/18/17 15:21

625(SIM) Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Acenaphthene	ND (0.19)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Acenaphthylene	ND (0.19)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Anthracene	ND (0.19)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Benzo(a)anthracene	ND (0.05)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Benzo(a)pyrene	ND (0.05)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Benzo(b)fluoranthene	ND (0.05)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Benzo(g,h,i)perylene	ND (0.19)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Benzo(k)fluoranthene	ND (0.05)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
bis(2-Ethylhexyl)phthalate	ND (1.87)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Butylbenzylphthalate	ND (2.34)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Chrysene	ND (0.05)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Dibenzo(a,h)Anthracene	ND (0.05)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Diethylphthalate	ND (2.34)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Dimethylphthalate	ND (2.34)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Di-n-butylphthalate	ND (2.34)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Di-n-octylphthalate	ND (2.34)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Fluoranthene	ND (0.19)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Fluorene	ND (0.19)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Indeno(1,2,3-cd)Pyrene	ND (0.05)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Naphthalene	ND (0.19)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Pentachlorophenol	ND (0.84)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Phenanthrene	ND (0.19)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812
Pyrene	ND (0.19)		625 SIM		1	09/19/17 3:00	C7I0284	CI71812

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	65 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	180 %	S+	15-110
<i>Surrogate: 2-Fluorobiphenyl</i>	75 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	91 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	77 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-17F
Date Sampled: 09/15/17 01:00
Percent Solids: N/A
Initial Volume: 500
Final Volume: 0.5
Extraction Method: 3535A

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-04
Sample Matrix: Ground Water
Units: ug/L
Analyst: VSC
Prepared: 9/18/17 18:00

8270D(SIM) Semi-Volatile Organic Compounds w/ Isotope Dilution

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,4-Dioxane	ND (0.250)		8270D SIM		1	09/19/17 12:18	C710291	CI71856

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,4-Dioxane-d8</i>	28 %		15-115



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-17F
Date Sampled: 09/15/17 01:00
Percent Solids: N/A

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-04
Sample Matrix: Ground Water

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Ammonia as N	1.76 (0.10)		350.1		1	JLK	09/18/17 18:58	mg/L	CI71804
Chloride	1770 (500)		300.0		1000	EEM	09/19/17 14:33	mg/L	CI71909
Hexavalent Chromium	ND (10.0)		3500Cr B-2009		1	JLK	09/15/17 20:49	ug/L	CI71551
Phenols	ND (100)		420.1		1	JLK	09/18/17 19:45	ug/L	CI71841
Total Cyanide (LL)	ND (5.00)		4500 CN CE		1	EEM	09/19/17 12:35	ug/L	CI71910
Total Petroleum Hydrocarbon	ND (5)		1664A		1	LAB	09/19/17 16:25	mg/L	CI71830
Total Residual Chlorine	ND (20.0)		4500Cl D		1	JLK	09/15/17 21:35	ug/L	CI71549
Total Suspended Solids	318 (10)		2540D		1	JLK	09/19/17 20:52	mg/L	CI71946



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-17F
Date Sampled: 09/15/17 01:00
Percent Solids: N/A
Initial Volume: 35
Final Volume: 2
Extraction Method: 504/8011

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-04
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 9/20/17 10:10

504.1 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,2-Dibromoethane	ND (0.015)		504.1		1	09/20/17 14:00		CI72021
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				
<i>Surrogate: Pentachloroethane</i>		98 %		30-150				
<i>Surrogate: Pentachloroethane [2C]</i>		74 %		30-150				



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: MW-17F
Date Sampled: 09/15/17 01:00
Percent Solids: N/A
Initial Volume: 1
Final Volume: 1
Extraction Method: No Prep

ESS Laboratory Work Order: 1709460
ESS Laboratory Sample ID: 1709460-04
Sample Matrix: Ground Water
Units: mg/L
Analyst: ZLC
Prepared: 9/19/17 9:18

Alcohol Scan by GC/FID

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Ethanol	ND (10)		ASTM D3695		1	ZLC	09/19/17 15:00		CI71906



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1709460

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch CI71551 - [CALC]										
Blank										
Chromium III	ND	10.0	ug/L							
LCS										
Chromium III	ND		ug/L							
LCS Dup										
Chromium III	ND		ug/L							
Batch CI71847 - 245.1/7470A										
Blank										
Mercury	ND	0.200	ug/L							
LCS										
Mercury	6.13	0.200	ug/L	6.000		102	85-115			
LCS Dup										
Mercury	6.02	0.200	ug/L	6.000		100	85-115	2	20	
Batch CI71971 - 245.1/7470A										
Blank										
Antimony	ND	10.0	ug/L							
Arsenic	ND	1.0	ug/L							
Cadmium	ND	0.05	ug/L							
Chromium	ND	4.0	ug/L							
Chromium III	ND	4.00	ug/L							
Copper	ND	4.0	ug/L							
Hardness	ND	165	ug/L							
Iron	ND	20.0	ug/L							
Lead	ND	1.0	ug/L							
Nickel	ND	4.0	ug/L							
Selenium	ND	2.0	ug/L							
Silver	ND	1.0	ug/L							
Zinc	ND	10.0	ug/L							
LCS										
Antimony	95.2	10.0	ug/L	100.0		95	85-115			
Arsenic	93.2	25.0	ug/L	100.0		93	85-115			
Cadmium	52.5	25.0	ug/L	50.00		105	85-115			
Chromium	91.9	4.0	ug/L	100.0		92	85-115			
Chromium III	91.9	4.00	ug/L							
Copper	93.2	4.0	ug/L	100.0		93	85-115			
Hardness	5980	165	ug/L							
Iron	442	20.0	ug/L	500.0		88	85-115			
Lead	110	25.0	ug/L	100.0		110	85-115			
Nickel	94.5	4.0	ug/L	100.0		94	85-115			
Selenium	177	50.0	ug/L	200.0		89	85-115			
Silver	44.8	1.0	ug/L	50.00		90	85-115			
Zinc	95.1	10.0	ug/L	100.0		95	85-115			
LCS Dup										



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1709460

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CI71971 - 245.1/7470A

Antimony	98.4	10.0	ug/L	100.0		98	85-115	3	20	
Arsenic	94.3	25.0	ug/L	100.0		94	85-115	1	20	
Cadmium	52.5	25.0	ug/L	50.00		105	85-115	0.01	20	
Chromium	95.0	4.0	ug/L	100.0		95	85-115	3	20	
Chromium III	95.0	4.00	ug/L							
Copper	96.2	4.0	ug/L	100.0		96	85-115	3	20	
Hardness	6300	165	ug/L							
Iron	459	20.0	ug/L	500.0		92	85-115	4	20	
Lead	116	25.0	ug/L	100.0		116	85-115	5	20	B+
Nickel	97.9	4.0	ug/L	100.0		98	85-115	4	20	
Selenium	169	50.0	ug/L	200.0		85	85-115	5	20	
Silver	46.9	1.0	ug/L	50.00		94	85-115	4	20	
Zinc	99.0	10.0	ug/L	100.0		99	85-115	4	20	

Batch CI72503 - 3005A/200.7

Blank

Copper	ND	2.0	ug/L							
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LCS

Copper	93.2	2.0	ug/L	100.0		93	85-115			
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LCS Dup

Copper	99.1	2.0	ug/L	100.0		99	85-115	6	20	
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524.2 Volatile Organic Compounds

Batch CI71838 - 524.2

Blank

1,1,1-Trichloroethane	ND	0.5	ug/L							
1,1,2-Trichloroethane	ND	0.5	ug/L							
1,1-Dichloroethane	ND	0.5	ug/L							
1,1-Dichloroethene	ND	0.5	ug/L							
1,2-Dichlorobenzene	ND	0.5	ug/L							
1,2-Dichloroethane	ND	0.5	ug/L							
1,3-Dichlorobenzene	ND	0.5	ug/L							
1,4-Dichlorobenzene	ND	0.5	ug/L							
Acetone	ND	5.0	ug/L							
Benzene	ND	0.5	ug/L							
Carbon Tetrachloride	ND	0.3	ug/L							
cis-1,2-Dichloroethene	ND	0.5	ug/L							
Ethylbenzene	ND	0.5	ug/L							
Methyl tert-Butyl Ether	ND	0.5	ug/L							
Methylene Chloride	ND	0.5	ug/L							
Naphthalene	ND	0.5	ug/L							
Tertiary-amyl methyl ether	ND	1.0	ug/L							
Tertiary-butyl Alcohol	ND	25.0	ug/L							
Tetrachloroethene	ND	0.5	ug/L							
Toluene	ND	0.5	ug/L							



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1709460

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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524.2 Volatile Organic Compounds

Batch CI71838 - 524.2

Trichloroethene	ND	0.5	ug/L							
Vinyl Chloride	ND	0.2	ug/L							
Xylene O	ND	0.5	ug/L							
Xylene P,M	ND	0.5	ug/L							
Surrogate: 1,2-Dichlorobenzene-d4	5.37		ug/L	5.000		107	80-120			
Surrogate: 4-Bromofluorobenzene	4.97		ug/L	5.000		99	80-120			

LCS

1,1,1-Trichloroethane	10.5		ug/L	10.00		105	70-130			
1,1,2-Trichloroethane	10.2		ug/L	10.00		102	70-130			
1,1-Dichloroethane	9.9		ug/L	10.00		99	70-130			
1,1-Dichloroethene	10.7		ug/L	10.00		107	70-130			
1,2-Dichlorobenzene	10.0		ug/L	10.00		100	70-130			
1,2-Dichloroethane	10.2		ug/L	10.00		102	70-130			
1,3-Dichlorobenzene	10.0		ug/L	10.00		100	70-130			
1,4-Dichlorobenzene	10.1		ug/L	10.00		101	70-130			
Acetone	49.7		ug/L	50.00		99	70-130			
Benzene	9.9		ug/L	10.00		99	70-130			
Carbon Tetrachloride	10.6		ug/L	10.00		106	70-130			
cis-1,2-Dichloroethene	9.7		ug/L	10.00		97	70-130			
Ethylbenzene	9.8		ug/L	10.00		98	70-130			
Methyl tert-Butyl Ether	9.6		ug/L	10.00		96	70-130			
Methylene Chloride	9.9		ug/L	10.00		99	70-130			
Naphthalene	9.0		ug/L	10.00		90	70-130			
Tertiary-amyl methyl ether	9.8		ug/L	10.00		98	70-130			
Tertiary-butyl Alcohol	50.6		ug/L	50.00		101	70-130			
Tetrachloroethene	10.3		ug/L	10.00		103	70-130			
Toluene	9.8		ug/L	10.00		98	70-130			
Trichloroethene	10.3		ug/L	10.00		103	70-130			
Vinyl Chloride	8.9		ug/L	10.00		89	70-130			
Xylene O	9.9		ug/L	10.00		99	70-130			
Xylene P,M	18.7		ug/L	20.00		94	70-130			
Surrogate: 1,2-Dichlorobenzene-d4	5.42		ug/L	5.000		108	80-120			
Surrogate: 4-Bromofluorobenzene	5.26		ug/L	5.000		105	80-120			

LCS Dup

1,1,1-Trichloroethane	10.3		ug/L	10.00		103	70-130	2	20	
1,1,2-Trichloroethane	10.6		ug/L	10.00		106	70-130	3	20	
1,1-Dichloroethane	9.9		ug/L	10.00		99	70-130	0.3	20	
1,1-Dichloroethene	10.4		ug/L	10.00		104	70-130	3	20	
1,2-Dichlorobenzene	10.4		ug/L	10.00		104	70-130	4	20	
1,2-Dichloroethane	10.7		ug/L	10.00		107	70-130	4	20	
1,3-Dichlorobenzene	10.5		ug/L	10.00		105	70-130	5	20	
1,4-Dichlorobenzene	10.5		ug/L	10.00		105	70-130	4	20	
Acetone	48.9		ug/L	50.00		98	70-130	2	20	
Benzene	10.0		ug/L	10.00		100	70-130	1	20	
Carbon Tetrachloride	10.1		ug/L	10.00		101	70-130	5	20	



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1709460

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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524.2 Volatile Organic Compounds

Batch CI71838 - 524.2

cis-1,2-Dichloroethene	10.1		ug/L	10.00		101	70-130	3	20	
Ethylbenzene	10.0		ug/L	10.00		100	70-130	2	20	
Methyl tert-Butyl Ether	10.2		ug/L	10.00		102	70-130	5	20	
Methylene Chloride	9.9		ug/L	10.00		99	70-130	0.4	20	
Naphthalene	9.5		ug/L	10.00		95	70-130	5	20	
Tertiary-amyl methyl ether	10.0		ug/L	10.00		100	70-130	2	20	
Tertiary-butyl Alcohol	54.2		ug/L	50.00		108	70-130	7	25	
Tetrachloroethene	10.3		ug/L	10.00		103	70-130	0.4	20	
Toluene	10.0		ug/L	10.00		100	70-130	2	20	
Trichloroethene	10.2		ug/L	10.00		102	70-130	0.4	20	
Vinyl Chloride	8.4		ug/L	10.00		84	70-130	6	20	
Xylene O	10.1		ug/L	10.00		101	70-130	2	20	
Xylene P,M	19.1		ug/L	20.00		95	70-130	2	20	
Surrogate: 1,2-Dichlorobenzene-d4	5.49		ug/L	5.000		110	80-120			
Surrogate: 4-Bromofluorobenzene	5.50		ug/L	5.000		110	80-120			

Batch CI71930 - 524.2

Blank

1,1,1-Trichloroethane	ND	0.5	ug/L							
1,1,2-Trichloroethane	ND	0.5	ug/L							
1,1-Dichloroethane	ND	0.5	ug/L							
1,1-Dichloroethene	ND	0.5	ug/L							
1,2-Dichlorobenzene	ND	0.5	ug/L							
1,2-Dichloroethane	ND	0.5	ug/L							
1,3-Dichlorobenzene	ND	0.5	ug/L							
1,4-Dichlorobenzene	ND	0.5	ug/L							
Acetone	ND	5.0	ug/L							
Benzene	ND	0.5	ug/L							
Carbon Tetrachloride	ND	0.3	ug/L							
cis-1,2-Dichloroethene	ND	0.5	ug/L							
Ethylbenzene	ND	0.5	ug/L							
Methyl tert-Butyl Ether	ND	0.5	ug/L							
Methylene Chloride	ND	0.5	ug/L							
Naphthalene	ND	0.5	ug/L							
Tertiary-amyl methyl ether	ND	1.0	ug/L							
Tertiary-butyl Alcohol	ND	25.0	ug/L							
Tetrachloroethene	ND	0.5	ug/L							
Toluene	ND	0.5	ug/L							
Trichloroethene	ND	0.5	ug/L							
Vinyl Chloride	ND	0.2	ug/L							
Xylene O	ND	0.5	ug/L							
Xylene P,M	ND	0.5	ug/L							
Surrogate: 1,2-Dichlorobenzene-d4	5.45		ug/L	5.000		109	80-120			
Surrogate: 4-Bromofluorobenzene	5.13		ug/L	5.000		103	80-120			

LCS

1,1,1-Trichloroethane	11.0		ug/L	10.00		110	70-130			
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CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1709460

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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524.2 Volatile Organic Compounds

Batch CI71930 - 524.2

1,1,2-Trichloroethane	10.7		ug/L	10.00		107	70-130			
1,1-Dichloroethane	10.5		ug/L	10.00		105	70-130			
1,1-Dichloroethene	10.6		ug/L	10.00		106	70-130			
1,2-Dichlorobenzene	10.5		ug/L	10.00		105	70-130			
1,2-Dichloroethane	11.1		ug/L	10.00		111	70-130			
1,3-Dichlorobenzene	10.3		ug/L	10.00		103	70-130			
1,4-Dichlorobenzene	10.5		ug/L	10.00		105	70-130			
Acetone	46.3		ug/L	50.00		93	70-130			
Benzene	10.1		ug/L	10.00		101	70-130			
Carbon Tetrachloride	10.6		ug/L	10.00		106	70-130			
cis-1,2-Dichloroethene	9.8		ug/L	10.00		98	70-130			
Ethylbenzene	9.7		ug/L	10.00		97	70-130			
Methyl tert-Butyl Ether	10.4		ug/L	10.00		104	70-130			
Methylene Chloride	9.9		ug/L	10.00		99	70-130			
Naphthalene	8.0		ug/L	10.00		80	70-130			
Tertiary-amyl methyl ether	10.0		ug/L	10.00		100	70-130			
Tertiary-butyl Alcohol	57.2		ug/L	50.00		114	70-130			
Tetrachloroethene	10.5		ug/L	10.00		105	70-130			
Toluene	9.6		ug/L	10.00		96	70-130			
Trichloroethene	10.4		ug/L	10.00		104	70-130			
Vinyl Chloride	8.7		ug/L	10.00		87	70-130			
Xylene O	10.4		ug/L	10.00		104	70-130			
Xylene P,M	19.0		ug/L	20.00		95	70-130			
Surrogate: 1,2-Dichlorobenzene-d4	5.54		ug/L	5.000		111	80-120			
Surrogate: 4-Bromofluorobenzene	5.33		ug/L	5.000		107	80-120			

LCS Dup

1,1,1-Trichloroethane	10.6		ug/L	10.00		106	70-130	4	20	
1,1,2-Trichloroethane	10.3		ug/L	10.00		103	70-130	4	20	
1,1-Dichloroethane	9.9		ug/L	10.00		99	70-130	6	20	
1,1-Dichloroethene	10.8		ug/L	10.00		108	70-130	2	20	
1,2-Dichlorobenzene	10.5		ug/L	10.00		105	70-130	0.3	20	
1,2-Dichloroethane	11.4		ug/L	10.00		114	70-130	3	20	
1,3-Dichlorobenzene	10.7		ug/L	10.00		107	70-130	4	20	
1,4-Dichlorobenzene	10.7		ug/L	10.00		107	70-130	2	20	
Acetone	47.2		ug/L	50.00		94	70-130	2	20	
Benzene	10.1		ug/L	10.00		101	70-130	0.2	20	
Carbon Tetrachloride	10.5		ug/L	10.00		105	70-130	0.9	20	
cis-1,2-Dichloroethene	9.9		ug/L	10.00		99	70-130	1	20	
Ethylbenzene	10.2		ug/L	10.00		102	70-130	4	20	
Methyl tert-Butyl Ether	10.5		ug/L	10.00		105	70-130	0.6	20	
Methylene Chloride	10.2		ug/L	10.00		102	70-130	3	20	
Naphthalene	8.5		ug/L	10.00		85	70-130	6	20	
Tertiary-amyl methyl ether	9.9		ug/L	10.00		99	70-130	2	20	
Tertiary-butyl Alcohol	54.8		ug/L	50.00		110	70-130	4	25	
Tetrachloroethene	10.2		ug/L	10.00		102	70-130	3	20	



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1709460

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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524.2 Volatile Organic Compounds

Batch CI71930 - 524.2

Toluene	10.1		ug/L	10.00		101	70-130	5	20	
Trichloroethene	10.1		ug/L	10.00		101	70-130	2	20	
Vinyl Chloride	8.5		ug/L	10.00		85	70-130	3	20	
Xylene O	10.3		ug/L	10.00		103	70-130	0.3	20	
Xylene P,M	19.0		ug/L	20.00		95	70-130	0.3	20	
Surrogate: 1,2-Dichlorobenzene-d4	5.41		ug/L	5.000		108	80-120			
Surrogate: 4-Bromofluorobenzene	5.50		ug/L	5.000		110	80-120			

608 Polychlorinated Biphenyls (PCB)

Batch CI71810 - 3510C

Blank

Aroclor 1016	ND	0.10	ug/L							
Aroclor 1016 [2C]	ND	0.10	ug/L							
Aroclor 1221	ND	0.10	ug/L							
Aroclor 1221 [2C]	ND	0.10	ug/L							
Aroclor 1232	ND	0.10	ug/L							
Aroclor 1232 [2C]	ND	0.10	ug/L							
Aroclor 1242	ND	0.10	ug/L							
Aroclor 1242 [2C]	ND	0.10	ug/L							
Aroclor 1248	ND	0.10	ug/L							
Aroclor 1248 [2C]	ND	0.10	ug/L							
Aroclor 1254	ND	0.10	ug/L							
Aroclor 1254 [2C]	ND	0.10	ug/L							
Aroclor 1260	ND	0.10	ug/L							
Aroclor 1260 [2C]	ND	0.10	ug/L							
Aroclor 1262	ND	0.10	ug/L							
Aroclor 1262 [2C]	ND	0.10	ug/L							
Aroclor 1268	ND	0.10	ug/L							
Aroclor 1268 [2C]	ND	0.10	ug/L							
Surrogate: Decachlorobiphenyl	0.0471		ug/L	0.05000		94	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0525		ug/L	0.05000		105	30-150			
Surrogate: Tetrachloro-m-xylene	0.0370		ug/L	0.05000		74	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0400		ug/L	0.05000		80	30-150			

LCS

Aroclor 1016	0.92	0.10	ug/L	1.000		92	40-140			
Aroclor 1016 [2C]	1.14	0.10	ug/L	1.000		114	40-140			
Aroclor 1260	0.98	0.10	ug/L	1.000		98	40-140			
Aroclor 1260 [2C]	1.06	0.10	ug/L	1.000		106	40-140			
Surrogate: Decachlorobiphenyl	0.0505		ug/L	0.05000		101	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0567		ug/L	0.05000		113	30-150			
Surrogate: Tetrachloro-m-xylene	0.0414		ug/L	0.05000		83	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0447		ug/L	0.05000		89	30-150			

LCS Dup



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1709460

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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608 Polychlorinated Biphenyls (PCB)

Batch CI71810 - 3510C

Aroclor 1016	0.97	0.10	ug/L	1.000		97	40-140	4	20	
Aroclor 1016 [2C]	1.13	0.10	ug/L	1.000		113	40-140	1	20	
Aroclor 1260	1.06	0.10	ug/L	1.000		106	40-140	8	20	
Aroclor 1260 [2C]	1.13	0.10	ug/L	1.000		113	40-140	6	20	

Surrogate: Decachlorobiphenyl	0.0488		ug/L	0.05000		98	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0542		ug/L	0.05000		108	30-150			
Surrogate: Tetrachloro-m-xylene	0.0388		ug/L	0.05000		78	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0408		ug/L	0.05000		82	30-150			

625(SIM) Semi-Volatile Organic Compounds

Batch CI71812 - 3510C

Blank

Acenaphthene	ND	0.20	ug/L							
Acenaphthylene	ND	0.20	ug/L							
Anthracene	ND	0.20	ug/L							
Benzo(a)anthracene	ND	0.05	ug/L							
Benzo(a)pyrene	ND	0.05	ug/L							
Benzo(b)fluoranthene	ND	0.05	ug/L							
Benzo(g,h,i)perylene	ND	0.20	ug/L							
Benzo(k)fluoranthene	ND	0.05	ug/L							
bis(2-Ethylhexyl)phthalate	ND	2.00	ug/L							
Butylbenzylphthalate	ND	2.50	ug/L							
Chrysene	ND	0.05	ug/L							
Dibenzo(a,h)Anthracene	ND	0.05	ug/L							
Diethylphthalate	ND	2.50	ug/L							
Dimethylphthalate	ND	2.50	ug/L							
Di-n-butylphthalate	ND	2.50	ug/L							
Di-n-octylphthalate	ND	2.50	ug/L							
Fluoranthene	ND	0.20	ug/L							
Fluorene	ND	0.20	ug/L							
Indeno(1,2,3-cd)Pyrene	ND	0.05	ug/L							
Naphthalene	ND	0.20	ug/L							
Pentachlorophenol	ND	0.90	ug/L							
Phenanthrene	ND	0.20	ug/L							
Pyrene	ND	0.20	ug/L							
Surrogate: 1,2-Dichlorobenzene-d4	1.76		ug/L	2.500		70	30-130			
Surrogate: 2,4,6-Tribromophenol	4.00		ug/L	3.750		107	15-110			
Surrogate: 2-Fluorobiphenyl	1.95		ug/L	2.500		78	30-130			
Surrogate: Nitrobenzene-d5	2.32		ug/L	2.500		93	30-130			
Surrogate: p-Terphenyl-d14	2.39		ug/L	2.500		96	30-130			

LCS

Acenaphthene	2.89	0.20	ug/L	4.000		72	40-140			
Acenaphthylene	3.18	0.20	ug/L	4.000		80	40-140			
Anthracene	3.23	0.20	ug/L	4.000		81	40-140			



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1709460

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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625(SIM) Semi-Volatile Organic Compounds

Batch CI71812 - 3510C

Benzo(a)anthracene	2.93	0.05	ug/L	4.000		73	40-140			
Benzo(a)pyrene	3.23	0.05	ug/L	4.000		81	40-140			
Benzo(b)fluoranthene	3.02	0.05	ug/L	4.000		76	40-140			
Benzo(g,h,i)perylene	2.74	0.20	ug/L	4.000		69	40-140			
Benzo(k)fluoranthene	3.12	0.05	ug/L	4.000		78	40-140			
bis(2-Ethylhexyl)phthalate	4.49	2.50	ug/L	4.000		112	40-140			
Butylbenzylphthalate	4.33	2.50	ug/L	4.000		108	40-140			
Chrysene	3.20	0.05	ug/L	4.000		80	40-140			
Dibenzo(a,h)Anthracene	2.73	0.05	ug/L	4.000		68	40-140			
Diethylphthalate	3.61	2.50	ug/L	4.000		90	40-140			
Dimethylphthalate	3.66	2.50	ug/L	4.000		91	40-140			
Di-n-butylphthalate	3.82	2.50	ug/L	4.000		95	40-140			
Di-n-octylphthalate	4.36	2.50	ug/L	4.000		109	40-140			
Fluoranthene	3.28	0.20	ug/L	4.000		82	40-140			
Fluorene	2.99	0.20	ug/L	4.000		75	40-140			
Indeno(1,2,3-cd)Pyrene	2.74	0.05	ug/L	4.000		68	40-140			
Naphthalene	2.34	0.20	ug/L	4.000		59	40-140			
Pentachlorophenol	3.25	0.90	ug/L	4.000		81	30-130			
Phenanthrene	3.14	0.20	ug/L	4.000		78	40-140			
Pyrene	3.64	0.20	ug/L	4.000		91	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	1.58		ug/L	2.500		63	30-130			
Surrogate: 2,4,6-Tribromophenol	6.49		ug/L	3.750		173	15-110			B+
Surrogate: 2-Fluorobiphenyl	2.10		ug/L	2.500		84	30-130			
Surrogate: Nitrobenzene-d5	2.11		ug/L	2.500		84	30-130			
Surrogate: p-Terphenyl-d14	2.24		ug/L	2.500		89	30-130			

LCS Dup

Acenaphthene	2.79	0.20	ug/L	4.000		70	40-140	4	20	
Acenaphthylene	3.03	0.20	ug/L	4.000		76	40-140	5	20	
Anthracene	3.19	0.20	ug/L	4.000		80	40-140	1	20	
Benzo(a)anthracene	2.63	0.05	ug/L	4.000		66	40-140	11	20	
Benzo(a)pyrene	2.80	0.05	ug/L	4.000		70	40-140	14	20	
Benzo(b)fluoranthene	2.88	0.05	ug/L	4.000		72	40-140	5	20	
Benzo(g,h,i)perylene	2.58	0.20	ug/L	4.000		65	40-140	6	20	
Benzo(k)fluoranthene	2.95	0.05	ug/L	4.000		74	40-140	5	20	
bis(2-Ethylhexyl)phthalate	3.81	2.50	ug/L	4.000		95	40-140	16	20	
Butylbenzylphthalate	3.78	2.50	ug/L	4.000		94	40-140	14	20	
Chrysene	2.82	0.05	ug/L	4.000		70	40-140	13	20	
Dibenzo(a,h)Anthracene	2.59	0.05	ug/L	4.000		65	40-140	5	20	
Diethylphthalate	3.61	2.50	ug/L	4.000		90	40-140	0.07	20	
Dimethylphthalate	3.54	2.50	ug/L	4.000		88	40-140	3	20	
Di-n-butylphthalate	3.84	2.50	ug/L	4.000		96	40-140	0.7	20	
Di-n-octylphthalate	4.00	2.50	ug/L	4.000		100	40-140	9	20	
Fluoranthene	3.18	0.20	ug/L	4.000		80	40-140	3	20	
Fluorene	2.95	0.20	ug/L	4.000		74	40-140	2	20	
Indeno(1,2,3-cd)Pyrene	2.58	0.05	ug/L	4.000		65	40-140	6	20	



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1709460

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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625(SIM) Semi-Volatile Organic Compounds

Batch CI71812 - 3510C

Naphthalene	2.35	0.20	ug/L	4.000		59	40-140	0.4	20	
Pentachlorophenol	3.44	0.90	ug/L	4.000		86	30-130	6	20	
Phenanthrene	3.16	0.20	ug/L	4.000		79	40-140	0.6	20	
Pyrene	3.02	0.20	ug/L	4.000		76	40-140	19	20	
Surrogate: 1,2-Dichlorobenzene-d4	1.60		ug/L	2.500		64	30-130			
Surrogate: 2,4,6-Tribromophenol	7.47		ug/L	3.750		199	15-110			B+
Surrogate: 2-Fluorobiphenyl	2.07		ug/L	2.500		83	30-130			
Surrogate: Nitrobenzene-d5	2.49		ug/L	2.500		100	30-130			
Surrogate: p-Terphenyl-d14	1.89		ug/L	2.500		75	30-130			

8270D(SIM) Semi-Volatile Organic Compounds w/ Isotope Dilution

Batch CI71856 - 3535A

Blank

1,4-Dioxane	ND	0.250	ug/L							
Surrogate: 1,4-Dioxane-d8	ND		ug/L	5.000		35	15-115			

LCS

1,4-Dioxane	10.9	0.250	ug/L	10.00		109	40-140			
Surrogate: 1,4-Dioxane-d8	1.77		ug/L	5.000		35	15-115			

LCS Dup

1,4-Dioxane	10.5	0.250	ug/L	10.00		105	40-140	4	20	
Surrogate: 1,4-Dioxane-d8	2.03		ug/L	5.000		41	15-115			

Batch CI71953 - 3535A

Blank

1,4-Dioxane	ND	0.250	ug/L							
Surrogate: 1,4-Dioxane-d8	ND		ug/L	5.000		40	15-115			

LCS

1,4-Dioxane	10.5	0.250	ug/L	10.00		105	40-140			
Surrogate: 1,4-Dioxane-d8	2.56		ug/L	5.000		51	15-115			

LCS Dup

1,4-Dioxane	11.3	0.250	ug/L	10.00		113	40-140	7	20	
Surrogate: 1,4-Dioxane-d8	3.53		ug/L	5.000		71	15-115			

Classical Chemistry

Batch CI71549 - General Preparation

Blank

Total Residual Chlorine	ND	20.0	ug/L							
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LCS

Total Residual Chlorine	1.80		mg/L	1.800		100	85-115			
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Batch CI71551 - General Preparation

Blank

Hexavalent Chromium	ND	10.0	ug/L							
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LCS



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1709460

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Classical Chemistry										
Batch CI71551 - General Preparation										
Hexavalent Chromium	0.490		mg/L	0.4998		98	90-110			
LCS Dup										
Hexavalent Chromium	0.489		mg/L	0.4998		98	90-110	0.2	20	
Batch CI71804 - NH4 Prep										
Blank										
Ammonia as N	ND	0.10	mg/L							
LCS										
Ammonia as N	0.11	0.10	mg/L	0.09994		112	80-120			
LCS										
Ammonia as N	1.12	0.10	mg/L	0.9994		112	80-120			
Batch CI71830 - General Preparation										
Blank										
Total Petroleum Hydrocarbon	ND	5	mg/L							
LCS										
Total Petroleum Hydrocarbon	14	5	mg/L	19.38		71	66-114			
Batch CI71841 - General Preparation										
Blank										
Phenols	ND	100	ug/L							
LCS										
Phenols	92	100	ug/L	100.0		92	80-120			
LCS										
Phenols	998	100	ug/L	1000		100	80-120			
Batch CI71909 - General Preparation										
Blank										
Chloride	ND	0.5	mg/L							
LCS										
Chloride	2.5		mg/L	2.500		99	90-110			
Batch CI71910 - TCN Prep										
Blank										
Total Cyanide (LL)	ND	5.00	ug/L							
LCS										
Total Cyanide (LL)	21.0	5.00	ug/L	20.06		105	90-110			
LCS										
Total Cyanide (LL)	149	5.00	ug/L	150.4		99	90-110			
LCS Dup										
Total Cyanide (LL)	148	5.00	ug/L	150.4		98	90-110	0.7	20	
Batch CI71946 - General Preparation										
Blank										
Total Suspended Solids	ND	5	mg/L							
LCS										



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1709460

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Classical Chemistry

Batch CI71946 - General Preparation

Total Suspended Solids	42		mg/L	43.50		97	80-120			
504.1 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane										

Batch CI72021 - 504/8011

Blank										
1,2-Dibromoethane	ND	0.015	ug/L							
1,2-Dibromoethane [2C]	ND	0.015	ug/L							
Surrogate: Pentachloroethane	0.166		ug/L	0.2000		83	30-150			
Surrogate: Pentachloroethane [2C]	0.124		ug/L	0.2000		62	30-150			
LCS										
1,2-Dibromoethane	0.087	0.015	ug/L	0.08000		108	70-130			
1,2-Dibromoethane [2C]	0.064	0.015	ug/L	0.08000		80	70-130			
Surrogate: Pentachloroethane	0.0992		ug/L	0.08000		124	30-150			
Surrogate: Pentachloroethane [2C]	0.0690		ug/L	0.08000		86	30-150			
LCS										
1,2-Dibromoethane	0.253	0.015	ug/L	0.2000		127	70-130			
1,2-Dibromoethane [2C]	0.188	0.015	ug/L	0.2000		94	70-130			
Surrogate: Pentachloroethane	0.259		ug/L	0.2000		129	30-150			
Surrogate: Pentachloroethane [2C]	0.202		ug/L	0.2000		101	30-150			

Alcohol Scan by GC/FID

Batch CI71906 - No Prep

Blank										
Ethanol	ND	10	mg/L							
LCS										
Ethanol	1230	10	mg/L	1007		122	60-140			
LCS Dup										
Ethanol	1240	10	mg/L	1007		123	60-140	0.6	30	



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1709460

Notes and Definitions

U	Analyte included in the analysis, but not detected
S+	Surrogate recovery(ies) above upper control limit (S+).
PT	Pentachlorophenol tailing factor > 2.
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.
CD+	Continuing Calibration %Diff/Drift is above control limit (CD+).
BT	Benzidine tailing factor >2.
B+	Blank Spike recovery is above upper 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: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1709460

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/meecd/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: Tighe & Bond - KPB/TB/MM
 Shipped/Delivered Via: ESS Courier

ESS Project ID: 1709460
 Date Received: 9/15/2017
 Project Due Date: 9/19/2017
 Days for Project: 2 Day

- | | |
|--|--|
| 1. Air bill manifest present? ☐ No
Air No.: <u>NA</u>
2. Were custody seals present? ☐ No
3. Is radiation count <100 CPM? ☐ Yes
4. Is a Cooler Present? ☐ Yes
Temp: <u>5.8</u> Iced with: <u>Ice</u>
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	163895	Yes	NA	Yes	VOA Vial - HCl	HCl	
01	163896	Yes	NA	Yes	VOA Vial - HCl	HCl	
01	163915	Yes	NA	Yes	1L Amber - Unpres	NP	
01	163916	Yes	NA	Yes	1L Amber - Unpres	NP	
01	163917	Yes	NA	Yes	1L Amber - Unpres	NP	
01	163918	Yes	NA	Yes	1L Amber - Unpres	NP	
01	163919	Yes	NA	Yes	1L Amber - Unpres	NP	
01	163920	Yes	NA	Yes	1L Amber - Unpres	NP	
01	163927	Yes	NA	Yes	1L Amber - Unpres	NP	
01	163928	Yes	NA	Yes	1L Amber - Unpres	NP	
01	163935	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
01	163936	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
01	163940	Yes	NA	Yes	1L Poly - Unpres	NP	
01	163944	Yes	NA	Yes	BOD Bottle	NP	
01	163948	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4	
01	163952	Yes	NA	Yes	500 mL Poly - HNO3	HNO3	
01	163956	Yes	NA	Yes	250 mL Poly - Unpres	NP	
01	163960	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	
01	163964	Yes	NA	Yes	250 mL Poly - NaOH	NaOH	
01	163986	Yes	No	Yes	VOA Vial - HCl	HCl	
01	163987	Yes	No	Yes	VOA Vial - HCl	HCl	
01	163988	Yes	No	Yes	VOA Vial - HCl	HCl	
01	163989	Yes	No	Yes	VOA Vial - HCl	HCl	

ph>12 9/15/17 1842 JA

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Tighe & Bond - KPB/TB/MM					ESS Project ID: 1709460		
					Date Received: 9/15/2017		
01	163990	Yes	No	Yes	VOA Vial - HCl	HCl	
01	163991	Yes	No	Yes	VOA Vial - HCl	HCl	
01	163992	Yes	No	Yes	VOA Vial - HCl	HCl	
01	164041	Yes	NA	Yes	500 mL Poly - Unpres	NP	
02	163893	Yes	NA	Yes	VOA Vial - HCl	HCl	
02	163894	Yes	NA	Yes	VOA Vial - HCl	HCl	
02	163909	Yes	NA	Yes	1L Amber - Unpres	NP	
02	163910	Yes	NA	Yes	1L Amber - Unpres	NP	
02	163911	Yes	NA	Yes	1L Amber - Unpres	NP	
02	163912	Yes	NA	Yes	1L Amber - Unpres	NP	
02	163913	Yes	NA	Yes	1L Amber - Unpres	NP	
02	163914	Yes	NA	Yes	1L Amber - Unpres	NP	
02	163925	Yes	NA	Yes	1L Amber - Unpres	NP	
02	163926	Yes	NA	Yes	1L Amber - Unpres	NP	
02	163933	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
02	163934	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
02	163939	Yes	NA	Yes	1L Poly - Unpres	NP	
02	163943	Yes	NA	Yes	BOD Bottle	NP	
02	163947	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4	
02	163951	Yes	NA	Yes	500 mL Poly - HNO3	HNO3	
02	163955	Yes	NA	Yes	250 mL Poly - Unpres	NP	
02	163959	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	
02	163963	Yes	NA	Yes	250 mL Poly - NaOH	NaOH	ph>12 9/15/17 1842 JA
02	163979	Yes	No	Yes	VOA Vial - HCl	HCl	
02	163980	Yes	No	Yes	VOA Vial - HCl	HCl	
02	163981	Yes	No	Yes	VOA Vial - HCl	HCl	
02	163982	Yes	No	Yes	VOA Vial - HCl	HCl	
02	163983	Yes	No	Yes	VOA Vial - HCl	HCl	
02	163984	Yes	No	Yes	VOA Vial - HCl	HCl	
02	163985	Yes	No	Yes	VOA Vial - HCl	HCl	
02	164040	Yes	NA	Yes	500 mL Poly - Unpres	NP	
03	163891	Yes	NA	Yes	VOA Vial - HCl	HCl	
03	163892	Yes	NA	Yes	VOA Vial - HCl	HCl	
03	163903	Yes	NA	Yes	1L Amber - Unpres	NP	
03	163904	Yes	NA	Yes	1L Amber - Unpres	NP	
03	163905	Yes	NA	Yes	1L Amber - Unpres	NP	
03	163906	Yes	NA	Yes	1L Amber - Unpres	NP	
03	163907	Yes	NA	Yes	1L Amber - Unpres	NP	
03	163908	Yes	NA	Yes	1L Amber - Unpres	NP	
03	163923	Yes	NA	Yes	1L Amber - Unpres	NP	
03	163924	Yes	NA	Yes	1L Amber - Unpres	NP	
03	163931	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
03	163932	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
03	163938	Yes	NA	Yes	1L Poly - Unpres	NP	
03	163942	Yes	NA	Yes	BOD Bottle	NP	
03	163946	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4	
03	163950	Yes	NA	Yes	500 mL Poly - HNO3	HNO3	
03	163954	Yes	NA	Yes	250 mL Poly - Unpres	NP	
03	163958	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	
03	163962	Yes	NA	Yes	250 mL Poly - NaOH	NaOH	ph>12 9/15/17 1842 JA
03	163972	Yes	No	Yes	VOA Vial - HCl	HCl	
03	163973	Yes	No	Yes	VOA Vial - HCl	HCl	
03	163974	Yes	No	Yes	VOA Vial - HCl	HCl	
03	163975	Yes	No	Yes	VOA Vial - HCl	HCl	
03	163976	Yes	No	Yes	VOA Vial - HCl	HCl	
03	163977	Yes	No	Yes	VOA Vial - HCl	HCl	
03	163978	Yes	No	Yes	VOA Vial - HCl	HCl	
03	164039	Yes	NA	Yes	500 mL Poly - Unpres	NP	
04	163889	Yes	NA	Yes	VOA Vial - HCl	HCl	
04	163890	Yes	NA	Yes	VOA Vial - HCl	HCl	
04	163897	Yes	NA	Yes	1L Amber - Unpres	NP	
04	163898	Yes	NA	Yes	1L Amber - Unpres	NP	
04	163899	Yes	NA	Yes	1L Amber - Unpres	NP	
04	163900	Yes	NA	Yes	1L Amber - Unpres	NP	
04	163901	Yes	NA	Yes	1L Amber - Unpres	NP	
04	163902	Yes	NA	Yes	1L Amber - Unpres	NP	
04	163921	Yes	NA	Yes	1L Amber - Unpres	NP	
04	163922	Yes	NA	Yes	1L Amber - Unpres	NP	
04	163929	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	

ph>12 9/15/17 1842 JA

ph>12 9/15/17 1842 JA

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Tighe & Bond - KPB/TB/MM

ESS Project ID: 1709460

Date Received: 9/15/2017

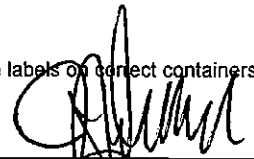
04	163930	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
04	163937	Yes	NA	Yes	1L Poly - Unpres	NP	
04	163941	Yes	NA	Yes	BOD Bottle	NP	
04	163945	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4	
04	163949	Yes	NA	Yes	500 mL Poly - HNO3	HNO3	
04	163953	Yes	NA	Yes	250 mL Poly - Unpres	NP	
04	163957	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	
04	163961	Yes	NA	Yes	250 mL Poly - NaOH	NaOH	ph>12 9/15/17 1842 JA
04	163965	Yes	No	Yes	VOA Vial - HCl	HCl	
04	163966	Yes	No	Yes	VOA Vial - HCl	HCl	
04	163967	Yes	No	Yes	VOA Vial - HCl	HCl	
04	163968	Yes	No	Yes	VOA Vial - HCl	HCl	
04	163969	Yes	No	Yes	VOA Vial - HCl	HCl	
04	163970	Yes	No	Yes	VOA Vial - HCl	HCl	
04	163971	Yes	No	Yes	VOA Vial - HCl	HCl	
04	164038	Yes	NA	Yes	500 mL Poly - Unpres	NP	

2nd Review

Are barcode labels on correct containers?

☒ Yes / ☐ No

Completed

By: 

Date & Time: 9/15/17 1850

Reviewed

By: 

Date & Time: 9/15/17 1920

Delivered

By: 

Date & Time: 9/15/17 1920

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

Turn Time	5-Day	Rush	48-hr
Regulatory State	Massachusetts		
Is this project for any of the following?:			
☐ OCT RCP	☒ MA MCF	☒ RGP	

1709460

RGP

☒ Standard Excel

Eversource EDD

Project Name
Woburn to Mystic

Address
1 University Ave

Zip Code
02090

FAX Number

2000	
Email Address	
dsbebis@tighebond.com	

[illegible]Cooler Temperature: 45.53°C 5-8-57 16m

Please specify "Other" preservative and containers types in this space

coc updated for RGP. mkm 9/18/17

* sample date 9/15/17

Relinquished by: (Signature, Date & Time)

Received By: (Signature, Date & Time)

Relinquished By: (Signature, Date & Time)

Received By: (Signature, Date & Time)

Relinquished by: (Signature, Date & Time)

Received By: (Signature, Date & Time)

Relinquished By: (Signature, Date & Time)

Received By: (Signature, Date & Time)



CERTIFICATE OF ANALYSIS

Michael Martin
Tighe & Bond
4 Barlows Landing Road, Unit 15
Pocasset, MA 02559

RE: Woburn to Mystic - RGP/MCP (N-0998)
ESS Laboratory Work Order Number: 1701175

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 4:19 pm, Jan 20, 2017

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 tandards, 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.

Subcontracted Analyses

RI Analytical Laboratories, Inc. - Warwick, Chloride
RI



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

SAMPLE RECEIPT

The following samples were received on January 10, 2017 for the analyses specified on the enclosed Chain of Custody Record.

To achieve CAM compliance for MCP data, ESS Laboratory has reviewed all QA/QC Requirements and Performance Standards listed in each method. Holding times and preservation have also been reviewed. All CAM requirements have been performed and achieved unless noted in the project narrative.

Each method has been set-up in the laboratory to reach required MCP standards. The methods for aqueous VOA and Soil Methanol VOA have known limitations for certain analytes. The regulatory standards may not be achieved due to these limitations. In addition, for all methods, matrix interferences, dilutions, and %Solids may elevate method reporting limits above regulatory standards. ESS Laboratory can provide, upon request, a Data Checker (regulatory standard comparison spreadsheet) electronic deliverable which will highlight these exceedances.

Question I: All samples for VOA and SVOA were analyzed for a subset of the required MCP list per the client's request.

Lab Number	Sample Name	Matrix	Analysis
1701175-01	MW-505A	Ground Water	§, 1664A, 2540D, 420.1, 4500 CN CE, 4500 NH3 G, 4500-Cl E, 6010C, 7010, 7196A, 7470A, 8011, 8015, 8082A, 8260B, 8270D SIM
1701175-02	MW-505B	Ground Water	§, 1664A, 2540D, 420.1, 4500 CN CE, 4500 NH3 G, 4500-Cl E, 7196A, 8011, 8015, 8082A, 8260B, 8270D SIM
1701175-03	MW-505A FF	Ground Water	§, 1664A, 2540D, 420.1, 4500 CN CE, 4500 NH3 G, 4500-Cl E, 6010C, 7010, 7196A, 7470A, 8011, 8015, 8082A, 8260B, 8270D SIM



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

PROJECT NARRATIVE

8260B Volatile Organic Compounds

1701175-01 [Present in Method Blank \(B\).](#)
Naphthalene
1701175-02 [Present in Method Blank \(B\).](#)
Naphthalene

8270D(SIM) Semi-Volatile Organic Compounds

1701175-01 [Present in Method Blank \(B\).](#)
bis(2-Ethylhexyl)phthalate , Butylbenzylphthalate , Di-n-octylphthalate
1701175-02 [Present in Method Blank \(B\).](#)
Butylbenzylphthalate , Di-n-octylphthalate
1701175-03 [Present in Method Blank \(B\).](#)
bis(2-Ethylhexyl)phthalate , Butylbenzylphthalate
C7A0148-TUN1 [Benzidine tailing factor >2.](#)
C7A0164-CCV1 [Continuing Calibration %Diff/Drift is above control limit \(CD+\).](#)
Butylbenzylphthalate (22% @ %), Di-n-octylphthalate (28% @ %)
CA71116-BS1 [Blank Spike recovery is above upper control limit \(B+\).](#)
bis(2-Ethylhexyl)phthalate (146% @ 40-140%)
CA71116-BSD1 [Blank Spike recovery is above upper control limit \(B+\).](#)
bis(2-Ethylhexyl)phthalate (143% @ 40-140%)
CA71116-BSD1 [Relative percent difference for duplicate is outside of criteria \(D+\).](#)
Naphthalene (21% @ 20%)

Classical Chemistry

1701175-01 [The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.](#)
Total Residual Chlorine
1701175-02 [The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.](#)
Total Residual Chlorine
1701175-03 [The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.](#)
Total Residual Chlorine

Total Metals

1701175-03 [Elevated Method Reporting Limits due to sample matrix \(EL\).](#)
Thallium
1701175-03 [Present in Method Blank \(B\).](#)
Iron
CA71302-BSD3 [Blank Spike recovery is below lower control limit \(B-\).](#)
Barium (73% @ 80-120%)



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

[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: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

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: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

MassDEP Analytical Protocol Certification Form

MADEP RTN: _____

This form provides certification for the following data set: **1701175-01 through 1701175-03**

Matrices: (X) Ground Water/Surface Water () Soil/Sediment () Drinking Water () Air () Other: _____

CAM Protocol (check all that apply below):

(X) 8260 VOC CAM II A	(X) 7470/7471 Hg CAM III B	() MassDEP VPH CAM IV A	() 8081 Pesticides CAM V B	(X) 7196 Hex Cr CAM VI B	() MassDEP APH CAM IX A
(X) 8270 SVOC CAM II B	(X) 7010 Metals CAM III C	() MassDEP EPH CAM IV B	() 8151 Herbicides CAM V C	() 8330 Explosives CAM VIII A	() TO-15 VOC CAM IX B
(X) 6010 Metals CAM III A	() 6020 Metals CAM III D	(X) 8082 PCB CAM V A	() 6860 Perchlorate CAM VIII B	(X) 9014 Total Cyanide/PAC CAM VI A	

Affirmative responses to questions A through F are required for "Presumptive Certainty" status

- | | | |
|---|---|----------------|
| A | Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times? | Yes (X) No () |
| B | Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed? | Yes (X) No () |
| C | Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances? | Yes (X) No () |
| D | Does the laboratory report comply with all the reporting requirements specified in the CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"? | Yes (X) No () |
| E | a. VPH, EPH, APH and TO-15 only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). | Yes () No () |
| | b. APH and TO-15 Methods only: Was the complete analyte list reported for each method? | Yes () No () |
| F | Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)? | Yes (X) No () |

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

- | | | |
|---|---|-----------------|
| G | Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocols(s)?
<i>Data User Note: Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.</i> | Yes () No (X)* |
| H | Were all QC performance standards specified in the CAM protocol(s) achieved? | Yes () No (X)* |
| I | Were results reported for the complete analyte list specified in the selected CAM protocol(s)? | Yes () No (X)* |

****All negative responses must be addressed in an attached laboratory narrative.***

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Laurel Stoddard
Printed Name: Laurel Stoddard

Date: January 20, 2017
Position: Laboratory Director



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-505A
Date Sampled: 01/10/17 11:00
Percent Solids: N/A

ESS Laboratory Work Order: 1701175
ESS Laboratory Sample ID: 1701175-01
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (5.0)	0.6	7010		1	KJK	01/13/17 6:49	50	25	CA71104
Arsenic	J 2.7 (5.0)	0.4	7010		1	KJK	01/13/17 3:22	50	25	CA71104
Barium	279 (25.0)	1.5	6010C		1	KJK	01/12/17 21:35	50	25	CA71104
Beryllium	1.9 (0.5)	0.1	6010C		1	KJK	01/12/17 21:35	50	25	CA71104
Cadmium	J 0.8 (1.5)	0.09	7010		3	KJK	01/13/17 15:14	50	25	CA71104
Chromium	61.5 (10.0)	1.5	6010C		1	KJK	01/12/17 21:35	50	25	CA71104
Chromium III	62 (10)		6010C		1	JLK	01/12/17 21:35	1	1	[CALC]
Copper	206 (5.0)	2.0	6010C		1	KJK	01/12/17 21:35	50	25	CA71104
Iron	24600 (50.0)	11.5	6010C		1	KJK	01/12/17 21:35	50	25	CA71104
Lead	34.5 (7.5)	1.5	7010		3	KJK	01/13/17 1:09	50	25	CA71104
Mercury	ND (0.20)	0.12	7470A		1	MJV	01/13/17 12:12	20	40	CA71110
Nickel	25.6 (10.0)	1.0	6010C		1	KJK	01/12/17 21:35	50	25	CA71104
Selenium	ND (5.0)	0.6	7010		1	KJK	01/12/17 17:10	50	25	CA71104
Silver	ND (0.2)	0.08	7010		1	KJK	01/13/17 19:39	50	25	CA71104
Thallium	ND (3.0)	1.6	7010		3	KJK	01/12/17 21:48	50	25	CA71104
Vanadium	26.6 (10.0)	1.0	6010C		1	KJK	01/12/17 21:35	50	25	CA71104
Zinc	203 (25.0)	4.5	6010C		1	KJK	01/12/17 21:35	50	25	CA71104



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-505A
Date Sampled: 01/10/17 11:00
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 1701175
ESS Laboratory Sample ID: 1701175-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: SMR
Prepared: 1/12/17 10:30
Cleanup Method: 3665A

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.09)	0.03	8082A		1	01/13/17 0:33		CA71203
Aroclor 1221	ND (0.09)	0.03	8082A		1	01/13/17 0:33		CA71203
Aroclor 1232	ND (0.09)	0.03	8082A		1	01/13/17 0:33		CA71203
Aroclor 1242	ND (0.09)	0.03	8082A		1	01/13/17 0:33		CA71203
Aroclor 1248	ND (0.09)	0.03	8082A		1	01/13/17 0:33		CA71203
Aroclor 1254	ND (0.09)	0.03	8082A		1	01/13/17 0:33		CA71203
Aroclor 1260	ND (0.09)	0.03	8082A		1	01/13/17 0:33		CA71203
Aroclor 1262	ND (0.09)	0.03	8082A		1	01/13/17 0:33		CA71203
Aroclor 1268	ND (0.09)	0.03	8082A		1	01/13/17 0:33		CA71203

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	42 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	35 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	65 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	80 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-505A
Date Sampled: 01/10/17 11:00
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 1701175
ESS Laboratory Sample ID: 1701175-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

8260B Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1-Trichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 12:17	C7A0139	CA71120
1,1,2-Trichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 12:17	C7A0139	CA71120
1,1-Dichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 12:17	C7A0139	CA71120
1,1-Dichloroethene	ND (1.0)	0.3	8260B		1	01/11/17 12:17	C7A0139	CA71120
1,2-Dibromoethane	ND (1.0)	0.2	8260B		1	01/11/17 12:17	C7A0139	CA71120
1,2-Dichlorobenzene	ND (1.0)	0.1	8260B		1	01/11/17 12:17	C7A0139	CA71120
1,2-Dichloroethane	ND (1.0)	0.2	8260B		1	01/11/17 12:17	C7A0139	CA71120
1,3-Dichlorobenzene	ND (1.0)	0.2	8260B		1	01/11/17 12:17	C7A0139	CA71120
1,4-Dichlorobenzene	ND (1.0)	0.1	8260B		1	01/11/17 12:17	C7A0139	CA71120
1,4-Dioxane - Screen	ND (500)	190	8260B		1	01/11/17 12:17	C7A0139	CA71120
Acetone	J 3.6 (10.0)	2.7	8260B		1	01/11/17 12:17	C7A0139	CA71120
Benzene	ND (1.0)	0.1	8260B		1	01/11/17 12:17	C7A0139	CA71120
Carbon Tetrachloride	ND (1.0)	0.1	8260B		1	01/11/17 12:17	C7A0139	CA71120
cis-1,2-Dichloroethene	ND (1.0)	0.2	8260B		1	01/11/17 12:17	C7A0139	CA71120
Ethylbenzene	ND (1.0)	0.1	8260B		1	01/11/17 12:17	C7A0139	CA71120
Methyl tert-Butyl Ether	ND (1.0)	0.3	8260B		1	01/11/17 12:17	C7A0139	CA71120
Methylene Chloride	ND (2.0)	0.2	8260B		1	01/11/17 12:17	C7A0139	CA71120
Naphthalene	B, J 0.3 (1.0)	0.2	8260B		1	01/11/17 12:17	C7A0139	CA71120
Tertiary-amyl methyl ether	ND (1.0)	0.2	8260B		1	01/11/17 12:17	C7A0139	CA71120
Tertiary-butyl Alcohol	ND (25.0)	10.0	8260B		1	01/11/17 12:17	C7A0139	CA71120
Tetrachloroethene	ND (1.0)	0.2	8260B		1	01/11/17 12:17	C7A0139	CA71120
Toluene	ND (1.0)	0.1	8260B		1	01/11/17 12:17	C7A0139	CA71120
Trichloroethene	ND (1.0)	0.2	8260B		1	01/11/17 12:17	C7A0139	CA71120
Vinyl Chloride	ND (1.0)	0.2	8260B		1	01/11/17 12:17	C7A0139	CA71120
Xylene O	ND (1.0)	0.1	8260B		1	01/11/17 12:17	C7A0139	CA71120
Xylene P,M	ND (2.0)	0.2	8260B		1	01/11/17 12:17	C7A0139	CA71120

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>93 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>88 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>99 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>106 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-505A
Date Sampled: 01/10/17 11:00
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 1701175
ESS Laboratory Sample ID: 1701175-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: VSC
Prepared: 1/11/17 15:35

8270D(SIM) Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Acenaphthene	J 0.04 (0.19)	0.04	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Acenaphthylene	ND (0.19)	0.03	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Anthracene	J 0.08 (0.19)	0.03	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Benzo(a)anthracene	0.11 (0.05)	0.01	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Benzo(a)pyrene	0.12 (0.05)	0.01	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Benzo(b)fluoranthene	0.15 (0.05)	0.02	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Benzo(g,h,i)perylene	J 0.10 (0.19)	0.02	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Benzo(k)fluoranthene	0.05 (0.05)	0.02	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
bis(2-Ethylhexyl)phthalate	B 5.22 (2.34)	0.19	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Butylbenzylphthalate	B, J 0.61 (2.34)	0.19	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Chrysene	0.13 (0.05)	0.01	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Dibenzo(a,h)Anthracene	J 0.03 (0.05)	0.02	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Diethylphthalate	J 0.54 (2.34)	0.19	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Dimethylphthalate	ND (2.34)	0.19	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Di-n-butylphthalate	ND (2.34)	0.19	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Di-n-octylphthalate	B, J 0.21 (2.34)	0.19	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Fluoranthene	0.21 (0.19)	0.02	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Fluorene	J 0.06 (0.19)	0.03	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Indeno(1,2,3-cd)Pyrene	0.10 (0.05)	0.02	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Naphthalene	J 0.05 (0.19)	0.04	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Pentachlorophenol	ND (0.84)	0.30	8270D SIM		1	01/18/17 23:30	C7A0148	CA71116
Phenanthrene	J 0.18 (0.19)	0.04	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116
Pyrene	0.25 (0.19)	0.02	8270D SIM		1	01/12/17 6:31	C7A0148	CA71116

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
Surrogate: 1,2-Dichlorobenzene-d4	44 %		30-130
Surrogate: 2,4,6-Tribromophenol	106 %		15-110
Surrogate: 2-Fluorobiphenyl	75 %		30-130
Surrogate: Nitrobenzene-d5	71 %		30-130
Surrogate: p-Terphenyl-d14	80 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-505A
Date Sampled: 01/10/17 11:00
Percent Solids: N/A

ESS Laboratory Work Order: 1701175
ESS Laboratory Sample ID: 1701175-01
Sample Matrix: Ground Water

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Ammonia as N	0.20 (0.10)		4500 NH3 G		1	JLK	01/12/17 17:05	mg/L	CA71107
Chloride	4800 (1000)		§		1	SUB	01/12/17 14:22	mg/L	CA71735
Hexavalent Chromium	ND (10)		7196A		1	JLK	01/10/17 21:30	ug/L	CA71051
Phenols	ND (100)	30	420.1		1	JLK	01/13/17 17:00	ug/L	CA71336
Total Cyanide (LL)	ND (5.00)	1.80	4500 CN CE		1	EEM	01/12/17 12:45	ug/L	CA71217
Total Petroleum Hydrocarbon	ND (5)		1664A		1	CRR	01/13/17 16:40	mg/L	CA71136
Total Residual Chlorine	HT ND (10)		4500-Cl E		1	JLK	01/10/17 20:58	ug/L	CA71052
Total Suspended Solids	1350000 (20000)		2540D		1	MJV	01/12/17 16:22	ug/L	CA71227



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-505A
Date Sampled: 01/10/17 11:00
Percent Solids: N/A
Initial Volume: 35
Final Volume: 2
Extraction Method: 504/8011

ESS Laboratory Work Order: 1701175
ESS Laboratory Sample ID: 1701175-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: JXS
Prepared: 1/13/17 12:00

8011 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,2-Dibromoethane	ND (0.015)	0.005	8011		1	JXS	01/13/17 13:22		CA71322
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>					
<i>Surrogate: Pentachloroethane</i>		105 %		30-150					



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-505A
Date Sampled: 01/10/17 11:00
Percent Solids: N/A
Initial Volume: 1
Final Volume: 1
Extraction Method: No Prep

ESS Laboratory Work Order: 1701175
ESS Laboratory Sample ID: 1701175-01
Sample Matrix: Ground Water
Units: mg/L
Analyst: DPS
Prepared: 1/12/17 14:30

Alcohol Scan by GC/FID

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Ethanol	ND (10)		8015		1	DPS	01/12/17 19:26		CA71246



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-505A FF
Date Sampled: 01/10/17 11:00
Percent Solids: N/A

ESS Laboratory Work Order: 1701175
ESS Laboratory Sample ID: 1701175-03
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Antimony	ND (5.0)	0.6	7010		1	KJK	01/17/17 23:48	50	25	CA71302
Arsenic	ND (5.0)	0.4	7010		1	KJK	01/18/17 7:31	50	25	CA71302
Barium	314 (75.0)	4.5	6010C		3	KJK	01/18/17 19:57	50	25	CA71302
Beryllium	J 0.8 (1.5)	0.3	6010C		3	KJK	01/18/17 19:57	50	25	CA71302
Cadmium	ND (0.5)	0.03	7010		1	KJK	01/17/17 17:02	50	25	CA71302
Chromium	J 2.1 (10.0)	1.5	6010C		1	KJK	01/13/17 17:32	50	25	CA71302
Chromium III	ND (10)		6010C		1	JLK	01/13/17 17:32	1	1	[CALC]
Copper	J 2.6 (5.0)	2.0	6010C		1	KJK	01/13/17 17:32	50	25	CA71302
Iron	B 1060 (150)	34.5	6010C		3	KJK	01/18/17 19:57	50	25	CA71302
Lead	ND (12.5)	2.5	7010		5	KJK	01/18/17 22:22	50	25	CA71302
Mercury	ND (0.20)	0.12	7470A		1	MJV	01/13/17 12:36	20	40	CA71110
Nickel	J 3.8 (10.0)	1.0	6010C		1	KJK	01/13/17 17:32	50	25	CA71302
Selenium	ND (5.0)	0.6	7010		1	KJK	01/18/17 23:49	50	25	CA71302
Silver	ND (0.2)	0.08	7010		1	KJK	01/17/17 20:43	50	25	CA71302
Thallium	EL ND (10.0)	5.4	7010		10	KJK	01/19/17 12:03	50	25	CA71302
Vanadium	J 2.4 (10.0)	1.0	6010C		1	KJK	01/13/17 17:32	50	25	CA71302
Zinc	J 12.8 (25.0)	4.5	6010C		1	KJK	01/13/17 17:32	50	25	CA71302



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-505A FF
Date Sampled: 01/10/17 11:00
Percent Solids: N/A
Initial Volume: 990
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 1701175
ESS Laboratory Sample ID: 1701175-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: SMR
Prepared: 1/12/17 10:30
Cleanup Method: 3665A

8082A Polychlorinated Biphenyls (PCB)

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Aroclor 1016	ND (0.10)	0.03	8082A		1	01/13/17 1:11		CA71203
Aroclor 1221	ND (0.10)	0.03	8082A		1	01/13/17 1:11		CA71203
Aroclor 1232	ND (0.10)	0.03	8082A		1	01/13/17 1:11		CA71203
Aroclor 1242	ND (0.10)	0.03	8082A		1	01/13/17 1:11		CA71203
Aroclor 1248	ND (0.10)	0.03	8082A		1	01/13/17 1:11		CA71203
Aroclor 1254	ND (0.10)	0.03	8082A		1	01/13/17 1:11		CA71203
Aroclor 1260	ND (0.10)	0.03	8082A		1	01/13/17 1:11		CA71203
Aroclor 1262	ND (0.10)	0.03	8082A		1	01/13/17 1:11		CA71203
Aroclor 1268	ND (0.10)	0.03	8082A		1	01/13/17 1:11		CA71203

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: Decachlorobiphenyl</i>	92 %		30-150
<i>Surrogate: Decachlorobiphenyl [2C]</i>	88 %		30-150
<i>Surrogate: Tetrachloro-m-xylene</i>	64 %		30-150
<i>Surrogate: Tetrachloro-m-xylene [2C]</i>	80 %		30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-505A FF
Date Sampled: 01/10/17 11:00
Percent Solids: N/A
Initial Volume: 5
Final Volume: 5
Extraction Method: 5030B

ESS Laboratory Work Order: 1701175
ESS Laboratory Sample ID: 1701175-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

8260B Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,1,1-Trichloroethane	ND (1.0)	0.2	8260B		1	01/12/17 17:53	C7A0161	CA71231
1,1,2-Trichloroethane	ND (1.0)	0.2	8260B		1	01/12/17 17:53	C7A0161	CA71231
1,1-Dichloroethane	ND (1.0)	0.2	8260B		1	01/12/17 17:53	C7A0161	CA71231
1,1-Dichloroethene	ND (1.0)	0.3	8260B		1	01/12/17 17:53	C7A0161	CA71231
1,2-Dibromoethane	ND (1.0)	0.2	8260B		1	01/12/17 17:53	C7A0161	CA71231
1,2-Dichlorobenzene	ND (1.0)	0.1	8260B		1	01/12/17 17:53	C7A0161	CA71231
1,2-Dichloroethane	ND (1.0)	0.2	8260B		1	01/12/17 17:53	C7A0161	CA71231
1,3-Dichlorobenzene	ND (1.0)	0.2	8260B		1	01/12/17 17:53	C7A0161	CA71231
1,4-Dichlorobenzene	ND (1.0)	0.1	8260B		1	01/12/17 17:53	C7A0161	CA71231
1,4-Dioxane - Screen	ND (500)	190	8260B		1	01/12/17 17:53	C7A0161	CA71231
Acetone	ND (10.0)	2.7	8260B		1	01/12/17 17:53	C7A0161	CA71231
Benzene	ND (1.0)	0.1	8260B		1	01/12/17 17:53	C7A0161	CA71231
Carbon Tetrachloride	ND (1.0)	0.1	8260B		1	01/12/17 17:53	C7A0161	CA71231
cis-1,2-Dichloroethene	ND (1.0)	0.2	8260B		1	01/12/17 17:53	C7A0161	CA71231
Ethylbenzene	ND (1.0)	0.1	8260B		1	01/12/17 17:53	C7A0161	CA71231
Methyl tert-Butyl Ether	ND (1.0)	0.3	8260B		1	01/12/17 17:53	C7A0161	CA71231
Methylene Chloride	ND (2.0)	0.2	8260B		1	01/12/17 17:53	C7A0161	CA71231
Naphthalene	ND (1.0)	0.2	8260B		1	01/12/17 17:53	C7A0161	CA71231
Tertiary-amyl methyl ether	ND (1.0)	0.2	8260B		1	01/12/17 17:53	C7A0161	CA71231
Tertiary-butyl Alcohol	ND (25.0)	10.0	8260B		1	01/12/17 17:53	C7A0161	CA71231
Tetrachloroethene	ND (1.0)	0.2	8260B		1	01/12/17 17:53	C7A0161	CA71231
Toluene	J 0.2 (1.0)	0.1	8260B		1	01/12/17 17:53	C7A0161	CA71231
Trichloroethene	ND (1.0)	0.2	8260B		1	01/12/17 17:53	C7A0161	CA71231
Vinyl Chloride	ND (1.0)	0.2	8260B		1	01/12/17 17:53	C7A0161	CA71231
Xylene O	ND (1.0)	0.1	8260B		1	01/12/17 17:53	C7A0161	CA71231
Xylene P,M	ND (2.0)	0.2	8260B		1	01/12/17 17:53	C7A0161	CA71231

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>104 %</i>		<i>70-130</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>94 %</i>		<i>70-130</i>
<i>Surrogate: Dibromofluoromethane</i>	<i>100 %</i>		<i>70-130</i>
<i>Surrogate: Toluene-d8</i>	<i>101 %</i>		<i>70-130</i>



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-505A FF
Date Sampled: 01/10/17 11:00
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 1701175
ESS Laboratory Sample ID: 1701175-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: VSC
Prepared: 1/12/17 10:15

8270D(SIM) Semi-Volatile Organic Compounds

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Acenaphthene	ND (0.19)	0.04	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Acenaphthylene	ND (0.19)	0.03	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Anthracene	J 0.03 (0.19)	0.03	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Benzo(a)anthracene	ND (0.05)	0.01	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Benzo(a)pyrene	ND (0.05)	0.01	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Benzo(b)fluoranthene	ND (0.05)	0.02	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Benzo(g,h,i)perylene	ND (0.19)	0.02	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Benzo(k)fluoranthene	ND (0.05)	0.02	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
bis(2-Ethylhexyl)phthalate	B 2.83 (2.34)	0.19	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Butylbenzylphthalate	B, J 0.31 (2.34)	0.19	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Chrysene	ND (0.05)	0.01	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Dibenzo(a,h)Anthracene	ND (0.05)	0.02	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Diethylphthalate	J 0.36 (2.34)	0.19	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Dimethylphthalate	ND (2.34)	0.19	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Di-n-butylphthalate	ND (2.34)	0.19	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Di-n-octylphthalate	ND (2.34)	0.19	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Fluoranthene	ND (0.19)	0.02	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Fluorene	ND (0.19)	0.03	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Indeno(1,2,3-cd)Pyrene	ND (0.05)	0.02	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Naphthalene	J 0.04 (0.19)	0.04	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Pentachlorophenol	ND (0.84)	0.30	8270D SIM		1	01/19/17 13:11	C7A0164	CA71116
Phenanthrene	ND (0.19)	0.04	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116
Pyrene	ND (0.19)	0.02	8270D SIM		1	01/12/17 19:35	C7A0164	CA71116

	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	72 %		30-130
<i>Surrogate: 2,4,6-Tribromophenol</i>	101 %		15-110
<i>Surrogate: 2-Fluorobiphenyl</i>	98 %		30-130
<i>Surrogate: Nitrobenzene-d5</i>	94 %		30-130
<i>Surrogate: p-Terphenyl-d14</i>	104 %		30-130



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-505A FF
Date Sampled: 01/10/17 11:00
Percent Solids: N/A

ESS Laboratory Work Order: 1701175
ESS Laboratory Sample ID: 1701175-03
Sample Matrix: Ground Water

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Ammonia as N	0.82 (0.10)		4500 NH3 G		1	JLK	01/16/17 16:46	mg/L	CA71301
Chloride	2600 (100)		§		1	SUB	01/18/17 8:26	mg/L	CA71801
Hexavalent Chromium	ND (10)		7196A		1	JLK	01/10/17 21:30	ug/L	CA71051
Phenols	ND (100)	30	420.1		1	JLK	01/13/17 17:00	ug/L	CA71336
Total Cyanide (LL)	ND (5.00)	1.80	4500 CN CE		1	EEM	01/12/17 12:45	ug/L	CA71217
Total Petroleum Hydrocarbon	ND (5)		1664A		1	CRR	01/16/17 14:42	mg/L	CA71306
Total Residual Chlorine	HT ND (10)		4500-Cl E		1	JLK	01/10/17 20:58	ug/L	CA71052
Total Suspended Solids	8000 (5000)		2540D		1	MJV	01/12/17 16:22	ug/L	CA71227



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-505A FF
Date Sampled: 01/10/17 11:00
Percent Solids: N/A
Initial Volume: 35
Final Volume: 2
Extraction Method: 504/8011

ESS Laboratory Work Order: 1701175
ESS Laboratory Sample ID: 1701175-03
Sample Matrix: Ground Water
Units: ug/L
Analyst: JXS
Prepared: 1/13/17 12:00

8011 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
1,2-Dibromoethane	ND (0.015)	0.005	8011		1	JXS	01/13/17 15:17		CA71322
		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>					
<i>Surrogate: Pentachloroethane</i>		115 %		30-150					



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP
Client Sample ID: MW-505A FF
Date Sampled: 01/10/17 11:00
Percent Solids: N/A
Initial Volume: 1
Final Volume: 1
Extraction Method: No Prep

ESS Laboratory Work Order: 1701175
ESS Laboratory Sample ID: 1701175-03
Sample Matrix: Ground Water
Units: mg/L
Analyst: DPS
Prepared: 1/12/17 14:30

Alcohol Scan by GC/FID

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Sequence</u>	<u>Batch</u>
Ethanol	ND (10)		8015		1	DPS	01/12/17 20:52		CA71246



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CA71051 - [CALC]

Blank

Chromium III	ND	10	ug/L
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LCS

Chromium III	ND		ug/L
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LCS Dup

Chromium III	ND		ug/L
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Batch CA71104 - 3005A

Blank

Barium	ND	50.0	ug/L
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Beryllium	ND	1.0	ug/L
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Chromium	ND	20.0	ug/L
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Copper	ND	10.0	ug/L
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Iron	ND	100	ug/L
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Nickel	ND	20.0	ug/L
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Vanadium	ND	20.0	ug/L
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Zinc	16.5	50.0	ug/L	J
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Blank

Antimony	ND	5.0	ug/L
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Arsenic	ND	5.0	ug/L
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Barium	ND	25.0	ug/L
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Beryllium	ND	0.5	ug/L
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Cadmium	ND	0.5	ug/L
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Chromium	ND	10.0	ug/L
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Chromium III	ND	10	ug/L
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Copper	ND	5.0	ug/L
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Iron	ND	50.0	ug/L
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Lead	ND	2.5	ug/L
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Nickel	ND	10.0	ug/L
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Selenium	ND	5.0	ug/L
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Silver	ND	0.2	ug/L
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Thallium	ND	1.0	ug/L
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Vanadium	ND	10.0	ug/L
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Zinc	ND	25.0	ug/L
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Blank

Antimony	ND	2.0	ug/L
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Arsenic	ND	2.0	ug/L
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Barium	ND	10.0	ug/L
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Beryllium	ND	0.2	ug/L
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Cadmium	ND	0.2	ug/L
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Chromium	ND	4.0	ug/L
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Chromium III	ND	4	ug/L
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Copper	ND	2.0	ug/L
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Iron	6.0	20.0	ug/L	J
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Lead	ND	1.0	ug/L
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CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CA71104 - 3005A

Nickel	ND	4.0	ug/L							
Selenium	ND	2.0	ug/L							
Silver	ND	0.1	ug/L							
Thallium	ND	0.4	ug/L							
Vanadium	ND	4.0	ug/L							
Zinc	2.2	10.0	ug/L							J

LCS

Barium	477	50.0	ug/L	500.0		95	80-120			
Beryllium	46.8	1.0	ug/L	50.00		94	80-120			
Chromium	476	20.0	ug/L	500.0		95	80-120			
Copper	478	10.0	ug/L	500.0		96	80-120			
Iron	2680	100	ug/L	2500		107	80-120			
Nickel	481	20.0	ug/L	500.0		96	80-120			
Vanadium	475	20.0	ug/L	500.0		95	80-120			
Zinc	463	50.0	ug/L	500.0		93	80-120			

LCS

Antimony	252	125	ug/L	250.0		101	80-120			
Arsenic	256	125	ug/L	250.0		102	80-120			
Barium	235	25.0	ug/L	250.0		94	80-120			
Beryllium	23.2	0.5	ug/L	25.00		93	80-120			
Cadmium	122	250	ug/L	125.0		98	80-120			J
Chromium	234	10.0	ug/L	250.0		94	80-120			
Chromium III	234	10	ug/L							
Copper	232	5.0	ug/L	250.0		93	80-120			
Iron	1140	50.0	ug/L	1250		91	80-120			
Lead	272	62.5	ug/L	250.0		109	80-120			
Nickel	237	10.0	ug/L	250.0		95	80-120			
Selenium	546	125	ug/L	500.0		109	80-120			
Silver	116	2.5	ug/L	125.0		93	80-120			
Silver	117	25.0	ug/L	125.0		94	80-120			
Thallium	275	25.0	ug/L	250.0		110	80-120			
Vanadium	234	10.0	ug/L	250.0		93	80-120			
Zinc	227	25.0	ug/L	250.0		91	80-120			

LCS

Antimony	93.5	50.0	ug/L	100.0		94	80-120			
Arsenic	108	50.0	ug/L	100.0		108	80-120			
Barium	96.8	10.0	ug/L	100.0		97	80-120			
Beryllium	9.5	0.2	ug/L	10.00		95	80-120			
Cadmium	47.7	100	ug/L	50.00		95	80-120			J
Chromium	96.6	4.0	ug/L	100.0		97	80-120			
Chromium III	97.0	4	ug/L							
Copper	97.1	2.0	ug/L	100.0		97	80-120			
Iron	483	20.0	ug/L	500.0		97	80-120			
Lead	108	25.0	ug/L	100.0		108	80-120			
Nickel	96.3	4.0	ug/L	100.0		96	80-120			



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CA71104 - 3005A

Selenium	222	50.0	ug/L	200.0		111	80-120			
Silver	40.5	10.0	ug/L	50.00		81	80-120			
Thallium	109	10.0	ug/L	100.0		109	80-120			
Vanadium	97.4	4.0	ug/L	100.0		97	80-120			
Zinc	96.1	10.0	ug/L	100.0		96	80-120			

LCS Dup

Barium	467	50.0	ug/L	500.0		93	80-120	2	20	
Beryllium	45.6	1.0	ug/L	50.00		91	80-120	3	20	
Chromium	465	20.0	ug/L	500.0		93	80-120	2	20	
Copper	472	10.0	ug/L	500.0		94	80-120	1	20	
Iron	2350	100	ug/L	2500		94	80-120	13	20	
Nickel	476	20.0	ug/L	500.0		95	80-120	1	20	
Vanadium	466	20.0	ug/L	500.0		93	80-120	2	20	
Zinc	452	50.0	ug/L	500.0		90	80-120	2	20	

LCS Dup

Antimony	252	125	ug/L	250.0		101	80-120	0.03	20	
Arsenic	260	125	ug/L	250.0		104	80-120	2	20	
Barium	247	25.0	ug/L	250.0		99	80-120	5	20	
Beryllium	24.2	0.5	ug/L	25.00		97	80-120	5	20	
Cadmium	120	250	ug/L	125.0		96	80-120	2	20	J
Chromium	247	10.0	ug/L	250.0		99	80-120	5	20	
Chromium III	247	10	ug/L							
Copper	244	5.0	ug/L	250.0		98	80-120	5	20	
Iron	1190	50.0	ug/L	1250		95	80-120	4	20	
Lead	270	62.5	ug/L	250.0		108	80-120	0.8	20	
Nickel	246	10.0	ug/L	250.0		98	80-120	4	20	
Selenium	541	125	ug/L	500.0		108	80-120	0.9	20	
Silver	118	25.0	ug/L	125.0		95	80-120	0.8	20	
Silver	122	2.5	ug/L	125.0		98	80-120	5	20	
Thallium	275	25.0	ug/L	250.0		110	80-120	0.03	20	
Vanadium	246	10.0	ug/L	250.0		98	80-120	5	20	
Zinc	239	25.0	ug/L	250.0		96	80-120	5	20	

LCS Dup

Antimony	99.0	50.0	ug/L	100.0		99	80-120	6	20	
Arsenic	108	50.0	ug/L	100.0		108	80-120	0.3	20	
Barium	93.7	10.0	ug/L	100.0		94	80-120	3	20	
Beryllium	9.1	0.2	ug/L	10.00		91	80-120	4	20	
Cadmium	50.8	100	ug/L	50.00		102	80-120	6	20	J
Chromium	93.0	4.0	ug/L	100.0		93	80-120	4	20	
Chromium III	93.0	4	ug/L							
Copper	93.0	2.0	ug/L	100.0		93	80-120	4	20	
Iron	462	20.0	ug/L	500.0		92	80-120	4	20	
Lead	108	25.0	ug/L	100.0		108	80-120	0.1	20	
Nickel	92.0	4.0	ug/L	100.0		92	80-120	4	20	
Selenium	225	50.0	ug/L	200.0		113	80-120	1	20	



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CA71104 - 3005A

Silver	40.7	10.0	ug/L	50.00		81	80-120	0.4	20	
Thallium	112	10.0	ug/L	100.0		112	80-120	3	20	
Vanadium	93.4	4.0	ug/L	100.0		93	80-120	4	20	
Zinc	92.1	10.0	ug/L	100.0		92	80-120	4	20	

Batch CA71110 - 245.1/7470A

Blank

Mercury	ND	0.20	ug/L							
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LCS

Mercury	6.33	0.20	ug/L	6.000		105	80-120			
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LCS Dup

Mercury	6.18	0.20	ug/L	6.000		103	80-120	2	20	
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Batch CA71302 - 3005A

Blank

Antimony	ND	5.0	ug/L							
Arsenic	ND	5.0	ug/L							
Barium	ND	25.0	ug/L							
Beryllium	0.1	0.5	ug/L							J
Cadmium	ND	0.5	ug/L							
Chromium	ND	10.0	ug/L							
Chromium III	ND	10	ug/L							
Copper	ND	5.0	ug/L							
Iron	22.3	50.0	ug/L							J
Lead	ND	2.5	ug/L							
Nickel	ND	10.0	ug/L							
Selenium	ND	5.0	ug/L							
Silver	ND	0.2	ug/L							
Silver	ND	2.5	ug/L							
Thallium	ND	1.0	ug/L							
Vanadium	ND	10.0	ug/L							
Zinc	ND	25.0	ug/L							

Blank

Barium	ND	5.0	ug/L							
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LCS

Antimony	246	125	ug/L	250.0		98	80-120			
Arsenic	227	125	ug/L	250.0		91	80-120			
Barium	247	25.0	ug/L	250.0		99	80-120			
Beryllium	24.3	0.5	ug/L	25.00		97	80-120			
Cadmium	124	250	ug/L	125.0		99	80-120			J
Chromium	245	10.0	ug/L	250.0		98	80-120			
Chromium III	245	10	ug/L							
Copper	232	5.0	ug/L	250.0		93	80-120			
Iron	1210	50.0	ug/L	1250		97	80-120			
Lead	295	62.5	ug/L	250.0		118	80-120			



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CA71302 - 3005A

Nickel	235	10.0	ug/L	250.0		94	80-120			
Selenium	584	125	ug/L	500.0		117	80-120			
Silver	118	2.5	ug/L	125.0		95	80-120			
Silver	105	25.0	ug/L	125.0		84	80-120			
Thallium	277	25.0	ug/L	250.0		111	80-120			
Vanadium	248	10.0	ug/L	250.0		99	80-120			
Zinc	238	25.0	ug/L	250.0		95	80-120			

LCS

Barium	43.4	5.0	ug/L	50.00		87	80-120			
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LCS Dup

Antimony	234	125	ug/L	250.0		93	80-120	5	20	
Arsenic	214	125	ug/L	250.0		86	80-120	6	20	
Barium	245	25.0	ug/L	250.0		98	80-120	1	20	
Beryllium	24.0	0.5	ug/L	25.00		96	80-120	2	20	
Cadmium	120	250	ug/L	125.0		96	80-120	4	20	J
Chromium	242	10.0	ug/L	250.0		97	80-120	1	20	
Chromium III	242	10	ug/L							
Copper	229	5.0	ug/L	250.0		91	80-120	2	20	
Iron	1200	50.0	ug/L	1250		96	80-120	0.9	20	
Lead	279	62.5	ug/L	250.0		112	80-120	5	20	
Nickel	231	10.0	ug/L	250.0		92	80-120	2	20	
Selenium	567	125	ug/L	500.0		113	80-120	3	20	
Silver	107	25.0	ug/L	125.0		86	80-120	2	20	
Silver	116	2.5	ug/L	125.0		93	80-120	2	20	
Thallium	273	25.0	ug/L	250.0		109	80-120	2	20	
Vanadium	243	10.0	ug/L	250.0		97	80-120	2	20	
Zinc	235	25.0	ug/L	250.0		94	80-120	1	20	

LCS Dup

Barium	36.5	5.0	ug/L	50.00		73	80-120	17	20	B-
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8082A Polychlorinated Biphenyls (PCB)

Batch CA71203 - 3510C

Blank

Aroclor 1016	ND	0.05	ug/L							
Aroclor 1221	ND	0.05	ug/L							
Aroclor 1232	ND	0.05	ug/L							
Aroclor 1242	ND	0.05	ug/L							
Aroclor 1248	ND	0.05	ug/L							
Aroclor 1254	ND	0.05	ug/L							
Aroclor 1260	ND	0.05	ug/L							
Aroclor 1262	ND	0.05	ug/L							
Aroclor 1268	ND	0.05	ug/L							

Surrogate: Decachlorobiphenyl

0.0373

ug/L

0.05000

75

30-150



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8082A Polychlorinated Biphenyls (PCB)

Batch CA71203 - 3510C

Surrogate: Decachlorobiphenyl [2C]	0.0338		ug/L	0.05000		68	30-150			
Surrogate: Tetrachloro-m-xylene	0.0282		ug/L	0.05000		56	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0363		ug/L	0.05000		73	30-150			

LCS

Aroclor 1016	0.92	0.05	ug/L	1.000		92	40-140			
Aroclor 1260	0.84	0.05	ug/L	1.000		84	40-140			

Surrogate: Decachlorobiphenyl	0.0407		ug/L	0.05000		81	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0384		ug/L	0.05000		77	30-150			
Surrogate: Tetrachloro-m-xylene	0.0345		ug/L	0.05000		69	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0394		ug/L	0.05000		79	30-150			

LCS Dup

Aroclor 1016	0.98	0.05	ug/L	1.000		98	40-140	5	20	
Aroclor 1260	0.86	0.05	ug/L	1.000		86	40-140	3	20	

Surrogate: Decachlorobiphenyl	0.0477		ug/L	0.05000		95	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.0448		ug/L	0.05000		90	30-150			
Surrogate: Tetrachloro-m-xylene	0.0388		ug/L	0.05000		78	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.0449		ug/L	0.05000		90	30-150			

8260B Volatile Organic Compounds

Batch CA71120 - 5030B

Blank

1,1,1-Trichloroethane	ND	1.0	ug/L							
1,1,2-Trichloroethane	ND	1.0	ug/L							
1,1-Dichloroethane	ND	1.0	ug/L							
1,1-Dichloroethene	ND	1.0	ug/L							
1,2-Dibromoethane	ND	1.0	ug/L							
1,2-Dichlorobenzene	ND	1.0	ug/L							
1,2-Dichloroethane	ND	1.0	ug/L							
1,3-Dichlorobenzene	ND	1.0	ug/L							
1,4-Dichlorobenzene	ND	1.0	ug/L							
1,4-Dioxane - Screen	ND	500	ug/L							
Acetone	ND	10.0	ug/L							
Benzene	ND	1.0	ug/L							
Carbon Tetrachloride	ND	1.0	ug/L							
cis-1,2-Dichloroethene	ND	1.0	ug/L							
Ethylbenzene	ND	1.0	ug/L							
Methyl tert-Butyl Ether	ND	1.0	ug/L							
Methylene Chloride	ND	2.0	ug/L							
Naphthalene	0.7	1.0	ug/L							
Tertiary-amyl methyl ether	ND	1.0	ug/L							
Tertiary-butyl Alcohol	ND	25.0	ug/L							
Tetrachloroethene	ND	1.0	ug/L							

J



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8260B Volatile Organic Compounds

Batch CA71120 - 5030B

Toluene	ND	1.0	ug/L							
Trichloroethene	ND	1.0	ug/L							
Vinyl Chloride	ND	1.0	ug/L							
Xylene O	ND	1.0	ug/L							
Xylene P,M	ND	2.0	ug/L							
Surrogate: 1,2-Dichloroethane-d4	22.8		ug/L	25.00		91	70-130			
Surrogate: 4-Bromofluorobenzene	22.4		ug/L	25.00		90	70-130			
Surrogate: Dibromofluoromethane	24.8		ug/L	25.00		99	70-130			
Surrogate: Toluene-d8	25.6		ug/L	25.00		102	70-130			

LCS

1,1,1-Trichloroethane	9.4		ug/L	10.00		94	70-130			
1,1,2-Trichloroethane	9.4		ug/L	10.00		94	70-130			
1,1-Dichloroethane	9.5		ug/L	10.00		95	70-130			
1,1-Dichloroethene	10.5		ug/L	10.00		105	70-130			
1,2-Dibromoethane	10.1		ug/L	10.00		101	70-130			
1,2-Dichlorobenzene	9.6		ug/L	10.00		96	70-130			
1,2-Dichloroethane	9.2		ug/L	10.00		92	70-130			
1,3-Dichlorobenzene	9.7		ug/L	10.00		97	70-130			
1,4-Dichlorobenzene	9.3		ug/L	10.00		93	70-130			
1,4-Dioxane - Screen	0.0		ug/L	200.0			0-332			
Acetone	45.2		ug/L	50.00		90	70-130			
Benzene	9.8		ug/L	10.00		98	70-130			
Carbon Tetrachloride	10.0		ug/L	10.00		100	70-130			
cis-1,2-Dichloroethene	9.9		ug/L	10.00		99	70-130			
Ethylbenzene	8.3		ug/L	10.00		83	70-130			
Methyl tert-Butyl Ether	9.0		ug/L	10.00		90	70-130			
Methylene Chloride	9.9		ug/L	10.00		99	70-130			
Naphthalene	11.6		ug/L	10.00		116	70-130			
Tertiary-amyl methyl ether	8.6		ug/L	10.00		86	70-130			
Tertiary-butyl Alcohol	48.2		ug/L	50.00		96	70-130			
Tetrachloroethene	7.7		ug/L	10.00		77	70-130			
Toluene	9.2		ug/L	10.00		92	70-130			
Trichloroethene	9.6		ug/L	10.00		96	70-130			
Vinyl Chloride	10.3		ug/L	10.00		103	70-130			
Xylene O	8.4		ug/L	10.00		84	70-130			
Xylene P,M	16.8		ug/L	20.00		84	70-130			
Surrogate: 1,2-Dichloroethane-d4	23.0		ug/L	25.00		92	70-130			
Surrogate: 4-Bromofluorobenzene	23.6		ug/L	25.00		94	70-130			
Surrogate: Dibromofluoromethane	25.2		ug/L	25.00		101	70-130			
Surrogate: Toluene-d8	26.4		ug/L	25.00		106	70-130			

LCS Dup

1,1,1-Trichloroethane	9.0		ug/L	10.00		90	70-130	5	25	
1,1,2-Trichloroethane	8.7		ug/L	10.00		87	70-130	7	25	
1,1-Dichloroethane	9.0		ug/L	10.00		90	70-130	5	25	
1,1-Dichloroethene	9.7		ug/L	10.00		97	70-130	8	25	



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8260B Volatile Organic Compounds

Batch CA71120 - 5030B

1,2-Dibromoethane	9.4		ug/L	10.00		94	70-130	7	25	
1,2-Dichlorobenzene	9.0		ug/L	10.00		90	70-130	6	25	
1,2-Dichloroethane	8.5		ug/L	10.00		85	70-130	8	25	
1,3-Dichlorobenzene	9.5		ug/L	10.00		95	70-130	3	25	
1,4-Dichlorobenzene	9.0		ug/L	10.00		90	70-130	4	25	
1,4-Dioxane - Screen	0.0		ug/L	200.0			0-332		200	
Acetone	42.2		ug/L	50.00		84	70-130	7	25	
Benzene	9.4		ug/L	10.00		94	70-130	4	25	
Carbon Tetrachloride	9.5		ug/L	10.00		95	70-130	5	25	
cis-1,2-Dichloroethene	9.3		ug/L	10.00		93	70-130	6	25	
Ethylbenzene	8.3		ug/L	10.00		83	70-130	0.5	25	
Methyl tert-Butyl Ether	8.6		ug/L	10.00		86	70-130	5	25	
Methylene Chloride	9.6		ug/L	10.00		96	70-130	4	25	
Naphthalene	10.4		ug/L	10.00		104	70-130	11	25	
Tertiary-amyl methyl ether	8.0		ug/L	10.00		80	70-130	8	25	
Tertiary-butyl Alcohol	48.1		ug/L	50.00		96	70-130	0.2	25	
Tetrachloroethene	7.5		ug/L	10.00		75	70-130	3	25	
Toluene	8.7		ug/L	10.00		87	70-130	6	25	
Trichloroethene	9.0		ug/L	10.00		90	70-130	7	25	
Vinyl Chloride	9.6		ug/L	10.00		96	70-130	7	25	
Xylene O	8.3		ug/L	10.00		83	70-130	2	25	
Xylene P,M	16.8		ug/L	20.00		84	70-130	0.6	25	
Surrogate: 1,2-Dichloroethane-d4	22.5		ug/L	25.00		90	70-130			
Surrogate: 4-Bromofluorobenzene	24.0		ug/L	25.00		96	70-130			
Surrogate: Dibromofluoromethane	24.4		ug/L	25.00		98	70-130			
Surrogate: Toluene-d8	26.1		ug/L	25.00		104	70-130			

Batch CA71231 - 5030B

Blank

1,1,1-Trichloroethane	ND	1.0	ug/L							
1,1,2-Trichloroethane	ND	1.0	ug/L							
1,1-Dichloroethane	ND	1.0	ug/L							
1,1-Dichloroethene	ND	1.0	ug/L							
1,2-Dibromoethane	ND	1.0	ug/L							
1,2-Dichlorobenzene	ND	1.0	ug/L							
1,2-Dichloroethane	ND	1.0	ug/L							
1,3-Dichlorobenzene	ND	1.0	ug/L							
1,4-Dichlorobenzene	ND	1.0	ug/L							
1,4-Dioxane - Screen	ND	500	ug/L							
Acetone	ND	10.0	ug/L							
Benzene	ND	1.0	ug/L							
Carbon Tetrachloride	ND	1.0	ug/L							
cis-1,2-Dichloroethene	ND	1.0	ug/L							
Ethylbenzene	ND	1.0	ug/L							
Methyl tert-Butyl Ether	ND	1.0	ug/L							
Methylene Chloride	ND	2.0	ug/L							



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8260B Volatile Organic Compounds

Batch CA71231 - 5030B

Naphthalene	0.4	1.0	ug/L							J
Tertiary-amyl methyl ether	ND	1.0	ug/L							
Tertiary-butyl Alcohol	ND	25.0	ug/L							
Tetrachloroethene	ND	1.0	ug/L							
Toluene	ND	1.0	ug/L							
Trichloroethene	ND	1.0	ug/L							
Vinyl Chloride	ND	1.0	ug/L							
Xylene O	ND	1.0	ug/L							
Xylene P,M	ND	2.0	ug/L							
Surrogate: 1,2-Dichloroethane-d4	24.2		ug/L	25.00		97	70-130			
Surrogate: 4-Bromofluorobenzene	23.8		ug/L	25.00		95	70-130			
Surrogate: Dibromofluoromethane	24.5		ug/L	25.00		98	70-130			
Surrogate: Toluene-d8	25.7		ug/L	25.00		103	70-130			

LCS

1,1,1-Trichloroethane	9.4		ug/L	10.00		94	70-130			
1,1,2-Trichloroethane	8.4		ug/L	10.00		84	70-130			
1,1-Dichloroethane	9.4		ug/L	10.00		94	70-130			
1,1-Dichloroethene	10.8		ug/L	10.00		108	70-130			
1,2-Dibromoethane	9.0		ug/L	10.00		90	70-130			
1,2-Dichlorobenzene	8.2		ug/L	10.00		82	70-130			
1,2-Dichloroethane	9.7		ug/L	10.00		97	70-130			
1,3-Dichlorobenzene	8.6		ug/L	10.00		86	70-130			
1,4-Dichlorobenzene	8.6		ug/L	10.00		86	70-130			
1,4-Dioxane - Screen	0.0		ug/L	200.0			0-332			
Acetone	48.2		ug/L	50.00		96	70-130			
Benzene	9.4		ug/L	10.00		94	70-130			
Carbon Tetrachloride	8.8		ug/L	10.00		88	70-130			
cis-1,2-Dichloroethene	9.6		ug/L	10.00		96	70-130			
Ethylbenzene	9.5		ug/L	10.00		95	70-130			
Methyl tert-Butyl Ether	10.1		ug/L	10.00		101	70-130			
Methylene Chloride	9.6		ug/L	10.00		96	70-130			
Naphthalene	9.5		ug/L	10.00		95	70-130			
Tertiary-amyl methyl ether	9.7		ug/L	10.00		97	70-130			
Tertiary-butyl Alcohol	50.1		ug/L	50.00		100	70-130			
Tetrachloroethene	8.6		ug/L	10.00		86	70-130			
Toluene	9.5		ug/L	10.00		95	70-130			
Trichloroethene	9.1		ug/L	10.00		91	70-130			
Vinyl Chloride	8.9		ug/L	10.00		89	70-130			
Xylene O	9.0		ug/L	10.00		90	70-130			
Xylene P,M	19.2		ug/L	20.00		96	70-130			
Surrogate: 1,2-Dichloroethane-d4	26.0		ug/L	25.00		104	70-130			
Surrogate: 4-Bromofluorobenzene	23.1		ug/L	25.00		93	70-130			
Surrogate: Dibromofluoromethane	24.8		ug/L	25.00		99	70-130			
Surrogate: Toluene-d8	25.1		ug/L	25.00		100	70-130			

LCS Dup



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8260B Volatile Organic Compounds

Batch CA71231 - 5030B

1,1,1-Trichloroethane	9.2		ug/L	10.00		92	70-130	2	25	
1,1,2-Trichloroethane	8.0		ug/L	10.00		80	70-130	6	25	
1,1-Dichloroethane	9.4		ug/L	10.00		94	70-130	0.3	25	
1,1-Dichloroethene	10.5		ug/L	10.00		105	70-130	3	25	
1,2-Dibromoethane	8.6		ug/L	10.00		86	70-130	4	25	
1,2-Dichlorobenzene	8.0		ug/L	10.00		80	70-130	3	25	
1,2-Dichloroethane	9.5		ug/L	10.00		95	70-130	2	25	
1,3-Dichlorobenzene	8.0		ug/L	10.00		80	70-130	8	25	
1,4-Dichlorobenzene	8.4		ug/L	10.00		84	70-130	3	25	
1,4-Dioxane - Screen	0.0		ug/L	200.0			0-332		200	
Acetone	49.6		ug/L	50.00		99	70-130	3	25	
Benzene	9.4		ug/L	10.00		94	70-130	0.1	25	
Carbon Tetrachloride	8.6		ug/L	10.00		86	70-130	2	25	
cis-1,2-Dichloroethene	9.8		ug/L	10.00		98	70-130	2	25	
Ethylbenzene	9.6		ug/L	10.00		96	70-130	0.8	25	
Methyl tert-Butyl Ether	10.5		ug/L	10.00		105	70-130	3	25	
Methylene Chloride	9.7		ug/L	10.00		97	70-130	1	25	
Naphthalene	9.2		ug/L	10.00		92	70-130	3	25	
Tertiary-amyl methyl ether	9.5		ug/L	10.00		95	70-130	3	25	
Tertiary-butyl Alcohol	44.2		ug/L	50.00		88	70-130	13	25	
Tetrachloroethene	8.6		ug/L	10.00		86	70-130	0.5	25	
Toluene	9.2		ug/L	10.00		92	70-130	3	25	
Trichloroethene	9.0		ug/L	10.00		90	70-130	0.9	25	
Vinyl Chloride	8.4		ug/L	10.00		84	70-130	5	25	
Xylene O	8.7		ug/L	10.00		87	70-130	4	25	
Xylene P,M	18.7		ug/L	20.00		93	70-130	3	25	
Surrogate: 1,2-Dichloroethane-d4	25.8		ug/L	25.00		103	70-130			
Surrogate: 4-Bromofluorobenzene	23.4		ug/L	25.00		94	70-130			
Surrogate: Dibromofluoromethane	25.3		ug/L	25.00		101	70-130			
Surrogate: Toluene-d8	25.1		ug/L	25.00		100	70-130			

8270D(SIM) Semi-Volatile Organic Compounds

Batch CA71116 - 3510C

Blank										
Acenaphthene	ND	0.20	ug/L							
Acenaphthylene	ND	0.20	ug/L							
Anthracene	ND	0.20	ug/L							
Benzo(a)anthracene	ND	0.05	ug/L							
Benzo(a)pyrene	ND	0.05	ug/L							
Benzo(b)fluoranthene	ND	0.05	ug/L							
Benzo(g,h,i)perylene	ND	0.20	ug/L							
Benzo(k)fluoranthene	ND	0.05	ug/L							
bis(2-Ethylhexyl)phthalate	2.37	2.50	ug/L							J
Butylbenzylphthalate	0.32	2.50	ug/L							J
Chrysene	ND	0.05	ug/L							



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D(SIM) Semi-Volatile Organic Compounds

Batch CA71116 - 3510C

Dibenzo(a,h)Anthracene	ND	0.05	ug/L							
Diethylphthalate	ND	2.50	ug/L							
Dimethylphthalate	ND	2.50	ug/L							
Di-n-butylphthalate	ND	2.50	ug/L							
Di-n-octylphthalate	0.26	2.50	ug/L							J
Fluoranthene	ND	0.20	ug/L							
Fluorene	ND	0.20	ug/L							
Indeno(1,2,3-cd)Pyrene	ND	0.05	ug/L							
Naphthalene	ND	0.20	ug/L							
Pentachlorophenol	ND	0.90	ug/L							
Phenanthrene	ND	0.20	ug/L							
Pyrene	ND	0.20	ug/L							
Surrogate: 1,2-Dichlorobenzene-d4	0.791		ug/L	2.500		32	30-130			
Surrogate: 2,4,6-Tribromophenol	2.97		ug/L	3.750		79	15-110			
Surrogate: 2-Fluorobiphenyl	1.22		ug/L	2.500		49	30-130			
Surrogate: Nitrobenzene-d5	1.42		ug/L	2.500		57	30-130			
Surrogate: p-Terphenyl-d14	2.24		ug/L	2.500		90	30-130			

LCS

Acenaphthene	2.51	0.20	ug/L	4.000		63	40-140			
Acenaphthylene	2.18	0.20	ug/L	4.000		54	40-140			
Anthracene	2.90	0.20	ug/L	4.000		73	40-140			
Benzo(a)anthracene	3.23	0.05	ug/L	4.000		81	40-140			
Benzo(a)pyrene	3.24	0.05	ug/L	4.000		81	40-140			
Benzo(b)fluoranthene	3.19	0.05	ug/L	4.000		80	40-140			
Benzo(g,h,i)perylene	3.23	0.20	ug/L	4.000		81	40-140			
Benzo(k)fluoranthene	3.07	0.05	ug/L	4.000		77	40-140			
bis(2-Ethylhexyl)phthalate	5.83	2.50	ug/L	4.000		146	40-140			B+
Butylbenzylphthalate	4.39	2.50	ug/L	4.000		110	40-140			
Chrysene	3.47	0.05	ug/L	4.000		87	40-140			
Dibenzo(a,h)Anthracene	3.03	0.05	ug/L	4.000		76	40-140			
Diethylphthalate	3.24	2.50	ug/L	4.000		81	40-140			
Dimethylphthalate	2.93	2.50	ug/L	4.000		73	40-140			
Di-n-butylphthalate	3.33	2.50	ug/L	4.000		83	40-140			
Di-n-octylphthalate	3.99	2.50	ug/L	4.000		100	40-140			
Fluoranthene	3.28	0.20	ug/L	4.000		82	40-140			
Fluorene	2.81	0.20	ug/L	4.000		70	40-140			
Indeno(1,2,3-cd)Pyrene	3.14	0.05	ug/L	4.000		78	40-140			
Naphthalene	1.61	0.20	ug/L	4.000		40	40-140			
Pentachlorophenol	3.98	0.90	ug/L	4.000		100	30-130			
Phenanthrene	2.88	0.20	ug/L	4.000		72	40-140			
Pyrene	3.64	0.20	ug/L	4.000		91	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	0.754		ug/L	2.500		30	30-130			
Surrogate: 2,4,6-Tribromophenol	3.65		ug/L	3.750		97	15-110			
Surrogate: 2-Fluorobiphenyl	1.40		ug/L	2.500		56	30-130			
Surrogate: Nitrobenzene-d5	1.40		ug/L	2.500		56	30-130			



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

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ESS Laboratory Work Order: 1701175

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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8270D(SIM) Semi-Volatile Organic Compounds

Batch CA71116 - 3510C

<i>Surrogate: p-Terphenyl-d14</i>	<i>2.48</i>		ug/L	<i>2.500</i>		<i>99</i>	<i>30-130</i>			
LCS Dup										
Acenaphthene	2.99	0.20	ug/L	4.000		75	40-140	17	20	
Acenaphthylene	2.57	0.20	ug/L	4.000		64	40-140	17	20	
Anthracene	3.10	0.20	ug/L	4.000		77	40-140	7	20	
Benzo(a)anthracene	3.32	0.05	ug/L	4.000		83	40-140	3	20	
Benzo(a)pyrene	3.40	0.05	ug/L	4.000		85	40-140	5	20	
Benzo(b)fluoranthene	3.48	0.05	ug/L	4.000		87	40-140	9	20	
Benzo(g,h,i)perylene	3.43	0.20	ug/L	4.000		86	40-140	6	20	
Benzo(k)fluoranthene	3.32	0.05	ug/L	4.000		83	40-140	8	20	
bis(2-Ethylhexyl)phthalate	5.73	2.50	ug/L	4.000		143	40-140	2	20	B+
Butylbenzylphthalate	4.62	2.50	ug/L	4.000		115	40-140	5	20	
Chrysene	3.63	0.05	ug/L	4.000		91	40-140	4	20	
Dibenzo(a,h)Anthracene	3.20	0.05	ug/L	4.000		80	40-140	6	20	
Diethylphthalate	3.59	2.50	ug/L	4.000		90	40-140	10	20	
Dimethylphthalate	3.31	2.50	ug/L	4.000		83	40-140	12	20	
Di-n-butylphthalate	3.49	2.50	ug/L	4.000		87	40-140	5	20	
Di-n-octylphthalate	4.22	2.50	ug/L	4.000		105	40-140	6	20	
Fluoranthene	3.40	0.20	ug/L	4.000		85	40-140	4	20	
Fluorene	3.20	0.20	ug/L	4.000		80	40-140	13	20	
Indeno(1,2,3-cd)Pyrene	3.35	0.05	ug/L	4.000		84	40-140	6	20	
Naphthalene	1.98	0.20	ug/L	4.000		49	40-140	21	20	D+
Pentachlorophenol	4.13	0.90	ug/L	4.000		103	30-130	4	20	
Phenanthrene	3.03	0.20	ug/L	4.000		76	40-140	5	20	
Pyrene	3.76	0.20	ug/L	4.000		94	40-140	3	20	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	<i>0.979</i>		ug/L	<i>2.500</i>		<i>39</i>	<i>30-130</i>			
<i>Surrogate: 2,4,6-Tribromophenol</i>	<i>3.78</i>		ug/L	<i>3.750</i>		<i>101</i>	<i>15-110</i>			
<i>Surrogate: 2-Fluorobiphenyl</i>	<i>1.67</i>		ug/L	<i>2.500</i>		<i>67</i>	<i>30-130</i>			
<i>Surrogate: Nitrobenzene-d5</i>	<i>1.73</i>		ug/L	<i>2.500</i>		<i>69</i>	<i>30-130</i>			
<i>Surrogate: p-Terphenyl-d14</i>	<i>2.55</i>		ug/L	<i>2.500</i>		<i>102</i>	<i>30-130</i>			

Classical Chemistry

Batch CA71051 - General Preparation

Blank										
Hexavalent Chromium	ND	10	ug/L							
LCS										
Hexavalent Chromium	0.5		mg/L	0.4998		98	90-110			
LCS Dup										
Hexavalent Chromium	0.5		mg/L	0.4998		99	90-110	0.1	20	

Batch CA71052 - General Preparation

Blank										
Total Residual Chlorine	ND	10	ug/L							
LCS										



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Classical Chemistry										
Batch CA71052 - General Preparation										
Total Residual Chlorine	2		mg/L	1.800		100	85-115			
Batch CA71107 - NH4 Prep										
Blank										
Ammonia as N	ND	0.10	mg/L							
LCS										
Ammonia as N	0.09	0.10	mg/L	0.09994		94	80-120			
LCS										
Ammonia as N	1.02	0.10	mg/L	0.9994		102	80-120			
Batch CA71136 - General Preparation										
Blank										
Total Petroleum Hydrocarbon	ND	5	mg/L							
LCS										
Total Petroleum Hydrocarbon	14	5	mg/L	19.38		74	66-114			
Batch CA71217 - TCN Prep										
Blank										
Total Cyanide (LL)	ND	5.00	ug/L							
LCS										
Total Cyanide (LL)	21.2	5.00	ug/L	20.06		106	90-110			
LCS										
Total Cyanide (LL)	150	5.00	ug/L	150.4		100	90-110			
LCS Dup										
Total Cyanide (LL)	149	5.00	ug/L	150.4		99	90-110	0.4	20	
Batch CA71227 - General Preparation										
Blank										
Total Suspended Solids	ND	5000	ug/L							
LCS										
Total Suspended Solids	66		mg/L	68.70		96	80-120			
Batch CA71301 - NH4 Prep										
Blank										
Ammonia as N	ND	0.10	mg/L							
LCS										
Ammonia as N	0.10	0.10	mg/L	0.09994		98	80-120			
LCS										
Ammonia as N	1.11	0.10	mg/L	0.9994		112	80-120			
Batch CA71306 - General Preparation										
Blank										
Total Petroleum Hydrocarbon	ND	5	mg/L							
LCS										
Total Petroleum Hydrocarbon	15	5	mg/L	19.38		78	66-114			



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Classical Chemistry

Batch CA71336 - General Preparation

Blank										
Phenols	ND	100	ug/L							

LCS										
Phenols	116	100	ug/L	100.0		116	80-120			

LCS										
Phenols	997	100	ug/L	1000		100	80-120			

8011 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane

Batch CA71322 - 504/8011

Blank										
1,2-Dibromoethane	ND	0.015	ug/L							
1,2-Dibromoethane [2C]	ND	0.015	ug/L							

Surrogate: Pentachloroethane	0.162		ug/L	0.2000		81	30-150			
Surrogate: Pentachloroethane [2C]	0.151		ug/L	0.2000		76	30-150			

LCS										
1,2-Dibromoethane	0.200	0.015	ug/L	0.2000		100	60-140			
1,2-Dibromoethane [2C]	0.190	0.015	ug/L	0.2000		95	70-130			

Surrogate: Pentachloroethane	0.167		ug/L	0.2000		83	30-150			
Surrogate: Pentachloroethane [2C]	0.162		ug/L	0.2000		81	30-150			

LCS										
1,2-Dibromoethane	0.084	0.015	ug/L	0.08000		105	60-140			
1,2-Dibromoethane [2C]	0.057	0.015	ug/L	0.08000		72	70-130			

Surrogate: Pentachloroethane	0.0704		ug/L	0.08000		88	30-150			
Surrogate: Pentachloroethane [2C]	0.0674		ug/L	0.08000		84	30-150			

Alcohol Scan by GC/FID

Batch CA71246 - No Prep

Blank										
Ethanol	ND	10	mg/L							

LCS										
Ethanol	948	10	mg/L	1000		95	60-140			

LCS Dup										
Ethanol	854	10	mg/L	1000		85	60-140	10	30	



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

Notes and Definitions

U	Analyte included in the analysis, but not detected
J	Reported between MDL and MRL
HT	The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.
EL	Elevated Method Reporting Limits due to sample matrix (EL).
D+	Relative percent difference for duplicate is outside of criteria (D+).
D	Diluted.
CD+	Continuing Calibration %Diff/Drift is above control limit (CD+).
BT	Benzidine tailing factor >2.
B+	Blank Spike recovery is above upper control limit (B+).
B-	Blank Spike recovery is below lower control limit (B-).
B	Present in Method Blank (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



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP/MCP

ESS Laboratory Work Order: 1701175

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/meedc/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>

LABORATORY REPORT

ESS Laboratory
Attn: Mr. Shawn Morrell
185 Frances Avenue
Cranston, RI 02910-2211

Date Received: 1/11/2017
Date Reported: 1/17/2017
P.O. Number B02406

Work Order #: 1701-00773

Project Name: PROJECT #1701175

Enclosed are the analytical results and Chain of Custody for your project referenced above. The sample(s) were analyzed by our Warwick, RI laboratory unless noted otherwise. When applicable, indication of sample analysis at our Hudson, MA laboratory and/or subcontracted results are noted and subcontracted reports are enclosed in their entirety.

All samples were analyzed within the established guidelines of US EPA approved methods with all requirements met, unless otherwise noted at the end of a given sample's analytical results or in a case narrative.

The Detection Limit is defined as the lowest level that can be reliably achieved during routine laboratory conditions.

These results only pertain to the samples submitted for this Work Order # and this report shall not be reproduced except in its entirety.

We certify that the following results are true and accurate to the best of our knowledge. If you have questions or need further assistance, please contact our Customer Service Department.

Approved by:



Yihai Ding
Technical Director

Laboratory Certification Numbers (as applicable to sample's origin state):

Warwick RI * RI LAI00033, MA M-RI015, CT PH-0508, ME RI00015, NH 2070, NY 11726
Hudson MA * M-MA1117, RI LAO00319

R.I. Analytical Laboratories, Inc.

Laboratory Report

ESS Laboratory

Work Order #: 1701-00773

Project Name: PROJECT #1701175

Sample Number: 001
Sample Description: 1701175-01
Sample Type : GRAB
Sample Date / Time : 1/10/2017 @ 11:00

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE/TIME ANALYZED	ANALYST
Chloride	4800	1000	mg/l	EPA 300.0	1/12/2017 14:22	TAS

Sample Number: 002
Sample Description: 1701175-02
Sample Type : GRAB
Sample Date / Time : 1/10/2017 @ 14:00

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE/TIME ANALYZED	ANALYST
Chloride	63	5.0	mg/l	EPA 300.0	1/12/2017 0:45	AEG



ESS Laboratory
1701-00773
1/17/17

-Method Blanks Results-

Parameter	Units	Results	Date Analyzed
Chloride	mg/l	<1.0	1/11/2017

-LCS/LCS Duplicate Data Results-

Parameter	Spike Conc	LCS Conc	LCS % Rec	LCS Dup Conc	LCS DUP % Rec	% RPD	Date Analyzed
Chloride	10.0	9.86	99				1/12/2017



LABORATORY REPORT

ESS Laboratory
Attn: Mr. Shawn Morrell
185 Frances Avenue
Cranston, RI 02910-2211

Date Received: 1/12/2017
Date Reported: 1/17/2017
P.O. Number B02406

Work Order #: 1701-00784

Project Name: PROJECT: 1701175

Enclosed are the analytical results and Chain of Custody for your project referenced above. The sample(s) were analyzed by our Warwick, RI laboratory unless noted otherwise. When applicable, indication of sample analysis at our Hudson, MA laboratory and/or subcontracted results are noted and subcontracted reports are enclosed in their entirety.

All samples were analyzed within the established guidelines of US EPA approved methods with all requirements met, unless otherwise noted at the end of a given sample's analytical results or in a case narrative.

The Detection Limit is defined as the lowest level that can be reliably achieved during routine laboratory conditions.

These results only pertain to the samples submitted for this Work Order # and this report shall not be reproduced except in its entirety.

We certify that the following results are true and accurate to the best of our knowledge. If you have questions or need further assistance, please contact our Customer Service Department.

Approved by:

Yihai Ding
Technical Director

Laboratory Certification Numbers (as applicable to sample's origin state):

Warwick RI * RI LAI00033, MA M-RI015, CT PH-0508, ME RI00015, NH 2070, NY 11726
Hudson MA * M-MA1117, RI LAO00319

R.I. Analytical Laboratories, Inc.**Laboratory Report**

ESS Laboratory

Work Order #: 1701-00784

Project Name: PROJECT: 1701175

Sample Number: 001
Sample Description: 1701175-03
Sample Type : GRAB
Sample Date / Time : 1/10/2017 @ 11:00

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	DATE/TIME ANALYZED	ANALYST
Chloride	2600	100	mg/l	EPA 300.0	1/17/2017 13:22	TAS



ESS Laboratory
1701-00784
1/17/17

-Method Blanks Results-

Parameter	Units	Results	Date Analyzed
Chloride	mg/l	<1.0	1/13/2017

-LCS/LCS Duplicate Data Results-

Parameter	Spike Conc	LCS Conc	LCS % Rec	LCS Dup Conc	LCS DUP % Rec	% RPD	Date Analyzed
Chloride	10.0	9.37	94				1/17/2017

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Tighe & Bond - KPB/TB/MM
 Shipped/Delivered Via: ESS Courier

ESS Project ID: 1701175
 Date Received: 1/10/2017
 Project Due Date: 1/17/2017
 Days for Project: 5 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: 1.0 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: 1, 2, 3
 Analysis: Chloride
 TAT: 5 day

12. Were VOAs received? ☒ Yes / No
 a. Air bubbles in aqueous VOAs? ☒ Yes / No / NA
 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:

Split FF samples from unfiltered for sample 3 per client. el 1/11/17
Added sample 3.

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	98059	Yes	No	Yes	VOA Vial - HCl	HCl	
01	98060	Yes	No	Yes	VOA Vial - HCl	HCl	
01	98061	Yes	No	Yes	VOA Vial - HCl	HCl	
01	98065	Yes	NA	Yes	VOA Vial - Unpres	NP	
01	98066	Yes	NA	Yes	VOA Vial - Unpres	NP	
01	98067	Yes	NA	Yes	VOA Vial - Unpres	NP	
01	98080	Yes	NA	Yes	1L Amber - Unpres	NP	
01	98081	Yes	NA	Yes	1L Amber - Unpres	NP	
01	98084	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
01	98085	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
01	98088	Yes	NA	Yes	1L Poly - Unpres	NP	
01	98091	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4	
01	98093	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	
01	98094	Yes	NA	Yes	250 mL Poly - NaOH	NaOH	pH > 12 el 1/10/17 1955
01	98097	Yes	NA	Yes	250 mL Poly - Unpres	NP	
01	98098	Yes	NA	Yes	250 mL Poly - Unpres	NP	
02	98053	Yes	No	Yes	VOA Vial - HCl	HCl	
02	98054	Yes	No	Yes	VOA Vial - HCl	HCl	
02	98055	Yes	No	Yes	VOA Vial - HCl	HCl	
02	98056	Yes	No	Yes	VOA Vial - Unpres	NP	
02	98057	Yes	No	Yes	VOA Vial - Unpres	NP	
02	98058	Yes	No	Yes	VOA Vial - Unpres	NP	
02	98071	Yes	NA	Yes	1L Amber - Unpres	NP	
02	98072	Yes	NA	Yes	1L Amber - Unpres	NP	

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Tighe & Bond - KPB/TB/MM

ESS Project ID: 1701175

Date Received: 1/10/2017

02	98073	Yes	NA	Yes	1L Amber - H2SO4	H2SO4
02	98074	Yes	NA	Yes	1L Amber - H2SO4	H2SO4
02	98075	Yes	NA	Yes	1L Poly - Unpres	NP
02	98076	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4
02	98077	Yes	NA	Yes	250 mL Poly - NaOH	NaOH
02	98078	Yes	NA	Yes	250 mL Poly - Unpres	NP
02	98079	Yes	NA	Yes	250 mL Poly - Unpres	NP
03	98407	Yes	No	Yes	VOA Vial - HCl	HCl
03	98408	Yes	No	Yes	VOA Vial - HCl	HCl
03	98409	Yes	No	Yes	VOA Vial - HCl	HCl
03	98410	Yes	No	Yes	VOA Vial - Unpres	NP
03	98411	Yes	No	Yes	VOA Vial - Unpres	NP
03	98412	Yes	No	Yes	VOA Vial - Unpres	NP
03	98413	Yes	NA	Yes	1L Amber - H2SO4	H2SO4
03	98414	Yes	NA	Yes	1L Amber - H2SO4	H2SO4
03	98415	Yes	NA	Yes	1L Amber - Unpres	NP
03	98416	Yes	NA	Yes	1L Amber - Unpres	NP
03	98417	Yes	NA	Yes	1L Poly - Unpres	NP
03	98418	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4
03	98419	Yes	NA	Yes	250 mL Poly - HNO3	HNO3
03	98420	Yes	NA	Yes	250 mL Poly - NaOH	NaOH
03	98421	Yes	NA	Yes	250 mL Poly - Unpres	NP
03	98422	Yes	NA	Yes	250 mL Poly - Unpres	NP

pH > 12 at 1/10/17 1955

pH > 12 at 1/10/17 1955

2nd Review

Are barcode labels on correct containers?

☒ Yes / No

Completed
By:

Date & Time:

Reviewed
By:

Date & Time:

Delivered
By:

Date & Time:

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Tighe & Bond - KP/B/TB/MM
 Shipped/Delivered Via: ESS Courier

ESS Project ID: 1701175
 Date Received: 1/10/2017
 Project Due Date: 1/17/2017
 Days for Project: 5 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: 1.0 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: 1, 2
 Analysis: Chloride
 TAT: 5 day

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	98059	Yes	No	Yes	VOA Vial - HCl	HCl	
01	98060	Yes	No	Yes	VOA Vial - HCl	HCl	
01	98061	Yes	No	Yes	VOA Vial - HCl	HCl	
01	98062	Yes	No	Yes	VOA Vial - HCl	HCl	
01	98063	Yes	No	Yes	VOA Vial - HCl	HCl	
01	98064	Yes	No	Yes	VOA Vial - HCl	HCl	
01	98065	Yes	NA	Yes	VOA Vial - Unpres	NP	
01	98066	Yes	NA	Yes	VOA Vial - Unpres	NP	
01	98067	Yes	NA	Yes	VOA Vial - Unpres	NP	
01	98068	Yes	NA	Yes	VOA Vial - Unpres	NP	
01	98069	Yes	NA	Yes	VOA Vial - Unpres	NP	
01	98070	Yes	NA	Yes	VOA Vial - Unpres	NP	
01	98080	Yes	NA	Yes	1L Amber - Unpres	NP	
01	98081	Yes	NA	Yes	1L Amber - Unpres	NP	
01	98082	Yes	NA	Yes	1L Amber - Unpres	NP	
01	98083	Yes	NA	Yes	1L Amber - Unpres	NP	
01	98084	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
01	98085	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
01	98086	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
01	98087	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
01	98088	Yes	NA	Yes	1L Poly - Unpres	NP	
01	98089	Yes	NA	Yes	1L Poly - Unpres	NP	
01	98090	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4	
01	98091	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4	

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Tighe & Bond - KPB/TB/MM

ESS Project ID: 1701175

Date Received: 1/10/2017

01	98092	Yes	NA	Yes	250 mL Poly - HNO3	HNO3		
01	98093	Yes	NA	Yes	250 mL Poly - HNO3	HNO3		
01	98094	Yes	NA	Yes	250 mL Poly - NaOH	NaOH	pH > 12	RL 1/10/17 1955
01	98095	Yes	NA	Yes	250 mL Poly - NaOH	NaOH	pH > 12	RL 1/10/17 1955
01	98096	Yes	NA	Yes	250 mL Poly - Unpres	NP		
01	98097	Yes	NA	Yes	250 mL Poly - Unpres	NP		
01	98098	Yes	NA	Yes	250 mL Poly - Unpres	NP		
02	98053	Yes	No	Yes	VOA Vial - HCl	HCl		
02	98054	Yes	No	Yes	VOA Vial - HCl	HCl		
02	98055	Yes	No	Yes	VOA Vial - HCl	HCl		
02	98056	Yes	No	Yes	VOA Vial - Unpres	NP		
02	98057	Yes	No	Yes	VOA Vial - Unpres	NP		
02	98058	Yes	No	Yes	VOA Vial - Unpres	NP		
02	98071	Yes	NA	Yes	1L Amber - Unpres	NP		
02	98072	Yes	NA	Yes	1L Amber - Unpres	NP		
02	98073	Yes	NA	Yes	1L Amber - H2SO4	H2SO4		
02	98074	Yes	NA	Yes	1L Amber - H2SO4	H2SO4		
02	98075	Yes	NA	Yes	1L Poly - Unpres	NP		
02	98076	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4		
02	98077	Yes	NA	Yes	250 mL Poly - NaOH	NaOH	pH > 12	RL 1/10/17 1955
02	98078	Yes	NA	Yes	250 mL Poly - Unpres	NP		
02	98079	Yes	NA	Yes	250 mL Poly - Unpres	NP		

2nd Review

Are barcode labels on correct containers?

Yes / No

Completed

By: [Signature]

Date & Time: 1/10/17 1958

Reviewed

By: [Signature]

Date & Time: 1/10/17 2009

Delivered

By: [Signature]

1/10/17 2009

ESS Laboratory

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

CHAIN OF CUSTODY

Turn Time										ESS Lab # 170117									
Regulatory State										Reporting Limits									
Is this project for any of the following? OCT RCP OMA MCP OGP										Electronic Deliverables									
Project # N-6198										Submit Checker									
Project Name Waco, N.Y. 115 km										Other (Please Specify)									
Address 745 Main St										Standard Excel									
City State MA 01508										TSS									
FAX Number 508-471-1615										TSS									
Collection Time										Analysis									
Sample Type										Sample ID									
1 11/10/17 11:00										17W-505A									
2 11/10/17 11:00										17W-505B									
3 11/10/17 11:00										17W-505A FF									
Container Type: AC-Air Cassette										G - Glass									
Container Volume: 1-100 mL										B-BOD Bottle									
Preservation Code: 1-Non Preserved										C-Cubittainer									
2-HCl										O-Other									
3-H2SO4										P-Poly									
4-HNO3										S-Sterile									
5-NaOH										V-Vial									
6-Methanol										10-8 oz									
7-Na2S2O3										11-Other									
8-ZnAc2, NaOH										12-Other									
9-NH4Cl										Number of Containers per Sample:									
10-D1 H2O										Sampled by: 7AP									
11-Ascorbic Acid										Comments:									
12-Other										Please specify "Other" preservative and containers types in this space									
Cooler Present: Yes										split FF samples from unidentified for sample 3 per client.									
Seals Intact: N/A										phthalates + PCP									
Cooler Temperature: 10.0 °C										Received By: (Signature, Date & Time)									
11/10/17 15:35										Relinquished By: (Signature, Date & Time)									
11/10/17 15:35										Received By: (Signature, Date & Time)									
11/10/17 15:35										Received By: (Signature, Date & Time)									

Laboratory Use Only										Received By: (Signature, Date & Time)									
Cooler Present: Yes										Relinquished By: (Signature, Date & Time)									
Seals Intact: N/A										Received By: (Signature, Date & Time)									
Cooler Temperature: 10.0 °C										Received By: (Signature, Date & Time)									
11/10/17 15:35										Relinquished By: (Signature, Date & Time)									
11/10/17 15:35										Received By: (Signature, Date & Time)									
11/10/17 15:35										Received By: (Signature, Date & Time)									

ESS Laboratory

Division of Thielsch Engineering, Inc.
185 Frances Avenue, Cranston RI 02910
Tel. (401) 461-7181 Fax (401) 461-4486
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CHAIN OF CUSTODY

ESS Lab # 170115									
Reporting Limits									
Electronic Deliverables									
☐ Submit Checker ☒ Other (Please Specify →)									
Standard Excel									
Project # N-8198 Project Name Waco, N.Y. 115 km Address 745 Main St PO # City Waco, N.Y. State MA 01068 Zip Code 01068 Email Address FAX Number Telephone Number Contact Person State									
Sample ID Sample Matrix Sample Type Collection Date Collection Time ESS Lab ID									
Analysis TSS Hexamethylenetriamine Chloride Cyanide MCP/4 Methyl VOC SVOC TPH MTB PCB LAMC									
Container Type: AC-Air Cassette AG-Amber Glass B-BOD Bottle C-Cubittainer G-Glass O-Other P-Poly S-Sterile V-Vial Container Volume: 1-100 mL 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz 11-Other Preservation Code: 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NAOH 6-Methanol 7-Na2S2O3 8-ZnAc2, NaOH 9-NH4Cl 10-DI H2O 11-Ascorbic Acid 12-Other									
Number of Containers per Sample:									

Laboratory Use Only		Sampled by: TAP Comments: Please specify "Other" preservative and containers types in this space	
Cooler Present: YES Seals Intact: NA Cooler Temperature: 10.0 °C 1.0 + 0.8	Relinquished By: (Signature, Date & Time) 1/10/17 1535	Relinquished By: (Signature, Date & Time) 1/10/17 18:11	Relinquished By: (Signature, Date & Time) 1/10/17 19:15

CERTIFICATE OF ANALYSIS

Michael Martin
Tighe & Bond
4 Barlows Landing Road, Unit 15
Pocasset, MA 02559

RE: Woburn to Mystic - RGP (N-998-11)
ESS Laboratory Work Order Number: 1711482

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 2:25 pm, Nov 20, 2017***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: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1711482

SAMPLE RECEIPT

The following samples were received on November 15, 2017 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 laboatroy that is able to achieve this limit. The data for Ethanol has been reported using our current method reporting limit.

<u>Lab Number</u>	<u>Sample Name</u>	<u>Matrix</u>	<u>Analysis</u>
1711482-01	Mystic at Winter	Surface Water	200.7, 3113B, 350.1, 3500Cr B-2009, 9040
1711482-02	Mystic	Surface Water	200.7, 3113B, 350.1, 3500Cr B-2009, 9040
1711482-03	Mystic Crossing	Surface Water	200.7, 3113B, 350.1, 3500Cr B-2009, 9040
1711482-04	Aberjona	Surface Water	200.7, 3113B, 350.1, 3500Cr B-2009, 9040
1711482-05	Winter Pond	Surface Water	200.7, 3113B, 350.1, 3500Cr B-2009, 9040
1711482-06	Mystic at Boston Inner	Surface Water	200.7, 2520B, 3113B, 350.1, 3500Cr B-2009, 9040
1711482-07	Mystic at Laydown	Surface Water	200.7, 3113B, 350.1, 3500Cr B-2009, 9040



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1711482

PROJECT NARRATIVE

Total Metals

1711482-06 [Elevated Method Reporting Limits due to sample matrix \(EL\).](#)

Cadmium , Copper , Nickel

1711482-07 [Elevated Method Reporting Limits due to sample matrix \(EL\).](#)

Cadmium , Copper , Nickel

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

[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: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1711482

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: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: Mystic at Winter
Date Sampled: 11/15/17 10:00
Percent Solids: N/A

ESS Laboratory Work Order: 1711482
ESS Laboratory Sample ID: 1711482-01
Sample Matrix: Surface Water
Units: ug/L

Extraction Method: 3005A/200.7

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Arsenic	ND (2.5)		3113B		5	KJK	11/18/17 6:38	100	10	CK71531
Cadmium	ND (2.00)		200.7		2	KJK	11/16/17 16:08	100	10	CK71531
Chromium	ND (4.0)		200.7		2	KJK	11/16/17 16:08	100	10	CK71531
Chromium III	ND (10.0)		200.7		2	JLK	11/16/17 16:08	1	1	[CALC]
Copper	ND (2.0)		200.7		2	KJK	11/16/17 16:08	100	10	CK71531
Hardness	184000 (824)		200.7		10	KJK	11/16/17 15:04	1	1	[CALC]
Iron	251 (100)		200.7		10	KJK	11/16/17 15:04	100	10	CK71531
Lead	ND (4.0)		200.7		2	KJK	11/16/17 16:08	100	10	CK71531
Nickel	ND (4.0)		200.7		2	KJK	11/16/17 16:08	100	10	CK71531
Zinc	10.9 (10.0)		200.7		2	KJK	11/16/17 16:08	100	10	CK71531



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: Mystic at Winter
Date Sampled: 11/15/17 10:00
Percent Solids: N/A

ESS Laboratory Work Order: 1711482
ESS Laboratory Sample ID: 1711482-01
Sample Matrix: Surface Water

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Ammonia as N	0.45 (0.10)		350.1		1	EEM	11/17/17 14:44	mg/L	CK71613
Hexavalent Chromium	ND (10.0)		3500Cr B-2009		1	JLK	11/15/17 20:47	ug/L	CK71546
pH	7.25 (N/A)		9040		1	BCA	11/15/17 21:40	S.U.	CK71549
pH Sample Temp	Aqueous pH measured in water at 17.4 °C. (N/A)								



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: Mystic
Date Sampled: 11/15/17 10:30
Percent Solids: N/A

ESS Laboratory Work Order: 1711482
ESS Laboratory Sample ID: 1711482-02
Sample Matrix: Surface Water
Units: ug/L

Extraction Method: 3005A/200.7

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Arsenic	ND (2.5)		3113B		5	KJK	11/18/17 6:44	100	10	CK71531
Cadmium	ND (2.00)		200.7		2	KJK	11/16/17 16:12	100	10	CK71531
Chromium	ND (4.0)		200.7		2	KJK	11/16/17 16:12	100	10	CK71531
Chromium III	ND (10.0)		200.7		2	JLK	11/16/17 16:12	1	1	[CALC]
Copper	ND (2.0)		200.7		2	KJK	11/16/17 16:12	100	10	CK71531
Hardness	181000 (824)		200.7		10	KJK	11/16/17 15:08	1	1	[CALC]
Iron	121 (100)		200.7		10	KJK	11/16/17 15:08	100	10	CK71531
Lead	ND (4.0)		200.7		2	KJK	11/16/17 16:12	100	10	CK71531
Nickel	ND (4.0)		200.7		2	KJK	11/16/17 16:12	100	10	CK71531
Zinc	10.2 (10.0)		200.7		2	KJK	11/16/17 16:12	100	10	CK71531



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: Mystic
Date Sampled: 11/15/17 10:30
Percent Solids: N/A

ESS Laboratory Work Order: 1711482
ESS Laboratory Sample ID: 1711482-02
Sample Matrix: Surface Water

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Ammonia as N	0.27 (0.10)		350.1		1	EEM	11/17/17 14:47	mg/L	CK71613
Hexavalent Chromium	ND (10.0)		3500Cr B-2009		1	JLK	11/15/17 20:47	ug/L	CK71546
pH	7.36 (N/A)		9040		1	BCA	11/15/17 21:40	S.U.	CK71549
pH Sample Temp	Aqueous pH measured in water at 17.2 °C. (N/A)								



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: Mystic Crossing
Date Sampled: 11/15/17 09:30
Percent Solids: N/A

ESS Laboratory Work Order: 1711482
ESS Laboratory Sample ID: 1711482-03
Sample Matrix: Surface Water
Units: ug/L

Extraction Method: 3005A/200.7

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Arsenic	ND (2.5)		3113B		5	KJK	11/18/17 6:55	100	10	CK71531
Cadmium	ND (2.00)		200.7		2	KJK	11/16/17 16:16	100	10	CK71531
Chromium	ND (4.0)		200.7		2	KJK	11/16/17 16:16	100	10	CK71531
Chromium III	ND (10.0)		200.7		2	JLK	11/16/17 16:16	1	1	[CALC]
Copper	ND (2.0)		200.7		2	KJK	11/16/17 16:16	100	10	CK71531
Hardness	147000 (824)		200.7		10	KJK	11/16/17 15:12	1	1	[CALC]
Iron	134 (100)		200.7		10	KJK	11/16/17 15:12	100	10	CK71531
Lead	ND (4.0)		200.7		2	KJK	11/16/17 16:16	100	10	CK71531
Nickel	ND (4.0)		200.7		2	KJK	11/16/17 16:16	100	10	CK71531
Zinc	11.1 (10.0)		200.7		2	KJK	11/16/17 16:16	100	10	CK71531



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: Mystic Crossing
Date Sampled: 11/15/17 09:30
Percent Solids: N/A

ESS Laboratory Work Order: 1711482
ESS Laboratory Sample ID: 1711482-03
Sample Matrix: Surface Water

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Ammonia as N	0.35 (0.10)		350.1		1	EEM	11/17/17 14:48	mg/L	CK71613
Hexavalent Chromium	ND (10.0)		3500Cr B-2009		1	JLK	11/15/17 20:47	ug/L	CK71546
pH	7.13 (N/A)		9040		1	BCA	11/15/17 21:40	S.U.	CK71549
pH Sample Temp	Aqueous pH measured in water at 17.1 °C. (N/A)								



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: Mystic at Laydown
Date Sampled: 11/15/17 11:00
Percent Solids: N/A

ESS Laboratory Work Order: 1711482
ESS Laboratory Sample ID: 1711482-07
Sample Matrix: Surface Water
Units: ug/L

Extraction Method: 3005A/200.7

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Arsenic	ND (5.0)		3113B		10	KJK	11/19/17 5:04	100	10	CK71531
Cadmium	EL ND (10.0)		200.7		10	KJK	11/16/17 16:04	100	10	CK71531
Chromium	ND (20.0)		200.7		10	KJK	11/16/17 16:04	100	10	CK71531
Chromium III	ND (20.0)		200.7		10	JLK	11/16/17 16:04	1	1	[CALC]
Copper	EL ND (10.0)		200.7		10	KJK	11/16/17 16:04	100	10	CK71531
Hardness	221000 (824)		200.7		10	KJK	11/17/17 11:22	1	1	[CALC]
Iron	274 (100)		200.7		10	KJK	11/16/17 16:04	100	10	CK71531
Lead	ND (2.0)		3113B		10	KJK	11/17/17 21:48	100	10	CK71531
Nickel	EL ND (20.0)		200.7		10	KJK	11/16/17 16:04	100	10	CK71531
Zinc	ND (50.0)		200.7		10	KJK	11/16/17 16:04	100	10	CK71531



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP
Client Sample ID: Mystic at Laydown
Date Sampled: 11/15/17 11:00
Percent Solids: N/A

ESS Laboratory Work Order: 1711482
ESS Laboratory Sample ID: 1711482-07
Sample Matrix: Surface Water

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Ammonia as N	0.28 (0.10)		350.1		1	EEM	11/17/17 14:51	mg/L	CK71613
Hexavalent Chromium	ND (10.0)		3500Cr B-2009		1	JLK	11/15/17 20:47	ug/L	CK71546
pH	7.46 (N/A)		9040		1	BCA	11/15/17 21:40	S.U.	CK71549
pH Sample Temp	Aqueous pH measured in water at 17.6 °C. (N/A)								



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1711482

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CK71531 - 3005A/200.7

Blank

Arsenic	ND	0.5	ug/L
Cadmium	ND	1.00	ug/L
Chromium	ND	2.0	ug/L
Chromium III	ND	2.00	ug/L
Copper	ND	1.0	ug/L
Hardness	ND	82.4	ug/L
Iron	ND	10.0	ug/L
Lead	ND	0.2	ug/L
Lead	ND	2.0	ug/L
Nickel	ND	2.0	ug/L
Silver	ND	0.5	ug/L
Zinc	ND	5.0	ug/L

LCS

Arsenic	44.8	12.5	ug/L	50.00	90	85-115
Cadmium	23.6	1.00	ug/L	25.00	94	85-115
Chromium	48.9	2.0	ug/L	50.00	98	85-115
Chromium III	48.9	2.00	ug/L			
Copper	52.4	1.0	ug/L	50.00	105	85-115
Hardness	3260	82.4	ug/L			
Iron	239	10.0	ug/L	250.0	96	85-115
Lead	45.3	5.0	ug/L	50.00	91	85-115
Lead	49.7	2.0	ug/L	50.00	99	85-115
Nickel	48.8	2.0	ug/L	50.00	98	85-115
Silver	26.1	0.5	ug/L	25.00	104	85-115
Zinc	51.7	5.0	ug/L	50.00	103	85-115

LCS Dup

Arsenic	48.5	12.5	ug/L	50.00	97	85-115	8	20
Cadmium	23.4	1.00	ug/L	25.00	94	85-115	0.7	20
Chromium	48.7	2.0	ug/L	50.00	97	85-115	0.4	20
Chromium III	48.7	2.00	ug/L					
Copper	52.0	1.0	ug/L	50.00	104	85-115	0.8	20
Hardness	3210	82.4	ug/L					
Iron	237	10.0	ug/L	250.0	95	85-115	0.8	20
Lead	47.5	5.0	ug/L	50.00	95	85-115	5	20
Lead	49.8	2.0	ug/L	50.00	100	85-115	0.02	20
Nickel	48.2	2.0	ug/L	50.00	96	85-115	1	20
Silver	26.0	0.5	ug/L	25.00	104	85-115	0.2	20
Zinc	53.8	5.0	ug/L	50.00	108	85-115	4	20

Batch CK71546 - [CALC]

Blank

Chromium III	ND	10.0	ug/L
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LCS

Chromium III	ND		ug/L
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CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1711482

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Total Metals

Batch CK71546 - [CALC]

LCS Dup

Chromium III	ND		ug/L							
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Classical Chemistry

Batch CK71546 - General Preparation

Blank

Hexavalent Chromium	ND	10.0	ug/L							
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LCS

Hexavalent Chromium	0.503		mg/L	0.4998		101	90-110			
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LCS Dup

Hexavalent Chromium	0.516		mg/L	0.4998		103	90-110	3	20	
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Batch CK71613 - NH4 Prep

Blank

Ammonia as N	ND	0.10	mg/L							
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LCS

Ammonia as N	0.08	0.10	mg/L	0.09994		81	80-120			
--------------	------	------	------	---------	--	----	--------	--	--	--

LCS

Ammonia as N	1.02	0.10	mg/L	0.9994		102	80-120			
--------------	------	------	------	--------	--	-----	--------	--	--	--

Batch CK71644 - General Preparation

LCS

Salinity	1.0		ppt	1.000		96	85-115			
----------	-----	--	-----	-------	--	----	--------	--	--	--



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1711482

Notes and Definitions

Z16d	Aqueous pH measured in water at 17.7 °C.
Z16c	Aqueous pH measured in water at 17.6 °C.
Z16b	Aqueous pH measured in water at 17.4 °C.
Z16a	Aqueous pH measured in water at 17.2 °C.
Z16	Aqueous pH measured in water at 17.1 °C.
U	Analyte included in the analysis, but not detected
EL	Elevated Method Reporting Limits due to sample matrix (EL).
D	Diluted.
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: Tighe & Bond

Client Project ID: Woburn to Mystic - RGP

ESS Laboratory Work Order: 1711482

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/meecd/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: Tighe & Bond - KPB/TB/MM

ESS Project ID: 1711482

Shipped/Delivered Via: ESS Courier

Date Received: 11/15/2017

Project Due Date: 11/17/2017

Days for Project: 2 Day

1. Air bill manifest present? ☐ No
Air No.: NA

6. Does COC match bottles? ☐ Yes

2. Were custody seals present? ☐ No

7. Is COC complete and correct? ☐ Yes

3. Is radiation count <100 CPM? ☐ Yes

8. Were samples received intact? ☐ Yes

4. Is a Cooler Present? ☐ Yes
Temp: 0.4 Iced with: Ice

9. Were labs informed about short holds & rushes? ☒ Yes / No / NA

5. Was COC signed and dated by client? ☐ Yes

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	182550	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4	
01	182557	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	
01	182570	Yes	NA	Yes	250 mL Poly - Unpres	NP	
01	182571	Yes	NA	Yes	250 mL Poly - Unpres	NP	
01	182578	Yes	NA	Yes	250 mL Amber - Unpres	NP	
02	182549	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4	
02	182556	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	
02	182568	Yes	NA	Yes	250 mL Poly - Unpres	NP	
02	182569	Yes	NA	Yes	250 mL Poly - Unpres	NP	
02	182577	Yes	NA	Yes	250 mL Amber - Unpres	NP	
03	182548	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4	
03	182555	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	
03	182566	Yes	NA	Yes	250 mL Poly - Unpres	NP	
03	182567	Yes	NA	Yes	250 mL Poly - Unpres	NP	
03	182576	Yes	NA	Yes	250 mL Amber - Unpres	NP	
04	182547	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4	
04	182554	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	
04	182564	Yes	NA	Yes	250 mL Poly - Unpres	NP	
04	182565	Yes	NA	Yes	250 mL Poly - Unpres	NP	
04	182575	Yes	NA	Yes	250 mL Amber - Unpres	NP	
05	182546	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4	
05	182553	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	
05	182562	Yes	NA	Yes	250 mL Poly - Unpres	NP	
05	182563	Yes	NA	Yes	250 mL Poly - Unpres	NP	

ESS Laboratory Sample and Cooler Receipt Checklist

Client: Tighe & Bond - KPB/TB/MM

ESS Project ID: 1711482

Date Received: 11/15/2017

05	182574	Yes	NA	Yes	250 mL Amber - Unpres	NP
06	182545	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4
06	182552	Yes	NA	Yes	250 mL Poly - HNO3	HNO3
06	182560	Yes	NA	Yes	250 mL Poly - Unpres	NP
06	182561	Yes	NA	Yes	250 mL Poly - Unpres	NP
06	182573	Yes	NA	Yes	250 mL Amber - Unpres	NP
07	182544	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4
07	182551	Yes	NA	Yes	250 mL Poly - HNO3	HNO3
07	182558	Yes	NA	Yes	250 mL Poly - Unpres	NP
07	182559	Yes	NA	Yes	250 mL Poly - Unpres	NP
07	182572	Yes	NA	Yes	250 mL Amber - Unpres	NP

2nd Review

Are barcode labels on correct containers?

☒ Yes / No

Completed

By: [Signature]

Date & Time: 11/15/17 1907

Reviewed

By: [Signature]

Date & Time: 11/15/17 2029

Delivered

By: [Signature]

11/15/17 2029

ESS Laboratory

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

CHAIN OF CUSTODY

ESS Lab #

1711482

Turn Time	5-Day	Rush	2-Day
Regulatory State	Massachusetts		
Is this project for any of the following?:			
OCT RCP	OMA MCP	RGP	

Reporting Limits

GW-1

Electronic ☒ Limit Checker ☒ Standard Excel
Deliverables ☒ Other (Please Specify →) pdf

Company Name Tighe & Bond			Project # N-998-11		Project Name Mystic to Woburn		Analysis	pH	Hardness	Cr+6	NH4	Salinity	Arsenic	Cadmium	Chromium III	Copper	Iron	Lead	Nickel	Silver	Zinc						
Contact Person Dean Bebis			Address 1 University Ave																								
City Westwood		State MA	Zip Code 02090		PO #																						
Telephone Number (508) 654-0492		FAX Number		Email Address dsbebis@tighebond.com																							
ESS Lab ID	Collection Date	Collection Time	Sample Type	Sample Matrix	Sample ID																						
01	11-15-17	10:00	Grab	Surface Water	Mystic at Winter		X	X	X	X		X	X	X	X	X	X	X	X								
02	11-15-17	10:30	Grab	Surface Water	Mystic		X	X	X	X		X	X	X	X	X	X	X	X								
03	11-15-17	9:30	Grab	Surface Water	Mystic Crossing		X	X	X	X		X	X	X	X	X	X	X	X								
04	11-15-17	9:00	Grab	Surface Water	Aberjona		X	X	X	X		X	X	X	X	X	X	X	X								
05	11-15-17	8:30	Grab	Surface Water	Winter Pond		X	X	X	X		X	X	X	X	X	X	X	X								
06	11-15-17	11:30	Grab	Surface Water	Mystic at Boston Inner		X		X	X	X	X	X	X	X	X	X	X	X								
07	11-15-17	11:00	Grab	Surface Water	Mystic at Laydown		X	X	X	X		X	X	X	X	X	X	X	X								
Container Type: AC-Air Cassette AG-Amber Glass B-BOD Bottle C-Cubitainer G - Glass O-Other P-Poly S-Sterile V-Vial																											
Container Volume: 1-100 mL 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz 11-Other*																											
Preservation Code: 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAce, NaOH 9-NH4Cl 10-DI H2O 11-Other*																											
Number of Containers per Sample:																											
Laboratory Use Only							Sampled by: Colleen Brothers																				
Cooler Present: ☒							Comments: Please specify "Other" preservative and containers types in this space																				
Seals Intact: ☒																											
Cooler Temperature: 0.4°C							Eversource Pricing																				
Relinquished by: (Signature, Date & Time)							Received By: (Signature, Date & Time)							Relinquished By: (Signature, Date & Time)							Received By: (Signature, Date & Time)						
Colleen E. Brothers 11-15-17 14:00							11/15/17 16:00							11/15/17 17:00							11/15/17 18:55						
Relinquished by: (Signature, Date & Time)							Received By: (Signature, Date & Time)							Relinquished By: (Signature, Date & Time)							Received By: (Signature, Date & Time)						

CERTIFICATE OF ANALYSIS

Michael Martin
Tighe & Bond
4 Barlows Landing Road, Unit 15
Pocasset, MA 02559

RE: Woburn to Mystic (N-0998-11-13)
ESS Laboratory Work Order Number: 1711673

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 2:35 pm, Nov 28, 2017****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: Tighe & Bond
Client Project ID: Woburn to Mystic

ESS Laboratory Work Order: 1711673

SAMPLE RECEIPT

The following samples were received on November 22, 2017 for the analyses specified on the enclosed Chain of Custody Record.

To achieve CAM compliance for MCP data, ESS Laboratory has reviewed all QA/QC Requirements and Performance Standards listed in each method. Holding times and preservation have also been reviewed. All CAM requirements have been performed and achieved unless noted in the project narrative.

Each method has been set-up in the laboratory to reach required MCP standards. The methods for aqueous VOA and Soil Methanol VOA have known limitations for certain analytes. The regulatory standards may not be achieved due to these limitations. In addition, for all methods, matrix interferences, dilutions, and %Solids may elevate method reporting limits above regulatory standards. ESS Laboratory can provide, upon request, a Limit Checker (regulatory standard comparison spreadsheet) electronic deliverable which will highlight these exceedances.

<u>Lab Number</u>	<u>Sample Name</u>	<u>Matrix</u>	<u>Analysis</u>
1711673-01	MW-36	Ground Water	6010C
1711673-02	MW-102	Ground Water	6010C



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic

ESS Laboratory Work Order: 1711673

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

[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: Tighe & Bond
Client Project ID: Woburn to Mystic

ESS Laboratory Work Order: 1711673

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: Tighe & Bond
Client Project ID: Woburn to Mystic
Client Sample ID: MW-36
Date Sampled: 11/22/17 06:00
Percent Solids: N/A

ESS Laboratory Work Order: 1711673
ESS Laboratory Sample ID: 1711673-01
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: [CALC]

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Hardness	142000 (412)		6010C		1	KJK	11/22/17 23:13	1	1	[CALC]



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic
Client Sample ID: MW-102
Date Sampled: 11/22/17 06:30
Percent Solids: N/A

ESS Laboratory Work Order: 1711673
ESS Laboratory Sample ID: 1711673-02
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: [CALC]

Total Metals

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>I/V</u>	<u>F/V</u>	<u>Batch</u>
Hardness	426000 (412)		6010C		1	KJK	11/22/17 23:47	1	1	[CALC]



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond
Client Project ID: Woburn to Mystic

ESS Laboratory Work Order: 1711673

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch CK72229 - 3005A/200.7										
Blank										
Calcium	ND	0.100	mg/L							
Hardness	ND	412	ug/L							
Magnesium	ND	0.100	mg/L							
LCS										
Calcium	2.38	0.100	mg/L	2.500		95	80-120			
Hardness	15400	412	ug/L							
Magnesium	2.30	0.100	mg/L	2.500		92	80-120			
LCS Dup										
Calcium	2.40	0.100	mg/L	2.500		96	80-120	0.6	20	
Hardness	15600	412	ug/L							
Magnesium	2.33	0.100	mg/L	2.500		93	80-120	1	20	



CERTIFICATE OF ANALYSIS

Client Name: Tighe & Bond

Client Project ID: Woburn to Mystic

ESS Laboratory Work Order: 1711673

Notes and Definitions

U	Analyte included in the analysis, but not detected
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: Tighe & Bond
Client Project ID: Woburn to Mystic

ESS Laboratory Work Order: 1711673

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/meecd/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: Tighe & Bond - KPB/TB/MM

ESS Project ID: 1711673
 Date Received: 11/22/2017
 Project Due Date: 11/28/2017
 Days for Project: 2 Day

Shipped/Delivered Via: ESS Courier

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: 2.3 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	185126	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	
02	185125	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	

2nd Review
 Are barcode labels on correct containers? ☒ Yes / No

Completed By: [Signature] Date & Time: 11/22/17 1845
 Reviewed By: [Signature] Date & Time: 11/22/17 1944
 Delivered By: [Signature] Date & Time: 11/22/17 1944

ESS Laboratory

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

CHAIN OF CUSTODY

ESS Lab #

1711673

Reporting Limits

GW-1

Electronic

☒ Limit Checker

☒ Standard Excel

Deliverables

☒ Other (Please Specify -->)

Eversource EDD

Company Name

Tighe and Bond

Contact Person

Dean Bebis

Project #

N-0998-11-13

Project Name

Woburn to Mystic

Address

1 University Ave

Zip Code

02090

PO #

Email Address

dsbebis@tighebond.com

City

Westwood

State

MA

Telephone Number

FAX Number

Analysis

Hardness

ANALYSIS REQUESTED

ESS Lab ID

Collection Date

Collection Time

Sample Type

Sample Matrix

Sample ID

01

11/22/17

600

G

Groundwater

MW-36

x

02

11/22/17

630

G

Groundwater

MW-102

x

Container Type: AC-Air Cassette AG-Amber Glass B-BOD Bottle C-Cubitainer G - Glass O-Other P-Poly S-Sterile V-Vial

p

Container Volume: 1-100 mL 2-2.5 gal 3-250 mL 4-300 mL 5-500 mL 6-1L 7-VOA 8-2 oz 9-4 oz 10-8 oz 11-Other*

3

Preservation Code: 1-Non Preserved 2-HCl 3-H2SO4 4-HNO3 5-NaOH 6-Methanol 7-Na2S2O3 8-ZnAc2, NaOH 9-NH4Cl 10-DI H2O 11-Other*

4

Number of Containers per Sample:

1

Laboratory Use Only

Cooler Present:

yes

Seals Intact:

yes

Cooler Temperature:

16.20 °C ice temp: 2.3

Sampled by: DSB

Comments:

Please specify "Other" preservative and containers types in this space

Eversource pricing

Pricing provided in Quote provide by Tim Byrnes

Relinquished by: (Signature, Date & Time)

Received By: (Signature, Date & Time)

Relinquished By: (Signature, Date & Time)

Received By: (Signature, Date & Time)

Relinquished by: (Signature, Date & Time)

Received By: (Signature, Date & Time)

Relinquished By: (Signature, Date & Time)

Received By: (Signature, Date & Time)