GEI Consultants

Consulting Engineers and Scientists

July 29, 2019, Revised August 13, 2019
Project 1703581

Via E-mail: NPDES.Generalpermits@epa.gov

Ms. Shelly Puleo
Environmental Protection Agency
RGP NOI Processing
5 Post Office Square, Suite 100
Mail Code OEP06-4
Boston, MA 02109-3912

Dear Ms. Puleo:

Re: Notice of Intent
NPDES Remediation General Permit
New Inpatient Building
Beth Israel Deaconess Medical Center
111 Francis Street
Boston, Massachusetts

On behalf of Beth Israel Deaconess Medical Center (BIDMC), GEI Consultants, Inc. has prepared this Notice of Intent (NOI) for coverage under the National Pollutant Discharge Elimination System (NPDES) Remediation General Permit (RGP), Massachusetts General Permit (MAG910000). This NOI was prepared in accordance with the general requirements of the NPDES RGP under Federal Register, Vol. 82, No. 12, dated January 19, 2017, and related guidance documentation provided by the U.S. Environmental Protection Agency (EPA). The completed NOI form is in Appendix A.

A copy of this NOI is being sent to the MassDEP Bureau of Resource Protection Water along with a check in the amount of $500 payable to the Commonwealth of Massachusetts for the required compliance fee. A copy of the check and fee transmittal form are in Appendix B. Once EPA issues an RGP authorization for this project, and before the start of work, we will apply for a Boston Water and Sewer Commission (BWSC) Dewatering Discharge Permit.

Site Information

This NOI has been prepared for the discharge of dewatering effluent during construction of the proposed New Inpatient Building (NIB) located at the intersection of Deaconess and Pilgrim Roads on the BIDMC West Campus in Boston, Massachusetts (the Property; Fig. 1). The NIB will be a 10- to 12-story building with a 2-level basement (Fig. 2). The footprint of the proposed NIB is was formerly occupied by the Emergency Department Entrance and Ambulance Bays of the Rosenberg Building, which are currently being relocated to the northwest side of the building on Pilgrim Street.

A historical Massachusetts Department of Environmental Protection (MassDEP) disposal site (Release Tracking Number [RTN] 3-1470) is located in the southwest portion of the NIB footprint. A gasoline service station had been located on the property, and the disposal site (RTN 3-1470) was closed with a Waiver Completion Statement in 1996. The remainder of the NIB footprint is not currently a MassDEP disposal site.

GEI Consultants, Inc.
400 Unicorn Park Drive, Woburn, MA 01801
781.721.4000 fax: 781.721.4073

Construction dewatering will be necessary during subsurface construction and excavation for the NIB. Dewatering effluent will be discharged to nearby BWSC catch basins, which discharge to the Muddy River via Outfall SDO161 (Fig. 3), in accordance with the RGP.

Owner and Operator Information Owner

Owner
BIDMC
200 Brookline Avenue, Suite OV-400B
Boston, MA 02215
Contact: David M. Flanagan
Senior Director of Capital Facilities
(617) 975-9931
jdmflanag@bidmc.harvard.edu

Operator
J. Derenzo Co.
338 Howard Street
Brockton, MA 02302
Contact: Peter Burch
Project Executive
(508) 328-5241
pburch@jderenzo.com

As the owner, BIDMC has operational control over the construction plans and specifications, including the ability to make modifications to those plans and specifications. J. Derenzo Co. of Brockton, Massachusetts, as the operator, will direct the personnel responsible for the implementation and day-to-day operations and activities that are necessary to ensure compliance with the NPDES RGP, including operation, inspection, monitoring, and reporting. The owner and operator are applying for coverage under the RGP as co-permittees.

Receiving Water Information

Receiving water quality data, collected by GEI on June 21, 2019 on behalf of BIDMC supports this NOI. A sample from the Muddy River, the receiving water, was collected approximately 250 feet southwest of the BWSC outfall (SDO161). The sample was submitted to ESS Laboratory, Inc. (ESS) of Cranston, Rhode Island for analysis of metals, hardness, ammonia, and pH. The results are summarized in Table 1 and the associated laboratory data report is in Appendix C. Receiving water temperature was obtained in the field and is noted on the effluent limitations input calculation page in Appendix A.

The seven-day-ten-year flow 7Q10 of the receiving water (Muddy River) was established using the U.S. Geological Survey (USGS) StreamStats program and confirmed by the MassDEP on July 3, 2019. The StreamStats report, Dilution Factor calculations, and MassDEP confirmation of the 7Q10 and Dilution Factor are included in Appendix A. The 7Q10 of the Muddy River is 0.547 ft^3/s and the Dilution Factor is 3.5.

The effluent limits were generated using the NPDES RGP NOI Dilution Factor Calculation spreadsheet. Copies of the "EnterData" and "FreshwaterResults" tabs from the spreadsheet are provided in Appendix A. The resulting calculated effluent limits are in Table 2.

Source Water Information

We evaluated the proposed influent by collecting two groundwater samples from the Property. The groundwater samples were collected from monitoring wells B202(OW) and B203(OW) on June 21, 2019 (Fig. 2) and submitted to ESS for analysis of the parameters required under the NPDES RGP. In addition, the pH and temperature of the proposed influent was measured in the field to evaluate existing conditions. The results are in Table 2 and the associated laboratory data report for these samples are provided in Appendix D.

The analytical results indicated the presence of ammonia, chloride, metals (antimony, iron, lead, and zinc), 1,4-dioxane (a volatile organic compound [VOC]), and methyl-tert-butyl ether (MTBE; a fuel parameter). The measured pH range of the groundwater within the project site was approximately

7.0 to 7.7 standard units (s.u.). The pH range detected is within the RGP effluent limit for Massachusetts waters (6.5 to 8.3 s.u.).

Treatment System Information

During construction, the collected water will be treated to remove suspended solids using a sedimentation tank and bag filters. The proposed conceptual treatment system is shown in the process flow diagram in Fig. 4. Additional treatment may include granulated activated carbon (GAC), ion exchange, and pH adjustment, if necessary.

Although final products for additional treatment will be determined by the operator or their designated contractor, example product information, including Safety Data Sheets (SDSs), associated hazards, operation recommendations, and product information for GAC and ion exchange systems adjustment are in Appendix A. These systems will be mobilized as necessary to achieve effluent limitations.

If required, pH adjustment will consist of using a metered sulfuric acid (70-100%) system to maintain pH within the effluent discharge limits of 6.5 to 8.3 S.U., and dosing will be automatically controlled using a meter pump, pH controller, and probe. In accordance with Part 2.5.3.d.i of the RGP, the product information, including dosing and metering are in Appendix A. . The sulfuric acid will be stored in 55-gallon drums with secondary containment systems. Procedures for proper handling and spill prevention are included in the project-specific Best Management Practices Plan (BMPP).

The estimated maximum magnitude of application (i.e. "ceiling value") would be 48 gallons of sulfuric acid per day at a flow rate of 0.144 million gallons per day (MGD), which results in a concentration of 333 parts per million. The lethal concentration to kill 50% of the fish population (LC50) in a receiving water is 510 ppm per the SDS in Appendix A. Therefore the "ceiling value" is less than the LC50 value. Actual daily application of sulfuric acid is anticipated to be less than 0.5 gallons per day.

Part F of the RGP requires that chemical additives be identified if applied to the effluent prior to discharge. To satisfy the confirmation requirements of RGP Part 2.5.3.d.ii:

- The addition of pH conditioner will not add any pollutants in concentrations which exceed permit effluent limitations;
- The use of this chemical will not result in exceedance of applicable water quality standard; and
- This chemical will not add any pollutants that would justify the application of permit conditions that are different from or absent in the permit.

The addition of sulfuric acid to reduce pH levels is an established practice for temporary construction dewatering, and is not expected to exceed applicable effluent limits, water quality standards, or alter conditions in the receiving water. Therefore, it is our opinion, that no additional testing is necessary for use of sulfuric acid or to demonstrate that use of this product will adversely affect the receiving water.

Discharge Information

We anticipate treated effluent discharge rates to be about 50 gallons per minute (gpm) or less, with occasional peak flows of approximately 100 gpm during significant precipitation events. The treated water will be discharged to any of four catch basins surrounding the NIB. These discharge locations are on Fig. 2 and the catch basins are identified in Appendix E as Proposed Discharge Points 1 through 4. According to plans we reviewed from BWSC's Engineering Department on June 18, 2019, these catch basins are part of the BWSC storm water drainage system that discharges to an outfall (SDO161) at the Muddy River, approximately 0.1 mile from the Site. An annotated copy of the BWSC plan showing the discharge path and ultimate discharge outfall at the Muddy River is in Appendix E.

Endangered Species Act Eligibility

We reviewed the U.S. Fish and Wildlife Service (FWS) Information, Planning, and Conservation (IPAC) online database for the site and receiving water ("project action area"). A copy of the database report is in Appendix F. Based on this report, the project action area meets FWS Criterion A (i.e., no listed species or critical habitats are within the project action area).

National Historic Preservation Requirements

We reviewed online records from the U.S. National Register of Historic Places database and the Massachusetts Cultural Resource Information System (MACRIS). Maps of the Property and surrounding areas obtained from both databases are included in Appendix G. Based on the review, the Property is not a listed as a National Historic Place. Portions of the BIDMC campus adjacent to the Property have been inventoried by the Massachusetts Historic Commission; however, the Property is not included in these areas.

The point where the discharge reaches the receiving water (i.e., Outfall SDO161 to the Muddy River) is not listed as a National Historic Place. However, the Olmsted Park System, which includes the banks of the Muddy River where the outfall is located, is a listed National Historic Place, but includes the upland riverbanks and adjacent buildings and structures, not the river itself. The inventory listing from the MACRIS database is included in Appendix G. Files related to the district have not yet been digitized on the National Register of Historic Places database, but the National Register of Historic Places Inventory-Nomination Form is included in Appendix G.

Coverage Under NPDES RGP

It is our opinion that the proposed discharge is eligible for coverage under the NPDES RGP based on the requirements of the NPDES RGP and our evaluation of the available project-specific information. On behalf of BIDMC, we are requesting coverage under the NPDES RGP for the discharge of treated construction dewatering effluent to the surface waters of the Muddy River via the BWSC storm water drainage system.

The attached NOI form and supporting documentation provides required information on the general site conditions, discharge, treatment system, receiving water, and consultation with federal services (Appendices A through G). A Best Management Practice Plan (BMPP), to be implemented at the Site during construction dewatering, treatment, and discharge is in Appendix H. Discharge of treated water is scheduled to begin in August 2019.

Please contact me at 781.721.4012 or igladstone@geiconsultants.com or Heather Ballantyne at 781.721.406 or hballantyne@geiconsultants.com if you have any questions.

Sincerely,

GEI CONSULTANTS, INC.

Ileen S. Gladstone, P.E., LSP, LEED AP
Senior Vice President

Heather A. Ballantyne, P.G., LSP
Project Manager

JLE/ISG/HBH:jam
Attachments
c: David M. Flanagan, BIDMC
Peter Burch, J. Derenzo Co.
Surface Water Discharge Program, MassDEP

Tables

Table 1. Chemical Testing Results - Receiving Water (Muddy River)
New Inpatient Building
Beth Israel Deaconess Medical Center
Boston, Massachusetts

		Sample Location:	**SW-1**
		Sample Date:	**6/21/2019**
Analyte	**Method**	**Units**	
Total Metals		ug/l	
Antimony	6020A		1.2
Arsenic	7010		1.3
Copper	6010C		11.5
Iron	6010C		1750
Lead	6010C		9.8
Zinc	6010C		39
Other			
Hardness	6010C	ug/l	47900
Ammonia as Nitrogen	350.1	ug/l	0.24
pH	9040	S.U.	6.87

General Notes:

1. Only analytes detected in at least one sample are reported here. For a complete list of analytes, see the laboratory data sheets.
2. "<" = Analyte not detected at a concentration above the laboratory reporting limit.
3. µg/l = micrograms per liter.
4. S.U. = standard units.

Table 2. Chemical Testing Results - Groundwater
New Inpatient Building
Beth Israel Deaconess Medical Center
Boston, Massachusetts

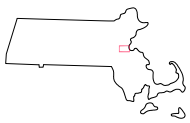
					Sample Location:	B202(OW)	B203(OW)
					Sample Date:	6/21/2019	6/21/2019
					Screen Interval:	45-65	40-50
Analyte	**Method**	**Units**	**MCP RCGW-2**	**Site Specific Effluent Limits**			
Volatile Organic Compounds (VOCs)		ug/l					
Total BTEX	524.2		NS	100		ND	ND
1,4-Dioxane	8270D-SIM		6,000	200		0.312	0.307
Total Non-Halogenated VOCs	524.2		NS	NS		ND	ND
Total Halogenated VOCs	524.2		NS	NS		ND	ND
Semivolatile Organic Compounds (SVOCs)	625.1 SIM	ug/l					
Total Phthalates			NS	190		ND	ND
Total Group I PAHs			NS	1		ND	ND
Total Group II PAHs			NS	100		ND	ND
Fuel Parameters		ug/l					
Total Petroleum Hydrocarbons	1664A		5,000	5,000		< 5,000	< 5,000
Methyl-tert-Butyl Ether	524.2		50,000	70		5.8	< 0.5
Ethanol	ASTM D3695		NS	Report		< 10,000	< 10,000
Inorganic Compounds		ug/L					
Antimony	200.8		8,000	206		0.3	0.3
Arsenic	3113B		900	104		< 2.5	< 2.5
Cadmium	200.8		4	10.2		< 0.5	< 0.2
Chromium, Total	200.7		300	NS		< 2.0	< 2.0
Chromium III	200.7		600	323		< 10.0	< 10.0
Chromium VI	3500Cr B-2009		300	323		< 10.0	< 10.0
Copper	200.7		100,000	242		< 2.0	< 2.0
Iron	200.7		NS	5,000		318	130
Lead	200.8		10	160		< 0.5	0.1
Mercury	245.1		20	0.739		< 0.2	< 0.2
Nickel	200.7		200	1,450		< 5.0	< 5.0
Selenium	3113B		100	235.8		< 5.0	< 5.0
Silver	200.7		7	35.1		< 0.5	< 1.0
Zinc	200.7		900	420		10.4	10.1
Cyanide	4500 CN CE		30	178		< 5.0	< 5.0
Polychlorinated Biphenlyls (PCBs)	608.3	ug/l					
Total PCBs			5	0.5		< 0.09	< 0.09
Other							
Ammonia as Nitrogen	350.1	mg/L	NS	Report		0.11	< 0.10
Chloride	300.0	mg/L	NS	Report		162	379
Phenols	420.1	ug/l	NS	NS		< 100	< 100
Hardness	200.7	ug/l	NS	NS		317000	533000
Total Residual Chloride	4500CL D	ug/l	NS	39		< 20.0	< 20.0
Total Suspended Solids	2540D	mg/l	NS	30		5	< 5
Temperature	Field	Deg C	NS	NS		14.3	15.1
pH	Field	S.U.	NS	6.5 to 8.3		7.7	7.0

General Notes:

1. For a complete list of analytes, see the laboratory data sheets.
2. "<" = Analyte not detected at a concentration above the laboratory reporting limit.
3. MCP = 310 CMR 40.0000 Massachusetts Contingency Plan with revisions effective June 20, 2014.
4. RCGW-2 = Reportable Concentration for category GW-2 Groundwater.
5. µg/l = micrograms per liter.
6. mg/l = milligram per liter.
7. deg C = Degrees Celsius.
8. S.U. = standard units.
9. Dilution Factor of 3.5 used to establish effluent limits.
10. Effluent limits calculated using NPDES RGP NOI Dilution Factor Spreadsheet.
11. Temperature and pH were measured in the field.

Figures

This Image provided by MassGIS is from U.S.G.S. Topographic
7.5 X 15 Minute Series
Boston South, MA Quadrangle, 1987.
Datum is National Geodetic Vertical Datum of 1929 (NGVD29).
Contour Interval is 3 Meters.



MASSACHUSETTS
QUADRANGLE LOCATION

NPDES RGP Notice of Intent BIDMC - New Inpatient Building Boston, Massachusetts	GEI Consultants	SITE LOCATION MAP
Beth Israel Deaconess Medical Center Boston, Massachusetts	Project 1703581	July 2019 Fig. 1

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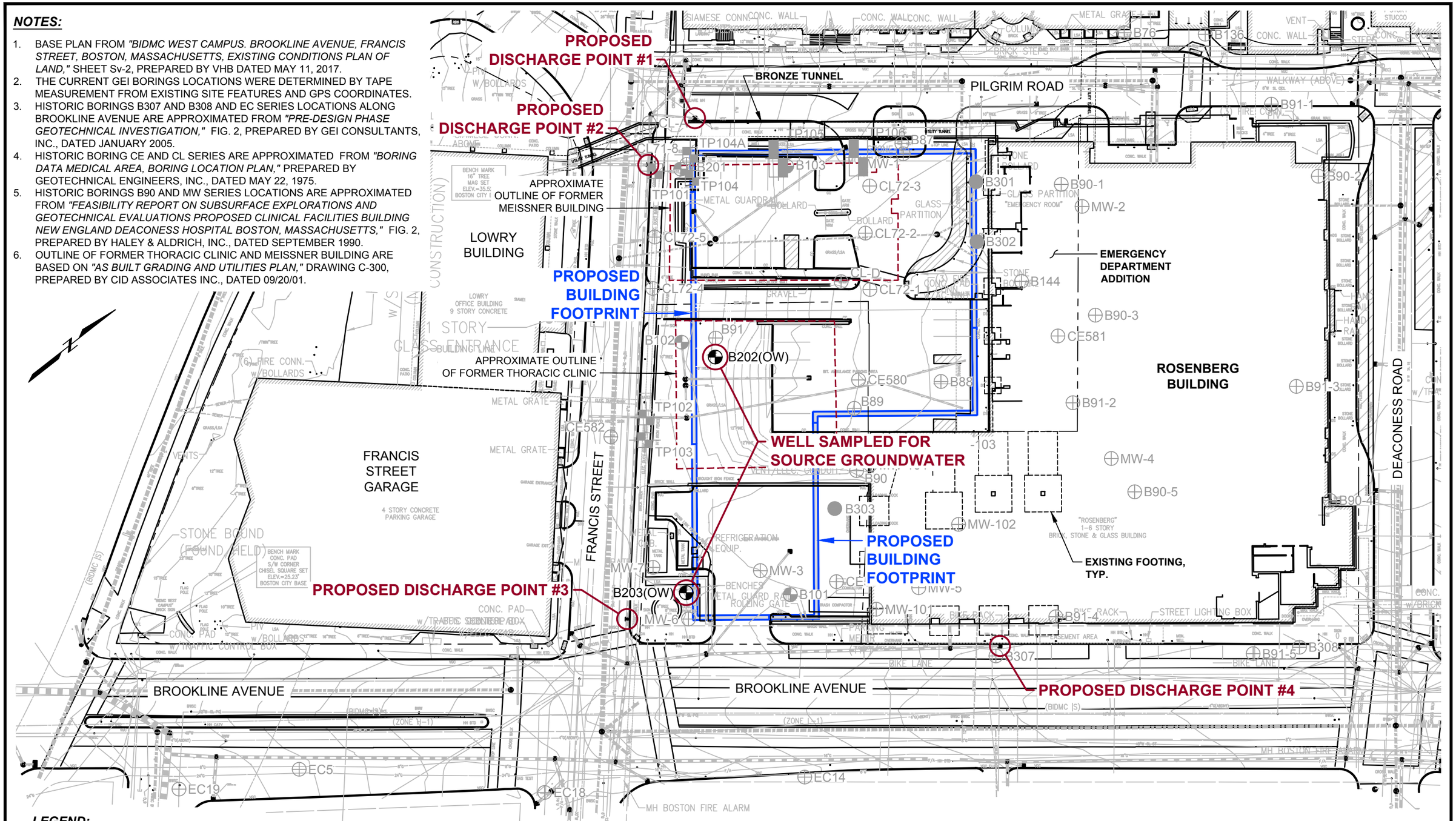
NOTES:

1. BASE PLAN FROM *"BIDMC WEST CAMPUS. BROOKLINE AVENUE, FRANCIS STREET, BOSTON, MASSACHUSETTS, EXISTING CONDITIONS PLAN OF LAND,"* SHEET Sv-2, PREPARED BY VHB DATED MAY 11, 2017.
2. THE CURRENT GEI BORINGS LOCATIONS WERE DETERMINED BY TAPE MEASUREMENT FROM EXISTING SITE FEATURES AND GPS COORDINATES.
3. HISTORIC BORINGS B307 AND B308 AND EC SERIES LOCATIONS ALONG BROOKLINE AVENUE ARE APPROXIMATED FROM *"PRE-DESIGN PHASE GEOTECHNICAL INVESTIGATION,"* FIG. 2, PREPARED BY GEI CONSULTANTS, INC., DATED JANUARY 2005.
4. HISTORIC BORING CE AND CL SERIES ARE APPROXIMATED FROM *"BORING DATA MEDICAL AREA, BORING LOCATION PLAN,"* PREPARED BY GEOTECHNICAL ENGINEERS, INC., DATED MAY 22, 1975.
5. HISTORIC BORINGS B90 AND MW SERIES LOCATIONS ARE APPROXIMATED FROM *"FEASIBILITY REPORT ON SUBSURFACE EXPLORATIONS AND GEOTECHNICAL EVALUATIONS PROPOSED CLINICAL FACILITIES BUILDING NEW ENGLAND DEACONESS HOSPITAL BOSTON, MASSACHUSETTS,"* FIG. 2, PREPARED BY HALEY & ALDRICH, INC., DATED SEPTEMBER 1990.
6. OUTLINE OF FORMER THORACIC CLINIC AND MEISSNER BUILDING ARE BASED ON *"AS BUILT GRADING AND UTILITIES PLAN,"* DRAWING C-300, PREPARED BY CID ASSOCIATES INC., DATED 09/20/01.



LEGEND:

- BORING, GEI (2017-2018)
- TEST PIT (2018)
- HISTORICAL BORING

0 50 100

SCALE: 1" = 50'

NPDES RGP Notice of Intent BIDMC - New Inpatient Building Boston, Massachusetts	GEI Consultants	SITE PLAN
Beth Israel Deaconess Medical Center Boston, Massachusetts	Project 1703581	July 2019 Fig. 2

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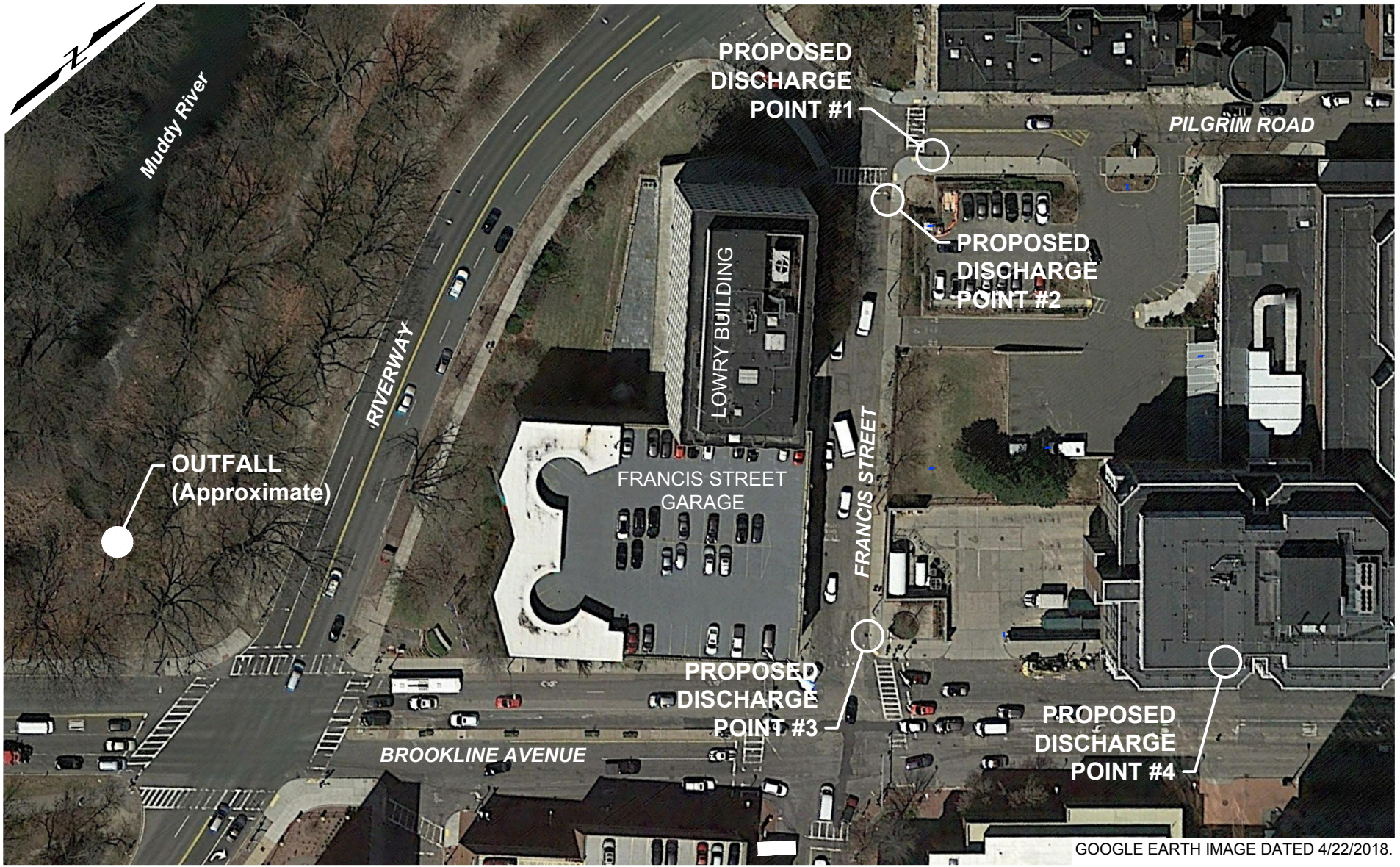

0 80 160

Approximate Scale, Feet

NPDES RGP Notice of Intent
BIDMC - New Inpatient Building
Boston, Massachusetts

Beth Israel Deaconess Medical Center
Boston, Massachusetts

GEI Consultants

OUTFALL LOCATION

Project 1703581 | July 2019 | Fig. 3

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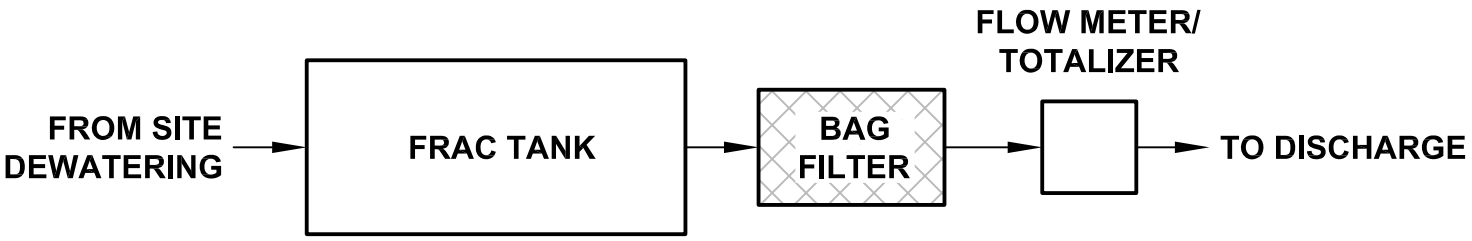

PROCESS FLOW DIAGRAM

Not to Scale

NPDES RGP Notice of Intent BIDMC - New Inpatient Building Boston, Massachusetts		GEI Consultants	PROCESS FLOW DIAGRAM
Beth Israel Deaconess Medical Center Boston, Massachusetts		Project 1703581	July 2019 Fig. 4

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Appendix A

Remediation General Permit

Notice of Intent

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

A. General site information:

<table>
<tr><td rowspan="2">1. Name of site:
Beth Israel Deaconess Medical Center
New Inpatient Building</td><td colspan="3">Site address: 111 Francis Street
Street:</td></tr>
<tr><td>City: Boston</td><td>State: MA</td><td>Zip: 02215</td></tr>
<tr><td rowspan="4">2. Site owner
Beth Israel Deaconess Medical Center

Owner is (check one): ☐ Federal ☐ State/Tribal ■ Private
☐ Other; if so, specify:</td><td colspan="3">Contact Person: David Flanagan, Senior Director of Capital Facilities</td></tr>
<tr><td colspan="2">Telephone: 617-975-9931</td><td>Email: dmflanag@bidmc.harvard.edu</td></tr>
<tr><td colspan="3">Mailing address:
Street: Beth Israel Deaconess Medical Center
200 Brookline Avenue, Suite OV-400B</td></tr>
<tr><td>City: Boston</td><td>State: MA</td><td>Zip: 02215</td></tr>
<tr><td rowspan="4">3. Site operator, if different than owner
J Derenzo Co.</td><td colspan="3">Contact Person: Peter Burch</td></tr>
<tr><td colspan="2">Telephone: 508-328-5241</td><td>Email: pburch@jderenzo.com</td></tr>
<tr><td colspan="3">Mailing address:
Street: 338 Howard Street</td></tr>
<tr><td>City: Brockton</td><td>State: MA</td><td>Zip: 02302</td></tr>
<tr><td>4. NPDES permit number assigned by EPA:
MAR100236

NPDES permit is (check all that apply: ☐ RGP ☐ DGP ☐ CGP
☐ MSGP ☐ Individual NPDES permit ☐ Other; if so, specify:</td><td colspan="3">5. Other regulatory program(s) that apply to the site (check all that apply):
■ MA Chapter 21e; list RTN(s): 3-1470
☐ NH Groundwater Management Permit or Groundwater Release Detection Permit:
☐ CERCLA
☐ UIC Program
☐ POTW Pretreatment
☐ CWA Section 404</td></tr>
</table>

B. Receiving water information:

1. Name of receiving water(s):	Waterbody identification of receiving water(s):	Classification of receiving water(s):
Muddy River	MA72-11	B

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. Impaired water body - see attached Table 1 for impairment pollutants and completed TMDLs

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.	0.547 cfs
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.	3.5

6. Has the operator received confirmation from the appropriate State for the 7Q10and dilution factor indicated? (check one): ■ Yes ☐ No
If yes, indicate date confirmation received: 07/03/2019

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 ☐ A surface water other than the receiving water; if so, indicate waterbody:	☐ Potable water; if so, indicate municipality or origin: ☐ Other; if so, specify:

2. Source water contaminants: Groundwater at former MassDEP disposal site for petroleum/gasoline contamination (RTN 3-1470)	
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): SDO161 (BWSC)	Outfall location(s): (Latitude, Longitude) 42.33584 degrees N 71.11102 degrees W
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: When issued, the RGP Authorization will be submitted to the Boston Water and Sewer Commission for Dewatering Discharge Permit 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): August 2019 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	

<table>
<tr><td>2. Activity Category: (check all that apply)</td><td colspan="2">3. Contamination Type Category: (check all that apply)</td></tr>
<tr><td rowspan="5">☐ 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</td><td colspan="2">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</td></tr>
<tr><td colspan="2">b. If Activity Category III, IV, V, VI, VII or VIII: (check either G or H)</td></tr>
<tr><td>■ G. Sites with Known Contamination</td><td>☐ H. Sites with Unknown Contamination</td></tr>
<tr><td>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>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>

4. Influent and Effluent Characteristics

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
A. Inorganics									
Ammonia		✔	2	350.1	100	110	55	Report mg/L	---
Chloride		✔	2	300.0	50000	379000	271000	Report µg/l	---
Total Residual Chlorine	✔		2	4500CLD	20.0	< 20.0	0	0.2 mg/L	39
Total Suspended Solids		✔	2	2540D	0.005	0.005	0.0025	30 mg/L	---
Antimony		✔	2	200.8	0.2	0.3	0.3	206 µg/L	2237
Arsenic	✔		2	3113B	2.5	<2.5	0	104 µg/L	32
Cadmium	✔		2	200.8	0.5	< 0.5	0	10.2 µg/L	0.4294
Chromium III	✔		2	200.7	10.0	<10.0	0	323 µg/L	502.5
Chromium VI	✔		2	3500Cr	10.0	<10.0	0	323 µg/L	40.0
Copper	✔		2	200.7	2.0	< 2.0	0	242 µg/L	26.9
Iron		✔	2	200.7	20.0	318	224	5,000 µg/L	1000
Lead		✔	2	200.8	0.5	0.1	0.05	160 µg/L	7.03
Mercury	✔		2	245.1	0.2	< 0.2	0	0.739 µg/L	3.17
Nickel	✔		2	200.7	5.0	< 5.0	0	1,450 µg/L	309.3
Selenium	✔		2	3113B	5.0	< 5.0	0	235.8 µg/L	17.5
Silver	✔		2	200.7	1.0	< 1.0	0	35.1 µg/L	38.7
Zinc		✔	2	200.7	5	10.4	10.25	420 µg/L	614.1
Cyanide	✔		2	4500CNC	5.0	<5.0	0	178 mg/L	18.2
B. Non-Halogenated VOCs									
Total BTEX	✔		2	524.2	0.5	< 0.5	0	100 µg/L	---
Benzene	✔		2	524.2	0.5	< 0.5	0	5.0 µg/L	---
1,4 Dioxane		✔	2	8270DSIM	0.250	0.312	03095	200 µg/L	---
Acetone	✔		2	524.2	5.0	< 5.0	0	7.97 mg/L	---
Phenol	✔		2	420.1	100	< 100	0	1,080 µg/L	1050

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	✔		2	524.2	0.3	< 0.3	0	4.4 µg/L	5.6
1,2 Dichlorobenzene	✔		2	524.2	0.5	< 0.5	0	600 µg/L	---
1,3 Dichlorobenzene	✔		2	524.2	0.5	< 0.5	0	320 µg/L	---
1,4 Dichlorobenzene	✔		2	524.2	0.5	< 0.5	0	5.0 µg/L	---
Total dichlorobenzene	✔		2	524.2	0.5	< 0.5	0	763 µg/L in NH	---
1,1 Dichloroethane	✔		2	524.2	0.5	< 0.5	0	70 µg/L	---
1,2 Dichloroethane	✔		2	524.2	0.5	< 0.5	0	5.0 µg/L	---
1,1 Dichloroethylene	✔		2	524.2	0.5	< 0.5	0	3.2 µg/L	---
Ethylene Dibromide	✔		2	504.1	0.015	< 0.015	0	0.05 µg/L	---
Methylene Chloride	✔		2	524.2	0.5	< 0.5	0	4.6 µg/L	---
1,1,1 Trichloroethane	✔		2	524.2	0.5	< 0.5	0	200 µg/L	---
1,1,2 Trichloroethane	✔		2	524.2	0.5	< 0.5	0	5.0 µg/L	---
Trichloroethylene	✔		2	524.2	0.5	< 0.5	0	5.0 µg/L	---
Tetrachloroethylene	✔		2	524.2	0.5	< 0.5	0	5.0 µg/L	11.6
cis-1,2 Dichloroethylene	✔		2	524.2	0.5	< 0.5	0	70 µg/L	---
Vinyl Chloride	✔		2	524.2	0.2	< 0.2	0	2.0 µg/L	---
D. Non-Halogenated SVOCs									
Total Phthalates	✔		2	625.1 SIM	2.34	< 2.34	0	190 µg/L	---
Diethylhexyl phthalate	✔		2	625.1 SIM	2.34	< 2.34	0	101 µg/L	7.7
Total Group I PAHs	✔		2	625.1 SIM	0.05	< 0.05	0	1.0 µg/L	---
Benzo(a)anthracene	✔		2	625.1 SIM	0.05	< 0.05	0	As Total PAHs	0.0133
Benzo(a)pyrene	✔		2	625.1 SIM	0.05	< 0.05	0		0.0133
Benzo(b)fluoranthene	✔		2	625.1 SIM	0.05	< 0.05	0		0.0133
Benzo(k)fluoranthene	✔		2	625.1 SIM	0.05	< 0.05	0		0.0133
Chrysene	✔		2	625.1 SIM	0.05	< 0.05	0		0.0133
Dibenzo(a,h)anthracene	✔		2	625.1 SIM	0.05	< 0.05	0		0.0133
Indeno(1,2,3-cd)pyrene	✔		2	625.1 SIM	0.05	< 0.05	0		0.0133

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
Total Group II PAHs	✔		2	625.1 SIM	0.19	< 0.19	0	100 µg/L	---
Naphthalene	✔		2	625.1 SIM	0.19	< 0.19	0	20 µg/L	---
E. Halogenated SVOCs									
Total PCBs	✔		2	608.3	0.09	<0.09	0	0.000064 µg/L	---
Pentachlorophenol	✔		2	625.1 SIM	0.86	<0.86	0	1.0 µg/L	---
F. Fuels Parameters									
Total Petroleum Hydrocarbons	✔		2	1664A	0.005	<0.005	0	5.0 mg/L	---
Ethanol	✔		2	D3695	0.010	< 0.010	0	Report mg/L	---
Methyl-tert-Butyl Ether		✔	2	524.2	0.5	5.8	2.9	70 µg/L	70
tert-Butyl Alcohol	✔		2	524.2	25	<25.0	0	120 µg/L in MA 40 µg/L in NH	---
tert-Amyl Methyl Ether	✔		2	524.2	1.0	< 1.0	0	90 µg/L in MA 140 µg/L in NH	---
Other (i.e., pH, temperature, hardness, salinity, LC_{50}, additional pollutants present); if so, specify:									
pH	✔		2	NA	NA	7.68 S.U.	7.32 S.U.		
Temp			2	NA	NA	59.1 deg F	58.4 deg F		
Hardness		✔	2	200.7	824	533000	425000		

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:
Granulated activated carbon, ion exchange, and other treatments as need to meet effluent limits.

2. Provide a written description of all treatment system(s) or processes that will be applied to the effluent prior to discharge.
Prior to discharge, dewatering effluent will be routed through a fractionation tan, bag filters, and other treatment as need to meet effluent requirements. See attached Figure 4.

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: Granulated activated carbon, ion exchange, and other treatments as need to meet effluent limits.

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: Flowmeter Is use of a flow meter feasible? (check one): ■ Yes ☐ No, if so, provide justification:	250
Provide the proposed maximum effluent flow in gpm.	100
Provide the average effluent flow in gpm.	50
If Activity Category IV applies, indicate the estimated total volume of water that will be discharged:	NA

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:
pH conditioners, granular activated carbon (GAC), and ion exchange may be added to the treatment system if necessary to meet effluent limits

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.

See attached letter report prepared by GEI.

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 implemented on the Site.
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: 7/25/19
Print Name and Title: David Flanagan, Director of Facilities	

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 implemented on the Site.	
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: Pt Bl	Date: 7-29-19
Print Name and Title: Peter Burch, J Derenzo Co. Project executive	

Table 1. Water Quality Assessment Status for Reporting Year 2014
Muddy River

Designated Use	Designated Use Group	Status
Aesthetic	Aesthetic Value	Impaired
Fish Consumption	Aquatic Life Harvesting	Impaired
Fish, Other Aquatic Life and Wildlife	Fish, Shellfish, And Wildlife Protection And Propagation	Impaired
Primary Contact Recreation	Recreation	Impaired
Secondary Contact Recreation	Recreation	Impaired

Causes of Impairment for Reporting Year 2014

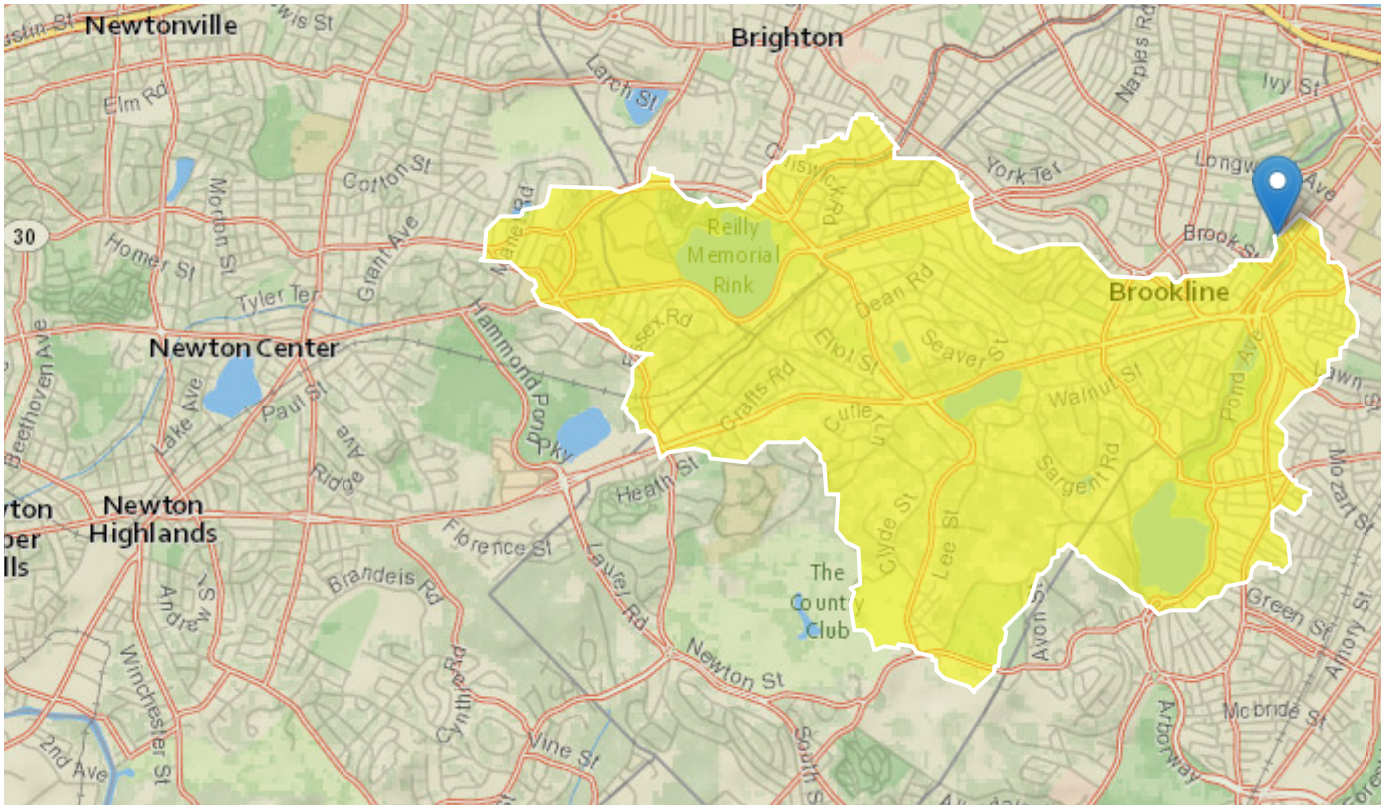
Cause of Impairment	Cause of Impairment Group	Designated Use(s)	State TMDL Development Status
Bottom Deposits	Sediment	Fish, Other Aquatic Life and Wildlife	Non-pollutant impairement
DDT	Pesticides	Fish Consumption	TMDL needed
Dissolved Oxygen	Organic Enrichment/Oxygen Depletion	Fish, Other Aquatic Life And Wildlife	TMDL needed
Escherichia Coli (E. Coli)	Pathogens	Primary Contact Recreation	TMDL completed
Non-Native Aquatic Plants	Nuisance Exotic Species	Fish, Other Aquatic Life And Wildlife	Non-pollutant impairment
Oil and Grease	Oil and Grease	Fish, Other Aquatic Life And Wildlife	TMDL needed
Other (Unspecified Metals in Sediments)	Other Cause	Fish, Other Aquatic Life And Wildlife	TMDL needed
Other Flow Regime Alterations	Flow Alteration(s)	Fish, Other Aquatic Life And Wildlife	Non-pollutant impairment
PCBs in Fish Tissue	Polychlorinated Biphenyls (PCBs)	Fish Consumption	TMDL needed
Phosphorus, Total	Nutrients	Fish, Other Aquatic Life And Wildlife	TMDL needed
Physical Substrate Habitat Alterations	Habitat Alterations	Fish, Other Aquatic Life And Wildlife	Non-pollutant impairment
Taste and Odor	Taste, Color and Odor	Aesthetic	TMDL needed
Turbidity	Turbidity	Primary and Secondary Contact Recreation, Aesthetic	TMDL needed

Sources:

1. Information obtained from EPA website: https://ofmpub.epa.gov/waters10/attains_index.home on July 1, 2019.
2. Massachusetts Year 2016 Integrated List of Waters, Massachusetts Division of Watershed Management Watershed Planning Program, June 2017.

StreamStats Report

Region ID: MA
Workspace ID: MA20190701203029912000
Clicked Point (Latitude, Longitude): 42.33680, -71.11126
Time: 2019-07-01 16:31:14 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	4.86	square miles
BSLDEM250	Mean basin slope computed from 1:250K DEM	3.328	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0.53	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless

Low-Flow Statistics Parameters[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	4.86	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	3.328	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0.53	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

Low-Flow Statistics Flow Report[Statewide Low Flow WRIR00 4135]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	PIu	SE	SEp
7 Day 2 Year Low Flow	0.963	ft^3/s	0.224	3.98	49.5	49.5
7 Day 10 Year Low Flow	0.547	ft^3/s	0.103	2.7	70.8	70.8

Low-Flow Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)

Application Version: 4.3.8

Remediation General Permit – Notice of Intent

Dilution Factor Calculation

Purpose and Approach:

Calculate the Dilution Factor (DF) for project based on 7 Day 10 Year (7Q10) Low Flow values and EPA formula:

DF = (Qd + Qs)/Qd where: Qd = Maximum flow rate of discharge in cubic feet per second (cfs)

Qs = Receiving water 7Q10 flow in cfs

Assumptions:

1. 7Q10 is 0.55 cfs (from StreamStats 4.3.8)
2. A conversion of 7.48 is used to convert cubic feet to gallons.
3. A design discharge flowrate of 100 gpm is assumed.

Calculations:

7Q10 Low Flow value (Qs):

$$Qs = \frac{0.55\ ft3}{S}\ X\ \frac{7.48\ gal}{ft3}\ X\ \frac{86{,}400\ s}{day}\ X\ \frac{1\ MG}{1{,}000{,}000\ gallons}$$

$$Qs = 0.36\ MGD$$

Discharge Flow Rate (Qd):

$$Qd = \frac{100\ gallons}{min} X\ \frac{1{,}440\ min}{day}\ X\ \frac{1MG}{1{,}000{,}000\ gallons}$$

$$Qd = 0.144\ MGD$$

Dilution Factor (DF):

$$DF = \frac{Qs + Qd}{Qd} = \frac{0.36\ MGD + 0.144\ MG}{0.144\ MGD} = 3.5$$

From: Wood, Jennifer (DEP)
To: Englehart, Jessica
Cc: Vakalopoulos, Catherine (DEP)
Subject: [EXTERNAL] RE: NPDES RGP NOI - 7Q10 and DF
Date: Wednesday, July 3, 2019 10:13:15 AM

Hi Jessica,

I can confirm that the 7Q10 value of 0.547 cfs and the dilution factor of 3.5 for the proposed discharge to the Muddy River (via an outfall from Brookline Ave, near the intersection with Parkway Road) are correct.

To assist you with filling out the NOI for coverage under the RGP, this segment of the Muddy River is identified as MA72-11, classified as Class B, and is not listed as an Outstanding Resource Water. There are two approved TMDLs for pathogens and nutrients. To see the causes of impairments, go to: https://www.mass.gov/files/documents/2016/08/sa/14list2_0.pdf and search for "MA72-11".

Note that if this is not a *current* MCP site, you must apply to MassDEP alongside submittal of the NOI by following the instructions at: https://www.mass.gov/how-to/wm-15-npdes-general-permit-notice-of-intent. There is a $500 fee unless the applicant is fee-exempt (e.g. a municipality).

Please let me or Cathy (617-348-4026) know if you have any questions.

Jennifer Wood
617-654-6536

From: Vakalopoulos, Catherine (DEP)
Sent: Wednesday, July 03, 2019 9:44 AM
To: jenglehart@geiconsultants.com
Cc: Wood, Jennifer (DEP)
Subject: FW: NPDES RGP NOI - 7Q10 and DF

Hi Jessica,
I'm cc-ing Jennifer Wood who will be able to help you.
Cathy

Cathy Vakalopoulos, Massachusetts Department of Environmental Protection
1 Winter St., Boston, MA 02108, 617-348-4026
Please consider the environment before printing this e-mail

From: Englehart, Jessica [mailto:jenglehart@geiconsultants.com]
Sent: Tuesday, July 02, 2019 9:46 AM
To: Ruan, Xiaodan (DEP)
Cc: Vakalopoulos, Catherine (DEP); Ballantyne, Heather
Subject: NPDES RGP NOI - 7Q10 and DF

Hi Xiaodan,

I'm preparing an RGP NOI for upcoming construction in the Longwood area of Boston. Dewatering effluent would discharge to BWSC catch basins and ultimately the Muddy River (via an outfall from Brookline Ave, near the intersection with Parkway Road). From StreamStats, I have a 7Q10 of 0.547 cfs. I calculated a dilution factor (DF) of 3.5 using a design flow rate of 100 gpm.

Could you please confirm the 7Q10 and DF? Let me know if you need any additional information.

Thanks,
Jess

GEI

JESSICA ENGLEHART, P.E.
Project Engineer
781.721.4104 cell: 781.835.5702
400 Unicorn Park Drive, Woburn, MA 01801

Enter number values in green boxes below

Enter values in the units specified

↓

0.36	Q_R = Enter upstream flow in **MGD**
0.144	Q_P = Enter discharge flow in **MGD**
0	Downstream 7Q10

Enter a dilution factor, if other than zero

↓

3.5

Enter values in the units specified

↓

533	C_d = Enter influent hardness in **mg/L** $CaCO_3$
47.9	C_s = Enter receiving water hardness in **mg/L** $CaCO_3$

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

↓

6.87	pH in **Standard Units**
17.9	Temperature in **°C**
0.24	Ammonia in **mg/L**
47.9	Hardness in **mg/L** $CaCO_3$
0	Salinity in **ppt**
1.2	Antimony in **µg/L**
1.3	Arsenic in **µg/L**
0	Cadmium in **µg/L**
0	Chromium III in **µg/L**
0	Chromium VI in **µg/L**
11.5	Copper in **µg/L**
1750	Iron in **µg/L**
9.8	Lead in **µg/L**
0	Mercury in **µg/L**
0	Nickel in **µg/L**
0	Selenium in **µg/L**
0	Silver in **µg/L**
38.8	Zinc in **µg/L**

Enter **influent** concentrations in the units specified

↓

0	TRC in **µg/L**
0.11	Ammonia in **mg/L**
0.3	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**
318	Iron in **µg/L**
0.1	Lead in **µg/L**
0	Mercury in **µg/L**
0	Nickel in **µg/L**
0	Selenium in **µg/L**
0	Silver in **µg/L**
10.4	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**
0	Total Phthalates in **µg/L**
0	Diethylhexylphthalate in **µg/L**
0	Benzo(a)anthracene in **µg/L**
0	Benzo(a)pyrene in **µg/L**
0	Benzo(b)fluoranthene in **µg/L**
0	Benzo(k)fluoranthene in **µg/L**
0	Chrysene in **µg/L**
0	Dibenzo(a,h)anthracene in **µg/L**
0	Indeno(1,2,3-cd)pyrene in **µg/L**
5.8	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_R; 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	3.5					
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	**39**	µg/L	50	µg/L
Total Suspended Solids	**30**	mg/L	---			
Antimony	**206**	µg/L	2237	µg/L		
Arsenic	**104**	µg/L	32	µg/L		
Cadmium	**10.2**	µg/L	0.4294	µg/L		
Chromium III	**323**	µg/L	502.5	µg/L		
Chromium VI	**323**	µg/L	40.0	µg/L		
Copper	**242**	µg/L	26.9	µg/L		
Iron	**5000**	µg/L	1000	µg/L		
Lead	**160**	µg/L	7.03	µg/L		
Mercury	**0.739**	µg/L	3.17	µg/L		
Nickel	**1450**	µg/L	309.3	µg/L		
Selenium	**235.8**	µg/L	17.5	µg/L		
Silver	**35.1**	µg/L	38.7	µg/L		
Zinc	**420**	µg/L	614.1	µg/L		
Cyanide	**178**	mg/L	18.2	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	1050	µg/L		
C. Halogenated VOCs						
Carbon Tetrachloride	**4.4**	µg/L	5.6	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	11.6	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	7.7	µg/L		
Total Group I Polycyclic Aromatic Hydrocarbons	**1.0**	µg/L	---			
Benzo(a)anthracene	**1.0**	µg/L	0.0133	µg/L	---	µg/L
Benzo(a)pyrene	**1.0**	µg/L	0.0133	µg/L	---	µg/L
Benzo(b)fluoranthene	**1.0**	µg/L	0.0133	µg/L	---	µg/L
Benzo(k)fluoranthene	**1.0**	µg/L	0.0133	µg/L	---	µg/L
Chrysene	**1.0**	µg/L	0.0133	µg/L	---	µg/L
Dibenzo(a,h)anthracene	**1.0**	µg/L	0.0133	µg/L	---	µg/L
Indeno(1,2,3-cd)pyrene	**1.0**	µg/L	0.0133	µg/L	---	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	**70**	µg/L		
tert-Butyl Alcohol	**120**	µg/L	---			
tert-Amyl Methyl Ether	**90**	µg/L	---			

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- Pressure Filtration
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- Separators/Strainers
- Tanks

Bag Filters / Accugaf Filter Bags

Accugaf filter bags are constructed from FDA compliant materials. They are ideal for food processing applications and will filter particulate from 1 micron to 25 microns with 99% efficiency..

Related Product Links
Accugaf Filter Bags | Duragaf Filter Bags | Hayflow Filter Element | Lofclear Filter Bags | Nylon & Polyester Mesh | Progaf Filter Bags | Sentinel® Filter Bags & Seal | Snap Ring Filtration Media Overview

ACCUGAF™, Filter Bags for Applications Demanding Efficiency >99%

The ACCUGAF filter bag pushes the boundaries of bag filtration technology far beyond traditional designs. With efficiencies >99%, each A model provides cost-effective filtration solutions for demanding applications. The five models assure users that particles from the range of can be removed effectively while delivering long service life.

Material	Filter Model	Buy Now	Particle Size at Common Removal Efficiencies (µm)					ΔP (psi) Size 02 @ 45 gpm
			>60%	>90%	>95%	>99%	>99.9%	
Polypropylene	AGF 51		0.2	0.6	0.8	1.5	5	1.30
	AGF 53		0.8	1	2	3	5	3.20
	AGF 55		1	2	3	5	15	0.73
	AGF 57		2	4	5	10	25	0.60
	AGF 59		10	25	30	25	35	0.44
Polyester	AGFE 51		0.2	0.6	0.8	1.5	5	1.30
	AGFE 55		1	2	3	5	15	0.73
	AGFE 57		2	4	5	10	25	0.60

High-Efficiency Performance

ACCUGAF filter bags feature:

- 100% welded seams
- Patented SENTINEL® seal ring
- Meltblown filtration media in polypropylene or polyester
- No additives, such as resins, binders or surface treatments

FDA Compliant Materials

ACCUGAF Polypropylene filter bags are constructed entirely of materials compliant to FDA requirements for materials in contact with food materials conform to US Code of Federal Regulations 21 CFR Part 177 and EU Directive 2002/72/EC.

Applications

Although ideally suited for food and beverages, ACCUGAF filter bags will deliver equal performance in a wide range of demanding applica as:

- Beer, wine, spirits and beverage filtration
- Fine particle removal in parts cleaning
- Final filtration of lacquers
- Final filtration of vinegar
- Activated carbon removal in process systems
- Final filtration of hydraulic oils and lubricants

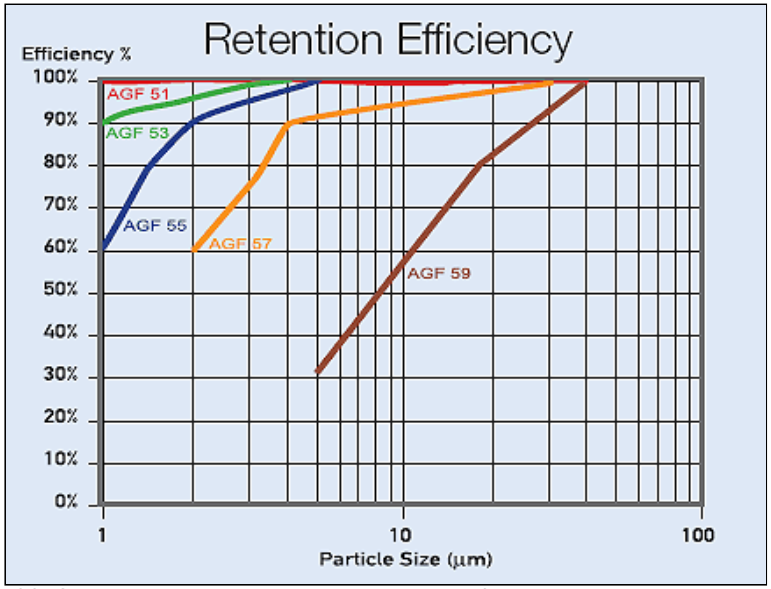
OPERATIONALCONSIDERATIONS

Bag Positioner

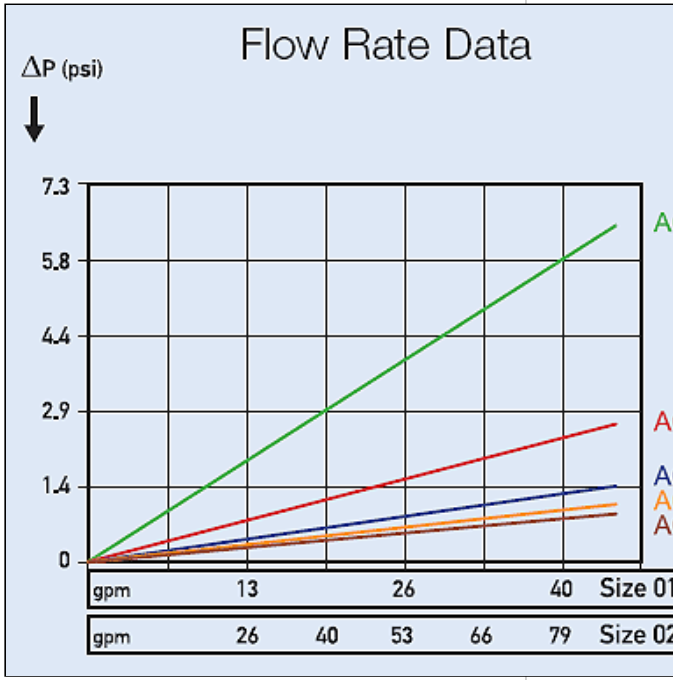
ACCUGAF filter bags must be used with the Eaton bagpositioner. This eases insertion and assures correct alignment of the filter bag inside the restrainer basket. In addition, the be protected against damage to inadvertent back-flow.

Pre-Wetting in Aqueous Solutions

ACCUGAF polypropylene filter bags are fabricated from microfiber filtration media. These materials are hydro-phobic, indicating that water will not wet the fiber surfaces.As will a polypropylene filters, a lower surface tension fluid (wetting agent) must be used to wet the media prior to introducing water. Prior to service, the filter bags must be immersed in a solution compatible with the process fluid. After wetting, an aqueous fluid will be drawn into the media through capillary action. Full details about installation and wetting are prov every box of ACCUGAF filter bags.



ACCUGAF Filter Bags are available in retention codes of 51,53,55,57,and 59.To select the perfect ACCUGAF Filter Bag for your application use the chart and choose the retention efficiency level you need on the left side (Y Axis) of the chart at the particle size in microns at the bottom (X Axis) .Next find which bag efficiency code (identified by the colored lines) is closest to that point.Thsi will assist you in finding the most cost effective filter bag for your critical filtration application.



BAG FILTER PRODUCT CODE EXPLANATION

ACCUGAF™ AGF: polypropylene melt-blown AGFE: polyester melt-blown		E: Polypropylene Mesh R: Polyester Mesh		E: PP SENTINEL® Ring H: Hytrel SENTINEL® Ring		Bags/Box Box Size (inc 01/02 10M 19 x 12
AGF Bag Material	- **53** Micron Rating µm	**E** Bag Cover Layer	**02** Bag Size	**E** Collar/Ring Type	- **O** Bottom Shape	- **10M** Packagi

AGF	AGFE
51	51
53	-
55	55
57	57
59	-

Code	Size	Area
01	ø 7 x 17 inches L	2.6 sqft
02	ø 7 x 32 inches L	5.2 sqft

round bottom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- Odor Control
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- Poultry Industry

Products
- Activated Carbon
- Bag Filtration
  - Bag Filter Housings
  - Bag Filter Media
- Biological Treatment
- Chemicals (Specialty)
- Clarifiers
- Controls
- Dissolved Air Flotation
- Dewatering
- Evaporators
- Membrane Filtration
- Microbial Bacteria
- Oil/Water Separators
- Ozone
- Pressure Filtration

Bag Filter Media / Lofclear Absolute Rate Oil Removal Filter Bags

Accugaf filter bags are constructed from FDA compliant materials. They are ideal for food processing applications and will filter particulate from 1 micron to 25 microns with 99% efficiency..

Related Product Links
Accugaf Filter Bags | Duragaf Filter Bags | Hayflow Filter Element | Lofclear Filter Bags | Nylon & Polyester Mesh | Progaf Filter Bags | Sentinel® Filter Bags & Seal | Snap Ring Filter Bags | Filtration Media Overview

LOFCLEAR: Cost Effective Filter Bags for Absolute Filtration Applications

A pleated prefilter provides a very large surface (about 32 sq ft) to collect

LOFCLEAR filter bags now make absolute filtration viable in many applications where only standard bags could be used due to cost constraints. Made from 100% pure polypropylene materials compliant with food requirements, LOFCLEAR filter bags contain no leachables or lubricants such as silicone oils. In addition, their excellent oil adsorbancy makes LOFCLEAR filter bags ideally suited to the oil removal needs of the paint and coatings industries.

LOFCLEAR™Filter Bag Filtration Ratings

Filter Model	Particle Size at Common Removal Efficiencies (µm)					ΔP (psi) Size 02 @ 45 gpm
	Buy Now	>60%	>90%	>95%	>99%	
113/123		0.5	1	2	4	0.36
114/124		0.75	2	3	5	0.30
115/125		1.5	3.5	8	10	0.15
116/126		2	6	13	15	<0.15
118/128		25	35	37	40	<0.15
119/129		15	25	27	30	<0.15
130		6	14	15	20	0.72
135		1	6	8	10	0.29
522		0.5	1	1.5	2.6	1.45
525		1	2	3.5	6	0.26
527		2	5	9	13	0.15
529		10	20	23	32	<0.15

Two Series to Match Filters to Applications

- Screens
- Separators/Strainers
- Tanks

gels and solids before it reaches the final filter layers.

LOFCLEAR filter bags are available in two styles, Series100 and Series 500. These two styles make it possible to match the requirements of a wide range of applications, depending on the needs for efficiency and long life. The Series 100 filters use a multi-layer construction for applications where high efficiency is of prime importance. The Series 500 filters utilize a patent pending pleated construction to increase surface area for applications requiring high dirt capacities and long life.

Perfect for Removal of Gelatinous Materials

LOFCLEAR filter bags have proven to be highly effective in the removal of gelatinous contaminants. The combination of deep micro fiber filtration media breaks up gels and retains them within the media depth. These features prevent surface blockage and breakthrough typical of standard filter bag materials.

LOFCLEAR™Series 100 Filter Bags

LOFCLEAR Series 100 Filter Bags feature a proven three layer construction with a sewn filter welded to the SENTINEL® seal. They feature efficiencies >99% over a wide range of particle sizes, with dirt capacities up to 1/2pound. The seven models feature:

• Polypropylene pre filter
• Meltblown polypropylene microfiber final filter
• Polypropylene outer migration barrier

LOFCLEAR Series 100 filter bags are an excellent choice for application such as high purity fluids with low particulate concentration, first pass guard filtration, oil adsorption and activated carbon removal.

The LOFCLEAR 128 and 129 were especially developed for the filtration of electro-coatings in the automotive industry. The filtration design allows pigments to pass through the filtration layers, while retaining impurities and removing silicones and other crater forming substances.The LOFCLEAR 130 filter bag adds extra adsorption capacity for retaining high amounts of oils or other crater forming substances. The LOFCLEAR 135 delivers high removal of particulate and oils for clear coat applications where pigment removal is not an issue.

LOFCLEAR™Series 500 Filter Bags

LOFCLEAR Series 500 Filter Bags have an all welded multi-pleated construction for high efficiency and long life. This series of bags has a pleated prefiltration layer and a complex design of final filtration layers, allowing the removal of difficult to filter gels and deformable particles with a high capacity of solids loading. The outer web covering eliminates any downstream fiber migration.

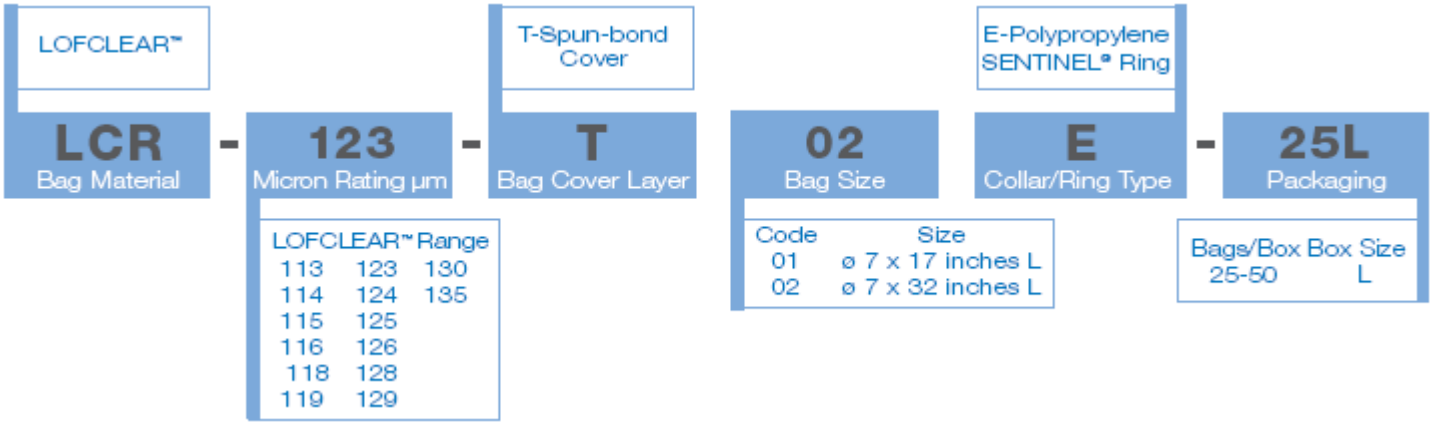
LOFCLEAR Series 500 Filter Bags are available in four different efficiency ratings so you can choose your exact required filtration efficiency. LOFCLEAR Filter Bags have filtration efficiencies from 95 to 99%, with a dirt holding capacity of over 2 pounds.

Among the many applications for LOFCLEAR Series 500 Filter Bags are oils, slurries, dilute oil removal, re-circulating batch systems, and systems with heavy contamination.

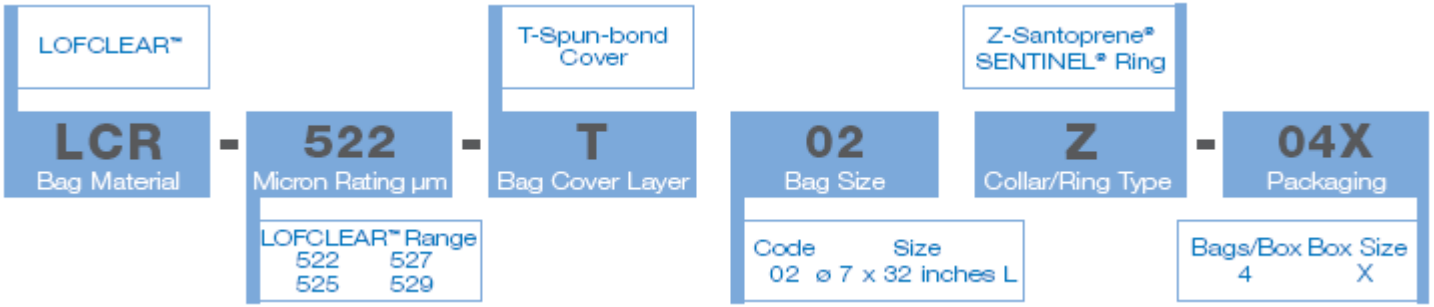
Operational Considerations

LOFCLEAR Series 500 Filter Bags must be used with a bag positioner. This eases insertion and assures correct alignment of the filter bag inside the restrainer basket. In addition, the positioner protects the filter bag from potential damage that could be caused by inadvertent back flow.

LOFCLEAR 100 SERIES BAG FIL TER PRODUCT CODE EXPLANATION



LOFCLEAR 500 SERIES BAG FIL TER PRODUCT CODE EXPLANATION



Activated Carbon | Aeration | Air Treatment | Bag Filters & Housings| Chemicals | Dissolved Air Flotation | Dust Collection | Evaporators | Filter Presses | Flocculation | Inline Filter Vessels | Membrane Filtration | Odor Control |Ozone | Oil Water Separators | Sewage Systems | Liquid and Vapor Phase Vessels | Wet Scrubbers | Careers

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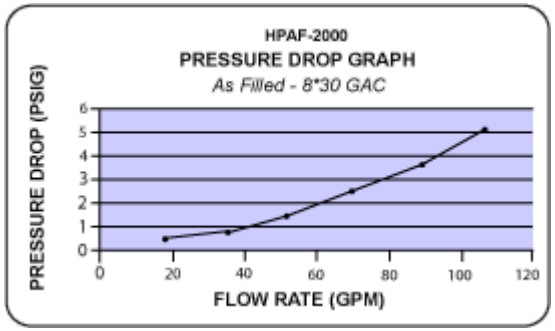
- Separators/Strainers

Liquid Phase V essels > HPAF 2000

General Description

The HPAF-2000 filter is a media filter vessel designed to treat liquid streams. While the typical design application is a activated carbon adsorbtion unit, the filter can easily accommodate many medias. Some applications include:

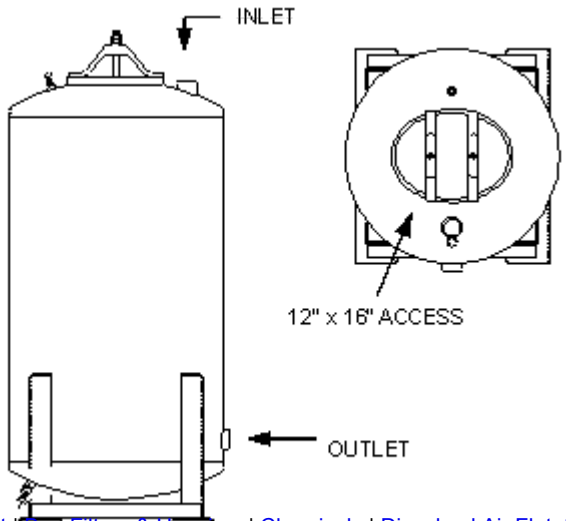
- Dissolved Organic Removal (Activated Carbon)
- Suspended Solids Removal (Sand Filter)
- Dissolved Minerals (Softener Resin)
- Oil and Grease Removal (Organo-Clays)
- Dissolved and Precipitated Metals Removal
- Special Organics (Resin/Carbon Blend)
- Catalytic Reactor (Chlorine and Peroxide Removal)
- Bio-Remediation Contactor Unit



Standard Specifications

HPAF-2000 SPECIFICATIONS			
Overall Height	8'6"	Vessel/Internal Piping Materials	CS(SA-36) / SCH 40 PVC
Diameter	48"	Internal Coating	Polyamide Epoxy Resin
Inlet / Outlet (FNPT)	3"	External Coating	Epoxy Mastic
Drain / Vent (FNPT)	3/4" / 1/2"	Maximum Pressure / Temp	75PSIG / 140° F
GAC Fill (lbs)	2,000	Cross Sectional Bed Area	12.5 FT^2
Shipping / Operational Weight (lbs)	3,020/6,775	Bed Depth/Volume	5.5 FT / 68.7 FT^3
Capacity in gallons	570	Flow rate based on 5-10 min. contact time	57 - 114 GPM

- Tanks



Liquid Phase V essels, Filter Series			
AFD Series	AF Series	HPAF Series	HPP Series
AFD 30	AF 250	HPAF 500	HPP 50
AFD 55	AF 500	HPAF 1000	HPP 100
AFD 85	AF 1000	HPAF 2000	HPP 200
AFD 110	AF 2000	HPAF 3000	HPP 300
AHP 55	AF 3000	HPAF 5000	HPP 500
N/A	AF 5000	HPAF10000	HPP 1000
N/A	AF10000	HPAF20000	HPP2000

Activated Carbon | Aeration | Air Treatment | Bag Filters & Housings | Chemicals | Dissolved Air Flotation | Dust Collection | Evaporators | Filter Presses | Flocculation | Inline Filter Vessels | Membrane Filtration | Odor Control | Ozone | Oil Water Separators | Sewage Systems | Liquid and Vapor Phase Vessels | Wet Scrubbers | Careers

SAFETY DATA SHEET

Section 1 - Identity

Identity (As Used on Label and List): GC Activated Carbon (Including, but not limited to GC C-40, GC 4 x 8B, GC 4 x 8S, GC 6 x 12, GC 6 x 12S, GC 8 x 30, GC 8 x 30AW, GC 8 x 30S, GC 8 x 30SAW, GC 12 x 40, GC 12 x 40AW, GC 12x40SAW, GC 20 x 50, GC 20 x 50S, GC Powdered, GC WDC activated carbons)

Manufacturers Name: General Carbon Corporation
33 Paterson Street
Paterson, NJ 07501
Tel: (973)523-2223
www.generalcarbon.com
Date Prepared: February 16, 2017

Section 2 - Hazardous Identification

2.1 GHS-US Classification

Eye Irritation	2B H320
STOT	SE 3 H335

Hazards not otherwise classified: Combustible dust. May form combustible dust concentrations in air. All powdered activated carbons are classified as weakly explosive (Dust explosion class St1): Given the necessary conditions of a strong ignition source, right concentrations of airborne carbon dust, adequate oxygen levels, and confinement, the potential for a deflagration event exists. A combustible dust hazard assessment and employee training should be carried out. See sections 7 and 9 for further information on combustible dust precautions.

2.2 Label Elements

Hazard Pictograms

Signal word (GHS-US) : Warning
Hazard Statements : H320- Causes eye irritation
: H335- May cause respiratory irritation
Precautionary statements (GHS-US) : P261- Avoid breathing dust
: P264- Wash thoroughly after handling
: P271- Use in well-ventilated area
: P280- Wear protective gloves/clothing/eye & face protect
: P304&340: IF INHALED: Remove person to fresh air

: P305&351&P338: If in eyes, Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do so. Continue rinsing.
: P312- Call Poison Control Center/Doctor if you feel sick
: P403& P233- Store in well-ventilated place. Keep container tightly closed
: P405- Store locked up
: P501- Dispose of container to appropriate receptacle

2.3 Other Hazards

No additional information available

2.4 Unknown acute toxicity (GHS-US)

No data available

Section 3: Composition/information on ingredients

3.1 Substances

Not applicable

3.2 Mixture

Name	CAS #	%	GHS_US classification
Carbon	7440-44-0	100	Not classified

Section 4 – First Aid Measures

4.1 Description of first aid measures

First aid after inhalation	Remove person to fresh air. If not breathing, administer CPR or artificial respiration. Get immediate medical attention.
First aid after skin contact	If skin reddening or irritation develops, seek medical attention
First aid after eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. If irritation persists, get medical attention.
First aid after ingestion	If the material is swallowed, get immediate medical attention or advice. DO NOT induce vomiting unless directed to do so by medical personnel.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation	May cause respiratory irritation
Symptoms/injuries after skin contact	May cause skin irritation
Symptoms/injuries after eye contact	Causes serious eye damage
Symptoms/injuries after ingestion	May be harmful is swallowed

4.3 Indication of any immediate medical attention and special treatment needed

No additional information available.

Section 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media	If involved with fire, flood with plenty of water
Unsuitable extinguishing media	None

5.2 Special hazards arising from substance or mixture

Fire hazard	None known
Explosion hazard	None known
Reactivity	Contact with strong oxidizers such as ozone, liquid oxygen, chlorine, etc. may result in fire.

5.3 Advice for firefighters

Protection during firefighting	Firefighters should wear full protective gear

Section 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

General measures	Avoid contact with the skin and eyes

6.1.1 For non-emergency personnel

No additional information available

6.1.2 For emergency responders

No additional information available

6.2 Environmental precautions

None

6.3 Methods and material for containment and cleaning up

For containment	If possible, stop flow of product
Methods for cleaning up	Shovel or sweep up and put in closed container for disposal

6.4 Reference to other sections

No additional information available

Section 7: Handling and storage

7.1 Precautions for safe handling

Precautions for safe handling	Avoid contact with eyes. Wet activated carbon removes oxygen from air causing severe hazard to workers inside carbon vessels or confined spaces

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions	Protect containers from physical damage. Store in dry, cool, well-ventilated area. Store away from strong oxidizers, strong acids, ignition sources, combustible materials, and heat. An adequate air gap between packages is recommended to reduce propagation in the case of fire **.**

Handling: A hazard assessment should be carried out. As with all finely divided materials, ground all transfer, blending, and dust collecting equipment to prevent static discharge. Remove all strong ignition sources from material handling, transfer, and processing areas where dust may be present or accumulate. Practice good housekeeping. Excessive accumulations of dust or dusty conditions can create the potential of secondary explosions. Inspection of hidden surfaces for dust accumulation should be made routinely. If possible, eliminate the pathways for dust to accumulate in hidden areas. Fine carbon dust may penetrate electrical equipment and cause electrical shorts. Where dusting is unavoidable, dust-proof boxes and regular electrical line maintenance are recommended. Refer to NFPA standards 654 for guidance.

Caution employees-no smoking in carbon storage and handling areas. Carbon is difficult to ignite, however, cutting and welding operations should be carried out using hot work permit systems where precautions are taken not to ignite carbon, which may smolder undetected.

7.3 Specific end use(s)

No additional information available

Section 8: Exposure controls/ personal protection

8.1 Control parameters

No additional information available

8.2 Exposure controls

Appropriate engineering controls	: Local exhaust and general ventilation must be adequate to meet exposure standards
Hand Protection	: None required under normal product handling conditions
Eye Protection	: safety glasses
Skin and body protection	: Wear suitable working clothes
Respiratory protection	: If airborne concentrations are above the applicable exposure limits, use NIOSH approved respiratory protection

Section 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state	: Solid
Appearance	: Particulate
Color	: Black
Odor	: No data available
Odor threshold	: No data available
Ph	: No data available
Relative evaporation rate	: No data available
Melting point	: No data available
Freezing point	: No data available
Boiling point	: No data available
Flash point	: No data available
Self ignition temperature	: No data available
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapor Pressure	: No data available
Relative Vapor density @ 20 deg C	: No data available
Relative Density	: 28-33 lb/ cubic foot
Solubility	: No data available
Log Pow	: No data available
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: No data available
Oxidizing properties	: No data available
Explosive limits	: No data available

Combustible dust- These products may contain combustible dusts. May form combustible dust concentrations in air. All powdered activated carbons are weakly explosive. No specific information on these carbons are available.
Typical combustible dust data for a variety of activated carbons:
K_{st} values reported between 43-113 (various sources).
Dust explosion class St1 (K_{st} values < 200 are Class St1-weakly explosive).
MEC (minimum explosible concentration) in air 50 and 60 g/m^3 (two reports)
Volatile content (by weight): < 8% ASTM D3175-11 (Watercarb)
MIT (minimum ignition temperature) values reported between 400-680°C (752-1256°F) (four reports)
Maximum Absolute Explosion pressure values reported between 6.0-8.6 bar (four reports)

9.2 Other information
No additional information available

Section 10: Stability and reactivity

10.1 Reactivity
Contact with strong oxidizers such as ozone, liquid oxygen, chlorine, etc. may result in fire

10.2 Chemical stability
Stable under normal conditions

10.3 Possibility of hazardous reactions
Will not occur

10.4 Conditions to avoid
None

10.5 Incompatible materials
Strong oxidizing and reducing agents such as ozone, liquid oxygen or chlorine.

10.6 Hazardous decomposition products
Carbon monoxide may be generated in the event of a fire.

Section 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity : Not classified

Carbon (7440-44-0)

LD50 oral rat	: >10000 mg/kg
Skin corrosion/irritation	: Not classified
Serious eye damage/irritation	: Causes eye irritation
Respiratory or skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
Specific target organ toxicity	: May cause respiratory irritation (single exposure)
Specific target organ toxicity	: Not classified (repeated exposure)
Aspiration hazard	: Not classified

Section 12: Ecological Information

12.1 Toxicity
No additional information available

12.2 Persistence and degradability
No additional information available

12.3 Bioaccumulative potential
No additional information available

12.4 Mobility in soil
No additional information available

12.5 Other adverse effects

No additional information available

Section 13: Disposal concerns

13.1 Waste treatment methods

Waste Disposal recommendations : Dispose of contents/container in accordance with local/ regional/ international regulations

Section 14: Transportation information

In accordance with DOT/ADR/RID/ADNR/IMDG/ICAO/IATA

14.1 UN Number

Not applicable. See Note 1 below.

14.2 UN proper shipping name

Not applicable

Note 1: Under the UN classification for activated carbon, all activated carbons have been identified as a class 4.2 product. However, This product has been tested according to the United Nations Transport of Dangerous Goods test protocol for a "self-heating substance" (United Nations Transportation of Dangerous Goods, Manual of Tests and Criteria, Part III, Section 33.3.1.6 - Test N.4 - Test Method for Self Heating Substances) and it has been specifically determined that this product does not meet the definition of a self heating substance (class 4.2) or any other hazard class, and therefore should not be listed as a hazardous material. This information is applicable only for the Activated Carbon Product identified in this document.

Section 15: Regulatory information

15.1 US Federal regulations

Carbon (7440-44-0)

Listed on the United States TSCA inventory

15.3 US State regulations

No additional information available

Section 16: Other information

Full text of H-phrases:

Eye Irrit. 2B	Serious eye damage/eye irritation Category 2B
STOT SE 3	Specific target organ toxicity (single exposure) Category 3
H335	May cause respiratory irritation

NFPA®

NFPA health hazard	: 1-Exposure could cause irritation but only minor residual injury even if no treatment is given
NFPA fire hazard	: 1- Materials that require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur (e.g. mineral oil). Includes some finely divided suspended solids that do not require heating before ignition can occur. Flash point at or above 93.3 °C (200 °F)
NFPA reactivity	: 0- Normally stable, even under fire exposure conditions, and are not reactive with water

The information contained herein is accurate to the best of our knowledge. General Carbon Corporation makes no warranty with respect hereto said information and disclaims all liability from reliance there in.

CGS

CATION EXCHANGE RESIN
SOFTENING GRADE
Na FORM

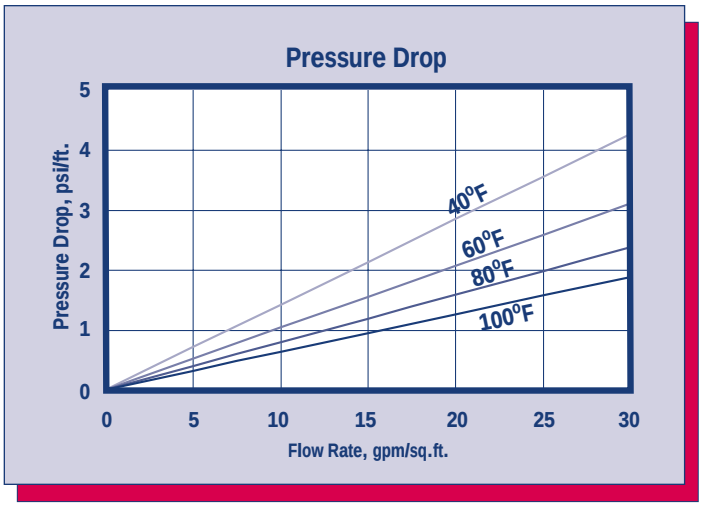
RESINTECH CGS is a high purity, light colored, high capacity, gel type sulfonated polystyrene cation resin supplied in the sodium form as moist, tough uniform spherical beads. *ResinTech CGS* specifically is intended for use in all water softening applications,including beverages, potable water and water used for food processing. It's high capacity and high DVB content provide long life and good chlorine resistance in all potable water applications. (It is also available as a dark colored product *RESINTECH CGS-BL* with identical properties.)

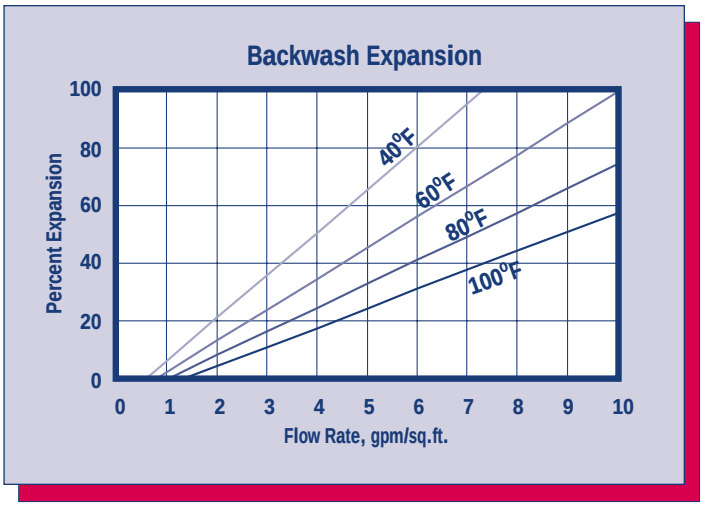
FEATURES & BENEFITS

- **COMPLIES WITH FDA REGULATIONS FOR POTABLE WATER APPLICATIONS**
  Conforms to paragraph 21CFR173.25 of the Food Additives Regulations of the F.D.A.*
- **EXCELLENT REGENERATION EFFICIENCY**
  Virtually the same operating capacity as premium grade *ResinTech CG8-BL*
- **NSF/ANSI-61 VALIDATED**
- **UNIFORM PARTICLE SIZE**
  16 to plus 50 mesh range; gives a LOWER PRESSURE DROP while maintaining SUPERIOR KINETICS.
- **SUPERIOR PHYSICAL STABILITY**
  90% plus sphericity and high crush strengths together with a very uniform particle size provide greater resistance to bead breakage while maintaining low pressure drops.
- **LOW COLOR THROW**

*For potable water applications, the resin must be properly pre-treated, usually by multiple exhaustion and regeneration cycles, to insure compliance with extractable levels.

HYDRAULIC PROPERTIES





PRESSURE DROP - The graph above shows the expected pressure loss per foot of bed depth as a function of flow rate, at various temperatures.

BACKWASH - After each cycle the resin bed should be backwashed at a rate that expands the bed 50 to 75 percent. This will remove any foreign matter and reclassify the bed. The graph above shows the expansion characteristics of *RESINTECH CGS* in the sodium form.

1 Resintech Plaza • 160 Cooper Road • West Berlin,NJ 08091 • Phone:(856)768-9600 • Fax:(856)768-9601 • E-mail:ixresin@resintech.com • Web Site:www.resintech.com

RESINTECH® CGS

PHYSICAL PROPERTIES

Polymer Structure	Styrene Crosslinked with DVB
Functional Group	$R-(SO_3)^-M^+$
Ionic Form, as shipped	Sodium
Physical Form	Tough, Spherical Beads
Screen Size Distribution	16 to 50
+16 mesh (U.S. Std)	< 5 percent
-50 mesh (U.S. Std)	< 1 percent
pH Range	0 to 14
Sphericity	90+ percent
Uniformity Coefficient	Approx. 1.6
Water Retention	
Sodium Form	48 to 54 percent
Solubility	Insoluble
Shipping Weight	
Sodium Form	48 lbs./cu.ft.
Total Capacity	
Sodium Form	1.8 meq/ml min

SUGGESTED OPERATING CONDITIONS

Maximum Temperature	
Sodium Form	250^0 F
Minimum Bed Depth	24 inches
Backwash Rate	50 to 75% Bed Expansion
Regenerant (NaCl or KCl)	
Concentration	10 to 15 percent
Flow Rate	0.5 to 1.5 gpm/cu.ft.
Contact Time	> 20 minutes
Level	4 to 15 pounds/cu.ft.
Displacement Rate	Same as Regen Flow Rate
Volume	10 to 15 gallons/cu.ft.
Fast Rinse Rate	Same as Service Flow Rate
Volume	35 to 60 gallons/cu.ft.
Service Flow Rate	2 to 10 gpm/cu.ft.

OPERATING CAPACITY

Sodium Chloride (NaCl) Regeneration

The sodium cycle operating capacity of *RESINTECH CGS* for hardness removal at various regeneration levels with an influent calcium/magnesium ratio of 2/1 and a hardness level of 500 ppm, as $CaCO_3$, is shown in the following table:

Pounds NaOH/cu.ft.	Capacity Kilograins/cu.ft.
5	20.0
7.5	25.4
10	29.0
15	33.0

Potassium Chloride (KCl) Regeneration

The potassium cycle operating capacity of *RESINTECH CGS* for hardness removal at various regeneration levels with an influent calcium/magnesium ratio of 2/1 and a hardness level of 500 ppm, as $CaCO_3$, is shown in the following table:

Pounds NaOH/cu.ft.	Capacity Kilograins/cu.ft.
5	16.6
7.5	21.8
10	26.6
15	31.2

APPLICATIONS

Softening

RESINTECH CGS is ideally suited for industrial, commercial, or residential softening applications where free chlorine is not present because of its high capacity, uniform particle size and good physical stability.

CGSver010603

SBG1

ANION EXCHANGE RESIN TYPE ONE GEL Cl OR OH FORM

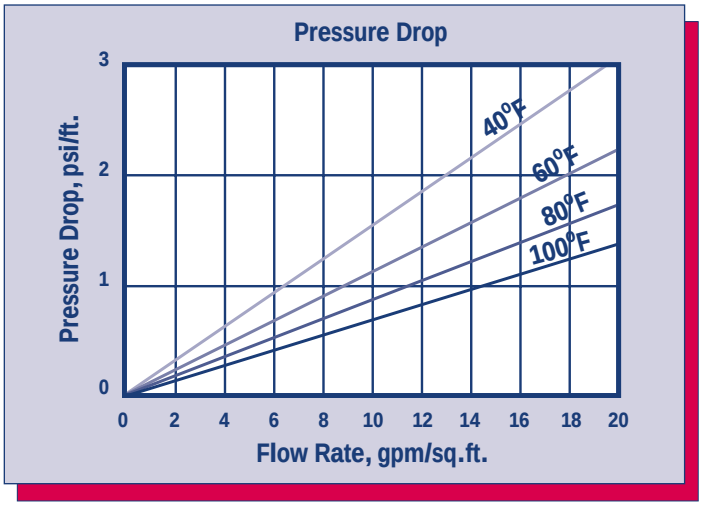
ResinTech SBG1 is a high capacity, shock resistant, gelular, Type 1, strongly basic anion exchange resin supplied in the chloride or hydroxide form as moist, tough, uniform, spherical beads. *ResinTech SBG1* is intended for use in all types of deionization systems and chemical processing applications. It is similar to *ResinTech SBG1P* but has a higher volumetric capacity and exhibits lower TOC leach rates. This makes it the better performer in single use applications such as in cartridge deionization and when high levels of regeneration are used such as in polishing mixed beds. On the other hand, *ResinTech SBG1P* is more resistant to organic fouling and gives higher operating capacities at low regeneration levels such as those used in make up demineralizers.

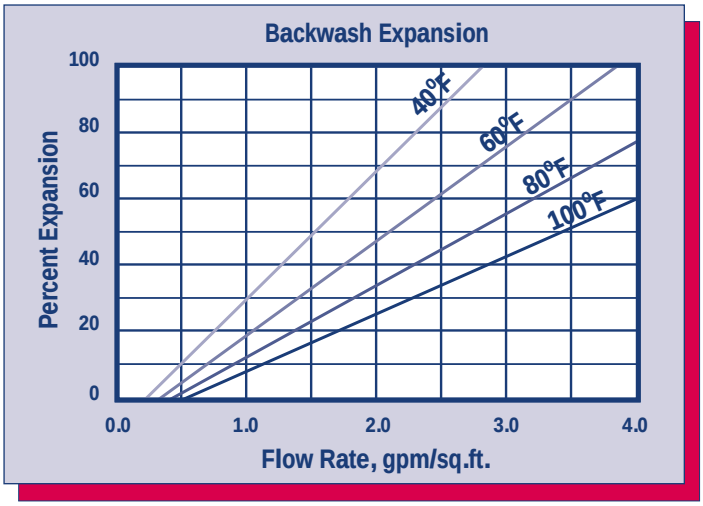
FEATURES & BENEFITS

- **COMPLIES WITH FDA REGULATIONS FOR POTABLE WATER APPLICATIONS.**
  Conforms to paragraph 21CFR173.125 of the Food Additives Regulations of the F.D.A.*
- **HIGH TOTAL CAPACITY**
  Provides longer run lengths in single use applications or where high levels of regeneration are used such as in mixed bed polishers, cartridge demineralizers.
- **UNIFORM PARTICLE SIZE**
  16 to plus 50 mesh range; gives a LOWER PRESSURE DROP while maintaining SUPERIOR KINETICS.
- **SUPERIOR PHYSICAL STABILITY**
- **LOWER TOC LEACH RATE**
  Makes it ideal for polishing mixed beds in wafer washing and other high purity water polishing applications.

*For potable water applications, the resin must be properly pre-treated, usually by multiple exhaustion and regeneration cycles, to ensure compliance with extractable levels.

HYDRAULIC PROPERTIES





PRESSURE DROP

The graph above shows the expected pressure loss per foot of bed depth as a function of flow rate, at various temperatures.

BACKWASH

After each cycle the resin bed should be backwashed at a rate that expands the bed 50 to 75 percent. This will remove any foreign matter and reclassify the bed. The graph above shows the expansion characteristics of *ResinTech SBG1* in the sodium form.

RESINTECH® SBG1

PHYSICAL PROPERTIES

Polymer Structure	Styrene Crosslinked with DVB
Functional Group	R-N-$(CH_3)_3^+Cl^-$
Ionic Form, as shipped	Chloride or Hydroxide
Physical Form	Tough, Spherical Beads
Screen Size Distribution	16 to 50
+16 mesh (U.S. Std)	< 5 percent
-50 mesh (U.S. Std)	< 1 percent
pH Range	0 to14
Sphericity	> 93 percent
Uniformity Coefficient	Approx. 1.6
Water Retention	
Chloride Form	43 to 50 percent
Hydroxide Form	Approx. 53 to 60 percent
Solubility	Insoluble
Approximate Shipping Weight	
Cl Form	44 lbs/cu.ft.
OH Form	41 lbs/cu.ft.
Swelling Cl- to OH-	18 to 25 percent
Total Capacity	
Cl Form	1.45 meq/ml min
OH Form	1.15 meq/ml min

SUGGESTED OPERATING CONDITIONS

Maximum Continuous Temperature	
Hydroxide Form	140°F
alt Form	170°F
Minimum Bed Depth	24 inches
Backwash Rate	50 to 75 percent Bed Expansion
Regenerant Concentration*	2 to 6 percent
Regenerant Flow Rate	0.25 to 1.0 gpm/cu.ft.
Regenerant Contact Time	At least 40 Minutes
Regenerant Level	4 to 10 pounds/cu.ft.
Displacement Rinse Rate	Same as Regenerant Flow Rate
Displacement Rinse Volume	10 to 15 gals/cu.ft.
Fast Rinse Rate	Same as Service Flow Rate
Fast Rinse Volume	35 to 60 gals/cu.ft.
Service Flow Rates	
Polishing Mixed Beds	3 to 15 gpm/cu.ft.
Non-Polishing Apps.	2 to 4 gpm/cu.ft.

OPERATING CAPACITY

The operating capacity of *RESINTECH SBG1* for a variety of acids at various regeneration levels when treating an influent with a concentration 500 ppm, expressed as $CaCO_3$ is shown in the following table:

Pounds NaOH/ft³	Capacity Kilograms per cubic foot			
	HCl	H_2SO_4	H_2SiO_3	H_2CO_3
4	11.3	14.0	14.7	18.6
6	12.8	16.3	17.3	19.8
8	14.3	13.3	19.5	21.6
10	15.5	20.0	22.2	22.2

APPLICATIONS

DEMINERALIZATION – *RESINTECH SBG1* is highly recommended for use in mixed bed demineralizers, wherever complete ion removal; superior physical and osmotic stability and low TOC leachables are required such as in wafer fabrication and other ultrapure applications.

RESINTECH SBG1 has high total capacity and low swelling on regeneration and provides maximum operating capacity in cartridge deionization applications. It is ideal for single use applications such as precious metal recovery, radwaste disposal and purification of toxic waste streams.

Highly crosslinked Type 1, styrenic anion exchangers have greater thermal and oxidation resistance than other types of strong base resins. They can be operated and regenerated at higher temperatures. The combination of lower porosity, high total capacity and Type 1 functionality make *RESINTECH SBG1* the resin of choice when water temperatures exceed 85°F and where the combination of carbon dioxide, borate and silica exceed 40% of the total anions.

RESINTECH SBG1P and *RESINTECH SBG1* are quite similar; the difference between them is the degree of porosity. *RESINTECH SBG1P* has greater porosity that gives it faster kinetics, and greater ability to reversibly sorb slow moving ions such as Naturally occurring Organic Matter (NOM). At lower regeneration levels and where chlorides make up a substantial portion of the anion load, or where the removal and elution of naturally occurring organics is of concern *RESINTECH SBG1P*, SBACR or SBG2 should be considered. At the higher regeneration levels used in mixed bed polishers *RESINTECH SBG1* provides higher capacity, and the lowest possible TOC leach rates.

***CAUTION:DO NOT MIX ION EXCHANGE RESIN WITH STRONG OXIDIZING AGENTS.** Nitric acid and other strong oxidizing agents can cause explosive reactions when mixed with organic materials,such as ion exchange resins.

Material Safety Data Sheets (MSDS) are available for all ResinTech Inc.products.To obtain a copy,contact your local ResinTech sales representative or our corporate headquarters. They contain important health and safety information.That information may be needed to protect your employees and customers from any known health and safety hazards associated with our products.We recommend that you secure and study the pertinent MSDS for our products and any other products being used These suggestions and data are based on information we believe to be reliable.They are offered in good faith.However we do not make any guarantee or warranty. We caution against using these products in an unsafe manner or in violation of any patents;further we assume no liability for the consequences of any such actions.

Safety Data Sheet

Product Names: SBG1, SBG1-HP, SBG1-UPS, SBG1-C, SBG1-F, SBMP1, SBMP1-UPS, GP-SBA, SBG1P, SBG1P-UPS

(Type I Strong Base Anion Exchange Resin Chloride Form)

Effective date 31 March 2015

Section 1: Identification

1a	Product Names	ResinTech SBG1, SBG1-HP, SBG1-UPS, SBG1-C, SBG1-F, SBMP1, SBMP1-UPS, GP-SBA, SBG1P, SBG1P-UPS
1b	Common Name	Type I Strong base anion resin in the chloride form.
1c	Intended use	All general purpose anion exchanges for general use including salt form and demineralization.
1d	Manufacturer Address	ResinTech, Inc. 160 Cooper Road, West Berlin, NJ 08091 USA
	Phone Email	856-768-9600 ixresin@resintech.com

Section 2: Hazard Identification

2a Hazard classification — Not hazardous or dangerous

Product Hazard Rating	Scale
Health = 0	0 = Negligible
Fire = 1	1 = Slight
Reactivity = 0	2 = Moderate
Special – N/A	3 = High
	4 = Extreme

2b Product description — White, yellow, or orange colored solid beads approximately 0.6 mm diameter with little or no odor.

2c Precautions for use — Safety glasses and gloves recommended. Slipping hazard if spilled.

2c Potential health effects — Will cause eye irritation. Will cause skin skin irritation. Ingestion is not likely to pose a health risk.

2d Environmental effects — This product may alter the pH of any water that contacts it.

RESINTECH INC.
INNOVATIONS IN ION EXCHANGE

MATERIAL SAFETY DATA SHEET

ION EXCHANGE RESINS

Product Name: CG10-H, CG10-H-ULTRA, CG10-H-LTOC, CG10-H-SC, CG10-H-NG, CG10-H-C, CG10-H-F, CG10-H-UPS, CG8-H, CG8-H-ULTRA, CG8-H-LTOC, CG8-H-SC, CG8-H-NG, CG8-H-C, CG8-H-F, CG8-H-UPS, CGS-H, CGS-H-C, CGS-H-F, CGS-H-UPS, CG6-H, GP-SAC-H

Cation Exchange Resin, Hydrogen Form

Effective Date: 11/1/07

1. Company Information:

Company Address:

ResinTech, Inc.
1 ResinTech Plaza
160 Cooper Road
West Berlin, NJ 08091 USA

Information Numbers:

Phone Number: 856-768-9600
Fax Number: 856-768-9601
Email: ixresin@resintech.com
Website: www.resintech.com

2. Composition/Ingredients:

Sulfonated copolymer of styrene and divinylbenzene in the hydrogen form. CAS# 69011-20-7 (35 – 65%)

Water CAS# 7732-18-5 (35 – 65%)

This document is prepared pursuant to the OSHA Hazard Communication Standard (29CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

3. Physical/Chemical Data:

Boiling Point:	Not Applicable
Vapor Pressure (MM HG):	Not Applicable
Evaporation Rate (water = 1):	1
Appearance & Odor:	Amber solid beads. No to low odor.
Specific Gravity:	1.2 (water = 1)
Melting Point (deg. F)	Not applicable
Solubility in Water:	Insoluble
Thermal:	May yield oxides of carbon and nitrogen
Vapor Density:	Not Applicable

Product Hazard Rating	Scale
Toxicity = 0	0 = Negligible
Fire = 0	1 = Slight
Reactivity = 0	2 = Moderate
Special – N/A	3 = High
	4 = Extreme

4. Fire & Explosion Hazard Data

Flammable Limits:	800 ° Deg. F
Unusual Fire & Explosion Hazards:	Product is not combustible until moisture is removed, then resin starts to burn in flame at

	230 C. Autoignition occurs above 500C. Possible fire.
Combustion Products:	Hazardous combustion products may include and are not limited to: hydrocarbons, sulfur oxides, organic sulfonates, carbon monoxide, carbon dioxide, benzene compounds.
Extinguishing Media:	Water, CO_2, Talc, Dry Chemical
Special Fire Fighting Procedures:	MSHA/NIOSH approved self-contained breathing gear.

5. Reactivity Data

Stability:	Stable
Conditions to Avoid:	Temperatures above 400° F
Hazardous by Products:	See Section 3 above for possible combustion products.
Materials to avoid contact with:	Strong oxidizing agents (i.e. nitric acid)
Hazardous Polymerization:	Material does not polymerize
Storage:	Store in a cool dry place

6. Health Hazards & Sara (Right to Know)

Emergency First Aid Procedures:	Contact with eyes can and skins can cause irritation.
Skin Absorption:	Skin absorption is unlikely due to physical properties.
Ingestion:	Single dose oral LD50 has not been determined. Single does oral toxicity is believed to be low. No hazards anticipated from ingestion incidental to industrial exposure.
Inhalation:	Vapors are unlikely due to physical properties.
Systemic & Other Effects:	No specific data available, however, repeated exposures are not anticipated to cause any significant adverse effects.
Carcinogenicity:	Not Applicable
Sara – title 3, sections 311 & 312:	All ingredients are non-hazardous

7. First Aid

Eyes:	Irrigate immediately with water for at least 5 minutes. Mechanical irritation only.
Skin:	No adverse effects anticipated by this route of exposure.
Ingestion:	No adverse effects anticipated by this route of exposure incidental to proper industrial handling.
Inhalation:	No adverse effects anticipated by this route of exposure.

8. Control Measures

Respiratory protection:	Not required for normal uses if irritation occurs from breathing-get fresh air!
Eye protection:	Splash goggles
Ventilation:	Normal
Protective Gloves:	Not required.

9. Safe handling procedures

In Case of Spills:	Sweep up material and transfer to containers. Use caution – the floor will be slippery!

sc200™ UNIVERSAL CONTROLLER

Applications
- Drinking Water
- Wastewater
- Industrial Water
- Power

One Controller for the Broadest Range of Sensors.

Choose from 30 digital and analog sensor families for up to 17 different parameters.

Maximum Versatility

The sc200 controller allows the use of digital and analog sensors, either alone or in combination, to provide compatibility with Hach's broad range of sensors, eliminating the need for dedicated, parameter-specific controllers.

Ease of Use and Confidence in Results

Large, high-resolution, transreflective display provides optimal viewing resolution in any lighting condition. Guided calibration procedures in 19 languages minimize complexity and reduce operator error. Password-protected SD card reader offers a simple solution for data download and transfer. Visual warning system provides critical alerts.

Wide Variety of Communication Options

Utilize two to five analog outputs to transmit primary and secondary values for each sensor, or integrate Hach sensors and analyzers into MODBUS RS232/RS485, Profibus® DP, and HART networks.

Password protected SD card reader offers a simple solution for data download and transfer, and sc200 and digital sensor configuration file duplication and backup.

HACH®
Be Right™

Controller Comparison

Features	Previous Models sc100™ Controller	Previous Models GLI53 Controller	sc200™ Controller	Benefits
Display	64 x 128 pixels 33 x 66 mm (1.3 x 2.6 in.)	64 x 128 pixels 33 x 66 mm (1.3 x 2.6 in.)	160 x 240 pixels 48 x 68 mm (1.89 x 2.67 in.) Transreflective	• Improved user interface—50% bigger • Easier to read in daylight and sunlight
Data Management	irDA Port/PDA Service Cable	N/A	SD Card Service Cable	• Simplifies data transfer • Standardized accessories/max compatibility
Sensor Inputs	2 Max Direct Digital Analog via External Gateway	2 Max Analog Depending on Parameter	2 Max Digital and/or Analog with Sensor Card	• Simplifies analog sensor connections • Works with analog and digital sensors
Analog Inputs	N/A	N/A	1 Analog Input Signal Analog 4-20mA Card	• Enables non-sc analyzer monitoring • Accepts mA signals from other analyzers for local display • Consolidates analog mA signals to a digital output
4-20 mA Outputs	2 Standard	2 Standard	2 Standard Optional 3 Additional	• Total of five (5) 4-20 mA outputs allows multiple mA outputs per sensor input
Digital Communication	MODBUS RS232/RS485 Profibus DP V1.0	HART	MODBUS RS232/RS485 Profibus DP V1.0 HART 7.2	• Unprecedented combination of sensor breadth and digital communication options

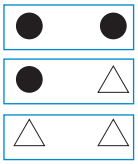
Choose from Hach's Broad Range of Digital and Analog Sensors

Parameter	Sensor	Digital or Analog
Ammonia	AMTAX™ sc, NH4D sc, AISE sc, AN-ISE sc	●
Chlorine	CLF10 sc, CLT10 sc, 9184 sc	●
Chlorine Dioxide	9185 sc	●
Conductivity	GLI 3400 Contacting, GLI 3700 Inductive	△
Dissolved Oxygen	LDO® Model 2, 5740 sc	●
Dissolved Oxygen	5500	△
Flow	U53, F53 Sensors	△
Nitrate	NITRATAX™ sc, NO3D sc, NISE sc, AN-ISE sc	●
Oil in Water	FP360 sc	●
Organics	UVAS sc	●
Ozone	9187 sc	●
pH/ORP	pHD	●
pH/ORP	pHD, pH Combination, LCP	△
Phosphate	PHOSPHAX™ sc	●
Sludge Level	SONATAX™ sc	●
Suspended Solids	SOLITAX™ sc, TSS sc	●
Turbidity	1720E, FT660 sc, SS7 sc, ULTRATURB sc, SOLITAX sc, TSS sc	●
Ultra Pure Conductivity	8310, 8311, 8312, 8315, 8316, 8317 Contacting	△
Ultra Pure pH/ORP	8362	△

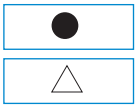
● = Digital △ = Analog

Connect up to two of any of the sensors listed above, in any combination, to meet your application needs. The diagrams below demonstrate the potential configurations. Operation of analog sensors requires the controller to be equipped with the appropriate sensor module. Contact Hach Technical Support for help with selecting the appropriate module.

2 Channel Configurations



1 Channel Configurations



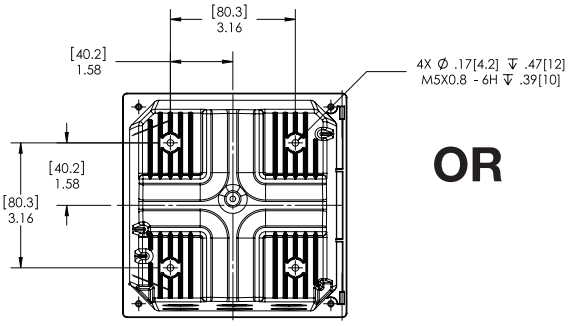
Specifications*

Dimensions (H x W x D)	5.7 in x 5.7 in x 7.1 in (144 mm x 144 mm x 181 mm)
Display	Graphic dot matrix LCD with LED backlighting, transreflective
Display Size	1.9 x 2.7 in. (48 mm x 68 mm)
Display Resolution	240 x 160 pixels
Weight	3.75 lbs. (1.70 kg)
Power Requirements (Voltage)	100 - 240 V AC, 24 V DC
Power Requirements (Hz)	50/60 Hz
Operating Temperature Range	-20 to 60 °C , 0 to 95% RH non-condensing
Analog Outputs	Two (Five with optional expansion module) to isolated current outputs, max 550 Ω , Accuracy: ± 0.1% of FS (20mA) at 25 °C, ± 0.5% of FS over -20 °C to 60 °C range Operational Mode: measurement or calculated value
Analog Output Functional Mode	Linear, Logarithmic, Bi-linear, PID
Security Levels	2 password-protected levels
Mounting Configurations	Wall, pole, and panel mounting
Enclosure Rating	NEMA 4X/IP66
Conduit Openings	1/2 in NPT Conduit
Relay: Operational Mode	Primary or secondary measurement, calculated value (dual channel only) or timer
Relay Functions	Scheduler (Timer), Alarm, Feeder Control, Event Control, Pulse Width Modulation, Frequency Control, and Warning
Relays	Four electromechanical SPDT (Form C) contacts, 1200 W, 5 A
Communication	MODBUS RS232/RS485, PROFIBUS DPV1, or HART 7.2 optional
Memory Backup	Flash memory
Electrical Certifications	EMC CE compliant for conducted and radiated emissions: - CISPR 11 (Class A limits) - EMC Immunity EN 61326-1 (Industrial limits) Safety cETLus safety mark for: - General Locations per ANSI/UL 61010-1 & CAN/CSA C22.2. No. 61010-1 - Hazardous Location Class I, Division 2, Groups A,B,C & D (Zone 2, Group IIC) per FM 3600 / FM 3611 & CSA C22.2 No. 213 M1987 with approved options and appropriately rated Class I, Division 2 or Zone 2 sensors cULus safety mark - General Locations per UL 61010-1 & CAN/CSA C22.2. No. 61010-1

Subject to change without notice.

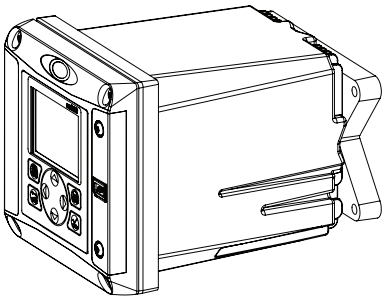
Dimensions

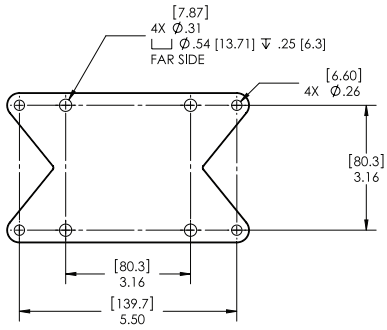
Surface Mounting Dimensions



Mounting Dimensions
(Rear View)

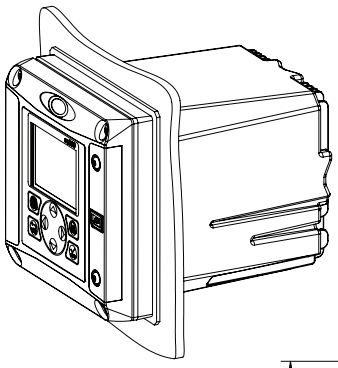
OR

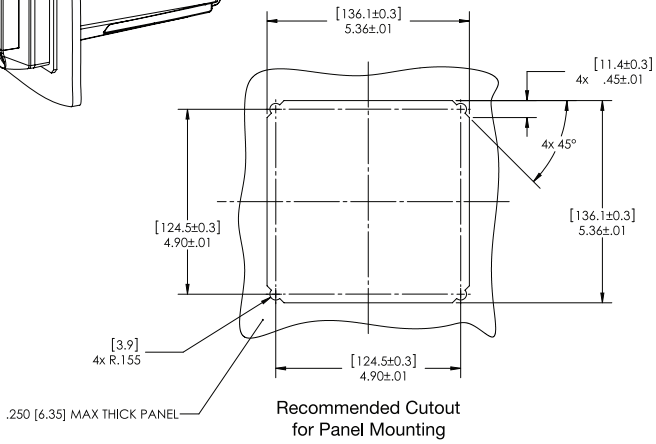




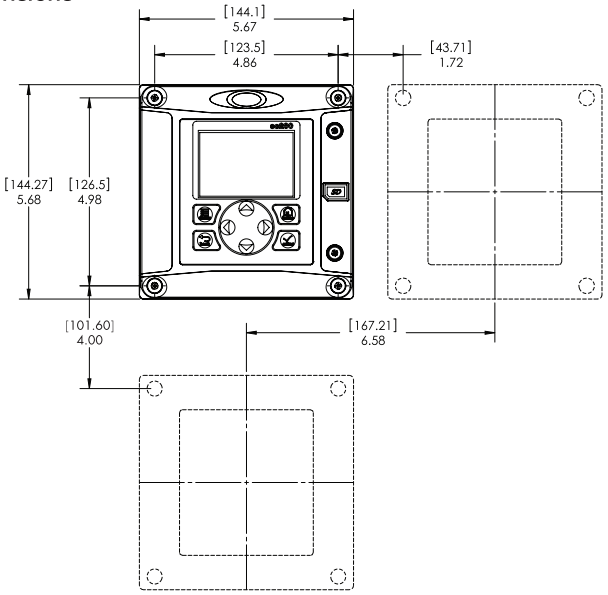
Bracket (supplied) for Surface Mounting
(Not compatible with Weather and Sun Shield
p/n 9220600 when surface mounting.)

Panel Mounting Dimensions



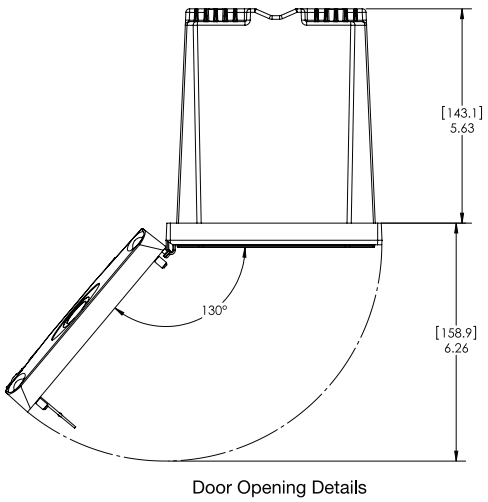


Recommended Cutout
for Panel Mounting

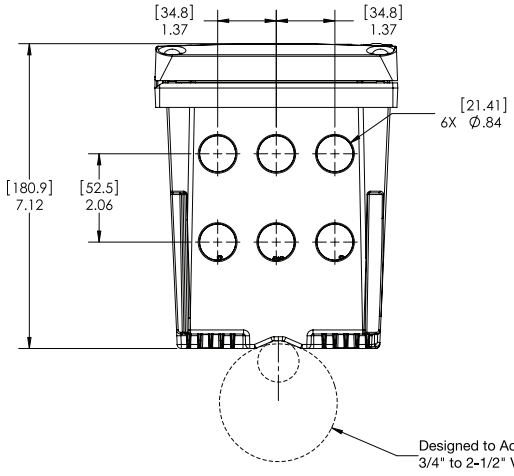


Minimum Spacing Dimensions
for Group Mounting

Top and Bottom Views



Door Opening Details



Ordering Information

sc200 for Hach Digital and Analog Sensors

LXV404.99.00552	sc200 controller, 2 channels, digital
LXV404.99.00502	sc200 controller, 1 channel, digital
LXV404.99.00102	sc200 controller, 1 channel, pH/DO
LXV404.99.00202	sc200 controller, 1 channel, Conductivity
LXV404.99.01552	sc200 controller, 2 channels, digital, Modbus RS232/RS485
LXV404.99.00112	sc200 controller, 2 channel, pH/DO

Note: Other Sensor combinations are available. Please contact Hach Technical Support or your Hach representative.

Note: Communication options (MODBUS, Profibus DPV1, and HART) are available. Please contact Hach Technical Support or your Hach representative.

sc200 for Ultrapure Sensors

9500.99.00602	sc200 controller, 1 channel, ultrapure conductivity
9500.99.00702	sc200 controller, 1 channel, ultrapure pH
9500.99.00662	sc200 controller, 2 channel, ultrapure conductivity
9500.99.00772	sc200 controller, 2 channel, ultrapure pH

Sensor and Communication Modules

9012900	Analog pH/ORP and DO module for GLI Sensors
9013000	Analog Conductivity module for GLI Sensors
9012700	Flow module
9012800	4-20 mA Input Module
9525700	Analog pH/ORP Module for Polymetron Sensors
9525800	Analog Conductivity Module for Polymetron Sensors
9013200	Modbus 232/485 Module
9173900	Profibus DP Module
9328100	HART Module
9334600	4-20 mA Output Module (Provides 3 additional mA Outputs)

Accessories

9220600	sc200 Weather and Sun Shield with UV Protection Screen
8809200	sc200 UV Protection Screen
9218200	SD card reader (USB) for connection to PC
9218100	4 GB SD card

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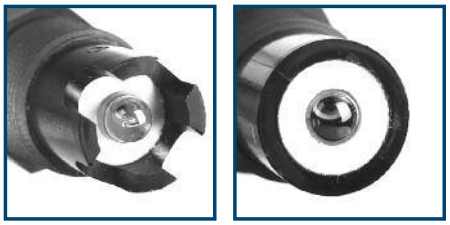
Outside United States: 970-669-3050 tel 970-461-3939 fax int@hach.com
hach.com

LIT2665 Rev 7
K13 Printed in U.S.A.

HACH®
Be Right™

3/4-inch Combination pH and ORP Sensor Kits

Use the Digital Gateway to make any Hach analog combination pH or ORP sensor compatible with the Hach sc1000 Controller.



Digital combination pH and ORP sensors are available in convertible, insertion, and sanitary mounting styles. Choose from rugged dome electrodes or "easy-to-clean" flat glass electrodes.

Features and Benefits

Low Price—High Performance

These combination sensors are designed for specialty applications for immersion or in-line mounting. The reference cell features a double-junction design for extended service life, and a built-in solution ground. The body is molded from chemically-resistant Ryton® or PVDF, and the reference junction is coaxial porous PTFE. All sensors are rated 0 to 105ºC up to 100 psig, and have integral 4.5 m (15 ft.) cables with tinned leads. The PC-series (for pH) and RC-series (for ORP) combination sensors are ideal for measuring mild and aggressive media.

Special Electrode Configurations

Sensors with rugged dome electrodes, "easy-to-clean" flat glass electrodes, and even HF (hydrofluoric acid) resistant glass electrodes are available for a wide variety of process solutions.

Temperature Compensation Element Option

The PC-series combination pH sensors are available with or without a Pt 1000 ohm RTD temperature element. The RC-series combination ORP sensors are supplied without a temperature element.

Versatile Mounting Styles

Sensors are available in three mounting styles—convertible, insertion, and sanitary. Please turn to page 3 for more information.

Full-Featured "Plug and Play" Hach sc Digital Controllers

There are no complicated wiring or set up procedures with any Hach sc controller. Just plug in any combination of Hach digital sensors and it's ready to use—it's "plug and play."

One or multiple sensors—The sc controller family allows you to receive data from up to eight Hach digital sensors in any combination using a single controller.

Communications—Multiple alarm/control schemes are available using the relays and PID control outputs. Available communications include analog 4-20 mA, digital MODBUS® (RS485 and RS232) or Profibus DP protocols. (Other digital protocols are available. Contact your Hach representative for details.)

Data logger—A built-in data logger collects measurement data, calibration, verification points, and alarm history.

Specifications*

Most pH applications fall in the 2.5-12.5 pH range. General purpose pH glass electrodes perform well in this range. Some industrial applications require accurate measurements and control at pH values below 2 or above 12. Consult Hach Technical Support for details on these applications.

Combination pH Sensors

Measuring Range
0 to 14 pH

Accuracy
Less than 0.1 pH under reference conditions

Temperature Range
0 to 105°C (32 to 221°F)

Flow Rate
0 to 2 m/s (0 to 6.6 ft./s); non-abrasive

Pressure Range
0 to 6.9 bar at 100°C (0 to 100 psig at 212°F)

Signal Transmission Distance
100 m (328 ft.) when used with the Hach Digital Gateway and a Hach sc Digital Controller.

1000 m (3280 ft.) when used with the Hach Digital Gateway, Termination Box, and a Hach sc Digital Controller.

Sensor Cable
Integral coaxial cable (plus two conductors for temperature compensator option); 4.5 m (15 ft.) long

Wetted Materials

Convertible style: Ryton® body (glass filled)

Insertion style: PVDF body (Kynar®)

Sanitary style: 316 stainless steel sleeved PVDF body

Common materials for all sensor styles include PTFE double junction, glass process electrode, and Viton® O-rings

Warranty
90 days

Combination ORP Sensors

Measuring Range
-2000 to +2000 millivolts

Accuracy
Limited to calibration solution accuracy (± 20 mV)

Temperature Range
0 to 105°C (32 to 221°F)

Flow Rate
0 to 2 m/s (0 to 6.6 ft./s); non-abrasive

Pressure Range
0 to 6.9 bar at 100°C (0 to 100 psig at 212°F)

Signal Transmission Distance
100 m (328 ft.) when used with the Hach Digital Gateway and a Hach sc Digital Controller.

1000 m (3280 ft.) when used with the Hach Digital Gateway, Termination Box, and a Hach sc Digital Controller.

Sensor Cable
Integral coaxial cable; 4.5 m (15 ft.) long; terminated with stripped and tinned wires

Wetted Materials

Convertible style: Ryton® body (glass filled)

Insertion style: PVDF body (Kynar®)

Common materials for all sensor styles include PTFE double junction, glass with platinum process electrode, and Viton® O-rings

Warranty
90 days

**Specifications subject to change without notice.*

Engineering Specifications

1. The pH sensor shall be available in convertible, insertion or sanitary styles. The ORP sensor shall be available in only convertible or insertion styles.
2. The convertible style sensor shall have a Ryton® body. The insertion style sensor shall have a PVDF body. The sanitary style sensor shall have a 316 stainless steel sleeved PVDF body. Common materials for all sensor styles shall include a PTFE double junction, and Viton® O-rings. The pH sensor shall have a glass pH electrode. The ORP sensor shall have a platinum ORP electrode.
3. The convertible style pH sensor shall be available with or without a built-in Pt 1000 ohm RTD temperature element. Insertion and sanitary style pH sensors shall have a built-in Pt 1000 ohm RTD temperature element. Convertible and insertion style ORP sensors shall not have a built-in temperature element.
4. The sensor shall communicate via MODBUS® RS-485 to a Hach sc Digital Controller.
5. The sensor shall be Hach Company Model PC sc or PC-series for pH measurement or Model PC sc or RC-series for ORP measurement.

Dimensions

Convertible Style Sensor

The convertible style sensor has a Ryton® body that features 3/4-inch NPT threads on both ends. The sensor can be directly mounted into a standard 3/4-inch pipe tee for flow-through mounting or fastened onto the end of a pipe for immersion mounting. The convertible style sensor enables inventory consolidation, thereby reducing associated costs. Mounting tees and immersion mounting hardware are offered in a variety of materials to suit application requirements.

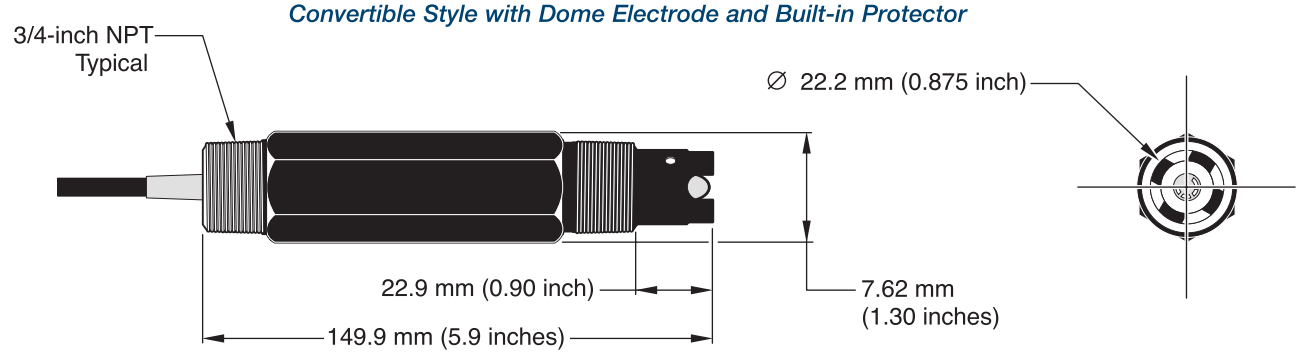
Insertion Style Sensor

Insertion style sensors feature a longer, non-threaded PVDF body with two Viton® O-rings, providing a seal when used with the optional Hach insertion mount hardware assembly. This ball valve hardware enables sensor insertion and retraction from a pipe or vessel without having to stop the process flow.

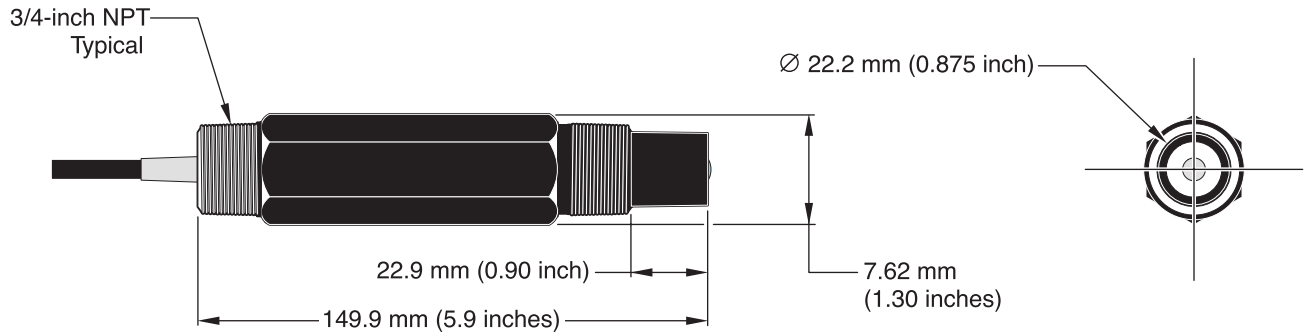
Sanitary Style Sensor

The sanitary style sensor, offered for pH measurement, has a 316 stainless steel-sleeved PVDF body with a 2-inch flange. The sensor mates to a standard 2-inch Tri-Clover fitting. The optional Hach sanitary mounting hardware includes a standard 2-inch sanitary tee, sanitary clamp, and Viton® sanitary gasket.

Convertible Style with Dome Electrode and Built-in Protector

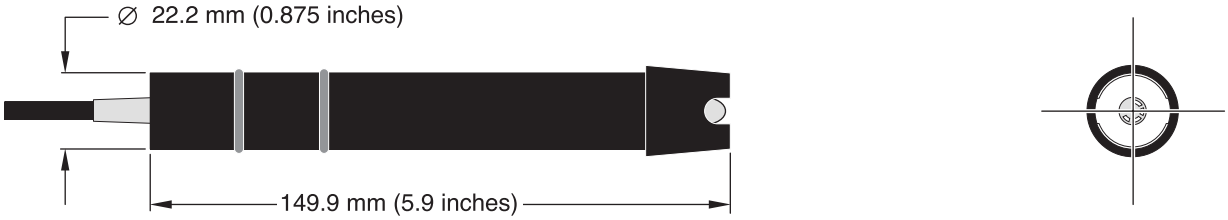


Convertible Style with Flat Electrode

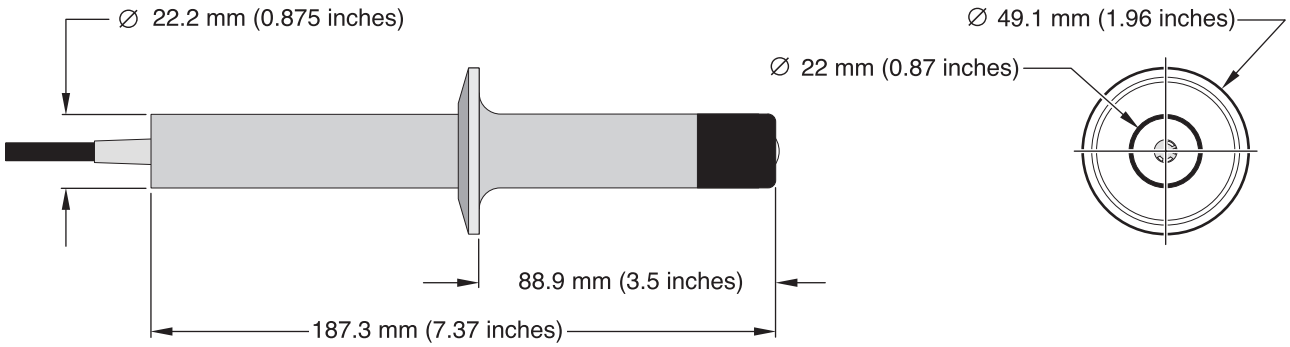


Dimensions *continued*

Insertion Style with Dome Electrode and Built-In Protector



Sanitary Style



Ordering Information

Digital PC sc and RC sc 3/4-inch Combination pH/ORP Sensors

All PC sc and RC sc 3/4-inch combination sensors come complete with an integral 4.5 m (15 ft.) sensor cable, Digital Gateway, and 1 m (3.3 ft.) digital extension cable.

Product Number	*Measurement*	*Sensor Style*	*Body Material*	*Electrode Type*	*Temp. Comp.*
DPC1R1N	pH	Convertible	Ryton	General purpose glass	None
DPC1R1A	pH	Convertible	Ryton	General purpose glass	Pt 1000 ohm RTD
DPC1R2N	pH	Convertible	Ryton	Flat glass, general purpose	None
DPC1R2A	pH	Convertible	Ryton	Flat glass, general purpose	Pt 1000 ohm RTD
DPC1R3A	pH	Convertible	Ryton	HF-resistant glass (see Note)	Pt 1000 ohm RTD
DPC2K1A	pH	Insertion	PVDF	General purpose glass	Pt 1000 ohm RTD
DPC2K2A	pH	Insertion	PVDF	Flat Glass	Pt 1000 ohm RTD
DPC3K2A	pH	Sanitary	316 SS/PVDF	General purpose glass	Pt 1000 ohm RTD
DRC1R5N	ORP	Convertible	Ryton	Platinum	None
DRC2K5N	ORP	Insertion	PVDF	Platinum	None

NOTE

The HF (hydrofluoric acid) resistant glass electrode reduces the HF dissolution of the complete glass surface to extend the lifetime of the electrode in acid fluoride solutions. The electrode will last longer than conventional glass pH electrodes. How much longer depends on the HF concentration and temperature of the solution.

Replacement Digital Gateway

6120600 Use the Digital Gateway to connect analog PC and RC sensors to a Hach sc Digital Controller.

Ordering Information *continued*

Analog PC and RC 3/4-inch Combination pH/ORP Sensors

All PC and RC 3/4-inch combination sensors come with an integral 4.5 m (15 ft.) standard length sensor cable.

Product Number	*Measurement*	*Sensor Style*	*Body Material*	*Electrode Type*	*Temp. Comp.*
PC1R1N	pH	Convertible	Ryton	General purpose glass	None
PC1R1A	pH	Convertible	Ryton	General purpose glass	Pt 1000 ohm RTD
PC1R2N	pH	Convertible	Ryton	Flat glass, general purpose	None
PC1R2A	pH	Convertible	Ryton	Flat glass, general purpose	Pt 1000 ohm RTD
PC1R3A	pH	Convertible	Ryton	HF-resistant glass	Pt 1000 ohm RTD
PC2K1A	pH	Insertion	PVDF	General purpose glass	Pt 1000 ohm RTD
PC2K2A	pH	Insertion	PVDF	Flat Glass	Pt 1000 ohm RTD
PC3K2A	pH	Sanitary	316 SS/PVDF	General purpose glass	Pt 1000 ohm RTD
RC1R5N	ORP	Convertible	Ryton	Platinum	None
RC2K5N	ORP	Insertion	PVDF	Platinum	None

Accessories for Digital and Analog 3/4-inch combination pH/ORP Sensors

Cables

Digital cables are used only with digital sensors or gateways when connecting to a Hach sc Digital Controller.

6122400 Digital Extension Cable, 1 m (3.3 ft)

5796000 Digital Extension Cable, 7.7 m (25 ft)

5796100 Digital Extension Cable, 15 m (50 ft)

5796200 Digital Extension Cable, 31 m (100 ft)

Analog cables are used only with analog sensors, junction box, and controller.

1W1100 Analog Interconnect Cable (order per foot)

Digital Termination Box

Used with digital extension cables when the desired cable length between the digital sensor/digital gateway and the Hach sc Digital Controller is between 100 m (328 ft) and 1000 m (3280 ft).

5867000 Digital Termination Box

Analog Junction Box

Used with analog interconnect cable when the desired cable length between analog sensor and analog controller is greater than the standard length of sensor cable. Each junction box includes terminal strip and gasket.

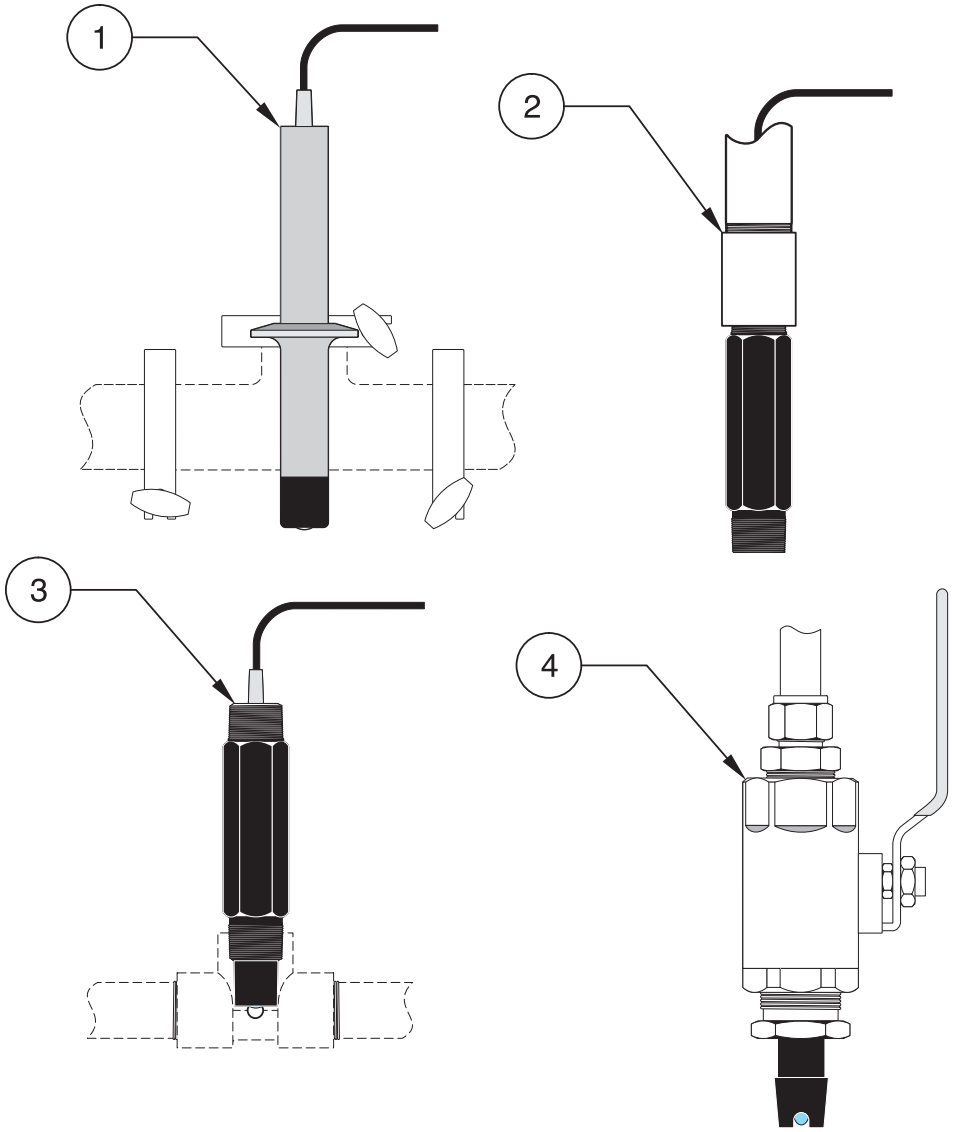
60A2053 Junction Box, Surface-mount, aluminum (includes mounting hardware)

60A9944 Junction Box, Pipe-mount, PVC, for 1/2-inch diameter pipe (includes mounting hardware)

60G2052 Junction Box, Pipe-mount, PVC, for 1-inch diameter pipe (includes mounting hardware)

76A4010-001 Junction Box, NEMA 4X (no mounting hardware included)

Ordering Information *continued*



1. Sanitary Mounting *2. Immersion Mounting* *3. Flow-through Mounting* *4. Insertion Mounting*

Mounting Hardware for PC sc and RC sc Combination Sensors

Sanitary Mount Hardware

9H1310 2-inch Sanitary Tee
9H1132 2-inch Sanitary Clamp
9H1384 2-inch Sanitary Viton Gasket

Immersion Mount Hardware

Each immersion hardware includes a 1/2-inch diameter x 4 foot long pipe, 1/2 x 3/4-inch NPT coupling, and plastic pipe-mount junction box with terminal strip.

MH432G CPVC Pipe

Flow-through Mount Hardware

Each tee is a standard 3/4-inch tee with 3/4-inch NPT threads on all three openings.

MH313N3NZ 316 SS Tee
MH333N3NZ CPVC Tee
MH373N3NZ PVC Tee

Insertion Mount Hardware

The insertion hardware includes a 1-1/2 inch ball valve, 1-1/2 inch NPT close nipple for process connection, sensor connection tube, stainless steel extension pipe, and stainless steel compression fitting with washer and lock nut.

MH116M3MZ 316 SS Hardware

To complete your pH and ORP measurement system, choose from these Hach controllers...

Model sc200 Controller

(see Lit. #2665)

The sc200 controller platform can be configured to operate either 2 Digital Sensor Inputs, or 1 or 2 Analog Sensor Inputs, or a combination of Digital and Analog Sensor Inputs. Customers may choose their communication options from a variety of offerings ranging from MODBUS RTU to Profibus DPV1.

sc200 for Hach Digital Sensors

LXV404.99.00552 sc200 controller, 2 channel, digital
LXV404.99.00502 sc200 controller, 1 channel, digital
LXV404.99.00542 sc200 controller, 2 channel, digital & mA input
LXV404.99.00512 sc200 controller, 2 channel, digital & pH/DO
LXV404.99.00522 sc200 controller, 2 channel, digital & Conductivity
LXV404.99.00532 sc200 controller, 2 channel, digital & Flow

sc200 for Hach Analog Sensors

LXV404.99.00102 sc200 controller, 1 channel, pH/DO
LXV404.99.00112 sc200 controller, 2 channel, pH/DO
LXV404.99.00202 sc200 controller, 1 channel, Conductivity
LXV404.99.00222 sc200 controller, 2 channel, Conductivity
LXV404.99.00212 sc200 controller, 2 channel, pH/DO & Conductivity
LXV404.99.00302 sc200 controller, 1 channel, Flow
LXV404.99.00332 sc200 controller, 2 channel, Flow
LXV404.99.00312 sc200 controller, 2 channel, Flow & pH/DO
LXV404.99.00322 sc200 controller, 2 channel, Flow & Conductivity

Note: Other sensor combinations are available. Please contact Hach Technical Support or your Hach representative.
Note: Communication options (MODBUS and Profibus DPV1) are available.

Model sc1000 Controller

(see Lit. #2403)

Each sc1000 Probe Module provides power to the system and can accept up to 8 digital sensors/expansion boards. Probe Modules can be networked together to accommodate up to 32 digital sensors/expansion boards attached to the same network.

LXV402.99.00002 sc1000 Display Module
LXV400.99.1R572 sc1000 Probe Module, 4 sensors, 4 mA Out, 4 mA In, 4 Relays, 110-230V
LXV400.99.1B572 sc1000 Probe Module, 4 sensors, 4 mA Out, 4 mA In, 4 Relays, RS-485 (MODBUS), 110-230V
LXV400.99.1F572 sc1000 Probe Module, 4 sensors, 4 mA Out, 4 mA In, 4 Relays, PROFIBUS DP, 110-230V
LXV400.99.1R582 sc1000 Probe Module, 6 sensors, 4 mA Out, 4 mA In, 4 Relays, 110-230V

At Hach, it's about learning from our customers and providing the right answers. It's more than ensuring the quality of water—it's about ensuring the quality of life. When it comes to the things that touch our lives...

Keep it pure.

Make it simple.

Be right.

For current price information, technical support, and ordering assistance, contact the Hach office or distributor serving your area.

In the United States, contact:

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Loveland, Colorado 80539-0389
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Telephone: 800-227-4224
Fax: 970-669-2932
E-mail: orders@hach.com
www.hach.com

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LIT2470 Rev 2
Printed in U.S.A.

HACH®
Be Right™

95-Gallon OverPack Salvage Drum #A95OVER - 32" dia x 41.5", 1 each/package

Stock a SpillTech® OverPack with sorbents for emergency spill response, or use it as a salvage drum to ship damaged containers or hazardous waste.

- DOT-Approved for Salvage: All SpillTech® OverPacks are DOT-approved and X-rated for use as salvage drums. Helps companies conform to federal regulations when shipping damaged or leaking containers of hazardous materials, or absorbents contaminated with hazardous substances.
- Perfect for Spill Kits: Stores sorbent products (not included) for easy access as needed for spill control. Saves time when quick response is necessary.
- Sturdy Construction: 100% polyethylene OverPack resists chemicals, rust and corrosion for years of use. Integrated handles make them easy to lift, move or carry with standard material handling equipment. Twist-on, double-wall lid with closed-cell gasket provides sealed, secure closure to prevent leaks and protect contents from moisture, dirt and damage. Durable to withstand rough handling.
- Customized for You: We can customize a Spill Kit to your exact specifications, including the container, its contents and accessories, with no upcharge! Contact your local Distributor for details.

A95OVER Specifications

Dimensions:	ext. dia. 32" x 41.5" H
Shipping Dimensions:	31.75" W x 41.5" L x 31.75" H
Sold as:	1 per package
Color:	Yellow
Composition:	Polyethylene
Weight:	48 lbs.
# per Pallet:	3
Incinerable:	No
UN RATING:	1H2/X295/S
Ship Class:	250

Metric Equivalent Specifications

Dimensions:	ext. dia. 81.3cm x 105.4cm H
Shipping Dimensions:	80.6cm W x 105.4cm L x 80.6cm H
Weight:	21.8 kg

SpillTech

Online: **spilltech.com**

Phone: **1-800-228-3877 (N.Am.)** **1-770-475-3877 (Other)**

Fax: **1-800-872-3764 (N.Am.)** **1-770-410-1812 (Other)**

Email: **sales@spilltech.com**

6455 East Johns Crossing, Suite 375 • Johns Creek GA 30097

Sulfuric Acid, 3M

SECTION 1 : Identification of the substance/mixture and of the supplier

Product name : **Sulfuric Acid, 3M**

Manufacturer/Supplier Trade name:

Manufacturer/Supplier Article number: **S25899**

Recommended uses of the product and uses restrictions on use:

Manufacturer Details:

AquaPhoenix Scientific
9 Barnhart Drive, Hanover, PA 17331

Supplier Details:

Fisher Science Education
15 Jet View Drive, Rochester, NY 14624

Emergency telephone number:

Fisher Science Education Emergency Telephone No.: 800-535-5053

SECTION 2 : Hazards identification

Classification of the substance or mixture:

Health hazard
Skin corrosion, category 1A
Serious eye damage, category 1

Corrosive to metals, category 1
skin corr./irrit. 1A
Corrosive to metals. 1
Eye corr. 1

Signal word :Danger

Hazard statements:
May be corrosive to metals
Causes severe skin burns and eye damage
Causes serious eye damage

Precautionary statements:
If medical advice is needed, have product container or label at hand
Keep out of reach of children
Read label before use
Wear protective gloves/protective clothing/eye protection/face protection
Wash ... thoroughly after handling
Do not breathe dust/fume/gas/mist/vapours/spray
Keep only in original container
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing
Immediately call a POISON CENTER or doctor/physician
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
Specific treatment (see ... on this label)
Absorb spillage to prevent material damage
Store locked up
Dispose of contents/container to ...

Other Non-GHS Classification:

WHMIS

D1A 

E 

NFPA/HMIS

NFPA SCALE (0-4)

Health	3
Flammability	0
Physical Hazard	0
Personal Protection	X

HMIS RATINGS (0-4)

SECTION 3 : Composition/information on ingredients

Ingredients:		
CAS 7664-93-9	Sulfuric Acid, ACS	31.004 %
CAS 7732-18-5	Water	68.996 %
		Percentages are by weight

SECTION 4 : First aid measures

Description of first aid measures

After inhalation: Loosen clothing as necessary and position individual in a comfortable position.Move exposed to fresh air. Give artificial respiration if necessary. If breathing is difficult give oxygen.Get medical assistance if cough or other symptoms appear.

After skin contact: Rinse/flush exposed skin gently using soap and water for 15-20 minutes.Seek medical advice if discomfort or irritation persists.

After eye contact: Protect unexposed eye.Rinse/flush exposed eye(s) gently using water for 15-20 minutes.Remove contact lens(es) if able to do so during rinsing.Seek medical attention if irritation persists or if concerned.

After swallowing: Rinse mouth thoroughly. Do not induce vomiting. Seek medical attention if irritation, discomfort, or vomiting persists.

Most important symptoms and effects, both acute and delayed:

Irritation.Headache.Nausea.Shortness of breath.;

Indication of any immediate medical attention and special treatment needed:

If seeking medical attention provide SDS document to physician. Physician should treat symptomatically.

SECTION 5 : Firefighting measures

Extinguishing media

Suitable extinguishing agents: Use water, dry chemical, chemical foam, carbon dioxide, or alcohol-resistant foam.

For safety reasons unsuitable extinguishing agents:

Special hazards arising from the substance or mixture:

Thermal decomposition can lead to release of irritating gases and vapors.

Advice for firefighters:

Protective equipment: Wear protective eyeware, gloves, and clothing. Refer to Section 8.Use NIOSH-approved respiratory protection/breathing apparatus.

Additional information (precautions): Avoid inhaling gases, fumes, dust, mist, vapor, and aerosols. Avoid contact with skin, eyes, and clothing.

SECTION 6 : Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Ensure adequate ventilation.Ensure that air-handling systems are operational.

Environmental precautions:

Should not be released into environment.Prevent from reaching drains, sewer, or waterway.

Methods and material for containment and cleaning up:

Wear protective eyeware, gloves, and clothing. Refer to Section 8.Always obey local regulations.Containerize for disposal. Refer to Section 13.If necessary use trained response staff or contractor. Evacuate personnel to safe areas. Keep in suitable closed containers for disposal.

Reference to other sections:

SECTION 7 : Handling and storage

Precautions for safe handling:

Avoid contact with skin, eyes, and clothing.Follow good hygiene procedures when handling chemical materials. Refer to Section 8.Follow proper disposal methods. Refer to Section 13.Do not eat, drink, smoke, or use personal products when handling chemical substances.

Conditions for safe storage, including any incompatibilities:

Store in a cool location. Keep away from food and beverages.Protect from freezing and physical damage.Provide ventilation for containers. Keep container tightly sealed.Store away from incompatible materials.

SECTION 8 : Exposure controls/personal protection

Control Parameters:	7664-93-9, Sulfuric Acid, ACS, OSHA PEL: 1mg/m3 7664-93-9, Sulfuric Acid, ACS, ACGIH TLV: 1 mg/m3
Appropriate Engineering controls:	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling. Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapor and mists below the applicable workplace exposure limits (Occupational Exposure Limits-OELs) indicated above.
Respiratory protection:	Not required under normal conditions of use. Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls.When necessary use NIOSH approved breathing equipment.
Protection of skin:	Select glove material impermeable and resistant to the substance.Select glove material based on rates of diffusion and degradation. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices.Use proper glove removal technique without touching outer surface. Avoid skin contact with used gloves.Wear protective clothing.
Eye protection:	Wear equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).Safety glasses or goggles are appropriate eye protection.
General hygienic measures:	Perform routine housekeeping. Wash hands before breaks and at the end of work. Avoid contact with skin, eyes, and clothing.Before wearing wash contaminated clothing.

SECTION 9 : Physical and chemical properties

Appearance (physical state,color):	Clear, colorless liquid.	**Explosion limit lower**: **Explosion limit upper**:	Not Determined Not Determined
Odor:	Odorless	**Vapor pressure**:	<0.00120mmHg
Odor threshold:	Not Determined	**Vapor density**:	Not Determined
pH-value:	< 0.03	**Relative density**:	Not Determined
Melting/Freezing point:	11C	**Solubilities**:	Miscible
Boiling point/Boiling range:	105 - 325C	**Partition coefficient (n-octanol/water)**:	Not Determined
Flash point (closed cup):	Not Determined	**Auto/Self-ignition temperature**:	Not Determined
Evaporation rate:	Not Determined	**Decomposition temperature**:	Not Determined
Flammability (solid,gaseous):	Not Determined	**Viscosity**:	a. Kinematic:Not Determined b. Dynamic: Not Determined
Density: Not Determined			

SECTION 10 : Stability and reactivity

Reactivity: Nonreactive under normal conditions.
Chemical stability: Stable under normal conditions.
Possible hazardous reactions: None under normal processing.

Conditions to avoid: Incompatible materials.
Incompatible materials: Organics. Metals. Chlorates. Alkalines. Carbides. Fulminates. Reducing agents. Nitrates. Acetic acid. Oxidizing agents
Hazardous decomposition products: Oxides of sulfur.

SECTION 11 : Toxicological information

Acute Toxicity:		
Inhalation:	510 mg/m3 2 h	Inhalation LC50 Rat
Oral:	2140 mg/kg	Oral LD50 Rat
Chronic Toxicity: No additional information.		
Corrosion Irritation: No additional information.		
Sensitization:		No additional information.
Single Target Organ (STOT):		No additional information.
Numerical Measures:		No additional information.
Carcinogenicity:		No additional information.
Mutagenicity:		No additional information.
Reproductive Toxicity:		No additional information.

SECTION 12 : Ecological information

Ecotoxicity

Freshwater Fish: 96 Hr LC50 Brachydanio rerio: >500 mg/L [static]

Fish: LC50 - Gambusia affinis (Mosquito fish) - 42 mg/l - 96 h

Invertebrates: EC50 - Daphnia magna (Water flea) - 29 mg/l - 24 h

Persistence and degradability:
Bioaccumulative potential:
Mobility in soil:
Other adverse effects:

SECTION 13 : Disposal considerations

Waste disposal recommendations:

Contact a licensed professional waste disposal service to dispose of this material.Dispose of empty containers as unused product.It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities (US 40CFR262.11). Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations. Ensure complete and accurate classification.

SECTION 14 : Transport information

UN-Number

1830

UN proper shipping name

Sulfuric Acid Solution

Transport hazard class(es)

Class:
8 Corrosive substances

Packing group:II
Environmental hazard:
Transport in bulk:
Special precautions for user:

SECTION 15 : Regulatory information

United States (USA)

SARA Section 311/312 (Specific toxic chemical listings):

Acute, Chronic

SARA Section 313 (Specific toxic chemical listings):

7664-93-9 Sulfuric Acid

RCRA (hazardous waste code):

None of the ingredients is listed

TSCA (Toxic Substances Control Act):

All ingredients are listed.

CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act):

7664-93-9 Sulfuric Acid 1000 lbs

Proposition 65 (California):

Chemicals known to cause cancer:

None of the ingredients is listed

Chemicals known to cause reproductive toxicity for females:

None of the ingredients is listed

Chemicals known to cause reproductive toxicity for males:

None of the ingredients is listed

Chemicals known to cause developmental toxicity:

None of the ingredients is listed

Canada

Canadian Domestic Substances List (DSL):

All ingredients are listed.

Canadian NPRI Ingredient Disclosure list (limit 0.1%):

None of the ingredients is listed

Canadian NPRI Ingredient Disclosure list (limit 1%):

None of the ingredients is listed

SECTION 16 : Other information

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the

SDS contains all the information required by the Controlled Products Regulations.Note:. The responsibility to provide a safe workplace remains with the user.The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment.The information contained herein is, to the best of our knowledge and belief, accurate.However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by the use of this material.It is the responsibility of the user to comply with all applicable laws and regulations applicable to this material.

GHS Full Text Phrases:

Abbreviations and acronyms:
IMDG: International Maritime Code for Dangerous Goods
PNEC: Predicted No-Effect Concentration (REACH)
CFR: Code of Federal Regulations (USA)
SARA: Superfund Amendments and Reauthorization Act (USA)
RCRA: Resource Conservation and Recovery Act (USA)
TSCA: Toxic Substances Control Act (USA)
NPRI: National Pollutant Release Inventory (Canada)
DOT: US Department of Transportation
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
ACGIH: American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
DNEL: Derived No-Effect Level (REACH)

Effective date : 02.15.2015
Last updated : 03.19.2015

Appendix B

MassDEP Transmittal Form

Enter your transmittal number → X283840 (Transmittal Number)

Your unique Transmittal Number can be accessed online:
http://www.mass.gov/eea/agencies/massdep/service/approvals/transmittal-form-for-payment.html

Massachusetts Department of Environmental Protection

Transmittal Form for Permit Application and Payment

1. Please type or print. A separate Transmittal Form must be completed for each permit application.

2. Make your check payable to the Commonwealth of Massachusetts and mail it with a copy of this form to: MassDEP, P.O. Box 4062, Boston, MA 02211.

3. Three copies of this form will be needed.

Copy 1 - the original must accompany your permit application. **Copy 2** must accompany your fee payment. **Copy 3** should be retained for your records

4. Both fee-paying and exempt applicants must mail a copy of this transmittal form to:

MassDEP
P.O. Box 4062
Boston, MA
02211

*** Note:**
For BWSC Permits, enter the LSP.

A. Permit Information

1. Permit Code: 4 to 7 character code from permit instructions	2. Name of Permit Category
WM 15	NPDES General Permit Notice of Intent

3. Type of Project or Activity: Construction Dewatering

B. Applicant Information – Firm or Individual

1. Name of Firm - Or, if party needing this approval is an individual enter name below: Beth Israel Deaconess Medical Center

2. **Last Name** of Individual	3. **First Name** of Individual	4. MI

5. Street Address: 200 Brookline Avenue, Suite OV-400B

6. City/Town	7. State	8. Zip Code	9. Telephone #	10. Ext. #
Boston	MA	02215	617-975-9921	

11. Contact Person	12. e-mail address
Jarrod Dore	jdeange3@bidmc.harvard.edu

C. Facility, Site or Individual Requiring Approval

1. Name of Facility, Site Or Individual: Beth Israel Deaconness Medical Center - New Inpatient Building

2. Street Address: 111 Francis Street

3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #
Boston	MA	02215		

8. DEP Facility Number (if Known)	9. Federal I.D. Number (if Known)	10. BWSC Tracking # (if Known)
RTN 3-1470		

D. Application Prepared by (if different from Section B)*

1. Name of Firm Or Individual: GEI Consultants, Inc.

2. Address: 400 Unicorn Park Drive

3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #
Woburn	MA	01801	781-721-4000	

8. Contact Person	9. LSP Number (BWSC Permits only)
Ileen Gladstone, P.E., LSP, LEED AP	9719

E. Permit - Project Coordination

1. Is this project subject to MEPA review? ☐ yes ☒ no
   If yes, enter the project's EOEA file number - assigned when an Environmental Notification Form is submitted to the MEPA unit:

EOEA File Number

F. Amount Due

DEP Use Only

Permit No:

Rec'd Date:

Reviewer:

Special Provisions:

1. ☐ **Fee** Exempt (city, town or municipal housing authority)(state agency if fee is $100 or less).
   There are no fee exemptions for BWSC permits, regardless of applicant status.
2. ☐ Hardship Request - payment extensions according to 310 CMR 4.04(3)(c).
3. ☐ Alternative Schedule Project (according to 310 CMR 4.05 and 4.10).
4. ☐ Homeowner (according to 310 CMR 4.02).

Check Number	Dollar Amount	Date
	$500.00	

Appendix C

Receiving Water Laboratory Data Report

CERTIFICATE OF ANALYSIS

Molly Greer
GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

RE: Beth Isreal Deaconess (1703581)
ESS Laboratory Work Order Number: 19F0747

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 5:44 pm, Jun 28, 2019

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: GEI Consultants, Inc.
Client Project ID: Beth Isreal Deaconess

ESS Laboratory Work Order: 19F0747

SAMPLE RECEIPT

The following samples were received on June 21, 2019 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
19F0747-01	1703581-SW-1	Ground Water	350.1, 6010C, 6020A, 7010, 7196A, 7470A, 9040

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Isreal Deaconess ESS Laboratory Work Order: 19F0747

PROJECT NARRATIVE

Total Metals
CF92434-BSD1 **Blank Spike recovery is above upper control limit (B+).**
Antimony (122% @ 80-120%)

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: GEI Consultants, Inc.
Client Project ID: Beth Isreal Deaconess

ESS Laboratory Work Order: 19F0747

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
MADEP 18-2.1 - 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
5035A - 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: GEI Consultants, Inc.
Client Project ID: Beth Isreal Deaconess
Client Sample ID: 1703581-SW-1
Date Sampled: 06/21/19 10:00
Percent Solids: N/A

ESS Laboratory Work Order: 19F0747
ESS Laboratory Sample ID: 19F0747-01
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A/200.7

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Antimony	**1.2** (0.2)		6020A		1	KJK	06/25/19 11:45	100	10	CF92434
Arsenic	**1.3** (0.5)		7010		1	KJK	06/26/19 23:00	100	10	CF92434
Cadmium	ND (0.5)		6010C		1	KJK	06/25/19 21:28	100	10	CF92434
Chromium	ND (2.0)		6010C		1	KJK	06/25/19 21:28	100	10	CF92434
Copper	**11.5** (2.0)		6010C		1	KJK	06/25/19 21:28	100	10	CF92434
Hardness	**47900** (82.4)		6010C		1	KJK	06/25/19 21:28	1	1	[CALC]
Iron	**1750** (50.0)		6010C		5	BJV	06/28/19 11:20	100	10	CF92434
Lead	**9.8** (2.0)		6010C		1	KJK	06/25/19 21:28	100	10	CF92434
Mercury	ND (0.20)		7470A		1	MKS	06/28/19 10:38	20	40	CF92741
Nickel	ND (5.0)		6010C		1	KJK	06/25/19 21:28	100	10	CF92434
Selenium	ND (1.0)		7010		1	KJK	06/26/19 18:41	100	10	CF92434
Silver	ND (1.0)		6010C		1	KJK	06/25/19 21:28	100	10	CF92434
Zinc	**38.8** (5.0)		6010C		1	KJK	06/25/19 21:28	100	10	CF92434

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Isreal Deaconess
Client Sample ID: 1703581-SW-1
Date Sampled: 06/21/19 10:00
Percent Solids: N/A

ESS Laboratory Work Order: 19F0747
ESS Laboratory Sample ID: 19F0747-01
Sample Matrix: Ground Water

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Ammonia as N	**0.24** (0.10)		350.1		1	JLK	06/27/19 17:58	mg/L	CF92628
Hexavalent Chromium	ND (10)		7196A		1	CCP	06/21/19 19:22	ug/L	CF92150
pH	**6.87** (N/A)		9040		1	PMH	06/21/19 20:25	S.U.	CF92152
pH Sample Temp	**Aqueous pH measured in water at 19.2 ºC.** (N/A)								

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Isreal Deaconess

ESS Laboratory Work Order: 19F0747

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch CF92434 - 3005A/200.7										
Blank										
Antimony	ND	0.2	ug/L							
Arsenic	ND	0.5	ug/L							
Cadmium	ND	0.5	ug/L							
Calcium	ND	0.020	mg/L							
Chromium	ND	2.0	ug/L							
Copper	ND	2.0	ug/L							
Iron	ND	10.0	ug/L							
Lead	ND	2.0	ug/L							
Magnesium	ND	0.020	mg/L							
Nickel	ND	5.0	ug/L							
Selenium	ND	1.0	ug/L							
Silver	ND	1.0	ug/L							
Zinc	ND	5.0	ug/L							
LCS										
Antimony	51.8	1.0	ug/L	50.00		104	80-120			
Arsenic	49.6	12.5	ug/L	50.00		99	80-120			
Cadmium	24.5	0.5	ug/L	25.00		98	80-120			
Calcium	0.470	0.020	mg/L	0.5000		94	80-120			
Chromium	50.0	2.0	ug/L	50.00		100	80-120			
Copper	50.5	2.0	ug/L	50.00		101	80-120			
Iron	218	10.0	ug/L	250.0		87	80-120			
Lead	53.7	2.0	ug/L	50.00		107	80-120			
Magnesium	0.457	0.020	mg/L	0.5000		91	80-120			
Nickel	50.4	5.0	ug/L	50.00		101	80-120			
Selenium	103	25.0	ug/L	100.0		103	80-120			
Silver	24.9	1.0	ug/L	25.00		100	80-120			
Zinc	52.2	5.0	ug/L	50.00		104	80-120			
LCS Dup										
Antimony	61.0	1.0	ug/L	50.00		122	80-120	16	20	B+
Arsenic	53.2	12.5	ug/L	50.00		106	80-120	7	20	
Cadmium	22.6	0.5	ug/L	25.00		91	80-120	8	20	
Calcium	0.441	0.020	mg/L	0.5000		88	80-120	6	20	
Chromium	47.9	2.0	ug/L	50.00		96	80-120	4	20	
Copper	48.8	2.0	ug/L	50.00		98	80-120	3	20	
Iron	199	10.0	ug/L	250.0		80	80-120	9	20	
Lead	49.5	2.0	ug/L	50.00		99	80-120	8	20	
Magnesium	0.423	0.020	mg/L	0.5000		85	80-120	8	20	
Nickel	47.8	5.0	ug/L	50.00		96	80-120	5	20	
Selenium	104	25.0	ug/L	100.0		104	80-120	1	20	
Silver	23.5	1.0	ug/L	25.00		94	80-120	6	20	
Zinc	49.6	5.0	ug/L	50.00		99	80-120	5	20	
Batch CF92741 - 245.1/7470A										
Blank										

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Isreal Deaconess

ESS Laboratory Work Order: 19F0747

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch CF92741 - 245.1/7470A										
Mercury	ND	0.20	ug/L							
LCS										
Mercury	6.14	0.20	ug/L	6.042		102	80-120			
LCS Dup										
Mercury	6.11	0.20	ug/L	6.042		101	80-120	0.4	20	
Classical Chemistry										
Batch CF92150 - General Preparation										
Blank										
Hexavalent Chromium	ND	10	ug/L							
LCS										
Hexavalent Chromium	0.5		mg/L	0.4998		97	90-110			
LCS Dup										
Hexavalent Chromium	0.5		mg/L	0.4998		98	90-110	0.5	20	
Batch CF92628 - NH4 Prep										
Blank										
Ammonia as N	ND	0.10	mg/L							
LCS										
Ammonia as N	0.09	0.10	mg/L	0.09994		86	80-120			
LCS										
Ammonia as N	1.14	0.10	mg/L	0.9994		114	80-120			

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Isreal Deaconess ESS Laboratory Work Order: 19F0747

Notes and Definitions

Z16	Aqueous pH measured in water at 19.2 ºC.
U	Analyte included in the analysis, but not detected
D	Diluted.
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
MF	Membrane Filtration
MPN	Most Probably Number
TNTC	Too numerous to Count
CFU	Colony Forming Units

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Isreal Deaconess

ESS Laboratory Work Order: 19F0747

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

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

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

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

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

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

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

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

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

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

ESS Laboratory Sample and Cooler Receipt Checklist

Client: GEI Consultants, Inc. - TB/MM

Shipped/Delivered Via: ESS Courier

ESS Project ID: 19F0747
Date Received: 6/21/2019
Project Due Date: 6/28/2019
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: 1.9 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	359015	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4	
01	359016	Yes	NA	Yes	250 mL Poly - Unpres	NP	
01	359017	Yes	NA	Yes	250 mL Poly - Unpres	NP	
01	359018	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	
01	359019	Yes	NA	Yes	500 mL Poly - HNO3	HNO3	

2nd Review

Were all containers scanned into storage/lab? Initials

Are barcode labels on correct containers? Yes / No
Are all Flashpoint stickers attached/container ID # circled? Yes / No / NA
Are all Hex Chrome stickers attached? Yes / No / NA
Are all QC stickers attached? Yes / No / NA
Are VOA stickers attached if bubbles noted? Yes / No / NA

Completed By: Date & Time: 6/21/19 1723
Reviewed By: Date & Time: 6/21/19 1759
Delivered By: 6/21/19 1759

Chain-of-Custody Record

Laboratory: ESS

Laboratory Job # (Lab use only) 19F0747

GEI Consultants
400 Unicorn Park Drive
Woburn, MA 01801
PH: 781.721.4000
FX: 781.721.4073

Project Information

Project Name: Beth Israel
Project Number: 1703581
Project Location: Boston MA
Project Manager: H. Ballantyne

Send Report to: Molly Greer

Send EDD to: labdata@geiconsultants.com

MCP PRESUMPTIVE CERTAINTY REQUIRED – YES NO

If Yes, Are MCP Analytical Methods Required? (YES) NO NA
If Yes, Are Drinking Water Samples Submitted? YES (NO) NA
If Yes, Have You Met Minimum Field QC Requirements? (YES) NO NA

Lab Sample Number	GEI Sample ID	Collection Date	Collection Time	Matrix	No. of Bottles	Sampler(s) Initials	Preservative: HNO_3	H_2SO_4	HNO_3	None	None					* Total Metals	Ammonia	Hardness	pH	Hex Cr.				
1	1703581-SW-1	6-21-19	1000	GW	5	CWS										X	X	X	X	X				

Sample Handling

Samples Field Filtered
YES (NO) NA

Sampled Shipped With Ice
(YES) NO

Sample Specific Remarks

MCP Level Needed: GEI requires the most stringent Method 1 MCP standard be met for all analytes whenever possible.

	Relinquished by sampler: (signature)	Date:	Time:	Received by: (signature)
1.		6-21-19	1350	
2.		6/21/19	16:57	6/21/19 1719
3.				
4.				

Turnaround Time (Business days):

Normal X Other ____
10-Day ____ 7-Day ____
5-Day ____ 3-Day ____

Additional Requirements/Comments/Remarks:

*Sb, As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Se, Ag, Zn (hdm 6/24/19)

ice temp: 1.9

Chain-of-Custody Record

Laboratory: ESS

Laboratory Job # (Lab use only) 19F0747

GEI Consultants
400 Unicorn Park Drive
Woburn, MA 01801
PH: 781.721.4000
FX: 781.721.4073

Project Information

Project Name: Beth Israel
Project Number: 1703581
Project Location: Boston MA
Project Manager: H. Ballantyne

Send Report to: Molly Greer

Send EDD to: labdata@geiconsultants.com

MCP PRESUMPTIVE CERTAINTY REQUIRED – YES NO

If Yes, Are MCP Analytical Methods Required? (YES) NO NA
If Yes, Are Drinking Water Samples Submitted? YES (NO) NA
If Yes, Have You Met Minimum Field QC Requirements? (YES) NO NA

Preservative

HNO_3	H_2SO_4	HNO_3	None	None				

Sample Handling

Samples Field Filtered: YES (NO) NA

Sampled Shipped With Ice: (YES) NO

Lab Sample Number	GEI Sample ID	Collection Date	Collection Time	Matrix	No. of Bottles	Sampler(s) Initials	Total Metals	Ammonia	Hardness	pH	Hex Cr.				Sample Specific Remarks
1	1703581-SW-1	6-21-19	1000	GW	5	CWS	X	X	X	X	X				

MCP Level Needed: GEI requires the most stringent Method 1 MCP standard be met for all analytes whenever possible.

Turnaround Time (Business days):

Normal X Other ____
10-Day ____ 7-Day ____
5-Day ____ 3-Day ____

Additional Requirements/Comments/Remarks:

	Date:	Time:	Received by: (signature)
1. Relinquished by sampler: (signature)	6-21-19	1350	1.
2. Relinquished by: (signature)	6/21/19	16:57	2. 6/21/19 1719
3. Relinquished by: (signature)			3.
4. Relinquished by: (signature)			4.

ice temp: 1.9

Appendix D

Source Water Laboratory Data Report

CERTIFICATE OF ANALYSIS

Heather Ballantyne
GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

RE: Beth Israel - RGP (1703581)
ESS Laboratory Work Order Number: 19F0748

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 5:45 pm, Jun 28, 2019

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: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP

ESS Laboratory Work Order: 19F0748

SAMPLE RECEIPT

The following samples were received on June 21, 2019 for the analyses specified on the enclosed Chain of Custody Record.

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

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

Lab Number	Sample Name	Matrix	Analysis
19F0748-01	1703581-B202 OW	Ground Water	1664A, 200.7, 200.8, 245.1, 2540D, 300.0, 3113B, 350.1, 3500Cr B-2009, 420.1, 4500 CN CE, 4500Cl D, 504.1, 524.2, 608.3, 625.1 SIM, 8270D SIM, ASTM D3695
19F0748-02	1703581-B203 OW	Ground Water	1664A, 200.7, 200.8, 245.1, 2540D, 300.0, 3113B, 350.1, 3500Cr B-2009, 420.1, 4500 CN CE, 4500Cl D, 504.1, 524.2, 608.3, 625.1 SIM, 8270D SIM, ASTM D3695

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP

ESS Laboratory Work Order: 19F0748

PROJECT NARRATIVE

625.1(SIM) Semi-Volatile Organic Compounds

C9F0427-CCV1 **Calibration required quadratic regression (Q).**
2,4,6-Tribromophenol (120% @ 80-120%), Pentachlorophenol (84% @ 80-120%)

C9F0427-CCV1 **Initial Calibration Verification recovery is above upper control limit (ICV+).**
2,4,6-Tribromophenol

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: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP

ESS Laboratory Work Order: 19F0748

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
MADEP 18-2.1 - 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
5035A - 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: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP
Client Sample ID: 1703581-B202 OW
Date Sampled: 06/21/19 11:55
Percent Solids: N/A

ESS Laboratory Work Order: 19F0748
ESS Laboratory Sample ID: 19F0748-01
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A/200.7

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Antimony	**0.3** (0.2)		200.8		5	NAR	06/25/19 11:50	100	10	CF92434
Arsenic	ND (2.5)		3113B		5	MKS	06/25/19 15:35	100	10	CF92434
Cadmium	ND (0.5)		200.8		5	NAR	06/25/19 11:50	100	10	CF92434
Chromium	ND (2.0)		200.7		1	KJK	06/25/19 21:32	100	10	CF92434
Chromium III	ND (10.0)		200.7		1	CCP	06/25/19 21:32	1	1	[CALC]
Copper	ND (2.0)		200.7		1	KJK	06/25/19 21:32	100	10	CF92434
Hardness	**317000** (824)		200.7		10	KJK	06/26/19 23:49	1	1	[CALC]
Iron	**318** (100)		200.7		10	KJK	06/26/19 23:49	100	10	CF92434
Lead	ND (0.5)	0.1	200.8		5	NAR	06/25/19 11:50	100	10	CF92434
Mercury	ND (0.2)		245.1		1	MKS	06/26/19 11:53	20	40	CF92437
Nickel	ND (5.0)		200.7		1	KJK	06/25/19 21:32	100	10	CF92434
Selenium	ND (5.0)		3113B		5	MKS	06/25/19 18:23	100	10	CF92434
Silver	ND (0.5)		200.7		1	KJK	06/25/19 21:32	100	10	CF92434
Zinc	**10.4** (5.0)		200.7		1	KJK	06/25/19 21:32	100	10	CF92434

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP
Client Sample ID: 1703581-B202 OW
Date Sampled: 06/21/19 11:55
Percent Solids: N/A
Initial Volume: 25
Final Volume: 25
Extraction Method: 524.2

ESS Laboratory Work Order: 19F0748
ESS Laboratory Sample ID: 19F0748-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

524.2 Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1-Trichloroethane	ND (0.5)		524.2		1	06/25/19 16:20	C9F0416	CF92517
1,1,2-Trichloroethane	ND (0.5)		524.2		1	06/25/19 16:20	C9F0416	CF92517
1,1-Dichloroethane	ND (0.5)		524.2		1	06/25/19 16:20	C9F0416	CF92517
1,1-Dichloroethene	ND (0.5)		524.2		1	06/25/19 16:20	C9F0416	CF92517
1,2-Dichlorobenzene	ND (0.5)		524.2		1	06/25/19 16:20	C9F0416	CF92517
1,2-Dichloroethane	ND (0.5)		524.2		1	06/25/19 16:20	C9F0416	CF92517
1,3-Dichlorobenzene	ND (0.5)		524.2		1	06/25/19 16:20	C9F0416	CF92517
1,4-Dichlorobenzene	ND (0.5)		524.2		1	06/25/19 16:20	C9F0416	CF92517
Acetone	ND (5.0)		524.2		1	06/25/19 16:20	C9F0416	CF92517
Benzene	ND (0.5)		524.2		1	06/25/19 16:20	C9F0416	CF92517
Carbon Tetrachloride	ND (0.3)		524.2		1	06/25/19 16:20	C9F0416	CF92517
cis-1,2-Dichloroethene	ND (0.5)		524.2		1	06/25/19 16:20	C9F0416	CF92517
Ethylbenzene	ND (0.5)		524.2		1	06/25/19 16:20	C9F0416	CF92517
Methyl tert-Butyl Ether	**5.8** (0.5)		524.2		1	06/25/19 16:20	C9F0416	CF92517
Methylene Chloride	ND (0.5)		524.2		1	06/25/19 16:20	C9F0416	CF92517
Naphthalene	ND (0.5)		524.2		1	06/25/19 16:20	C9F0416	CF92517
Tertiary-amyl methyl ether	ND (1.0)		524.2		1	06/25/19 16:20	C9F0416	CF92517
Tertiary-butyl Alcohol	ND (25.0)		524.2		1	06/25/19 16:20	C9F0416	CF92517
Tetrachloroethene	ND (0.5)		524.2		1	06/25/19 16:20	C9F0416	CF92517
Toluene	ND (0.5)		524.2		1	06/25/19 16:20	C9F0416	CF92517
Trichloroethene	ND (0.5)		524.2		1	06/25/19 16:20	C9F0416	CF92517
Vinyl Chloride	ND (0.2)		524.2		1	06/25/19 16:20	C9F0416	CF92517
Xylene O	ND (0.5)		524.2		1	06/25/19 16:20	C9F0416	CF92517
Xylene P,M	ND (0.5)		524.2		1	06/25/19 16:20	C9F0416	CF92517

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*95 %*		*80-120*
Surrogate: 4-Bromofluorobenzene	*97 %*		*80-120*

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP
Client Sample ID: 1703581-B202 OW
Date Sampled: 06/21/19 11:55
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 19F0748
ESS Laboratory Sample ID: 19F0748-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: MJV
Prepared: 6/25/19 12:03

608.3 Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.09)		608.3		1	06/26/19 4:35		CF92502
Aroclor 1221	ND (0.09)		608.3		1	06/26/19 4:35		CF92502
Aroclor 1232	ND (0.09)		608.3		1	06/26/19 4:35		CF92502
Aroclor 1242	ND (0.09)		608.3		1	06/26/19 4:35		CF92502
Aroclor 1248	ND (0.09)		608.3		1	06/26/19 4:35		CF92502
Aroclor 1254	ND (0.09)		608.3		1	06/26/19 4:35		CF92502
Aroclor 1260	ND (0.09)		608.3		1	06/26/19 4:35		CF92502
Aroclor 1262	ND (0.09)		608.3		1	06/26/19 4:35		CF92502
Aroclor 1268	ND (0.09)		608.3		1	06/26/19 4:35		CF92502

	%Recovery	Qualifier	Limits
Surrogate: Decachlorobiphenyl	*68 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*65 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*54 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*60 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP
Client Sample ID: 1703581-B202 OW
Date Sampled: 06/21/19 11:55
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 19F0748
ESS Laboratory Sample ID: 19F0748-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 6/25/19 12:33

625.1(SIM) Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Acenaphthene	ND (0.19)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Acenaphthylene	ND (0.19)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Anthracene	ND (0.19)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Benzo(a)anthracene	ND (0.05)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Benzo(a)pyrene	ND (0.05)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Benzo(b)fluoranthene	ND (0.05)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Benzo(g,h,i)perylene	ND (0.19)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Benzo(k)fluoranthene	ND (0.05)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
bis(2-Ethylhexyl)phthalate	ND (2.34)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Butylbenzylphthalate	ND (2.34)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Chrysene	ND (0.05)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Dibenzo(a,h)Anthracene	ND (0.05)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Diethylphthalate	ND (2.34)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Dimethylphthalate	ND (2.34)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Di-n-butylphthalate	ND (2.34)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Di-n-octylphthalate	ND (2.34)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Fluoranthene	ND (0.19)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Fluorene	ND (0.19)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Indeno(1,2,3-cd)Pyrene	ND (0.05)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Naphthalene	ND (0.19)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Pentachlorophenol	ND (0.84)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Phenanthrene	ND (0.19)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504
Pyrene	ND (0.19)		625.1 SIM		1	06/25/19 19:30	C9F0427	CF92504

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*41 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*93 %*		*15-110*
Surrogate: 2-Fluorobiphenyl	*53 %*		*30-130*
Surrogate: Nitrobenzene-d5	*55 %*		*30-130*
Surrogate: p-Terphenyl-d14	*99 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP
Client Sample ID: 1703581-B202 OW
Date Sampled: 06/21/19 11:55
Percent Solids: N/A
Initial Volume: 500
Final Volume: 0.5
Extraction Method: 3535A

ESS Laboratory Work Order: 19F0748
ESS Laboratory Sample ID: 19F0748-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 6/24/19 16:15

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

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,4-Dioxane	**0.312** (0.250)		8270D SIM		1	06/25/19 5:48	C9F0398	CF92432

	%Recovery	Qualifier	Limits
Surrogate: 1,4-Dioxane-d8	*52 %*		*15-115*

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP
Client Sample ID: 1703581-B202 OW
Date Sampled: 06/21/19 11:55
Percent Solids: N/A

ESS Laboratory Work Order: 19F0748
ESS Laboratory Sample ID: 19F0748-01
Sample Matrix: Ground Water

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Ammonia as N	**0.11** (0.10)		350.1		1	JLK	06/27/19 17:59	mg/L	CF92628
Chloride	**162** (50.0)		300.0		100	EEM	06/26/19 16:53	mg/L	CF92615
Hexavalent Chromium	ND (10.0)		3500Cr B-2009		1	CCP	06/21/19 19:22	ug/L	CF92150
Phenols	ND (100)		420.1		1	JLK	06/25/19 15:44	ug/L	CF92524
Total Cyanide	ND (5.00)		4500 CN CE		1	EEM	06/24/19 12:35	ug/L	CF92425
Total Petroleum Hydrocarbon	ND (5)		1664A		1	LAB	06/24/19 16:26	mg/L	CF92411
Total Residual Chlorine	ND (20.0)		4500Cl D		1	CCP	06/21/19 18:43	ug/L	CF92146
Total Suspended Solids	**5** (5)		2540D		1	CCP	06/24/19 17:06	mg/L	CF92430

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP
Client Sample ID: 1703581-B202 OW
Date Sampled: 06/21/19 11:55
Percent Solids: N/A
Initial Volume: 35
Final Volume: 2
Extraction Method: 504/8011

ESS Laboratory Work Order: 19F0748
ESS Laboratory Sample ID: 19F0748-01
Sample Matrix: Ground Water
Units: ug/L
Analyst: CAD
Prepared: 6/27/19 11:10

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

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,2,3-Trichloropropane	ND (0.025)		504.1		1	06/27/19 13:41		CF92724
1,2-Dibromo-3-Chloropropane	ND (0.015)		504.1		1	06/27/19 13:41		CF92724
1,2-Dibromoethane	ND (0.015)		504.1		1	06/27/19 13:41		CF92724

	%Recovery	Qualifier	Limits
Surrogate: Pentachloroethane	*74 %*		*30-150*
Surrogate: Pentachloroethane [2C]	*84 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP
Client Sample ID: 1703581-B202 OW
Date Sampled: 06/21/19 11:55
Percent Solids: N/A
Initial Volume: 1
Final Volume: 1
Extraction Method: No Prep

ESS Laboratory Work Order: 19F0748
ESS Laboratory Sample ID: 19F0748-01
Sample Matrix: Ground Water
Units: mg/L
Analyst: ZLC
Prepared: 6/28/19 7:55

Alcohol Scan by GC/FID

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Ethanol	ND (10)		ASTM D3695		1	ZLC	06/28/19 10:04		CF92801

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP
Client Sample ID: 1703581-B203 OW
Date Sampled: 06/21/19 12:30
Percent Solids: N/A

ESS Laboratory Work Order: 19F0748
ESS Laboratory Sample ID: 19F0748-02
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A/200.7

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Antimony	**0.3** (0.2)		200.8		5	NAR	06/25/19 11:55	100	10	CF92434
Arsenic	ND (2.5)		3113B		5	MKS	06/25/19 15:46	100	10	CF92434
Cadmium	ND (0.2)		200.8		5	NAR	06/25/19 11:55	100	10	CF92434
Chromium	ND (2.0)		200.7		1	KJK	06/25/19 21:37	100	10	CF92434
Chromium III	ND (10.0)		200.7		1	CCP	06/25/19 21:37	1	1	[CALC]
Copper	ND (2.0)		200.7		1	KJK	06/25/19 21:37	100	10	CF92434
Hardness	**533000** (824)		200.7		10	KJK	06/26/19 23:53	1	1	[CALC]
Iron	**130** (20.0)		200.7		2	KJK	06/27/19 0:05	100	10	CF92434
Lead	**0.1** (0.5)	0.1	200.8		5	NAR	06/25/19 11:55	100	10	CF92434
Mercury	ND (0.2)		245.1		1	MKS	06/26/19 11:55	20	40	CF92437
Nickel	ND (5.0)		200.7		1	KJK	06/25/19 21:37	100	10	CF92434
Selenium	ND (5.0)		3113B		5	MKS	06/25/19 18:29	100	10	CF92434
Silver	ND (1.0)		200.7		2	KJK	06/27/19 0:05	100	10	CF92434
Zinc	**10.1** (5.0)		200.7		1	KJK	06/25/19 21:37	100	10	CF92434

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP
Client Sample ID: 1703581-B203 OW
Date Sampled: 06/21/19 12:30
Percent Solids: N/A
Initial Volume: 25
Final Volume: 25
Extraction Method: 524.2

ESS Laboratory Work Order: 19F0748
ESS Laboratory Sample ID: 19F0748-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

524.2 Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1-Trichloroethane	ND (0.5)		524.2		1	06/25/19 16:55	C9F0416	CF92517
1,1,2-Trichloroethane	ND (0.5)		524.2		1	06/25/19 16:55	C9F0416	CF92517
1,1-Dichloroethane	ND (0.5)		524.2		1	06/25/19 16:55	C9F0416	CF92517
1,1-Dichloroethene	ND (0.5)		524.2		1	06/25/19 16:55	C9F0416	CF92517
1,2-Dichlorobenzene	ND (0.5)		524.2		1	06/25/19 16:55	C9F0416	CF92517
1,2-Dichloroethane	ND (0.5)		524.2		1	06/25/19 16:55	C9F0416	CF92517
1,3-Dichlorobenzene	ND (0.5)		524.2		1	06/25/19 16:55	C9F0416	CF92517
1,4-Dichlorobenzene	ND (0.5)		524.2		1	06/25/19 16:55	C9F0416	CF92517
Acetone	ND (5.0)		524.2		1	06/25/19 16:55	C9F0416	CF92517
Benzene	ND (0.5)		524.2		1	06/25/19 16:55	C9F0416	CF92517
Carbon Tetrachloride	ND (0.3)		524.2		1	06/25/19 16:55	C9F0416	CF92517
cis-1,2-Dichloroethene	ND (0.5)		524.2		1	06/25/19 16:55	C9F0416	CF92517
Ethylbenzene	ND (0.5)		524.2		1	06/25/19 16:55	C9F0416	CF92517
Methyl tert-Butyl Ether	ND (0.5)		524.2		1	06/25/19 16:55	C9F0416	CF92517
Methylene Chloride	ND (0.5)		524.2		1	06/25/19 16:55	C9F0416	CF92517
Naphthalene	ND (0.5)		524.2		1	06/25/19 16:55	C9F0416	CF92517
Tertiary-amyl methyl ether	ND (1.0)		524.2		1	06/25/19 16:55	C9F0416	CF92517
Tertiary-butyl Alcohol	ND (25.0)		524.2		1	06/25/19 16:55	C9F0416	CF92517
Tetrachloroethene	ND (0.5)		524.2		1	06/25/19 16:55	C9F0416	CF92517
Toluene	ND (0.5)		524.2		1	06/25/19 16:55	C9F0416	CF92517
Trichloroethene	ND (0.5)		524.2		1	06/25/19 16:55	C9F0416	CF92517
Vinyl Chloride	ND (0.2)		524.2		1	06/25/19 16:55	C9F0416	CF92517
Xylene O	ND (0.5)		524.2		1	06/25/19 16:55	C9F0416	CF92517
Xylene P,M	ND (0.5)		524.2		1	06/25/19 16:55	C9F0416	CF92517

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*96 %*		*80-120*
Surrogate: 4-Bromofluorobenzene	*97 %*		*80-120*

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP
Client Sample ID: 1703581-B203 OW
Date Sampled: 06/21/19 12:30
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 19F0748
ESS Laboratory Sample ID: 19F0748-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: MJV
Prepared: 6/25/19 12:03

608.3 Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.09)		608.3		1	06/26/19 4:54		CF92502
Aroclor 1221	ND (0.09)		608.3		1	06/26/19 4:54		CF92502
Aroclor 1232	ND (0.09)		608.3		1	06/26/19 4:54		CF92502
Aroclor 1242	ND (0.09)		608.3		1	06/26/19 4:54		CF92502
Aroclor 1248	ND (0.09)		608.3		1	06/26/19 4:54		CF92502
Aroclor 1254	ND (0.09)		608.3		1	06/26/19 4:54		CF92502
Aroclor 1260	ND (0.09)		608.3		1	06/26/19 4:54		CF92502
Aroclor 1262	ND (0.09)		608.3		1	06/26/19 4:54		CF92502
Aroclor 1268	ND (0.09)		608.3		1	06/26/19 4:54		CF92502

	%Recovery	Qualifier	Limits
Surrogate: Decachlorobiphenyl	*77 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*74 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*54 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*62 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP
Client Sample ID: 1703581-B203 OW
Date Sampled: 06/21/19 12:30
Percent Solids: N/A
Initial Volume: 1050
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 19F0748
ESS Laboratory Sample ID: 19F0748-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 6/25/19 12:33

625.1(SIM) Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Acenaphthene	ND (0.19)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Acenaphthylene	ND (0.19)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Anthracene	ND (0.19)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Benzo(a)anthracene	ND (0.05)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Benzo(a)pyrene	ND (0.05)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Benzo(b)fluoranthene	ND (0.05)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Benzo(g,h,i)perylene	ND (0.19)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Benzo(k)fluoranthene	ND (0.05)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
bis(2-Ethylhexyl)phthalate	ND (2.38)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Butylbenzylphthalate	ND (2.38)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Chrysene	ND (0.05)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Dibenzo(a,h)Anthracene	ND (0.05)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Diethylphthalate	ND (2.38)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Dimethylphthalate	ND (2.38)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Di-n-butylphthalate	ND (2.38)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Di-n-octylphthalate	ND (2.38)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Fluoranthene	ND (0.19)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Fluorene	ND (0.19)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Indeno(1,2,3-cd)Pyrene	ND (0.05)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Naphthalene	ND (0.19)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Pentachlorophenol	ND (0.86)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Phenanthrene	ND (0.19)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504
Pyrene	ND (0.19)		625.1 SIM		1	06/25/19 20:17	C9F0427	CF92504

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*40 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*87 %*		*15-110*
Surrogate: 2-Fluorobiphenyl	*53 %*		*30-130*
Surrogate: Nitrobenzene-d5	*54 %*		*30-130*
Surrogate: p-Terphenyl-d14	*92 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP
Client Sample ID: 1703581-B203 OW
Date Sampled: 06/21/19 12:30
Percent Solids: N/A
Initial Volume: 500
Final Volume: 0.5
Extraction Method: 3535A

ESS Laboratory Work Order: 19F0748
ESS Laboratory Sample ID: 19F0748-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: IBM
Prepared: 6/24/19 16:15

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

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,4-Dioxane	**0.307** (0.250)		8270D SIM		1	06/25/19 6:22	C9F0398	CF92432

	%Recovery	Qualifier	Limits
Surrogate: 1,4-Dioxane-d8	*54 %*		*15-115*

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP
Client Sample ID: 1703581-B203 OW
Date Sampled: 06/21/19 12:30
Percent Solids: N/A

ESS Laboratory Work Order: 19F0748
ESS Laboratory Sample ID: 19F0748-02
Sample Matrix: Ground Water

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Ammonia as N	ND (0.10)		350.1		1	JLK	06/27/19 18:00	mg/L	CF92628
Chloride	**379** (50.0)		300.0		100	EEM	06/26/19 17:09	mg/L	CF92615
Hexavalent Chromium	ND (10.0)		3500Cr B-2009		1	CCP	06/21/19 19:22	ug/L	CF92150
Phenols	ND (100)		420.1		1	JLK	06/25/19 15:44	ug/L	CF92524
Total Cyanide	ND (5.00)		4500 CN CE		1	EEM	06/24/19 12:35	ug/L	CF92425
Total Petroleum Hydrocarbon	ND (5)		1664A		1	LAB	06/24/19 16:26	mg/L	CF92411
Total Residual Chlorine	ND (20.0)		4500Cl D		1	CCP	06/21/19 18:43	ug/L	CF92146
Total Suspended Solids	ND (5)		2540D		1	CCP	06/24/19 17:06	mg/L	CF92430

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP
Client Sample ID: 1703581-B203 OW
Date Sampled: 06/21/19 12:30
Percent Solids: N/A
Initial Volume: 35
Final Volume: 2
Extraction Method: 504/8011

ESS Laboratory Work Order: 19F0748
ESS Laboratory Sample ID: 19F0748-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: CAD
Prepared: 6/27/19 11:10

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

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,2,3-Trichloropropane	ND (0.025)		504.1		1	06/27/19 14:04		CF92724
1,2-Dibromo-3-Chloropropane	ND (0.015)		504.1		1	06/27/19 14:04		CF92724
1,2-Dibromoethane	ND (0.015)		504.1		1	06/27/19 14:04		CF92724

	%Recovery	Qualifier	Limits
Surrogate: Pentachloroethane	*127 %*		*30-150*
Surrogate: Pentachloroethane [2C]	*138 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP
Client Sample ID: 1703581-B203 OW
Date Sampled: 06/21/19 12:30
Percent Solids: N/A
Initial Volume: 1
Final Volume: 1
Extraction Method: No Prep

ESS Laboratory Work Order: 19F0748
ESS Laboratory Sample ID: 19F0748-02
Sample Matrix: Ground Water
Units: mg/L
Analyst: ZLC
Prepared: 6/28/19 7:55

Alcohol Scan by GC/FID

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Ethanol	ND (10)		ASTM D3695		1	ZLC	06/28/19 11:39		CF92801

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP

ESS Laboratory Work Order: 19F0748

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch CF92434 - 3005A/200.7										
Blank										
Antimony	ND	0.2	ug/L							
Arsenic	ND	0.5	ug/L							
Cadmium	ND	0.2	ug/L							
Chromium	ND	2.0	ug/L							
Copper	ND	2.0	ug/L							
Iron	ND	10.0	ug/L							
Lead	ND	0.5	ug/L							
Nickel	ND	5.0	ug/L							
Selenium	ND	1.0	ug/L							
Silver	ND	0.5	ug/L							
Zinc	ND	5.0	ug/L							
LCS										
Antimony	51.8	1.0	ug/L	50.00		104	85-115			
Arsenic	49.6	12.5	ug/L	50.00		99	85-115			
Cadmium	25.9	1.0	ug/L	25.00		104	85-115			
Chromium	50.0	2.0	ug/L	50.00		100	85-115			
Copper	50.5	2.0	ug/L	50.00		101	85-115			
Iron	218	10.0	ug/L	250.0		87	85-115			
Lead	51.4	2.5	ug/L	50.00		103	85-115			
Nickel	50.4	5.0	ug/L	50.00		101	85-115			
Selenium	103	25.0	ug/L	100.0		103	85-115			
Silver	24.9	0.5	ug/L	25.00		100	85-115			
Zinc	52.2	5.0	ug/L	50.00		104	85-115			
Batch CF92437 - 245.1/7470A										
Blank										
Mercury	ND	0.2	ug/L							
LCS										
Mercury	6.1	0.2	ug/L	6.042		101	85-115			
LCS Dup										
Mercury	6.1	0.2	ug/L	6.042		100	85-115	1	20	
524.2 Volatile Organic Compounds										
Batch CF92517 - 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							

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP

ESS Laboratory Work Order: 19F0748

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
524.2 Volatile Organic Compounds										
Batch CF92517 - 524.2										
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	*4.85*		ug/L	*5.000*		*97*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*4.96*		ug/L	*5.000*		*99*	*80-120*			
LCS										
1,1,1-Trichloroethane	10.6		ug/L	10.00		106	70-130			
1,1,2-Trichloroethane	9.6		ug/L	10.00		96	70-130			
1,1-Dichloroethane	10.7		ug/L	10.00		107	70-130			
1,1-Dichloroethene	10.4		ug/L	10.00		104	70-130			
1,2-Dichlorobenzene	9.5		ug/L	10.00		95	70-130			
1,2-Dichloroethane	10.3		ug/L	10.00		103	70-130			
1,3-Dichlorobenzene	9.6		ug/L	10.00		96	70-130			
1,4-Dichlorobenzene	9.7		ug/L	10.00		97	70-130			
Acetone	49.7		ug/L	50.00		99	70-130			
Benzene	9.9		ug/L	10.00		99	70-130			
Carbon Tetrachloride	9.6		ug/L	10.00		96	70-130			
cis-1,2-Dichloroethene	10.2		ug/L	10.00		102	70-130			
Ethylbenzene	9.9		ug/L	10.00		99	70-130			
Methyl tert-Butyl Ether	10.2		ug/L	10.00		102	70-130			
Methylene Chloride	10.4		ug/L	10.00		104	70-130			
Naphthalene	9.2		ug/L	10.00		92	70-130			
Tertiary-amyl methyl ether	9.7		ug/L	10.00		97	70-130			
Tertiary-butyl Alcohol	48.9		ug/L	50.00		98	70-130			
Tetrachloroethene	9.9		ug/L	10.00		99	70-130			
Toluene	10.0		ug/L	10.00		100	70-130			
Trichloroethene	10.0		ug/L	10.00		100	70-130			
Vinyl Chloride	10.0		ug/L	10.00		100	70-130			
Xylene O	9.8		ug/L	10.00		98	70-130			
Xylene P,M	19.8		ug/L	20.00		99	70-130			

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Client Name: GEI Consultants, Inc.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
524.2 Volatile Organic Compounds										
Batch CF92517 - 524.2										
Surrogate: 1,2-Dichlorobenzene-d4	*4.96*		ug/L	*5.000*		*99*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*4.94*		ug/L	*5.000*		*99*	*80-120*			
LCS Dup										
1,1,1-Trichloroethane	10.5		ug/L	10.00		105	70-130	1	20	
1,1,2-Trichloroethane	9.7		ug/L	10.00		97	70-130	0.9	20	
1,1-Dichloroethane	10.8		ug/L	10.00		108	70-130	0.8	20	
1,1-Dichloroethene	10.2		ug/L	10.00		102	70-130	2	20	
1,2-Dichlorobenzene	9.5		ug/L	10.00		95	70-130	0.5	20	
1,2-Dichloroethane	10.4		ug/L	10.00		104	70-130	1	20	
1,3-Dichlorobenzene	9.5		ug/L	10.00		95	70-130	1	20	
1,4-Dichlorobenzene	9.7		ug/L	10.00		97	70-130	0.3	20	
Acetone	47.8		ug/L	50.00		96	70-130	4	20	
Benzene	9.9		ug/L	10.00		99	70-130	0.3	20	
Carbon Tetrachloride	9.4		ug/L	10.00		94	70-130	2	20	
cis-1,2-Dichloroethene	10.2		ug/L	10.00		102	70-130	0	20	
Ethylbenzene	10.0		ug/L	10.00		100	70-130	0.6	20	
Methyl tert-Butyl Ether	10.1		ug/L	10.00		101	70-130	0.7	20	
Methylene Chloride	10.4		ug/L	10.00		104	70-130	0.1	20	
Naphthalene	9.7		ug/L	10.00		97	70-130	5	20	
Tertiary-amyl methyl ether	9.7		ug/L	10.00		97	70-130	0	20	
Tertiary-butyl Alcohol	49.0		ug/L	50.00		98	70-130	0.2	25	
Tetrachloroethene	9.8		ug/L	10.00		98	70-130	2	20	
Toluene	9.8		ug/L	10.00		98	70-130	2	20	
Trichloroethene	9.9		ug/L	10.00		99	70-130	1	20	
Vinyl Chloride	9.7		ug/L	10.00		97	70-130	3	20	
Xylene O	9.9		ug/L	10.00		99	70-130	0.9	20	
Xylene P,M	19.5		ug/L	20.00		97	70-130	2	20	
Surrogate: 1,2-Dichlorobenzene-d4	*5.00*		ug/L	*5.000*		*100*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*4.83*		ug/L	*5.000*		*97*	*80-120*			
608.3 Polychlorinated Biphenyls (PCB)										
Batch CF92502 - 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							

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Client Name: GEI Consultants, Inc.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
608.3 Polychlorinated Biphenyls (PCB)										
Batch CF92502 - 3510C										
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	*0.0357*		ug/L	*0.05000*		*71*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0339*		ug/L	*0.05000*		*68*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0299*		ug/L	*0.05000*		*60*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0342*		ug/L	*0.05000*		*68*	*30-150*			
LCS										
Aroclor 1016	0.85	0.10	ug/L	1.000		85	50-140			
Aroclor 1016 [2C]	0.89	0.10	ug/L	1.000		89	50-140			
Aroclor 1260	0.88	0.10	ug/L	1.000		88	1-164			
Aroclor 1260 [2C]	0.94	0.10	ug/L	1.000		94	1-164			
Surrogate: Decachlorobiphenyl	*0.0456*		ug/L	*0.05000*		*91*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0436*		ug/L	*0.05000*		*87*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0329*		ug/L	*0.05000*		*66*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0340*		ug/L	*0.05000*		*68*	*30-150*			
LCS Dup										
Aroclor 1016	0.83	0.10	ug/L	1.000		83	50-140	2	36	
Aroclor 1016 [2C]	0.87	0.10	ug/L	1.000		87	50-140	2	36	
Aroclor 1260	0.87	0.10	ug/L	1.000		87	1-164	2	38	
Aroclor 1260 [2C]	0.93	0.10	ug/L	1.000		93	1-164	2	38	
Surrogate: Decachlorobiphenyl	*0.0435*		ug/L	*0.05000*		*87*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0416*		ug/L	*0.05000*		*83*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0301*		ug/L	*0.05000*		*60*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0325*		ug/L	*0.05000*		*65*	*30-150*			
625.1(SIM) Semi-Volatile Organic Compounds										
Batch CF92504 - 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							

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Client Name: GEI Consultants, Inc.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
625.1(SIM) Semi-Volatile Organic Compounds										
Batch CF92504 - 3510C										
Benzo(k)fluoranthene	ND	0.05	ug/L							
bis(2-Ethylhexyl)phthalate	ND	2.50	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	*0.750*		ug/L	*2.500*		*30*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*3.61*		ug/L	*3.750*		*96*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*1.10*		ug/L	*2.500*		*44*	*30-130*			
Surrogate: Nitrobenzene-d5	*1.56*		ug/L	*2.500*		*62*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.36*		ug/L	*2.500*		*94*	*30-130*			
LCS										
Acenaphthene	2.37	0.20	ug/L	4.000		59	40-140			
Acenaphthylene	2.48	0.20	ug/L	4.000		62	40-140			
Anthracene	2.74	0.20	ug/L	4.000		68	40-140			
Benzo(a)anthracene	2.96	0.05	ug/L	4.000		74	40-140			
Benzo(a)pyrene	3.04	0.05	ug/L	4.000		76	40-140			
Benzo(b)fluoranthene	3.24	0.05	ug/L	4.000		81	40-140			
Benzo(g,h,i)perylene	3.08	0.20	ug/L	4.000		77	40-140			
Benzo(k)fluoranthene	3.00	0.05	ug/L	4.000		75	40-140			
bis(2-Ethylhexyl)phthalate	3.37	2.50	ug/L	4.000		84	40-140			
Butylbenzylphthalate	3.44	2.50	ug/L	4.000		86	40-140			
Chrysene	3.02	0.05	ug/L	4.000		76	40-140			
Dibenzo(a,h)Anthracene	3.20	0.05	ug/L	4.000		80	40-140			
Diethylphthalate	2.75	2.50	ug/L	4.000		69	40-140			
Dimethylphthalate	3.29	2.50	ug/L	4.000		82	40-140			
Di-n-butylphthalate	3.49	2.50	ug/L	4.000		87	40-140			
Di-n-octylphthalate	3.41	2.50	ug/L	4.000		85	40-140			
Fluoranthene	2.93	0.20	ug/L	4.000		73	40-140			
Fluorene	2.53	0.20	ug/L	4.000		63	40-140			
Indeno(1,2,3-cd)Pyrene	3.09	0.05	ug/L	4.000		77	40-140			
Naphthalene	1.74	0.20	ug/L	4.000		44	40-140			
Pentachlorophenol	1.78	0.90	ug/L	4.000		45	30-130			
Phenanthrene	2.85	0.20	ug/L	4.000		71	40-140			

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Client Name: GEI Consultants, Inc.
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
625.1(SIM) Semi-Volatile Organic Compounds										
Batch CF92504 - 3510C										
Pyrene	3.24	0.20	ug/L	4.000		81	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	*1.09*		ug/L	*2.500*		*44*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*3.56*		ug/L	*3.750*		*95*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*1.56*		ug/L	*2.500*		*62*	*30-130*			
Surrogate: Nitrobenzene-d5	*1.63*		ug/L	*2.500*		*65*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.35*		ug/L	*2.500*		*94*	*30-130*			
LCS Dup										
Acenaphthene	2.42	0.20	ug/L	4.000		61	40-140	2	20	
Acenaphthylene	2.52	0.20	ug/L	4.000		63	40-140	2	20	
Anthracene	2.63	0.20	ug/L	4.000		66	40-140	4	20	
Benzo(a)anthracene	2.64	0.05	ug/L	4.000		66	40-140	12	20	
Benzo(a)pyrene	2.74	0.05	ug/L	4.000		69	40-140	10	20	
Benzo(b)fluoranthene	3.02	0.05	ug/L	4.000		76	40-140	7	20	
Benzo(g,h,i)perylene	2.79	0.20	ug/L	4.000		70	40-140	10	20	
Benzo(k)fluoranthene	2.65	0.05	ug/L	4.000		66	40-140	12	20	
bis(2-Ethylhexyl)phthalate	3.26	2.50	ug/L	4.000		81	40-140	3	20	
Butylbenzylphthalate	3.25	2.50	ug/L	4.000		81	40-140	6	20	
Chrysene	2.67	0.05	ug/L	4.000		67	40-140	12	20	
Dibenzo(a,h)Anthracene	2.87	0.05	ug/L	4.000		72	40-140	11	20	
Diethylphthalate	2.63	2.50	ug/L	4.000		66	40-140	5	20	
Dimethylphthalate	3.19	2.50	ug/L	4.000		80	40-140	3	20	
Di-n-butylphthalate	3.31	2.50	ug/L	4.000		83	40-140	5	20	
Di-n-octylphthalate	3.45	2.50	ug/L	4.000		86	40-140	1	20	
Fluoranthene	2.76	0.20	ug/L	4.000		69	40-140	6	20	
Fluorene	2.52	0.20	ug/L	4.000		63	40-140	0.2	20	
Indeno(1,2,3-cd)Pyrene	2.68	0.05	ug/L	4.000		67	40-140	14	20	
Naphthalene	1.88	0.20	ug/L	4.000		47	40-140	8	20	
Pentachlorophenol	1.86	0.90	ug/L	4.000		46	30-130	4	20	
Phenanthrene	2.73	0.20	ug/L	4.000		68	40-140	4	20	
Pyrene	3.08	0.20	ug/L	4.000		77	40-140	5	20	
Surrogate: 1,2-Dichlorobenzene-d4	*1.21*		ug/L	*2.500*		*48*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*3.35*		ug/L	*3.750*		*89*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*1.60*		ug/L	*2.500*		*64*	*30-130*			
Surrogate: Nitrobenzene-d5	*1.69*		ug/L	*2.500*		*67*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.22*		ug/L	*2.500*		*89*	*30-130*			
8270D(SIM) Semi-Volatile Organic Compounds w/ Isotope Dilution										
Batch CF92432 - 3535A										
Blank										
1,4-Dioxane	ND	0.250	ug/L							
Surrogate: 1,4-Dioxane-d8	*2.55*		ug/L	*5.000*		*51*	*15-115*			
LCS										
1,4-Dioxane	9.69	0.250	ug/L	10.00		97	40-140			
Surrogate: 1,4-Dioxane-d8	*2.38*		ug/L	*5.000*		*48*	*15-115*			

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D(SIM) Semi-Volatile Organic Compounds w/ Isotope Dilution										
Batch CF92432 - 3535A										
LCS Dup										
1,4-Dioxane	10.1	0.250	ug/L	10.00		101	40-140	4	20	
Surrogate: 1,4-Dioxane-d8	*2.98*		ug/L	*5.000*		*60*	*15-115*			
Classical Chemistry										
Batch CF92146 - General Preparation										
Blank										
Total Residual Chlorine	ND	20.0	ug/L							
LCS										
Total Residual Chlorine	1.38		mg/L	1.390		99	85-115			
Batch CF92150 - General Preparation										
Blank										
Hexavalent Chromium	ND	10.0	ug/L							
LCS										
Hexavalent Chromium	0.485		mg/L	0.4998		97	90-110			
LCS Dup										
Hexavalent Chromium	0.488		mg/L	0.4998		98	90-110	0.5	20	
Batch CF92411 - General Preparation										
Blank										
Total Petroleum Hydrocarbon	ND	5	mg/L							
LCS										
Total Petroleum Hydrocarbon	14	5	mg/L	19.38		70	66-114			
Batch CF92425 - TCN Prep										
Blank										
Total Cyanide	ND	5.00	ug/L							
LCS										
Total Cyanide	20.2	5.00	ug/L	20.06		101	90-110			
LCS										
Total Cyanide	150	5.00	ug/L	150.4		100	90-110			
LCS Dup										
Total Cyanide	149	5.00	ug/L	150.4		99	90-110	0.7	20	
Batch CF92430 - General Preparation										
Blank										
Total Suspended Solids	ND	5	mg/L							
LCS										
Total Suspended Solids	36		mg/L	36.40		99	80-120			
Batch CF92524 - General Preparation										
Blank										
Phenols	ND	100	ug/L							

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Classical Chemistry										
Batch CF92524 - General Preparation										
LCS										
Phenols	96	100	ug/L	100.0		96	80-120			
LCS										
Phenols	1030	100	ug/L	1000		103	80-120			
Batch CF92615 - General Preparation										
Blank										
Chloride	ND	0.5	mg/L							
LCS										
Chloride	2.3		mg/L	2.500		93	90-110			
Batch CF92628 - NH4 Prep										
Blank										
Ammonia as N	ND	0.10	mg/L							
LCS										
Ammonia as N	0.09	0.10	mg/L	0.09994		86	80-120			
LCS										
Ammonia as N	1.14	0.10	mg/L	0.9994		114	80-120			
504.1 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane										
Batch CF92724 - 504/8011										
Blank										
1,2,3-Trichloropropane	ND	0.025	ug/L							
1,2,3-Trichloropropane [2C]	ND	0.025	ug/L							
1,2-Dibromo-3-Chloropropane	ND	0.015	ug/L							
1,2-Dibromo-3-Chloropropane [2C]	ND	0.015	ug/L							
1,2-Dibromoethane	ND	0.015	ug/L							
1,2-Dibromoethane [2C]	ND	0.015	ug/L							
Surrogate: Pentachloroethane	*0.164*		ug/L	*0.2000*		*82*	*30-150*			
Surrogate: Pentachloroethane [2C]	*0.186*		ug/L	*0.2000*		*93*	*30-150*			
LCS										
1,2,3-Trichloropropane	0.068	0.025	ug/L	0.08000		84	70-130			
1,2,3-Trichloropropane [2C]	0.058	0.025	ug/L	0.08000		72	70-130			
1,2-Dibromo-3-Chloropropane	0.057	0.015	ug/L	0.08000		72	70-130			
1,2-Dibromo-3-Chloropropane [2C]	0.065	0.015	ug/L	0.08000		81	70-130			
1,2-Dibromoethane	0.058	0.015	ug/L	0.08000		73	70-130			
1,2-Dibromoethane [2C]	0.071	0.015	ug/L	0.08000		89	70-130			
Surrogate: Pentachloroethane	*0.0650*		ug/L	*0.08000*		*81*	*30-150*			
Surrogate: Pentachloroethane [2C]	*0.0784*		ug/L	*0.08000*		*98*	*30-150*			
LCS										
1,2,3-Trichloropropane	0.155	0.025	ug/L	0.2000		78	70-130			
1,2,3-Trichloropropane [2C]	0.172	0.025	ug/L	0.2000		86	70-130			

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP

ESS Laboratory Work Order: 19F0748

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
504.1 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane										
Batch CF92724 - 504/8011										
1,2-Dibromo-3-Chloropropane	0.200	0.015	ug/L	0.2000		100	70-130			
1,2-Dibromo-3-Chloropropane [2C]	0.219	0.015	ug/L	0.2000		110	70-130			
1,2-Dibromoethane	0.230	0.015	ug/L	0.2000		115	70-130			
1,2-Dibromoethane [2C]	0.237	0.015	ug/L	0.2000		118	70-130			
Surrogate: Pentachloroethane	*0.243*		ug/L	*0.2000*		*122*	*30-150*			
Surrogate: Pentachloroethane [2C]	*0.265*		ug/L	*0.2000*		*132*	*30-150*			
Alcohol Scan by GC/FID										
Batch CF92801 - No Prep										
Blank										
Ethanol	ND	10	mg/L							
LCS										
Ethanol	811	10	mg/L	1134		71	60-140			
LCS Dup										
Ethanol	852	10	mg/L	1134		75	60-140	5	30	

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP

ESS Laboratory Work Order: 19F0748

Notes and Definitions

U	Analyte included in the analysis, but not detected
Q	Calibration required quadratic regression (Q).
ICV+	Initial Calibration Verification recovery is above upper control limit (ICV+).
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
MF	Membrane Filtration
MPN	Most Probably Number
TNTC	Too numerous to Count
CFU	Colony Forming Units

CERTIFICATE OF ANALYSIS

Client Name: GEI Consultants, Inc.
Client Project ID: Beth Israel - RGP

ESS Laboratory Work Order: 19F0748

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

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

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

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

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

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

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

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

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

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

ESS Laboratory Sample and Cooler Receipt Checklist

Client: GEI Consultants, Inc. - TB/MM

Shipped/Delivered Via: ESS Courier

ESS Project ID: 19F0748
Date Received: 6/21/2019
Project Due Date: 6/28/2019
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: 1.9 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	359027	Yes	No	Yes	VOA Vial - HCl	HCl	
01	359028	Yes	No	Yes	VOA Vial - HCl	HCl	
01	359029	Yes	No	Yes	VOA Vial - HCl	HCl	
01	359030	Yes	No	Yes	VOA Vial - HCl	HCl	
01	359031	Yes	No	Yes	VOA Vial - HCl	HCl	
01	359033	Yes	No	Yes	VOA Vial - Unpres	NP	
01	359036	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
01	359037	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
01	359044	Yes	NA	Yes	1L Amber - Unpres	NP	
01	359045	Yes	NA	Yes	1L Amber - Unpres	NP	
01	359046	Yes	NA	Yes	1L Amber - Unpres	NP	
01	359047	Yes	NA	Yes	1L Amber - Unpres	NP	
01	359048	Yes	NA	Yes	1L Amber - Unpres	NP	
01	359049	Yes	NA	Yes	1L Amber - Unpres	NP	
01	359051	Yes	NA	Yes	1L Poly - Unpres	NP	
01	359053	Yes	NA	Yes	250 mL Poly - Unpres	NP	
01	359055	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4	
01	359057	Yes	NA	Yes	250 mL Poly - NaOH	NaOH	**pH > 12**
01	359059	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	
01	359062	Yes	NA	Yes	500 mL Poly - HNO3	HNO3	
01	359063	Yes	NA	Yes	500 mL Poly - HNO3	HNO3	
02	359020	Yes	No	Yes	VOA Vial - HCl	HCl	
02	359021	Yes	No	Yes	VOA Vial - HCl	HCl	

ESS Laboratory Sample and Cooler Receipt Checklist

Client: GEI Consultants, Inc. - TB/MM

ESS Project ID: 19F0748

Date Received: 6/21/2019

02	359022	Yes	No	Yes	VOA Vial - HCl	HCl	
02	359023	Yes	No	Yes	VOA Vial - HCl	HCl	
02	359024	Yes	No	Yes	VOA Vial - HCl	HCl	
02	359025	Yes	No	Yes	VOA Vial - HCl	HCl	
02	359032	Yes	No	Yes	VOA Vial - Unpres	NP	
02	359034	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
02	359035	Yes	NA	Yes	1L Amber - H2SO4	H2SO4	
02	359038	Yes	NA	Yes	1L Amber - Unpres	NP	
02	359039	Yes	NA	Yes	1L Amber - Unpres	NP	
02	359040	Yes	NA	Yes	1L Amber - Unpres	NP	
02	359041	Yes	NA	Yes	1L Amber - Unpres	NP	
02	359042	Yes	NA	Yes	1L Amber - Unpres	NP	
02	359043	Yes	NA	Yes	1L Amber - Unpres	NP	
02	359050	Yes	NA	Yes	1L Poly - Unpres	NP	
02	359052	Yes	NA	Yes	250 mL Poly - Unpres	NP	
02	359054	Yes	NA	Yes	500 mL Poly - H2SO4	H2SO4	
02	359056	Yes	NA	Yes	250 mL Poly - NaOH	NaOH	**pH > 12**
02	359058	Yes	NA	Yes	250 mL Poly - HNO3	HNO3	
02	359060	Yes	NA	Yes	500 mL Poly - HNO3	HNO3	
02	359061	Yes	NA	Yes	500 mL Poly - HNO3	HNO3	

2nd Review

Were all containers scanned into storage/lab? Initials MM

Yes / No

Are barcode labels on correct containers? Yes / No / NA

Are all Flashpoint stickers attached/container ID # circled? Yes / No / NA

Are all Hex Chrome stickers attached? Yes / No / NA

Are all QC stickers attached? Yes / No / NA

Are VOA stickers attached if bubbles noted? Yes / No / NA

Completed By: _____ Date & Time: 6/21/19 1742

Reviewed By: _____ Date & Time: 6/21/19 1829

Delivered By: _____ 6/21/19 1829

ESS Laboratory

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

CHAIN OF CUSTODY

ESS LAB PROJECT ID: 19F0748

Turn Time: Standard Rush Approved By:

Reporting Limits -

Discharge into: Fresh Water ☐ Salt Water ☐

State where samples were collected: MA NH

Is this project for: RGP

Electonic Deliverable Yes No
Format: Excel Access PDF Other

Project Manager: M. Ballantyne
Company: GEI Consultants
Address: 400 Unicorn Park Drive
Woburn, MA 01801

Project # 1703581
Project Name: Beth Israel
PO # [illegible]

ESS Lab Sample ID	Date	Collection Time	Grab -G Composite-C	Matrix	Sample Identification	# of Containers	RGP Metals Total	RGP Metals Dissolved	Hardness (Calculation)	Ethanol ASTM D3695	Chloride 300.0*	Total Cyanide 4500 LL	TPH 1664	TSS 2540D*	TRC 4500-CL D*	Ammonia 350.1	Tri Cr (Calc. MUST run T. Cr)	Hex Cr 3500	Phenol 420.1	RGP VOC Long List 524	1,4-Dioxane 8270-SIM	EDB 504.1	RGP SVOC Log List 625-SIM	PCB 608	Comment #
1	6-21-19	11:55		GW	1703581-B202(OW)	22	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1,2,3
2	6-21-19	12:30		GW	1703581-B203(OW)	22	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1,2,3
Preservation Code: 1-NP, 2-HCl, 3-H2SO4, 4-HNO3, 5-NaOH, 6-MeOH, 7-Asorbic Acid, 8-ZnAct, 9-_____							4	4	4	1	1	5	3	1	1	3	-	1	3	2	1	2	1	1	
Container Type: P-Poly G-Glass AG-Amber Glass S-Sterile V-VOA							P	P	P	V	P	P	AG	P	P	P	-	P	AG	V	AG	V	AG	AG	

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

Cooler Present ✓ Yes ___ No ___
Seals Intact ___ Yes ___ No NA: ✓
Cooler Temperature: ice temp. 1.9

Sampled by: CWS sampled B202(OW) and BAL sampled B203(OW)

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

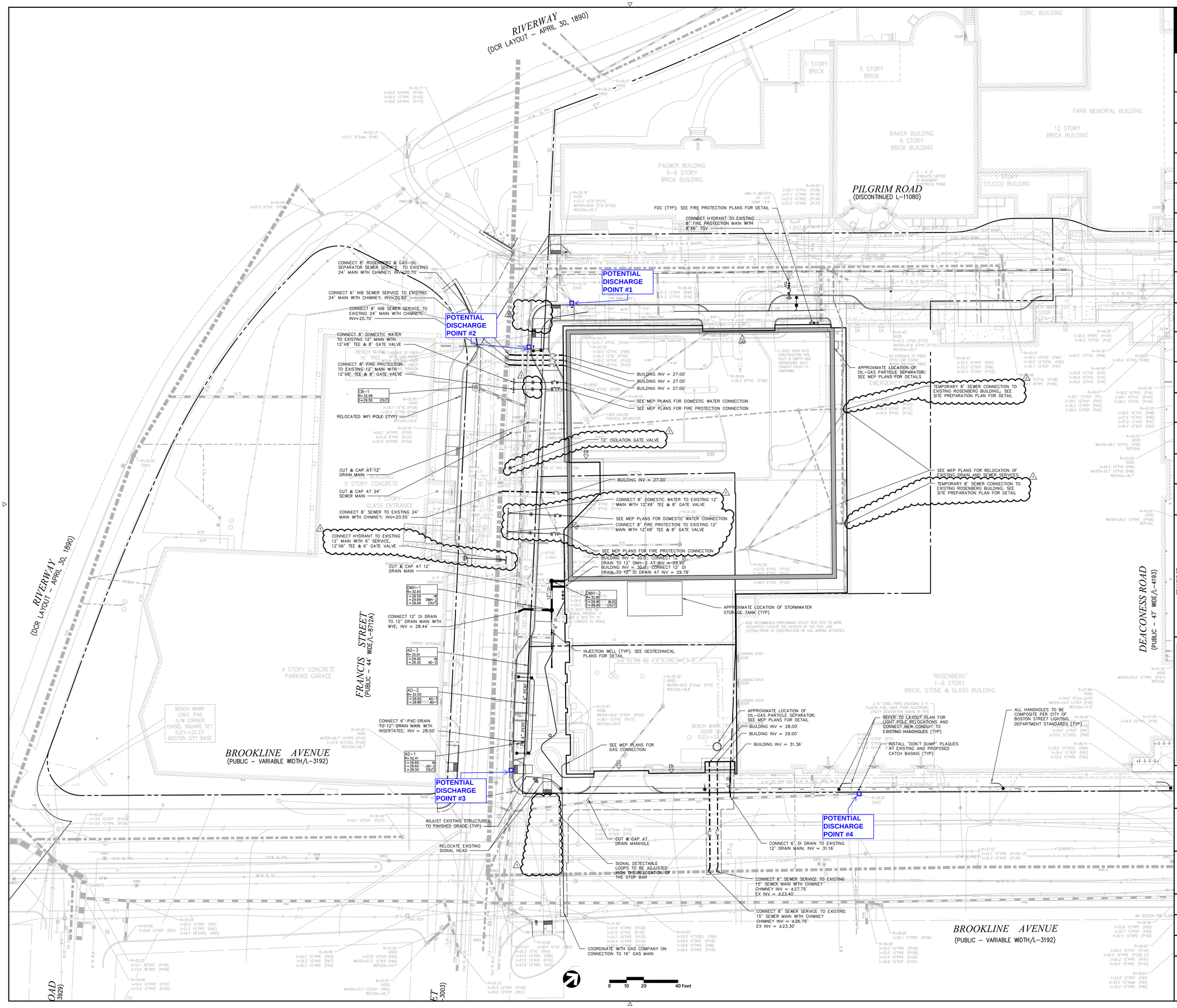
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
[signature]	6/21/19 1350	[signature] 6/21/19	13:47 [signature] 6/21/19	16:57	[signature] 6/21/19 1714
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)

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

Page 1 of 2

Appendix E

Detailed Plans of Proposed Discharge Points



Architect / Landscape Architect
Payette Associates Inc.
290 Congress Street, Fifth Floor
Boston, MA 02210-1005
Tel: 617-895-1000

MEP/FP Engineer/Tel Data Engineer
Bard, Rao + Athanas Consulting Engineers, LLC
Tel: 617-254-0016
www.brplusa.com

Structural Engineer
Simpson Gumpertz & Heger
Tel: 781-907-9000
www.sgh.com

Civil Engineer
VHB
Tel: 617-728-7777
www.vhb.com

Geotechnical Engineer
GEI Consultants, Inc.
Tel: 781-721-4000
www.geiconsultants.com/

Food Service Consultant
Colburn & Guyette
Tel: 781-826-5522
www.colburnguyette.com

Technology Consultant
Hoefer Wysocki
Tel: 214-445-4400
www.hoeferwysocki.com

Materials Management / Vertical Transport
St. Onge Company
Tel: 717-840-8181
www.stonge.com

Equipment Planners
OneEQ
Tel: 214-468-7600
www.one-eq.com

Healthcare Planning Consultant
HC Tangram Design
Tel: 617-417-9056
www.hctangramdesign.com

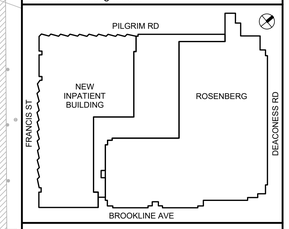
Owner's Representative
Leggat McCall Properties
Tel: 617-422-7000
www.lmp.com

Construction Manager
Turner Construction Company
Tel: 617-247-6400
www.turnerconstruction.com

Code Consultant
Hastings Consulting Inc.
Tel: 508-397-8417
www.hastings-consulting.com

Acoustics/Vibration Consultant
Acentech
Tel: 617-499-8000
www.acentech.com

Lighting Consultant
Available Light
Tel: 978-744-6800
www.availablelight.com



#	DATE	DESCRIPTION
1	05/24/2019	ADDENDUM NO. 1

ISSUED FOR CONSTRUCTION DOCUMENTS

Beth Israel Deaconess Medical Center
NEW INPATIENT BUILDING

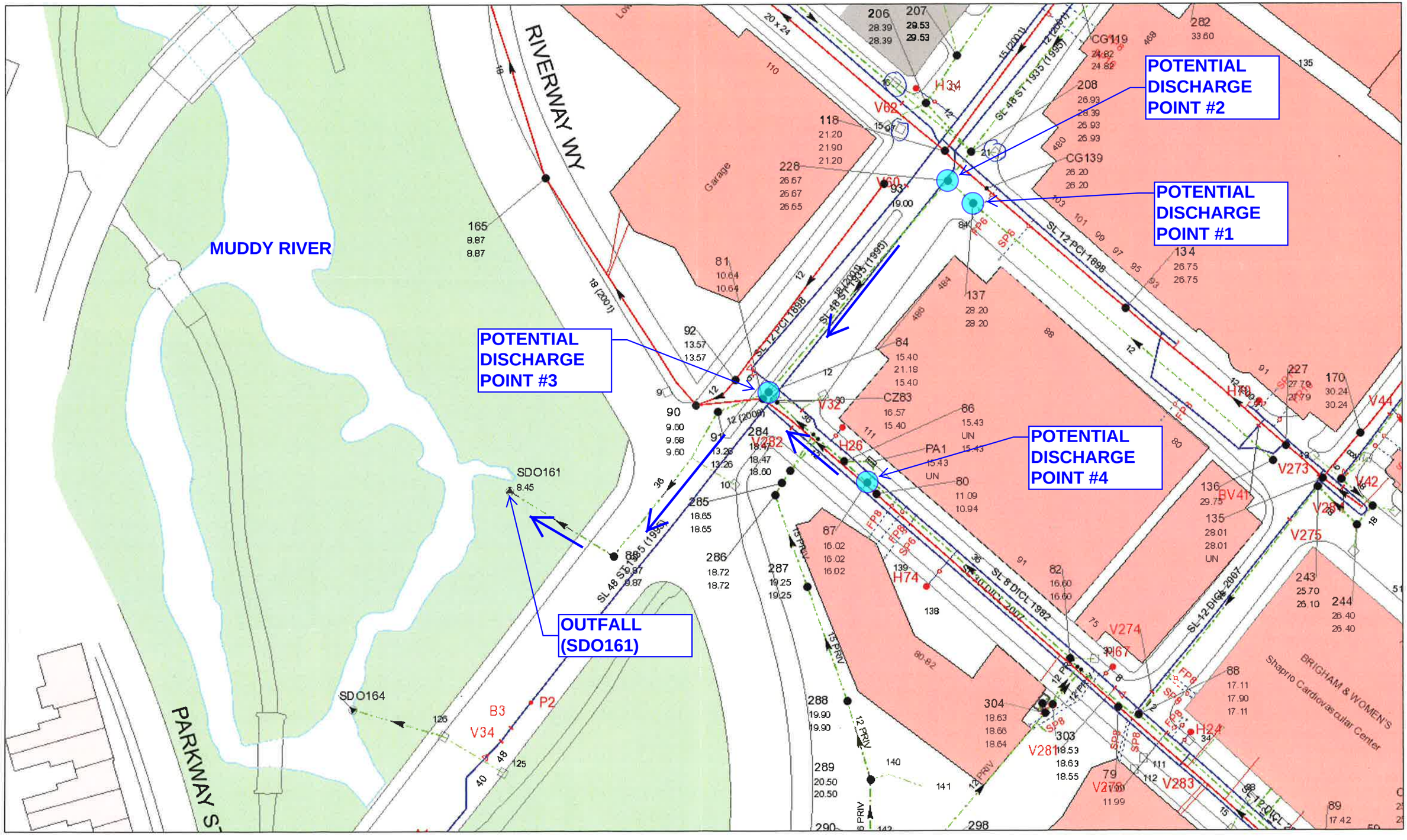
UTILITY PLAN

Drawing Scale
1"=20'

Project Number
13853.00

Date Issued
05/03/2019

C6.00



BOSTON WATER AND SEWER

N W E S

0 30 60 120 180 240 Feet

Brookline Av

Appendix F

Endangered Species Act Eligibility Documentation

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

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

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

Location

Suffolk County, Massachusetts

Local office

New England Ecological Services Field Office

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

70 Commercial Street, Suite 300
Concord, NH 03301-5094

http://www.fws.gov/newengland

Endangered species

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

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

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

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

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

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

---

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. 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.

THERE ARE NO ENDANGERED SPECIES EXPECTED TO OCCUR AT THIS LOCATION.

Migratory birds

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

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

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

Additional information can be found using the following links:

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

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

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

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS

ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)

Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Black-billed Cuckoo Coccyzus erythropthalmus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Bobolink Dolichonyx oryzivorus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Canada Warbler Cardellina canadensis This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10
Cerulean Warbler Dendroica cerulea This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 29 to Jul 20
Evening Grosbeak Coccothraustes vespertinus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Kentucky Warbler Oporornis formosus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 20
Lesser Yellowlegs Tringa flavipes This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Long-eared Owl asio otus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3631	Breeds elsewhere

Prairie Warbler Dendroica discolor — Breeds May 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Prothonotary Warbler Protonotaria citrea — Breeds Apr 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Red-headed Woodpecker Melanerpes erythrocephalus — Breeds May 10 to Sep 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

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

Ruddy Turnstone Arenaria interpres morinella — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

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

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

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

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

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

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

Wood Thrush *Hylocichla mustelina* Breeds May 10 to Aug 31

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

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

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

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

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

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

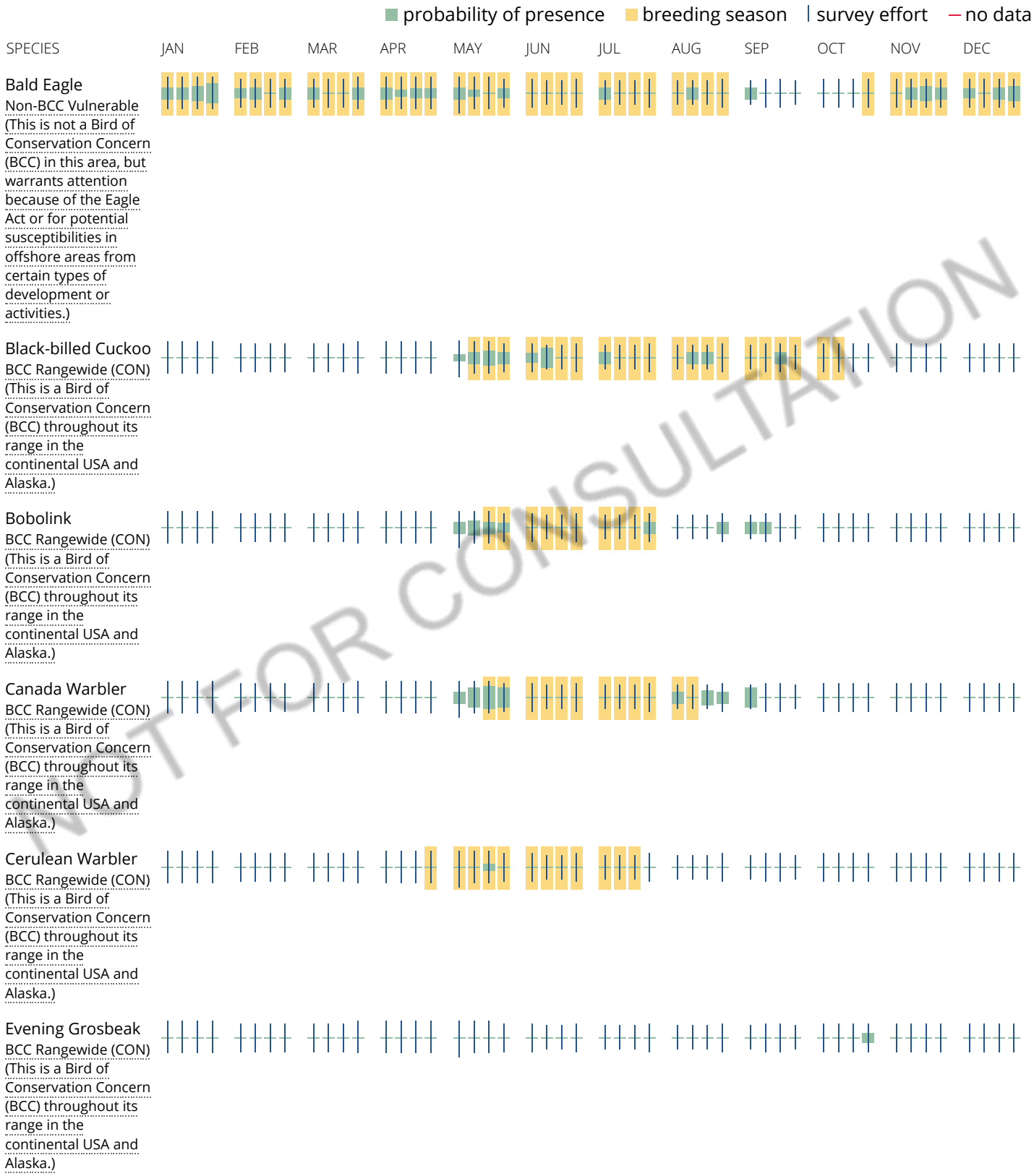
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

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

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

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



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

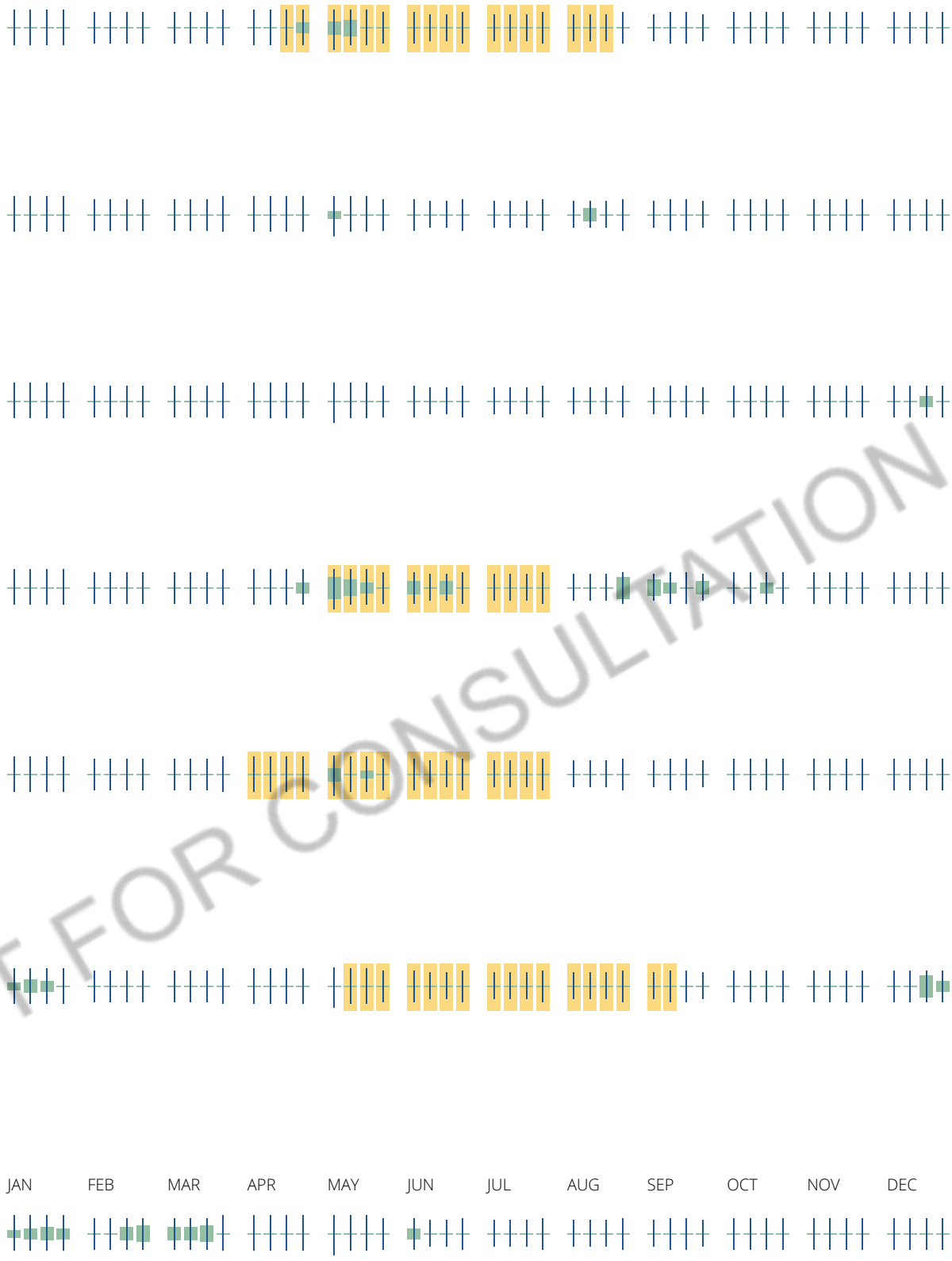
Lesser Yellowlegs
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Long-eared Owl
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

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

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

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



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

Ruddy Turnstone
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

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

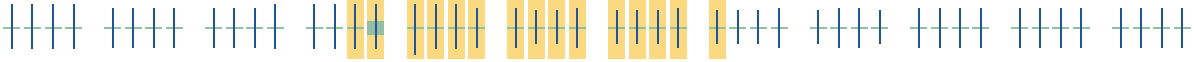
Semipalmated Sandpiper
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Short-billed Dowitcher
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

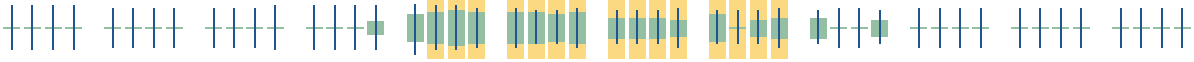
Snowy Owl
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

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

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



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



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

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

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

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

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

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

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

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

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

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

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

What are the levels of concern for migratory birds?

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

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

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

Details about birds that are potentially affected by offshore projects

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

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

What if I have eagles on my list?

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

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

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

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

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

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

THERE ARE NO KNOWN WETLANDS AT THIS LOCATION.

Data limitations

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

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

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

Data exclusions

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

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

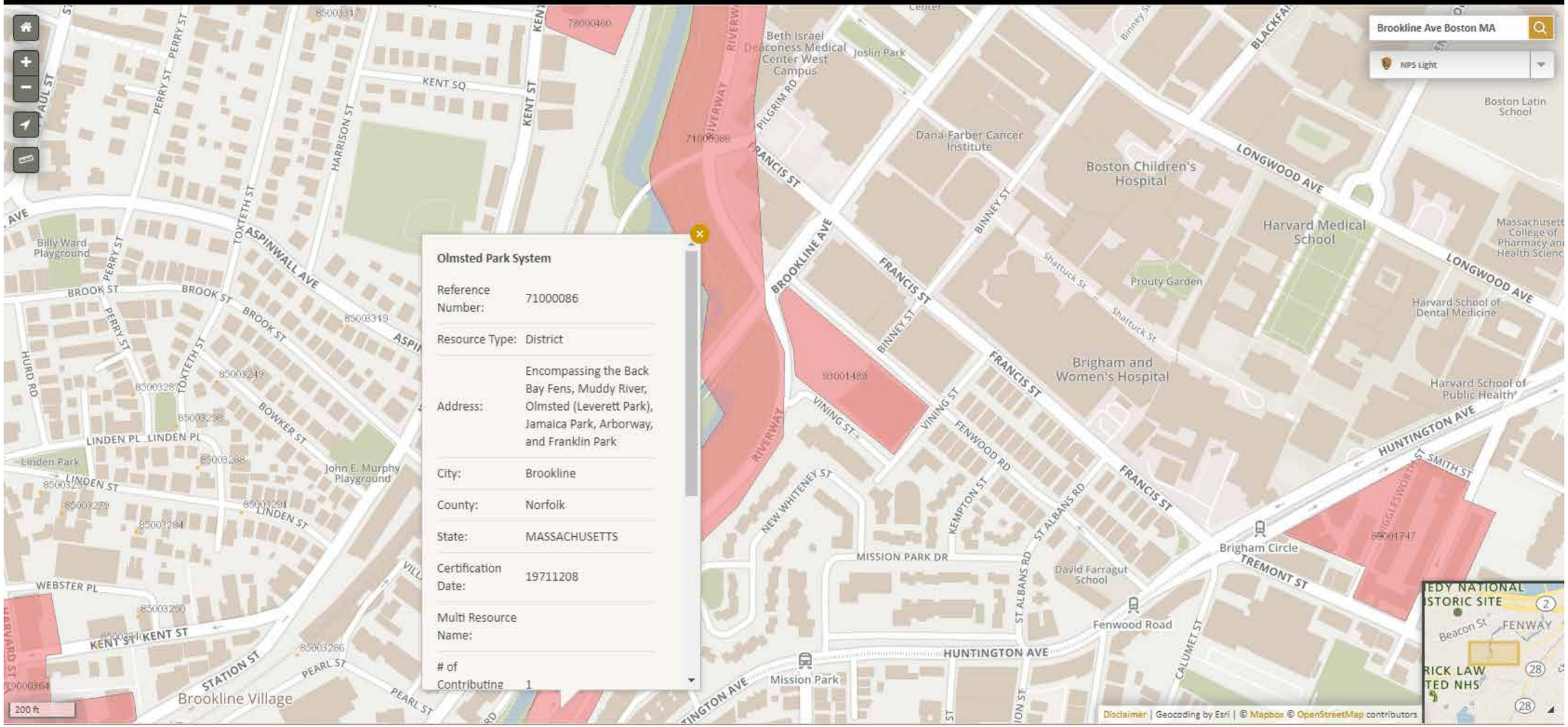
Appendix G

Historic Preservation Documentation

National Register of Historic Places

Public, non-restricted data depicting National Register spatial data processed by the Cultural Resources GIS facility. Data last updated in April, 2014.

National Park Service
U.S. Department of the Interior



https://www.nps.gov/maps/full.html?mapId=7ad17cc9-b808-4ff8-a2f9-a99909164466

Accessed June 27, 2019

MACRIS MAPS 2.0 beta

About || Help || Disclaimer

Brookline Ave Boston Search

Brookline Ave, Boston, Massachusetts, 02215

Bing MassDOT Street View

Legend

MHC Inventory Points

- Nat'l Register of Historic Places
- Preservation Restriction
- Local Historic District
- NRHP and LHD
- Inventoried Property

MHC Inventory Areas

- Nat'l Register of Historic Places
- Preservation Restriction
- Local Historic District
- NRHP and LHD
- Inventoried Area

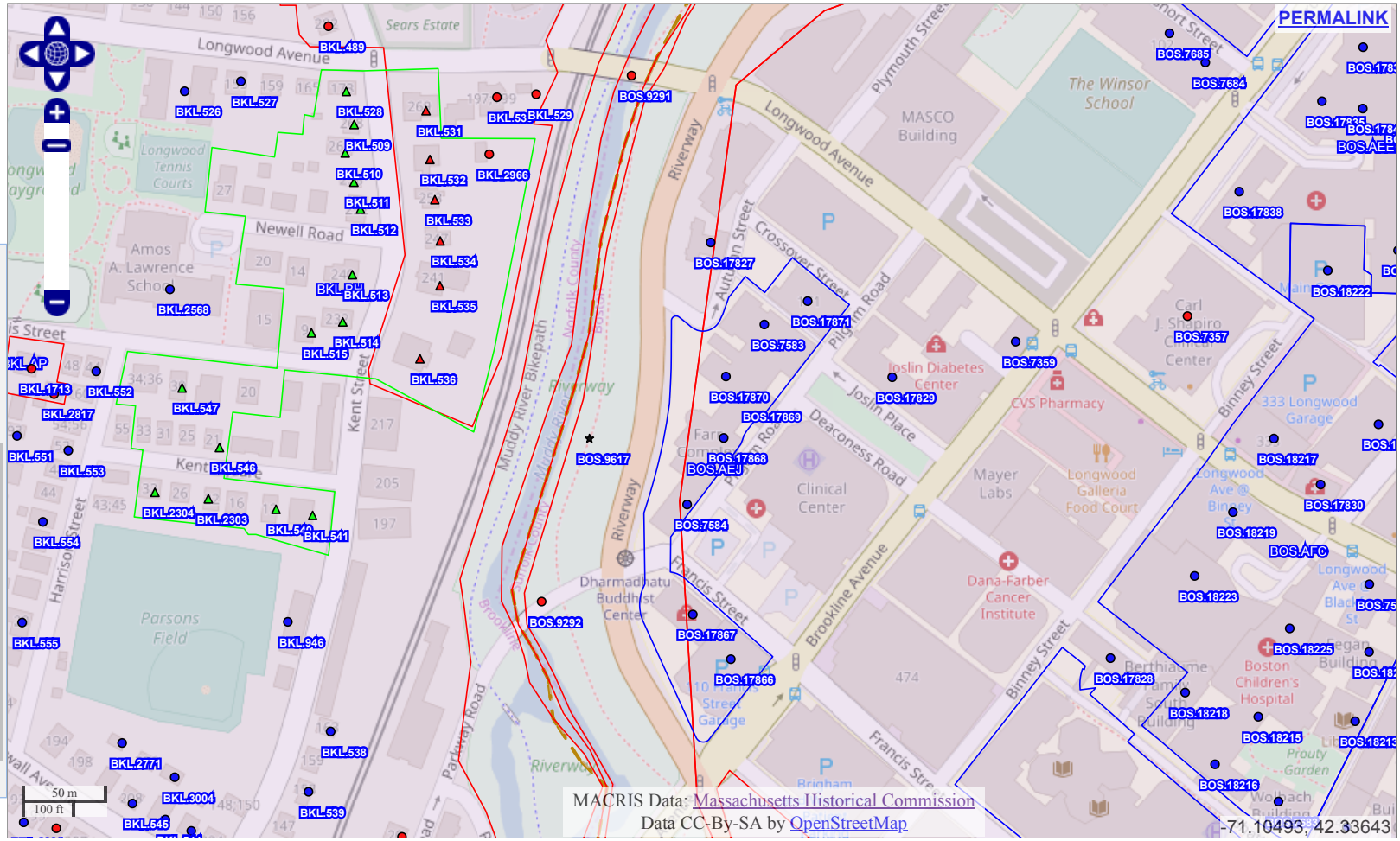
MHC Towns Completed

- Updates Pending
- Completed
- Not Completed

Archaeology Login

Username:

Password: Login



MACRIS Maps Last Updated 06/18/2019

Massachusetts Cultural Resource Information System

MACRIS

MACRIS Search Results

Search Criteria: Town(s): Boston; Name: olmsted;

Inv. No.	Property Name	Street	Town	Year
BOS.IO	Olmsted Park System		Boston	
BOS.9302	Olmsted Park - Cumberland Avenue Footbridge	Cumberland Ave	Boston	1892
BOS.9310	Olmsted Park - Retaining Walls along Jamaicaway	Jamaicaway	Boston	1894
BOS.9301	Olmsted Park - Cove Bridge	Leverett Pond	Boston	1892
BOS.9309	Olmsted Park - Nickerson Hill Stone Steps	Nickerson Hill	Boston	1894
BOS.9312	Olmsted Park Electric Lights	Olmsted Park	Boston	c 1890
BOS.9311	Olmsted Park Retaining Wall and Iron Fence	Perkins St	Boston	1894
BOS.9304	Olmsted Park - Ward's Pond Footbridge	Ward's Pond	Boston	1892
BOS.9303	Olmsted Park - Willow Pond Footbridge	Willow Pond	Boston	1892
BOS.8061	Olmsted Park - Kelly Skating Rink	Willow Pond Rd	Boston	1965
BOS.9231	Olmsted Park - Daisy Field	Willow Pond Rd	Boston	

Massachusetts Cultural Resource Information System

MACRIS

MACRIS Search Results

Search Criteria: Town(s): Boston; Place: Fenway - Longwood; Resource Type(s): Area, Building, Burial Ground, Object, Structure;

Inv. No.	Property Name	Street	Town	Year
BOS.JE	Emerald Necklace Parks		Boston	
BOS.JG	Massachusetts Mental Health Center		Boston	
BOS.JH	Massachusetts State Hospitals and State Schools		Boston	
BOS.TC	Emmanuel College Campus		Boston	
BOS.ACA	Francis Street - Fenwood Road District		Boston	
BOS.AEE	Beth Israel Hospital		Boston	
BOS.AEF	Evans Way - Gordon College Area		Boston	
BOS.AEG	Harvard Medical School and School of Public Health		Boston	
BOS.AEH	Huntington Avenue - Longwood Avenue Area		Boston	
BOS.AEI	Louis Prang Street - Vancouver Street Residential Area		Boston	
BOS.AEJ	New England Deaconess Hospital		Boston	
BOS.AEK	Normal and Girls' Latin School Group - Massachusetts College of Art and Design		Boston	
BOS.AEL	Brigham, Peter Bent Hospital - Brigham and Women's Hospital		Boston	
BOS.AEM	Simmons College Residence Campus		Boston	
BOS.AEN	Wheelock College Area		Boston	
BOS.AFC	Boston Children's Hospital		Boston	
BOS.17827	Riverway Hall	21 Autumn St	Boston	1928
BOS.17843	Emmanuel College - Alumnae Hall	45 Ave Louis Pasteur	Boston	1948
BOS.17849	Harvard Medical School - Harvard Institutes of Medicine	77 Ave Louis Pasteur	Boston	1971
BOS.7517	Boston Public Latin School	78 Ave Louis Pasteur	Boston	1921
BOS.7516	Harvard Medical School - Vanderbilt Hall	107 Ave Louis Pasteur	Boston	1926
BOS.17828	Jimmy Fund Building and Auditorium	43 Binney St	Boston	1949
BOS.18220	Boston Children's Hospital - Karp Family	1 Blackfan Circ	Boston	2003

Inv. No.	Property Name	Street	Town	Year
	Research Laboratory Building			
BOS.18223	Boston Children's Hospital - James A. Mandell Building	17 Blackfan St	Boston	2013
BOS.18218	Boston Children's Hospital - Berthiaume Family South Clinical Building	29 Blackfan St	Boston	2005
BOS.9293	Riverway - Brookline Avenue Bridge	Brookline Ave	Boston	1894
BOS.17882	Simmons College Residence Campus - Morse Hall	259-275 Brookline Ave	Boston	1952
BOS.17883	Simmons College Residence Campus - Simmons Hall	259-275 Brookline Ave	Boston	1956
BOS.7413	Boston Academy of Notre Dame	264-274 Brookline Ave	Boston	1913
BOS.13247	Emmanuel College - Saint Ann Hall	264-274 Brookline Ave	Boston	1961
BOS.13249	Emmanuel College - Loretto Hall	264-274 Brookline Ave	Boston	1963
BOS.13250	Emmanuel College - Marian Hall	264-274 Brookline Ave	Boston	1954
BOS.13251	Emmanuel College - Saint Joseph Hall	264-274 Brookline Ave	Boston	1966
BOS.17844	Emmanuel College - Cardinal Cushing Library	264-274 Brookline Ave	Boston	1966
BOS.17884	Simmons College Residence Campus - Mesick Hall	291 Brookline Ave	Boston	1960
BOS.17885	Simmons College Residence Campus - Evans Hall	305 Brookline Ave	Boston	1938
BOS.17835	Beth Israel Hospital - Outpatient Department Building	320-350 Brookline Ave	Boston	1925
BOS.17836	Beth Israel Hospital - Main Hospital Building	320-350 Brookline Ave	Boston	1926
BOS.17837	Beth Israel Hospital - Service and Operating Building	320-350 Brookline Ave	Boston	1926
BOS.17838	Beth Israel Hospital - Nurses' Home	320-350 Brookline Ave	Boston	1925
BOS.17839	Beth Israel Hospital - Yamins, Nathan Research Laboratory	320-350 Brookline Ave	Boston	1948
BOS.17840	Beth Israel Hospital - Service Building	320-350 Brookline Ave	Boston	1948
BOS.17841	Beth Israel Hospital - Stoneman Building	320-350 Brookline Ave	Boston	1948
BOS.17842	Beth Israel Hospital - Rabb Building	320-350 Brookline Ave	Boston	1966
BOS.7358	Simmons College Residence Campus - South Hall	321 Brookline Ave	Boston	1905
BOS.7580	Simmons College Residence Campus - North Hall	321 Brookline Ave	Boston	1906
BOS.7581	Simmons College Residence Campus - Refectory	321 Brookline Ave	Boston	1905
BOS.17886	Simmons College Residence Campus - Bartol Dining Hall	321 Brookline Ave	Boston	1952
BOS.17887	Simmons College Residence Campus - Health Center	321 Brookline Ave	Boston	1966
BOS.18222	Boston Children's Hospital - Parking Garage	340 Brookline Ave	Boston	r 1975

Inv. No.	Property Name	Street	Town	Year
BOS.7357	Massachusetts School of Art	364 Brookline Ave	Boston	1929
BOS.7359	Boston Fire Engine House #3	411 Brookline Ave	Boston	1873
BOS.17829	Joslin Diabetes Center	415-435 Brooklne Ave	Boston	1955
BOS.17845		22 Evans Way	Boston	1916
BOS.17846		26 Evans Way	Boston	1916
BOS.17847	Gordon College - Frost Hall	30 Evans Way	Boston	1916
BOS.17848	Gordon College - Frost Hall Addition	40-48 Evans Way	Boston	1930
BOS.7414	Lyons, John B. Three-Family House	7 Fenwood Rd	Boston	1910
BOS.7410	Farragut Primary School	10 Fenwood Rd	Boston	1903
BOS.7415	Spillane, Jeremiah C. Two-Family House	11 Fenwood Rd	Boston	1903
BOS.7416	Spillane, Jeremiah C. Two-Family House	15 Fenwood Rd	Boston	1903
BOS.16666	Sheean, Benjamin Two-Family House	17 Fenwood Rd	Boston	c 1899
BOS.16667	Dunn, F. and J. L. Two-Family House	19 Fenwood Rd	Boston	c 1899
BOS.16668	Whelan, M. J. and A. J. Two-Family House	21 Fenwood Rd	Boston	c 1899
BOS.16669	Mahan, E. J. Two-Family House	24 Fenwood Rd	Boston	c 1899
BOS.16670	Barry, Anna M. Two-Family House	30 Fenwood Rd	Boston	1909
BOS.16671	Stroud, F. W. Two-Family House	31 Fenwood Rd	Boston	c 1899
BOS.16672	Lowney, J. F. Two-Family House	32 Fenwood Rd	Boston	c 1899
BOS.16673	Kilduff, M. Two-Family House	33 Fenwood Rd	Boston	c 1899
BOS.16674	Holland, J. F. Two-Family House	35 Fenwood Rd	Boston	1901
BOS.7411	Olsson, H. C. Two-Family House	36 Fenwood Rd	Boston	c 1900
BOS.16675	Bailey, N. Two-Family House	39 Fenwood Rd	Boston	1899
BOS.7412	Mead, C. E. Two-Family House	40 Fenwood Rd	Boston	1900
BOS.7417	Freiman, Max Two-Family House	43 Fenwood Rd	Boston	c 1899
BOS.16676	Hosmer, Ida A. Two-Family House	44 Fenwood Rd	Boston	c 1899
BOS.16677	Ewing, E. F. Two-Family House	47 Fenwood Rd	Boston	c 1899
BOS.7418	Spillane, Jeremiah C. Two-Family House	49 Fenwood Rd	Boston	c 1899
BOS.16678	Callahan, J. M. Two-Family House	50 Fenwood Rd	Boston	c 1899
BOS.7422	Dooley, Rose H. Three Decker	51 Fenwood Rd	Boston	c 1899
BOS.16679	Sampson, W. W. Two-Family House	52 Fenwood Rd	Boston	1899
BOS.16680	Leather, Annie Three-Decker	53 Fenwood Rd	Boston	1900
BOS.16681	Connor, Genevieve Three-Decker	54 Fenwood Rd	Boston	1904
BOS.16682	Spillane, J. C. Two-Family House	55 Fenwood Rd	Boston	c 1899
BOS.16683	Gregory, Gustina M. Two-Family House	56 Fenwood Rd	Boston	1905
BOS.16684	Moon, Patrick W. Two-Family House	57 Fenwood Rd	Boston	1902
BOS.16685	Connelly, C. J. Two-Family House	58 Fenwood Rd	Boston	c 1899
BOS.7711	Massachusetts Mental Health Center Main Building	74 Fenwood Rd	Boston	1912

Inv. No.	Property Name	Street	Town	Year
BOS.7712	Massachusetts Mental Health Center Power House	74 Fenwood Rd	Boston	1912
BOS.7713	Massachusetts Mental Health Center Research Bldg.	74 Fenwood Rd	Boston	1954
BOS.7714	Massachusetts Mental Health Center Therapeutic Blg	74 Fenwood Rd	Boston	1957
BOS.9295	Massachusetts Mental Health Center Fence	74 Fenwood Rd	Boston	1912
BOS.16686	Santander Bank	2-6 Francis St	Boston	c 1999
BOS.7497	Brigham, Peter Bent Hospital - Administration Building	5-75 Francis St	Boston	1911
BOS.17874	Brigham, Peter Bent Hospital - Ward A	5-75 Francis St	Boston	1911
BOS.17875	Brigham, Peter Bent Hospital - Ward B	5-75 Francis St	Boston	1915
BOS.17876	Brigham, Peter Bent Hospital - Surgical Building	5-75 Francis St	Boston	c 1915
BOS.17877	Brigham, Peter Bent Hospital - Coolidge House	5-75 Francis St	Boston	1962
BOS.17878	Brigham, Peter Bent Hospital - Radiology Building	5-75 Francis St	Boston	1963
BOS.16687	Donlan, D. Three-Decker	12 Francis St	Boston	1900
BOS.16688	Lindauer, Louisa Three-Decker	16 Francis St	Boston	1899
BOS.16689	Lindauer, Louisa Three-Decker	18 Francis St	Boston	c 1899
BOS.16690	Breen, Jane Three-Decker	20 Francis St	Boston	1899
BOS.16691	Cannon, P. and J. Three-Decker	22 Francis St	Boston	1900
BOS.7419	Crowley, Daniel Apartment Building	30 Francis St	Boston	c 1900
BOS.16692	Donovan, C. J. Three-Decker	32 Francis St	Boston	1898
BOS.16693	Donovan, C. J. Three-Decker	34 Francis St	Boston	1898
BOS.16694	Hourihan, J. Three-Decker	36 Francis St	Boston	1898
BOS.16695	Cole, William S. Three-Decker	38 Francis St	Boston	1900
BOS.16696	McGovern, O. Three-Decker	40 Francis St	Boston	1901
BOS.9773	Francis Street Garden	42 Francis St	Boston	r 2000
BOS.16698	Hannan, R. and M. Three-Decker	44 Francis St	Boston	1898
BOS.16699	O'Neil, M. Three-Decker	46 Francis St	Boston	1901
BOS.16700	Cole, Mary A. Three-Decker	48 Francis St	Boston	1899
BOS.7421	Ilse, Fredericka Three-Decker	50 Francis St	Boston	1900
BOS.16701	Sullivan, Mary Three-Decker	52 Francis St	Boston	1900
BOS.7423	Donovan, Jereh Three Decker	58 Francis St	Boston	1901
BOS.17866	New England Deaconess Hospital - Lowry Parking Garage	110 Francis St	Boston	1963
BOS.17867	New England Deaconess Hospital - Lowry Medical Office Building	110 Francis St	Boston	1962
BOS.7494	Bangs, Edward A. - Bangs, Outram Double House	553-555 Huntington Ave	Boston	c 1900

Inv. No.	Property Name	Street	Town	Year
BOS.7495	Stanley, Martha Apartment Building	641 Huntington Ave	Boston	1888
BOS.7496	Holmes, William Apartment Building	643-645 Huntington Ave	Boston	1888
BOS.17853	Harvard Medical School - Education Facilties Building	677 Huntington Ave	Boston	1969
BOS.17850	Harvard School of Public Health - Health Sciences Laboratory Building #1	689-695 Huntington Ave	Boston	1960
BOS.17851	Harvard School of Public Health - Health Sciences Laboratory Building #2	689-695 Huntington Ave	Boston	1960
BOS.9772	Hanlon Square	725 Huntington Ave	Boston	r 2000
BOS.7498	Harmon, James Apartment House and Commercial Block	733-739 Huntington Ave	Boston	1899
BOS.7499	Lyons, L. J. Apartment House	741-747 Huntington Ave	Boston	1899
BOS.16702	Avondale Chambers - Avondale Apartments	777-779 Huntington Ave	Boston	1916
BOS.9291	Longwood Avenue Bridge	Longwood Ave	Boston	c 1897
BOS.17855	Longwood Spa - Sparr's Drug Store	158 Longwood Ave	Boston	1911
BOS.7504	Carlton Building	160 Longwood Ave	Boston	1892
BOS.7505	Westcourt Apartment Building	164 Longwood Ave	Boston	1900
BOS.7514	Massachusetts College of Pharmacy - White, George Robert Building	179 Longwood Ave	Boston	1917
BOS.7506	Angell Memorial Animal Hospital	180-184 Longwood Ave	Boston	1915
BOS.7507	Harvard University Dental School	188 Longwood Ave	Boston	1908
BOS.7511	Harvard Medical School - Building D - Bacteriology and Pathology Building	210 Longwood Ave	Boston	1906
BOS.7509	Harvard Medical School - Building B - Anatomy and Histology Building	220 Longwood Ave	Boston	1906
BOS.7515	Boston Lying-in Hospital	221 Longwood Ave	Boston	1922
BOS.7510	Harvard Medical School - Building C - Physiological Chemistry and Physiology Building	240 Longwood Ave	Boston	1906
BOS.7512	Harvard Medical School - Building E - Pharmacology and Hygiene Building	260 Longwood Ave	Boston	1906
BOS.18224	Boston Children's Hospital - Patient and Family Parking Garage	283 Longwood Ave	Boston	1995
BOS.7513	Boston Children's Hospital - Hunnewell Building	300 Longwood Ave	Boston	1912
BOS.18213	Boston Children's Hospital - Ida C. Smith Ward	300 Longwood Ave	Boston	1930
BOS.18214	Boston Children's Hospital - Fegan Building	300 Longwood Ave	Boston	1966
BOS.18215	Boston Children's Hospital - Farley Building	300 Longwood Ave	Boston	1956
BOS.18216	Boston Children's Hospital - Bader Building	300 Longwood Ave	Boston	1930
BOS.18221	Boston Children's Hospital - Children's Hospital Library	300 Longwood Ave	Boston	1994
BOS.18225	Boston Children's Hospital - Radiology and Surgery Expansion Pavilion	300 Longwood Ave	Boston	1974
BOS.17830	Longwood Medical Building	319 Longwood Ave	Boston	1929

Inv. No.	Property Name	Street	Town	Year
BOS.18219	Boston Children's Hospital - John F. Enders Pediatric Research Laboratories	320-332 Longwood Ave	Boston	1970
BOS.18217	Boston Children's Hospital - 333 Longwood Avenue	333 Longwood Ave	Boston	1984
BOS.17831	Temple Israel	477 Longwood Ave	Boston	1928
BOS.17856		60 Louis Prang St	Boston	1899
BOS.17857		62 Louis Prang St	Boston	1899
BOS.17858		64 Louis Prang St	Boston	1899
BOS.17859		66 Louis Prang St	Boston	1899
BOS.17860		68 Louis Prang St	Boston	1906
BOS.9292	Netherlands Road Bridge	Netherlands Rd	Boston	1894
BOS.17833	Garden Hall - Worthington Hall Apartments	14 Palace Rd	Boston	1914
BOS.7533	Normal and Girls' Latin Group - Girls Latin School	115 Palace Rd	Boston	1906
BOS.7534	Normal and Girls' Latin Group - Collins, Patrick A. School	115 Palace Rd	Boston	1906
BOS.7535	Boston Normal School - Boston State College	115 Palace Rd	Boston	1906
BOS.17872	Boston Normal School and Girls' Latin School Common Building	115 Palace Rd	Boston	1905
BOS.17873	State College at Boston - Kennedy, William H. J. Building	115 Palace Rd	Boston	1964
BOS.9288	Riverway Shelter and Toolhouse	Park Dr	Boston	1893
BOS.9289	Riverway - Chapel Street Bridge	Park Dr	Boston	1890
BOS.9290	Riverway - Bridle Path Bridge	Park Dr	Boston	1892
BOS.9617	Riverway Pathway	Park Dr	Boston	
BOS.7536	Riverway Administration Building	440 Park Dr	Boston	1898
BOS.17892	Wheelock College - Wheelock, Lucy Memorial Auditorium	Pilgrim Rd	Boston	1963
BOS.17891	Wheelock College - Classroom Building	31 Pilgrim Rd	Boston	1941
BOS.17888	Simmons College Residence Campus - Dix Hall	38 Pilgrim Rd	Boston	1952
BOS.17889	Simmons College Residence Campus - Smith Hall	46 Pilgrim Rd	Boston	1963
BOS.17890	Simmons College Residence Campus - Arnold Hall	62 Pilgrim Rd	Boston	1951
BOS.7582	The Winsor School	103-117 Pilgrim Rd	Boston	1909
BOS.17894	Wheelock College - Wheelock, Lucy School	100-110 Riverway	Boston	1914
BOS.17895	Wheelock College - Pilgrim Court Apartments	114-122 Riverway	Boston	1923
BOS.17893	Wheelock College - Riverway Studio Building	132 Riverway	Boston	1915
BOS.17896	Wheelock College - Pilgrim House	154-164 Riverway	Boston	1911
BOS.17897	Wheelock College- Dining Hall	154-164 Riverway	Boston	1949
BOS.17898	Wheelock College - Longwood House	154-164 Riverway	Boston	1914

Inv. No.	Property Name	Street	Town	Year
BOS.17899	Wheelock College - Riverway House	154-164 Riverway	Boston	1915
BOS.17900	Riverway Manor	210-214 Riverway	Boston	1923
BOS.7583	New England Deaconess Hospital	334 Riverway	Boston	1903
BOS.7584	New England Deaconess Hospital - Palmer Memorial Hospital	334 Riverway	Boston	1926
BOS.17868	New England Deaconess Hospital - Baker, George F. Clinic	334 Riverway	Boston	1933
BOS.17869	New England Deaconess Hospital - Central Building	334 Riverway	Boston	1952
BOS.17870	New England Deaconess Hospital - Dooley, Arthur T. Chapel	334 Riverway	Boston	1955
BOS.17871	New England Deaconess Hospital - Maintenance Building	334 Riverway	Boston	1959
BOS.9294	Route 9 Overpass and Retaining Wall	Rt 9	Boston	1936
BOS.7420	Crowley, Daniel Apartment Building	5 Saint Albans Rd	Boston	1900
BOS.16703	Kelley, Frank C. Two-Family House	24 Saint Albans Rd	Boston	1926
BOS.16697	McInerney, Elizabeth C. Two-Family House	26-28 Saint Albans Rd	Boston	c 1906
BOS.17854	Harvard Medical School - Countway, Francis A. Library of Medicine	10 Shattuck St	Boston	1963
BOS.17879	Brigham, Peter Bent Hospital - Out-Door Department	20 Shattuck St	Boston	1913
BOS.17880	Brigham, Peter Bent Hospital - Clinical Building	20 Shattuck St	Boston	1913
BOS.17881	Brigham, Peter Bent Hospital - Pearl Memorial Geriatric Unit	20 Shattuck St	Boston	1956
BOS.7508	Harvard Medical School - Building A - Administrative Building	25 Shattuck St	Boston	1906
BOS.17852	Harvard Medical School - Laboratory of Human Reproduction and Reproductive Biology	45 Shattuck St	Boston	1969
BOS.7683	Boston Children's Hospital - Wolbach Building	55 Shattuck St	Boston	1914
BOS.7684	Hastings, Mary C. Hews House	2 Short St	Boston	c 1875
BOS.7685	Pope - Hastings, Bulkley A. House	4 Short St	Boston	c 1855
BOS.17832	Tetlow Hall	11 Tetlow St	Boston	1914
BOS.7408	Gardner, Isabella Stewart Museum	280 The Fenway	Boston	1900
BOS.7409	Simmons College - Main Building	300 The Fenway	Boston	1903
BOS.17834	Simmons College - Park Science Center	300 The Fenway	Boston	1970
BOS.13248	Emmanuel College - Campus Shop	400 The Fenway	Boston	1962
BOS.7706	Green, Joseph House	7 Vancouver St	Boston	1900
BOS.17861		9 Vancouver St	Boston	1898
BOS.17862		11 Vancouver St	Boston	1898
BOS.17863		15 Vancouver St	Boston	1898
BOS.17864		17 Vancouver St	Boston	1898

Inv. No.	Property Name	Street	Town	Year
BOS.17865		19 Vancouver St	Boston	1898

Form 10-300
(July 1969)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY – NOMINATION FORM

(Type all entries – complete applicable sections)

STATE: Massachusetts
COUNTY: Norfolk-Suffolk
FOR NPS USE ONLY
ENTRY NUMBER | DATE

SEE INSTRUCTIONS

1. NAME

COMMON: Olmsted Park System — Cong. Dists: 8+9
AND/OR HISTORIC:

2. LOCATION see separate sheet

STREET AND NUMBER: Back Bay Fens, Muddy River, Olmsted (Leverett) Park, Jamaica Park, Arborway, Franklin Park
CITY OR TOWN: Boston-Brookline

STATE	CODE	COUNTY:	CODE
Massachusetts	25	Norfolk-Suffolk	21-25

3. CLASSIFICATION

CATEGORY (Check One)	OWNERSHIP		STATUS	ACCESSIBLE TO THE PUBLIC
☒ District ☐ Building	☒ Public	Public Acquisition:	☒ Occupied	Yes:
☐ Site ☐ Structure	☐ Private	☐ In Process	☐ Unoccupied	☐ Restricted
☐ Object	☐ Both	☐ Being Considered	☐ Preservation work in progress	☒ Unrestricted
				☐ No

PRESENT USE (Check One or More as Appropriate)

☐ Agricultural	☐ Government	☒ Park	☒ Transportation	☐ Comments
☐ Commercial	☐ Industrial	☐ Private Residence	☐ Other (Specify)	
☐ Educational	☐ Military	☐ Religious		
☐ Entertainment	☐ Museum	☐ Scientific		

4. OWNER OF PROPERTY

OWNER'S NAME: City of Boston, Town of Brookline
STREET AND NUMBER: City Hall Town Hall
CITY OR TOWN: Boston Brookline
STATE: Norfolk-Suffolk
CODE: 21-25
STATE: Mass.

5. LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC: Suffolk Registry of Deeds Norfolk Registry of Deeds
STREET AND NUMBER: Suffolk Couty Courthouse Norfolk County Courthouse
CITY OR TOWN: Boston Dedham
STATE: Mass.
CODE: 25
COUNTY: Norfolk Suffolk

6. REPRESENTATION IN EXISTING SURVEYS

TITLE OF SURVEY: Inventory of the historic assets of the Commonwealth
DATE OF SURVEY: 1971 ☐ Federal ☒ State ☐ County ☐ Local
DEPOSITORY FOR SURVEY RECORDS: Massachusetts Historical Commission
STREET AND NUMBER: Office of the Secretary, State House
CITY OR TOWN: Boston,
STATE: Mass.
CODE: 025

FOR NPS USE ONLY
ENTRY NUMBER
DATE

7. DESCRIPTION

CONDITION	(Check One) ☐ Excellent ☒ Good ☐ Fair ☐ Deteriorated ☐ Ruins ☐ Unexposed
	(Check One) ☒ Altered (addition) ☐ Unaltered — (Check One) ☐ Moved ☒ Original Site

DESCRIBE THE PRESENT AND ORIGINAL (If known) PHYSICAL APPEARANCE

The Olmsted Park System includes a series of parks linked by continuous parkways. It curves south from the mouth of the Muddy River to Franklin Park. When originally conceived, the System also included Boston's existing parks, the Common and the Public Garden which were linked to the Olmsted Plan by the Commonwealth Avenue mall.

One of the most heavily used portions of the System is that which comprises the Fens. Olmsted's plan eliminated the original tidal swamp with its dangers of pollution and flooding, and created an informal park. In the section of the Fens north of Boylston Street, although the boundaries remain the same, an overpass access to and from Storrow Drive has mutilated the original landscape design. However, the formal modern design and the plantings are spectacular, and the material used to face the overpass structures is compatible with Richardson's Boylston Street bridge, which was built between 1880-84. Other alterations to the Fens area have been restricted to changes in park land use and have not affected the boundaries and road patterns proposed by Olmsted in 1879. Much of the original swamp has been filled in, although the swamplike vegetation originally used by Olmsted remains along a short portion of the River. Except for a low stadium which desecrates the original design at the junction of the Fenway and Park Drive, most of the remainder of the park presently consists of grass, shade trees and gardens. West of the Muddy River are formal rose garden and small neat gardens tended by nearby residents of the area. These plots began as "Victory Gardens" during World War II and today serve as vivid reminders of that historic preiod. The most important original structures in this area are Richardson's Boylston Street bridge and the Agassiz Bridge, built in 1887-88.

A linear park, though which the Muddy River flows, links the Fens with Jamaica Pond. Various names have been given to this area, the most common of which are "The Riverway", which extends from the Fens to Route 9, and "Leverett" (or Olmsted) Park". In these areas the River was an eyesore and a cause of sanitation problems. To remedy these, Olmsted created a plan for the sanitary improvement of the River and to connect the Fens with Jamaica Park in 1881. The result is a greenscape which curves sinuously following the natural contours of the River valley. At the southern end of this portion of the System, the River ends in a series of fresh water ponds, the largest of which is called Leverett. With the exception of a large parking lot near Brookline Avenue, some poorly designed recreational facilities near the Ponds, and a large overpass at Route 9, this section of the System retains most of its original design. The original structures date from the early to mid-1890's and were designed by Shepley, Rutan and Coolidge. These include 3 vehicular bridges, 2 footbridges, and a stone shelter on the Riverway.

Jamaica Park was designed in 1892, but only in 1894 was construction on it begun. Jamaica Pond, the only fresh water body of any size within the city limits, and one of the important features of the entire Park System, occupies a major portion of the Park. In his designs, Olmsted bordered the Pond with paths and shade trees. He encircled it with parkways by utilizing the existing parkway on the eastern side (Jamaicaway) and adding roads on the western side. He incorporated the Perkins Mansion ("Pine Bank" House), situated at the northern end of the Pond, in his plans. This structure, the third to stand on the site, was built in 1870 in the Ruskinian Gothic style. After a fire, the City Architect Wheelwright remodelled the interior, roof, chimneys and garden terrace in 1896. The Boston Parks Department uses the house as headquarters for its recreational division. The stone steps, which lead from the house to the Pond, were taken from the John Hancock House. The Park and road patterns

SEE INSTRUCTIONS

7. DESCRIPTION

remain intact, and the Pond is still used for its original purpose of boating and fishing. In 1906, Daniel Chester French carved the Francis Parkman Memorial which stands on a sloping lawn at the western side of the Park.

At the same time that Jamaica Park was being developed, the Parkway (Arborway) was continued from it along the edge of the Arnold Arboretum[2] to Franklin Park. An overpass and new road patterns have obliterated the short portion from the east end of the Arboretum to Franklin Park. Despite the addition of two traffic rotaries, the rest of the Parkway retains not only Olmsted's street design, but a great many of the original trees which have now grown to an impressive height completely shading the Abborway.

Franklin Park, the terminus of the System, is unquestionably one of Olmsted's masterpieces. In 1885, Olmsted designed this large rural park especially for working class people. The largest area of the property, "The Country Park"was reserved exclusively "to provide opportunity for a form of recreation to be obtained only through the influence of pleasing natural scenery upon the sensibilities of those quietly contemplating it."[1] "The Country Park" has been used as a golf course since the late nineties. Although this was not the use which Olmsted intended, it has ensured preservation and a standard of maintenance for at least this portion of the Park. Other areas were set aside for sports (the Playstead, on which has been built White Stadium), a deer park, now part of the Zoo, and a playground for small children. The only formal part of the Park is a grand mall, called "The Greeting", designed for use as a promenade and meeting place. The Greeting was never completely planted as planned and has been incorporated into part of the Zoo. Two monuments that Daniel Chester French designed in 1882 for the Boston Post Office are now located at the northern entrance to the Greeting. These groups represent "Labor, Art and the Family" and "Science Controlling the Forces of Steam and Electricity."

The Park is still used for horseback riding and Olmsted's road pattern is intact. Much of the fine original stonework remains, although in bad condition. These structures include the Playstead Overlook (1885-88) and the terraces and arbors on Schoolmaster's Hill (1890=91), both of which appear on Olmsted's 1885 plan, the Valley Gate (1888-89 by Walker and Best) and several rustic fountains. A State hospital, the Shattuck, has been erected on what was formerly the Heathfield on Morton Street.

1 Fabos, Julius G.Y., Milde, Gordon T., and Weinmayr, V. Michael, Frederick Law Olmsted, Sr., 1968, University of Massachusetts Press.

2.NOTE: Since the Arnold Arboretum has already been declared a National Historic Landmark, it is not included in this nomination.

8. SIGNIFICANCE

PERIOD (Check One or More as Appropriate)

☐ Pre-Columbian	☐ 16th Century	☐ 18th Century	☒ 20th Century
☐ 15th Century	☐ 17th Century	☒ 19th Century	

SPECIFIC DATE(S) (If Applicable and Known) 1879, 1881, 1885, 1892

AREAS OF SIGNIFICANCE (Check One or More as Appropriate)

Aboriginal	☐ Education	☐ Political	☒ Urban Planning
☐ Prehistoric	☐ Engineering	☐ Religion/Phi-	☒ Other (Specify)
☐ Historic	☐ Industry	losophy	
☐ Agriculture	☐ Invention	☐ Science	Recreation
☐ Architecture	☒ Landscape	☐ Sculpture	
☐ Art	Architecture	☐ Social/Human-	
☐ Commerce	☐ Literature	itarian	
☐ Communications	☐ Military	☐ Theater	
☐ Conservation	☐ Music	☐ Transportation	

STATEMENT OF SIGNIFICANCE

The comprehensive parksystem which Frederick Law Olmsted Sr. planned for the City of Boston in the late 1870's is one of the nation's outstanding examples of a multi-use open space and the landscape architect's finest design project in New England. Olmsted's work on the system, which became known as the "Emerald Neck around Boston," created a storng precedent for it included all the design and planning elements which later landscape architects have applied to regional planning on a large scale.

Olmsted's original plans for the park system had three purposes: to creat needed municipal open space while solving an engineering problem; to link ne annexed parts of the city with its historic center; to provide - as in his earlier designs for Central Park (1857-63) - a variety of forms of recreatio Olmsted established a hierarchy of uses for areas within the system, creating large- and medium-size parks for rural relaxation and picknicking, smaller landscaped areas with ponds for recreation and linear parkland for pleasure driving, riding and hiking. Though they were never carried out completely, sketches of circulation patterns suggest that Olmsted intended to separate traffic within the park system according to volume and type, again like his plans for Central Park.

The Bay Bay Fens and the Fenway were the first portions of the park syste to be planned. Into the 1870's the Fens were a tidal swamp which served as a repository for sewage and were subject to violent floods. The three-man Boston Park Commission was created in 1875 primarily to find a solution to this problem. Following an unsuccessful competition for a design, Olmsted was asked to prepare a new plan for the Fens. Using swamp-like vegetation able to withstand periodic soakings with salt water, he created an informal park which was a unique feat of engineering skill and naturalistic landscapi

Franklin Park, the terminus of thesystem, is one of Olmsted's masterpieces This large rural park, included in the earliest schemes for Boston's park system, was financed in part by a bequest made to the city by Benjamin Frank Olmsted's plan for the Franklin Park area was completed and work begun in 18 Though the surrounding area was still rural, Olmsted anticipated the growth of the city in this direction and designed the Park as a retreat for working class people whose access to open space would be limited without it. In his concern for the social and humanitarian aspects of park design, Olmsted was influenced by the work of Joseph Paxton, whose "People's Park" at Birkenhead (England) he had first visited in 1850. Olmsted's plan for Franklin Park is a more elaborate and highly articulated version of Paxton's Brikenhead design.

SEE INSTRUCTIONS

9. MAJOR BIBLIOGRAPHICAL REFERENCES

Board of Commissioners of the Department of Parks, Boston, Mass., Annual Reports and Special Reports, 1876-1900.

Olmsted, Frederick Law, "Notes on the Plan of Franklin Park and Related Matters", Eleventh Annual Report, Boston Park Department, Boston, 1886.

Fabos, Julius GY., Milde, Gordon T., & Weinmayr, V. Michael, Frederick Law Olmsted, Sr. Massachusetts, University of Massachusetts Press. 1968.

10. GEOGRAPHICAL DATA see separate sheet

BACK BAY FENS

LATITUDE AND LONGITUDE COORDINATES DEFINING A RECTANGLE LOCATING THE PROPERTY						OR	LATITUDE AND LONGITUDE COORDINATES DEFINING THE CENTER POINT OF A PROPERTY OF LESS THAN TEN ACRES					
CORNER	LATITUDE			LONGITUDE				LATITUDE			LONGITUDE	
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds		Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
NW	42	21	07	71	06	03							
NE	42	21	07	71	05	27							
SE	42	20	19	71	05	27							
SW	42	20	19	71	06	03							

APPROXIMATE ACREAGE OF NOMINATED PROPERTY: estimated 843

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE:	CODE	COUNTY	CODE
Mass.	25	Norfolk	21
Mass.	25	Suffolk	25

SEE INSTRUCTIONS

11. FORM PREPARED BY

NAME AND TITLE: Anne R. Wardwell, Survey Director

ORGANIZATION: Massachusetts Historical Commission — DATE: 7/1/71

STREET AND NUMBER: Office of the Secretary, State House

CITY OR TOWN: Boston — STATE: Mass. — CODE: 25

12. STATE LIAISON OFFICER CERTIFICATION

As the designated State Liaison Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service. The recommended level of significance of this nomination is:

National [X] State [ ] Local [ ]

Name: [signature]

Secretary of the Commonwealth, Chairman, Mass. Historical Commission

Title

Date 7/2/71

NATIONAL REGISTER VERIFICATION

I hereby certify that this property is included in the National Register.

Chief, Office of Archeology and Historic Preservation

Date

ATTEST:

Keeper of The National Register

Date

Form 10-300a
(July 1969)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
INVENTORY - NOMINATION FORM

(Continuation Sheet)

STATE	
Mass.	
COUNTY	
Norfolk-Suffolk	
FOR NPS USE ONLY	
ENTRY NUMBER	DATE

(Number all entries) BOSTON: OLMSTED PARK SYSTEM

2. Location, cont. - Note: The description below should not be considered a legal description.

Beginning at the intersection of Morton Street and Forest Hills Street; Thence turning and running westerly and northwesterly by the center line of Morton St. and the Arborway; Thence turning and running northwesterly and northerly by the southerly, southwesterly and westerly line of the Arborway to a point at the intersection of the Arborway and Centre St; Thence turning and running northerly and northeasterly by the westerly and northwesterly line of the Arborway to the intersection of the Arborway and Prince St; Thence turning and running generally northwesterly by the center line of Prince St. to a point at the intersection of Perkins St.; Thence turning and running northeasterly and northerly by the northwesterly and northerly line of Perkins St. to a point at the intersection of Perkins St. and Pond Avenue; Thence turning and running northerly, northeasterly, easterly and northerly by the westerly, northwesterly, westerly and northwesterly line of Pond Avenue and Boylston Street; Thence turning and running westerly by the center line of Boylston Street to the intersection of Boylston St. and River Road; Thence turning and running northerly, northeasterly and northerly again by the center line of River Rd. to a point at the intersection of River Rd. and Brookline Avenue; Thence turning and running northeasterly by the center line of Brookline Avenue to a point at the intersection of Brookline Avenue and Parkway Road; Thence turning and running northwesterly along the center line of Parkway Rd. to the intersection of Netherlands Rd.; Thence turning and running northwesterly in a straight line to the southeastern boundary of the Massachusetts Bay Transit Authority line; Thence turning and running northwesterly by the center line of said Massachusetts Bay Transit Authority line to the intersection of said line and Park Drive; Thence turning and running southeasterly, easterly, northeasterly and northerly by the northeasterly, northerly, northwesterly and westerly line of Park Drive to the intersection of Park Drive and Boylston St; Thence turning and running northeasterly, northerly by the northwesterly line of Boylston St. and easterly line of private property to a point at the northwest side of Ipswich St. and the southerly line of Interstate Route 90; Thence turning and running easterly by the southerly line of Interstate Route 90 to a point at the northeast corner of Ipswich St. at the intersection of Charlesgate East; Thence turning and running southwesterly by the southeasterly line of Charlesgate East to the intersection of Boylston St. and the Fenway; Thence turning and running southerly, southwesterly, westerly and northwesterly by the easterly, southeasterly, southerly and southwesterly line of theFenway to the intersection of the Fenway and Brookline Avenue; Thence turning and running northwesterly, westerly, southwesterly, southerly, southeasterly, southerly and southwesterly by the southwesterly, southerly, southeasterly easterly, northeasterly, easterly and southeasterly line of the Riverway to the intersection of the Riverway and Huntington Avenue; Thence turning and running generally southerly, southwesterly, southerly, southeasterly, southerly, southeasterly and easterly by the easterly, southeasterly, easterly, northeasterly, easterly, northeasterly and northerly lines of Jamaicaway, Pond St. and the Arborway to the intersection of the Arborway and Forest Hills Street; Thence turning and running northeasterly and northerly by the center line of Forest Hills Street to the intersection of Forest Hills Street and Glen Road; Thence turning and

Form 10-300a
(July 1969)

ED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
INVENTORY - NOMINATION FORM

(Continuation Sheet)

STATE	Mass.	
COUNTY	Norfolk-Suffolk	
FOR NPS USE ONLY		
ENTRY NUMBER		DATE

(Number all entries)

BOSTON: OMSTED PARK SYSTEM, CONT.

2 LOCATION, CONT.

running southeasterly by the center line of Glen Road to the intersection of Glen Rd. and Sigourney St.; Thence turning and running northeasterly by the center line of Sigourney St. to the intersection of Sigourney St. and Peter Parley Rd.; Thence turning and running northerly and northeasterly by the center line of Walnut Avenue to the intersection of Walnut Avenue and Seaver St.; Thence turning and running southeasterly by the center line of Seaver St. to the intersection of Seaver St. and Blue Hill Avenue; Thence turning and running southeasterly by the center line of Blue Hill Avenue to the intersection of Blue Hill Avenue and American Legion Highway; Thence turning and running southwesterly by the center line of American Legion Highway to the intersection of American Legion Highway and Canterbury St.; Thence turning and running westerly by the center line of Canterbury St. to the intersection of Canterbury St. and Morton Street; Thence turning and running northwesterly and westerly by the center line of Morton St. to the intersection of Forest Hills Street and Morton Street.

Northern section of the Fens
Beginning at the northwest roner of Back Street at its intersection with Charlesgate West; Thence turning and running northeasterly to the northeast corner of Back St. at its intersection with Charlesgate East; Thence turning and running southerly by the easterly line of Charlesgate East to the northern boundary of Interstate Route 90; Thence turning and running westerly by the northerly line of Interstate Route 90; Thence turning and running northerly by the westerly line of Charlesgate West to the point of beginning.

10. Geographical Data

Muddy River/Jamaica Park

NW	Lat 42°20'47"	Long. 71°06'27"	
NE	42 20 35	71 05 57	
SE	42 18 43½	71 07 11	
SW	42 18 57½	71 07 43	(Newton Quad)

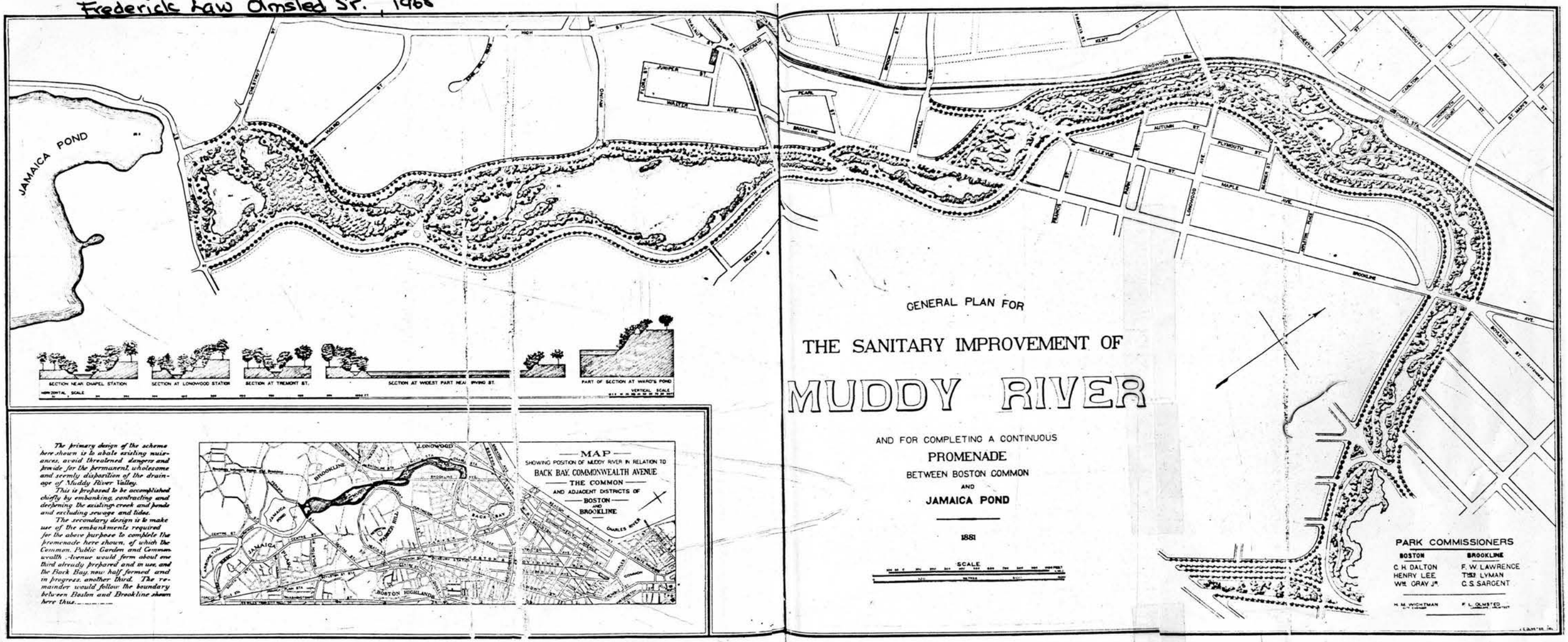
Arborway

NW	42 18 35½	71 07 41	(Newton Quad)
NE	42 18 49	71 07 22	
SE	42 18 02½	71 06 23	
SW	42 17 48½	71 06 42	

Franklin Park

NW	42 18 47	71 06 23	
NE	42 18 47	71 05 08	
SE	42 17 35	71 05 08	
SW	42 17 35	71 06 23	

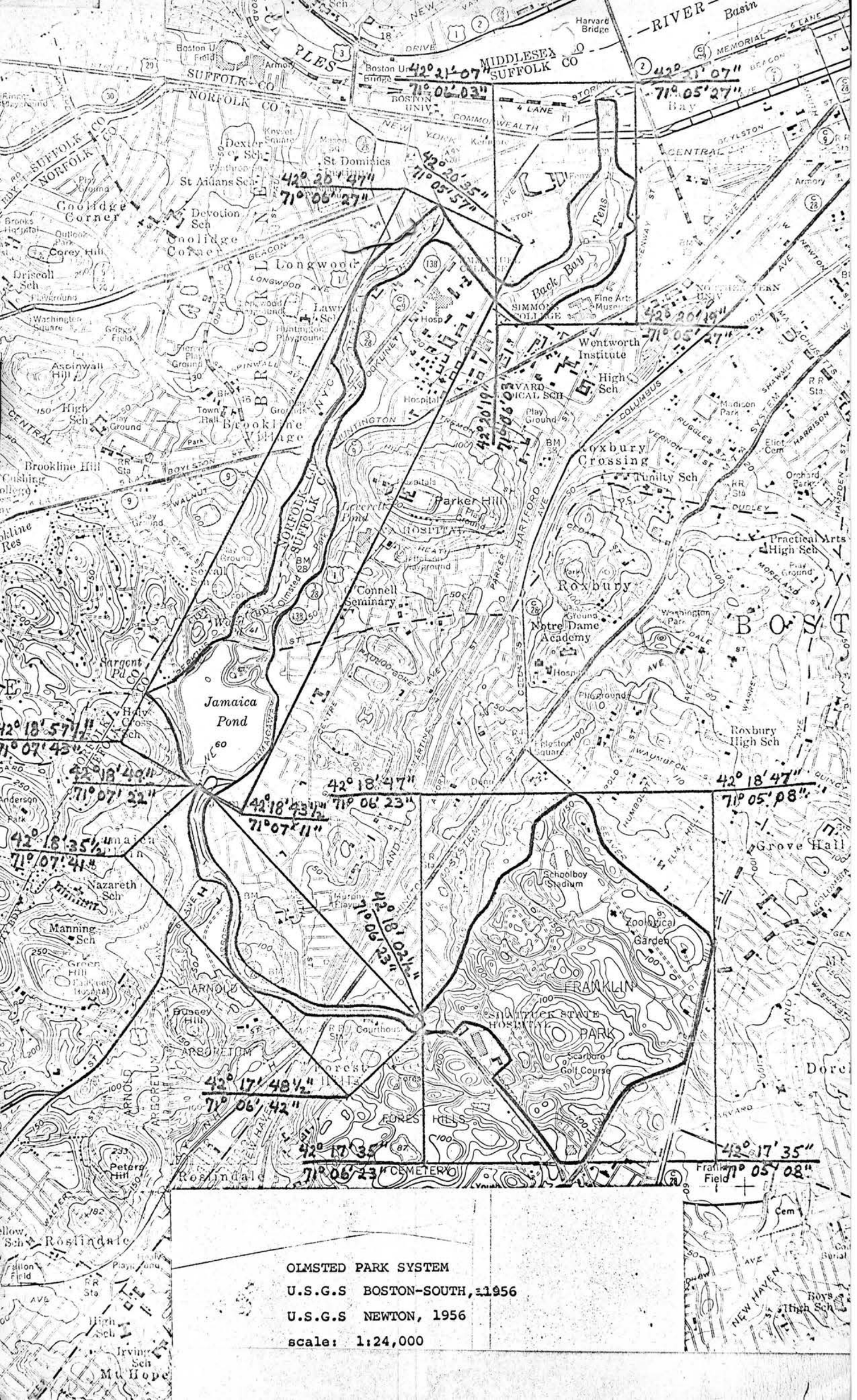
From Fabos Milde + Weinmayer
Frederick Law Olmsted Sr., 1968



PLAN FOR THE MUDDY RIVER, BOSTON

Olmsted was at his best when following the natural contours of a river valley

[Olmsted Office Portfolio]



OLMSTED PARK SYSTEM

U.S.G.S BOSTON-SOUTH, 1956

U.S.G.S NEWTON, 1956

scale: 1:24,000

1. Boat house, Jamaica Pond (Photographer: "W.H.", Metropolitan District Police, 22 February 1971)

2. Muddy River at Simmons College. (Photographer: "W.H.", Metropolitan District Police, 22 February 1971)

3. Parallel to Jamaica Way. (Photographer: "W.H.", Metropolitan District Police, 22 February 1971)

4. Jamiaca Pond. (Photographer: "W.H.", Metropolitan District Police, 22 February 1971)

5. Looking across Jamaica Pond from Brookline side to Jamaica Way. (Photographer: "W.H.", Metropolitan District Police, 22 February 1971)

6. Arborway, North view. (Photographer: "W.H.", Metropolitan District Police, 22 February 1971)

7. Fenway, Muddy River at Simmons College. (Photographer: "W.H.", Metropolitan District Police, 22 February 1971)

8. Leverett Pond, view northeast toward Boston. (Photographer: "W.H.", Metropolitan District Police, 22 February 1971)

9. Leverett Pond, Brookline. (Photographer: "W.H.", Metropolitan District Police, 22 February 1971)

10. Arborway. Northview toward Pond Street. (Photographer: "W.H.", Metropolitan District Police, 22 February 1971)

11. Franklin Park: Daniel Chester French Statue at entrance to Zoo Area. (Photographer: "W.H.", Metropolitan District Police, 22 February 1971)

12. Arborway. (Photographer: "W.H.", Metropolitan District Police, 22 February 1971)

13. Jamaicaway and Pond. (Photographer: "W.H.", Metropolitan District Police, 22 February 1971)

Form 10-301
(Dec. 1968)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES

PROPERTY MAP FORM

(Type all entries - attach to or enclose with map)

STATE	
Mass.	
COUNTY	
Norfolk-Suffolk	
FOR NPS USE ONLY	
ENTRY NUMBER	DAT

SEE INSTRUCTIONS

1. NAME

COMMON: Olmsted Park System

AND/OR HISTORIC:

2. LOCATION

STREET AND NUMBER: Back Bay Fens, Riverway, (Muddy River) Olmsted (Leverett) Park, Jamaica Park, Arborway, Franklin Park

CITY OR TOWN: Boston, Brookline

STATE:	CODE	COUNTY:	COD
Mass.	25	Norfolk-Suffolk	21-2

3. MAP REFERENCE

SOURCE: U.S. Geological Survey Maps Boston-South, Newton

SCALE: 1:24,000

DATE: 1956

4. REQUIREMENTS

TO BE INCLUDED ON ALL MAPS

1. Property broundaries where required.
2. North arrow.
3. Latitude and longitude reference.

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES

PROPERTY PHOTOGRAPH FORM

(Type all entries - attach to or enclose with photograph)

STATE	
Mass.	
COUNTY	
Norfolk-Suffolk	
FOR NPS USE ONLY	
ENTRY NUMBER	DAT

SEE INSTRUCTIONS

1. NAME

COMMON: Olmsted Park System

AND/OR HISTORIC:

2. LOCATION

STREET AND NUMBER: Back Bay Fens, Muddy River, Olmsted (Leverett) Park, Jamaic Park, Arborway, Franklin Park

CITY OR TOWN: Boston-Brookline

STATE:	CODE	COUNTY:	COD
Mass.	25	Norfolk-Suffolk	21-2

3. PHOTO REFERENCE

PHOTO CREDIT: Metropolitan District Police

DATE OF PHOTO: 2-22-71

NEGATIVE FILED AT: Metropolitan District Commission

4. IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC.

Westerly view of Riverway (Muddy River) from Longwood Ave. bridge.

Appendix H

Best Management Practices Plan

Best Management Practices Plan

A Notice of Intent (NOI) for a National Pollution Discharge Elimination System (NPDES) Remediation General Permit (RGP) has been submitted to the U.S. Environmental Protection Agency (EPA) in anticipation of temporary dewatering required for the construction of the proposed New Inpatient Building (NIB) located at the intersection of Deaconess and Pilgrim Roads on the Beth Israel Deaconess Medical Center (BIDMC) West Campus in Boston, Massachusetts. This Best Management Practices Plan (BMPP) and will be posted at the Property during construction dewatering activities. Construction dewatering will be performed in accordance with Project Specifications, the NPDES RGP, and a project-specific Storm Water Pollution Prevention Plan (SWPPP). The SWPPP will also be posted at the Property.

Water Treatment and Management

Construction dewatering will be necessary during subsurface construction and excavation for the NIB. Dewatering effluent will be discharged to the nearby municipal storm water drainage system after treatment. At a minimum, treatment will consist of pumping dewatering effluent to a sedimentation tank and bag filters to remove suspended solids. If necessary, the treatment system will be expanded to include additional components to meet the effluent limits specified in the RGP.

Treated effluent will then be discharged to one of four potential catch basins in the vicinity of the project work area (see Appendix E of the attached RGP NOI). The catch basins are connected to the Boston Water and Sewer Commission (BWSC) storm drainage system and discharge to an outfall (SDO161) at the Muddy River.

Dewatering effluent will be pumped directly to the treatment system to minimize handling.

The system schematics and site plans showing the discharge points and outfall location are included in the attached RGP NOI. Contact information for the owner and operator are also included in the attached RGP NOI.

Discharge Monitoring and Compliance

If dewatering to the storm water drainage system is necessary, monitoring and compliance sampling will be required under the RGP.

The operator will perform daily monitoring consisting of checking the condition of the treatment system, recording flow rates and discharge quantities, and verifying the flow path of the discharged effluent. The flow will be measured by the flowmeter installed in the treatment system. Flow will be maintained by regularly monitoring flow and adjusting the amount of construction dewatering as needed.

Compliance sampling will include collection from the intake of the treatment system (influent) and the discharge after treatment (effluent) on:

- The first day of discharge, and on one non-consecutive day of discharge within the first week.
- Weekly for the first month (i.e. weeks 2, 3, and 4).
- Monthly after the first month.

The list of contaminants required by the U.S. EPA to be monitored under the NPDES RGP will be identified by EPA at the time the permit is issued. As required by the NPDES RGP, samples collected in the first week (a total of two influent and two effluent samples) require an expedited laboratory turnaround time of 72-hours. Subsequent samples require a standard 5-day turnaround time. Treatment system adjustments will be based on the compliance sampling results.

Monthly monitoring reports will be compiled and maintained at the Property.

Maintenance

Regular maintenance and periodic cleaning will be performed to ensure proper operation of the treatments system. Regular maintenance will include daily checks of treatment system components including the sedimentation tank, bag filters, hoses, pumps, and the flow meter. Repairs and replacement of treatment system components will be made as necessary.

Management of Treatment System Materials

Sediment from the tank used in the treatment system will be characterized and transported off-site for reuse, recycling, or disposal. Filter bags and any media added to the treatment system will be replaced and or disposed of as necessary.

Additional Site Controls

Potential runoff to and from the Site will be minimized by erosion control measures installed and maintained in accordance with project specifications and drawings, and the project-specific SWPPP. Procedures for proper handling and spill prevention are also included in the SWPPP. Staging areas for equipment or materials that may be possible sources of pollution will be established away from any dewatering activities, to the extent practicable. Security of the treatment system will be addressed within the overall site security plan for the project.