HALEY ALDRICH

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REPORT ON

NPDES RGP APPLICATION FOR TEMPORARY CONSTRUCTION DEWATERING
50 CAMBRIDGEPARK DRIVE
CAMBRIDGE, MASSACHUSETTS

by Haley & Aldrich, Inc.
Boston, Massachusetts

for Environmental Protection Agency (EPA) Region 1
Boston, Massachusetts

File No. 131188-006
May 2019

HALEY & ALDRICH, INC.
465 Medford St.
Suite 2200
Boston, MA 02129
617.886.7400

22 May 2019
Revised 25 June 2019
File No. 131188-006

Environmental Protection Agency (EPA) Region 1
5 Post Office Square, Suite 100
Mail Code OEP06-4
Boston, Massachusetts 02129

Attention: Shauna Little

Subject: NPDES RGP Application for Temporary Construction Dewatering
50 Cambridgepark Drive
Cambridge, Massachusetts

Ladies and Gentlemen:

On behalf of our client, 50 CP Development Limited Partnership (c/o Hanover RS Construction, LLC), Haley & Aldrich, Inc. (Haley & Aldrich) is submitting this application to request authorization under the National Pollutant Discharge Elimination System (NPDES) Remediation General Permit (RGP) for off-site discharge of temporary construction dewatering during construction activities at the planned redevelopment project located at 50 Cambridgepark Drive in Cambridge, Massachusetts (herein referred to as the "Site"). A copy of the Notice of Intent (NOI) is included in Appendix A.

A. GENERAL SITE INFORMATION

Site Conditions and History

The Site is comprised of three parcels of land totaling approximately 1.5 acres currently occupied by three buildings with surface parking and landscaped areas. The Site has historically been operated as warehouses for printing operations and lubricating systems, and offices and laboratory space for pharmaceutical companies. The Site was most recently occupied by Vecna, a developer of technology software and autonomous robotics, who is currently in the process of vacating the Site. Until recently, the three Site buildings were addressed as 32, 34, and 36 Cambridgepark Drive and were operated by Vecna as mechanical engineering and research and development laboratories, a machine shop, and office space for software development. The 32 and 34 Cambridgepark Drive buildings are one story structures constructed in 1966 with no basements. The 36 Cambridgepark Drive building is a two-story structure with a basement, originally constructed in 1966 with an addition constructed in 1972. The new address for the property is 50 Cambridgepark Drive. Demolition of the existing structures is planned for June 2019.

The Site is bound to the north by Cambridgepark Drive, beyond which is a newly constructed office building (35 Cambridgepark Drive); to the east and south by the multi-family residential developments; and to the west by an access roadway beyond which is a commercial office building (100 Cambridgepark Drive).

Proposed Construction

Based on drawings provided by the Site developer and new owner, redevelopment of the Site includes a proposed 8-story mixed-use building. The ground level will include retail, lobby and amenity space, bike storage and parking. The second floor will include parking space and residential units, and the remaining levels 3 through 8 will include residential apartments and associated amenities. The remainder of the Site will be improved with hard and soft landscaped areas, and flood storage will be provided beneath the structure.

Dewatering is anticipated to be required for construction of the building foundations, utilities, and drainage improvements. Groundwater has been encountered at the site at depths ranging from approximately 5 to 8 feet. Excavations for building foundations and utilities are expected to extend through fill and organic deposits and into marine sand and clay deposits, up to 15 feet below existing site grade, or approximately 10 to 13 feet below the groundwater table.

Additional water may also be generated from surface runoff from precipitation, groundwater seepage, and construction-generated water (e.g., wheel washes, dust control, decontamination activities, water utility testing, etc.). Temporary construction dewatering is anticipated to begin in July 2019 and is estimated to occur intermittently over a period of approximately 12 months until June 2020.

Regulatory Status

The subject site is underlain by urban fill, comprised of varying amounts of cinders and ash, containing chemical constituents, including petroleum hydrocarbons (TPH), metals, and polycyclic aromatic hydrocarbons (PAHs), at levels typical of urban fill and this area of Cambridge.

As part of due diligence activities in preparation for Site redevelopment, Haley & Aldrich has conducted several limited subsurface investigations since 2017 to assess soil and groundwater conditions. In 2017, low levels of total petroleum hydrocarbons (TPH), lead, mercury, zinc, and polycyclic aromatic hydrocarbons (PAHs) were identified comingled in urban fill soil in excess of applicable MCP RCS-1 Reportable Concentrations.

In addition, the limited testing program in 2017 identified concentrations of dissolved zinc in groundwater at the Site, which slightly exceeded the applicable MCP RCGW-2 Reportable Concentrations. Haley & Aldrich noted that zinc in soil and groundwater is common in this area of Cambridge and the groundwater detection may have been the result of turbidity in the sample. As part of a June/July 2018 soil and groundwater characterization program, three newly-installed observation wells were developed and sampled on 12 and 13 July 2018 to assess the extent of dissolved zinc.

Although dissolved zinc in well HA17-GP6 (OW) slightly exceeded the applicable Reportable Concentrations (RCGW-2) in 2017, the new wells installed and sampled in July 2018 indicated zinc ranging from ND to 0.42 mg/l which were below the applicable Reportable Concentration for dissolved zinc (0.9 mg/l) therefore the impact of this condition is very localized.

Analytical results of the 2018 soil samples identified detectable concentrations of PAHs, total petroleum hydrocarbons (TPH), and metals (lead, mercury, and zinc) in soil exceeding applicable MCP RCS-1 thresholds.

On behalf of 50 CP Development Limited Partnership, who plans to take ownership of the Site in late May 2019, Haley & Aldrich submitted a Release Notification Form (RNF) to the MassDEP on 26 April 2019. MassDEP subsequently assigned Release Tracking Number (RTN) 3-35590 to the Site. Impacted soil and groundwater identified at the Site is likely attributable to historical Site use and the presence of urban fill, common for this area of Cambridge.

During Site redevelopment, soil and groundwater management will be conducted in accordance with the Release Abatement Measure (RAM) Plan and the soil management provisions of the MCP contained in 310 CMR 40.0030. Additional sampling is planned following demolition of current site buildings and will further inform options for soil management and the future regulatory pathway. It is anticipated that the RAM activities will achieve a condition of "No Significant Risk" for unrestricted future use (residential).

B. RECEIVING WATER INFORMATION

Receiving water quality data was collected in support of this NOI on 1 February 2019, the results of which are summarized in Table I. Receiving water temperature was obtained in the field at 7.1 °C, noted on the effluent limitations input calculation page in Appendix B. The sample was collected from Alewife Brook approximately 100 feet upstream from the discharge point to Alewife Brook of the proposed outfall D45. The laboratory data report is provided in Appendix F.

The seven-day-ten-year flow (7Q10) of the receiving water was established using the U.S. Geological Survey (USGS) StreamStats program and confirmed by Massachusetts Department of Environmental Protection (MassDEP) on 16 May 2019. The StreamStats report, Dilution Factor calculations, and MassDEP confirmation of the 7Q10 and Dilution Factor are included in Appendix B.

Copies of the "EnterData" and "FreshwaterResults" tabs from the excel file provided as an additional resource by EPA are included in Appendix B and will be transmitted electronically with the NOI. The effluent limitations calculated are included for reference in Table I.

C. SOURCE WATER INFORMATION

For preliminary Site characterization and groundwater sampling in 2017 and 2018, Haley & Aldrich installed three monitoring wells, HA17-GP1(OW), HA17-GP4(OW), and HA17-GP6(OW), shown on

Figure 2. To evaluate groundwater (source water) quality at the Site with respect to National Pollution Discharge Elimination System (NPDES) Remediation General Dewatering Permit (RGP) dewatering effluent criteria, Haley & Aldrich collected a representative groundwater sample on 1 February 2019 from the monitoring well designated HA17-GP4 (OW).

The groundwater sample was sent to a MassDEP-certified laboratory, Alpha Analytical, for analysis of constituents consistent with requirements for a NPDES RGP. The groundwater samples were analyzed for one or more of the following parameters: TPH, VOCs, SVOCs, PCBs, Total and Dissolved Metals, and Waste Characteristics.

A summary of the groundwater chemical analytical data is provided as Table I. Copies of the laboratory data reports are provided in Appendix F. The analytical data results from the 2017 and 2018 investigations are also included in Table I.

The data are compared to the applicable 2014 MCP Reportable Groundwater Concentrations (RCGW-2) criteria and the Site-Specific 2017 NPDES RGP Fresh Water Effluent Limits concentrations as determined in the WQBEL calculations. The 2019 sampling data exceed the Site-Specific NPDES RGP criteria for total iron, and two groundwater samples collected in 2017 and 2018 contained reportable concentrations of dissolved zinc. These metals exceedances will require dewatering treatment, as discussed below.

D. DISCHARGE INFORMATION

Dewatering will be conducted from sumps or well points located inside the excavations. Dewatering is currently anticipated to begin in July 2019 and is anticipated to be required for up to 12 months. On average, we estimate effluent discharge rates of about 50 gallons per minute (gpm), with occasional peak flows of approximately 100 gpm during significant precipitation events.

Construction dewatering under this RGP will include piping and discharging to storm drains located within and near the Site. The storm drains travel a short distance north and discharge to Alewife Brook via Outfall 45. The proposed discharge route is shown on Figure 3.

The proposed outfall location to Alewife Brook is owned and operated by the City of Cambridge. An application to discharge is being submitted to the City of Cambridge concurrently with this NOI.

A Best Management Practices Plan (BMPP), which outlines the proposed discharge operations covered under the RGP, will be available at the Site and is not being submitted with this NOI.

E. DEWATERING TREATMENT SYSTEM INFORMATION

An effluent treatment system will be designed and implemented by the Contractor to meet the applicable 2017 RGP Discharge Effluent Criteria. Prior to discharge, collected water will be routed through a sedimentation tank and bag filters to remove suspended solids and undissolved chemical constituents, as shown on Figure 4. The treatment system is expected to include ion exchange resin as

required to meet the discharge criteria (product information is included in Appendix C). The use of a resin for ion exchange is a standard treatment for temporary construction dewatering and is not expected to exceed applicable permit limitations and water quality standards or alter conditions in the receiving water. The ion exchange system will be self-contained and resin is not expected to enter the dewatering stream. No additional testing is considered necessary for use of this product or to demonstrate that use of this product will not adversely affect the receiving water.

F. TREATMENT CHEMICALS AND ADDITIVES

The use of chemicals or additives is not currently planned for the treatment system. If additional treatment is needed to meet necessary effluent limits, a Notice of Change (NOC) will be submitted to the EPA for review and approval, including proposed product information (e.g. Safety Data Sheets, associated hazards, manufacturer, and proper system operation, etc.).

G. DETERMINATION OF ENDANGERED SPECIES ACT ELIGIBILITY

According to the guidelines outlined in Appendix I of the 2017 NPDES RGP, a preliminary determination for the action area associated with this project was established using the U.S. Fish and Wildlife Service (FWS) Information, Planning, and Conservation (IPAC) online system; a copy of the determination is attached in Appendix D. Based on the results of the determination, the project and action area are considered to meet FWS Criterion A as no critical habitats have been established to be present within the project action area.

H. DOCUMENTATION OF NATIONAL HISTORIC PRESERVATION ACT REQUIREMENTS

Based on a review of the resources provided by the U.S. National Register of Historic Places and a review of the Massachusetts Cultural Resource Information System (MACRIS), no historic properties have been established to be present at the Site, and due to the planned treatment process, discharges and discharge-related activities are not considered to have the potential to affect historic properties downgradient. The discharge is considered to meet Criterion A. Documentation is included in Appendix E.

I. SUPPLEMENTAL INFORMATION

Owner and operator information are provided below for reference:

Owner/Operator:
50 CP Development Limited Partnership
1780 S. Post Oak Lane
Houston, TX 77056
Attn: Kathy Binford

CLOSING

Thank you very much for your consideration. Please feel free to contact us should you wish to discuss the information contained herein or if you need additional information.

Sincerely yours,
HALEY & ALDRICH, INC.

Kimberly Scalise
Senior Geologist

Keith E. Johnson, P.E., LSP
Technical Expert

Enclosures:

- Table I – Summary of Water Quality Data
- Figure 1 – Project Locus
- Figure 2 – Site Plan
- Figure 3 – Discharge Route
- Figure 4 – Proposed Treatment System Schematic
- Appendix A – Notice of Intent (NOI)
- Appendix B – Effluent Limitations Documentation
- Appendix C – Additional Treatment Information
- Appendix D – Endangered Species Act Assessment
- Appendix E – National Historic Preservation Act Review
- Appendix F – Laboratory Data Reports

c: 50 CP Development Limited Partnership; Attn: Kathy Binford, Kristen Gates, Tom Denney

TABLES

TABLE I
SUMMARY OF WATER QUALTIY DATA
50 CAMBRIDGEPARK DRIVE
CAMBRIDGE, MASSACHUSETTS
FILE NO. 131188-006

LOCATION SAMPLING DATE LAB SAMPLE ID SAMPLE TYPE	2017 NPDES RGP Site-Specific Criteria	MassDEP MCP RCGW-2 2014	HA17-GP4 OW 2/1/2019 L1904244-01 WATER	OUTFALL 2/1/2019 L1904244-02 WATER	HA17-GP4(OW)-20171019 10/19/2017 L1738018-01 WATER	HA17-GP1(OW)-20171019 10/19/2017 L1738018-03 WATER	HA17-GP6(OW)-20171019 10/19/2017 L1738018-02 WATER	HA17-GP6(OW)-20180328 03/28/2018 L1810684-01 WATER	HA18-GP-D1 (OW)-20180713 07/13/2018 L1826894-01 WATER	HA18-GP-D1N (OW)-20180713 07/13/2018 L1826894-02 WATER	HA18-GP-D1S (OW)-20180713 07/13/2018 L1826894-03 WATER
Volatile Organics (µg/l)											
Toluene	*100	40000	ND(1)	-	1.7	ND (1)	ND (1)	-	-	-	-
Total BTEX	100	NA	ND	-	1.7	ND	ND	-	-	-	-
SUM of Volatile Organic Compound	NA	NA	ND	-	1.7	ND	ND	-	-	-	-
Volatile Organics by SIM (µg/l)											
1,4-Dioxane	200	6000	ND(50)	-	ND (250)	ND (250)	ND (250)	-	-	-	-
Semivolatile Organics (µg/l)											
Total Phthalates	190	NA	ND	-	-	-	-	-	-	-	-
SUM of Semivolatile Organic Comp	NA	NA	ND	-	-	-	-	-	-	-	-
Semivolatile Organics by SIM (µg/l)											
Naphthalene	20	700	0.11	-	-	-	-	-	-	-	-
SUM of Group I PAHs	1	NA	ND	-	-	-	-	-	-	-	-
SUM of Group II PAHs	100	NA	ND	-	-	-	-	-	-	-	-
SUM of Semivolatile Organic Comp	NA	NA	0.11	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (µg/l)											
TPH, SGT-HEM	5000	5000	ND(4000)	-	-	-	-	-	-	-	-
Total Metals (µg/l)											
Antimony, Total	206	8000	ND(4)	ND(4)	-	-	-	-	-	-	-
Arsenic, Total	104	900	3.28	1.47	-	-	-	-	-	-	-
Cadmium, Total	10.2	4	ND(0.2)	0.2	-	-	-	-	-	-	-
Chromium, Total	NA	300	1.15	ND(1)	-	-	-	-	-	-	-
Copper, Total	242	100000	1.37	3.21	-	-	-	-	-	-	-
Iron, Total	1000	NA	**6990**	2160	-	-	-	-	-	-	-
Lead, Total	160	10	ND(1)	ND(1)	-	-	-	-	-	-	-
Mercury, Total	0.739	20	ND(0.2)	ND(0.2)	-	-	-	-	-	-	-
Nickel, Total	1450	200	ND(2)	ND(2)	-	-	-	-	-	-	-
Selenium, Total	235.8	100	ND(5)	ND(5)	-	-	-	-	-	-	-
Silver, Total	35.1	7	ND(0.4)	ND(0.4)	-	-	-	-	-	-	-
Zinc, Total	420	900	93.54	19.62	-	-	-	-	-	-	-
Inorganic Compounds (mg/L)											
Arsenic, Dissolved	NA	0.9	-	-	0.009	0.012	ND (0.005)	-	-	-	-
Barium, Dissolved	NA	50	-	-	0.055	0.037	0.34	-	-	-	-
Nickel, Dissolved	NA	0.2	-	-	ND (0.025)	ND (0.025)	0.031	-	-	-	-
Zinc, Dissolved	NA	0.9	-	-	ND (0.05)	ND (0.05)	**1.01**	**1.9**	ND (0.05)	0.419	0.114
Polychlorinated Biphenyls (µg/l)											
Aroclor 1016	0.000064	5	ND(0.25)	-	-	-	-	-	-	-	-
Aroclor 1221	0.000064	5	ND(0.25)	-	-	-	-	-	-	-	-
Aroclor 1232	0.000064	5	ND(0.25)	-	-	-	-	-	-	-	-
Aroclor 1242	0.000064	5	ND(0.25)	-	-	-	-	-	-	-	-
Aroclor 1248	0.000064	5	ND(0.25)	-	-	-	-	-	-	-	-
Aroclor 1254	0.000064	5	ND(0.25)	-	-	-	-	-	-	-	-
Aroclor 1260	0.000064	5	ND(0.2)	-	-	-	-	-	-	-	-
Total PCBs	0.000064	5	ND	-	-	-	-	-	-	-	-
Microextractables (µg/l)											
1,2-Dibromo-3-chloropropane	NA	1000	ND(0.01)	-	-	-	-	-	-	-	-
1,2-Dibromoethane (Ethylene Dibro	0.05	2	ND(0.01)	-	-	-	-	-	-	-	-
General Chemistry (µg/l)											
Chloride	Report	NA	314000	-	-	-	-	-	-	-	-
Chlorine, Total Residual	21	NA	ND(20)	-	-	-	-	-	-	-	-
Chromium, Hexavalent	323	300	ND(10)	ND(10)	-	-	-	-	-	-	-
Chromium, Trivalent	323	600	ND(10)	ND(10)	-	-	-	-	-	-	-
Cyanide, Total	178	30	ND(5)	-	-	-	-	-	-	-	-
Ethanol	Report	NA	ND(500)	-	-	-	-	-	-	-	-
Hardness	NA	NA	155000	242000	-	-	-	-	-	-	-
Nitrogen, Ammonia	Report	NA	428	2600	-	-	-	-	-	-	-
pH (H)	NA	NA	6.6	7.3	-	-	-	-	-	-	-
Phenolics, Total	NA	NA	ND(30)	-	-	-	-	-	-	-	-
Total Suspended Solids	30000	NA	5300	-	-	-	-	-	-	-	-

ABBREVIATIONS NOTES:

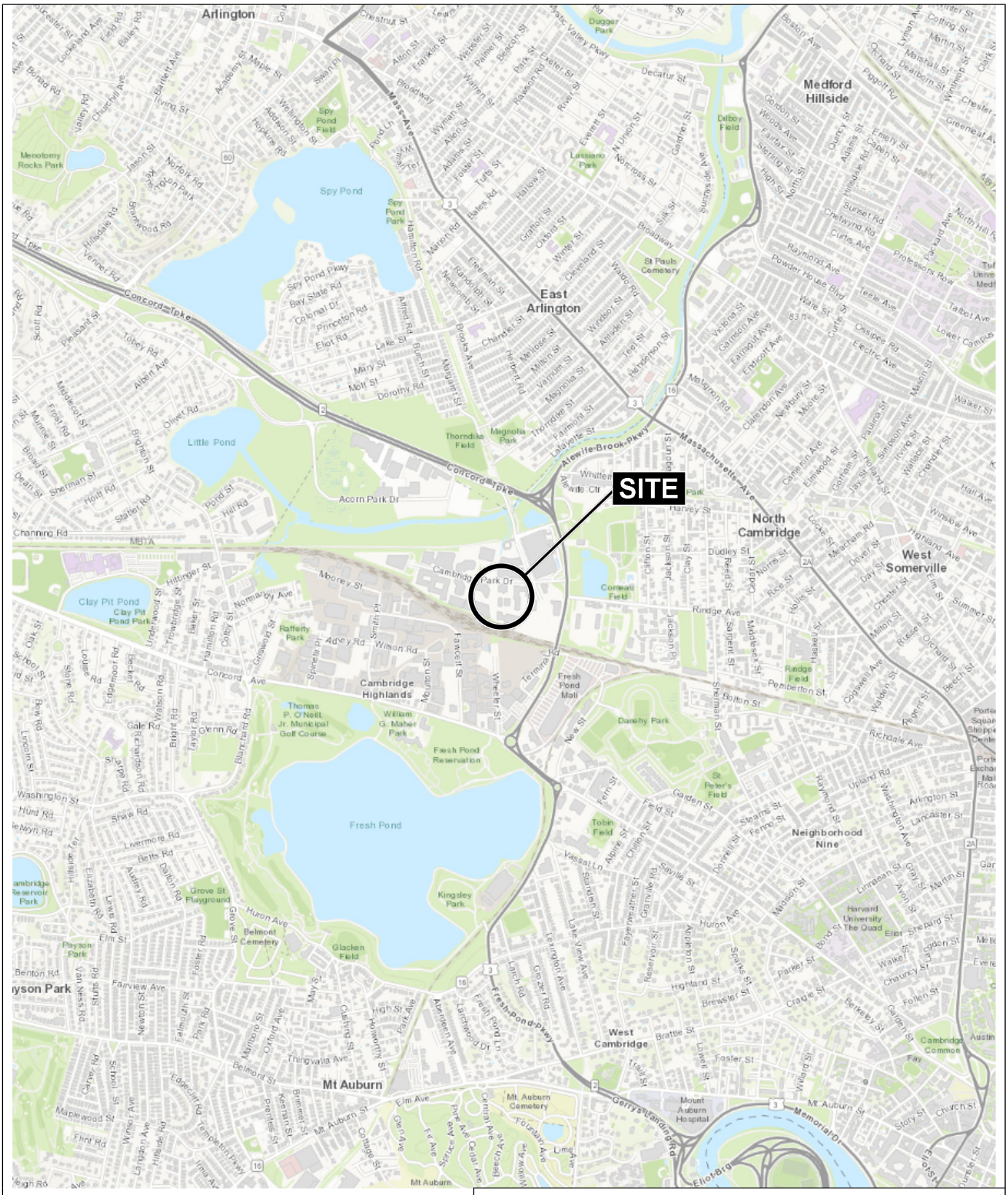
-: Not analyzed NA: Not Applicable

ug/l: micrograms per liter SU: Standard Units

ND (2.5): Result not detected above reporting limit (shown in parentheses)

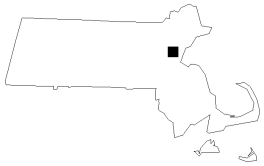
1. Analytes detected in at least one sample are reported herein. For a complete list of analytes see the laboratory data sheets.
2. **Blue bold** values indicate an exceedance of the applicable site-specific 2017 RGP Criteria.

FIGURES



MAP SOURCE: ESRI

SITE COORDINATES: 42°23'39"N, 71°8'38"W



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50 CAMBRIDGEPARK DRIVE
CAMBRIDGE, MASSACHUSETTS

PROJECT LOCUS

APPROXIMATE SCALE: 1 IN = 2000 FT
MAY 2019

FIGURE 1

131188-003_1_LOCUS.PDF

CAMBRIDGEPARK DRIVE
PUBLIC - VARIABLE WIDTH
CITY ACQUISITION PLAN 1440 OF 1984

HA17-GP5
HA17-TB2
HA17-GP6(OW)
HA17-SS2
HA17-SS1
HA17-GP3
HA17-GP4(OW)
HA17-TB1
HA17-GP2
HA17-GP1(OW)

APPROXIMATE LIMITS OF SUBJECT SITE

N/F SAMUELS CAMBRIDGEPARK DRIVE LLC BOOK 31679 PAGE 476 MAP 265D LOT 50 74 CAMBRIDGEPARK DRIVE

2 STORY BRICK BUILDING

N/F SAMUELS CAMBRIDGEPARK DRIVE LLC BOOK 31679 PAGE 476 MAP 265D LOT 51 54 CAMBRIDGEPARK DRIVE

N/F ASN CAMBRIDGEPARK LLC BOOK 49825 PAGE 171 MAP 265D LOT 45 30 CAMBRIDGEPARK DRIVE

7 STORY BUILDING #30

N/F PROPERTIES AT CAMBRIDGE PARK, LLC BOOK 45900 PAGE 319 MAP 265D LOT 45 40 CAMBRIDGEPARK DRIVE

N/F 76R CAMBRIDGEPARK REALTY LLC BK 50676 PG 550 MAP 265D LOT 46 46 CAMBRIDGEPARK DRIVE

1 STORY BRICK BUILDING

7 STORY BUILDING

1 STORY WOOD FRAME

SEWER LINE INSTALLED AS PART OF 88 CAMBRIDGEPARK DRIVE GARAGE PROJECT (TYP.)

WATER LINE INSTALLED AS PART OF 88 CAMBRIDGEPARK DRIVE GARAGE PROJECT (TYP.)

ELECTRIC AND TELCOM UTILITIES INSTALLED AS PART OF 88 CAMBRIDGEPARK DRIVE GARAGE PROJECT (TYP.)

EXISTING 72" DRAINLINE INSTALLED AS PART OF 88 CAMBRIDGEPARK DRIVE GARAGE PROJECT (TYP.)

8 LEVEL

LEGEND

HA17-TB1 — DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING DRILLED BY CRAWFORD DRILLING SERVICES BETWEEN 11 AND 18 OCTOBER 2017 AND OBSERVED BY HALEY & ALDRICH, INC.

HA17-SS1 ▼ — DESIGNATION AND APPROXIMATE LOCATION OF SURFICIAL SOIL SAMPLE COLLECTED BY HALEY & ALDRICH, INC. ON 11 OCTOBER 2017

HA17-GP2 — DESIGNATION AND APPROXIMATE LOCATION OF GEOPROBE DRILLED BY CRAWFORD DRILLING SERVICES ON 10 OCTOBER 2017 AND OBSERVED BY HALEY & ALDRICH, INC.

(OW) INDICATES OBSERVATION WELL INSTALLED IN COMPLETED GEOPROBE EXPLORATION

NOTE

1. BASE PLAN TAKEN FROM A DRAWING TITLED "EXISTING CONDITIONS PLAN, V-100", PREPARED BY BSC GROUP, DATED 10 OCTOBER 2016.

0 50 100
SCALE IN FEET

HALEY ALDRICH

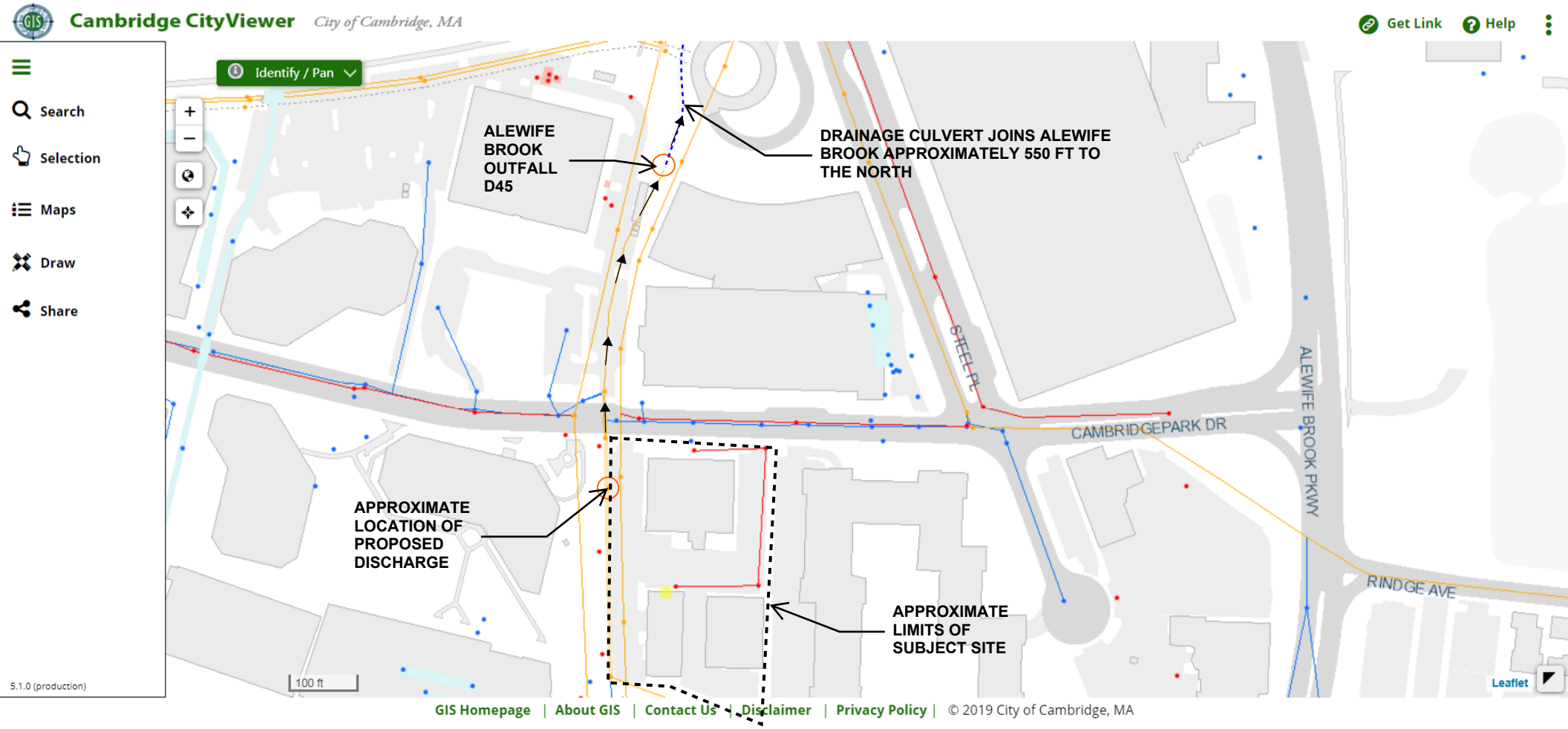
50 CAMBRIDGEPARK DRIVE
CAMBRIDGE, MASSACHUSETTS

SITE PLAN

SCALE: AS SHOWN
MAY 2019

FIGURE 2

ERVIN, DAYNA Printed: 10/27/2017 3:02 PM Layout: B001
J:\GRAPHICS\131188\131188-003-B001.DWG



NOTES:

1. SITE PLAN EXTRACTED FROM CAMBRIDGE CITYVIEWER GIS, CITY OF CAMBRDIGE, MA, ACCESSED MAY 2019.

INDICATES PROPOSED DISCHARGE ROUTE

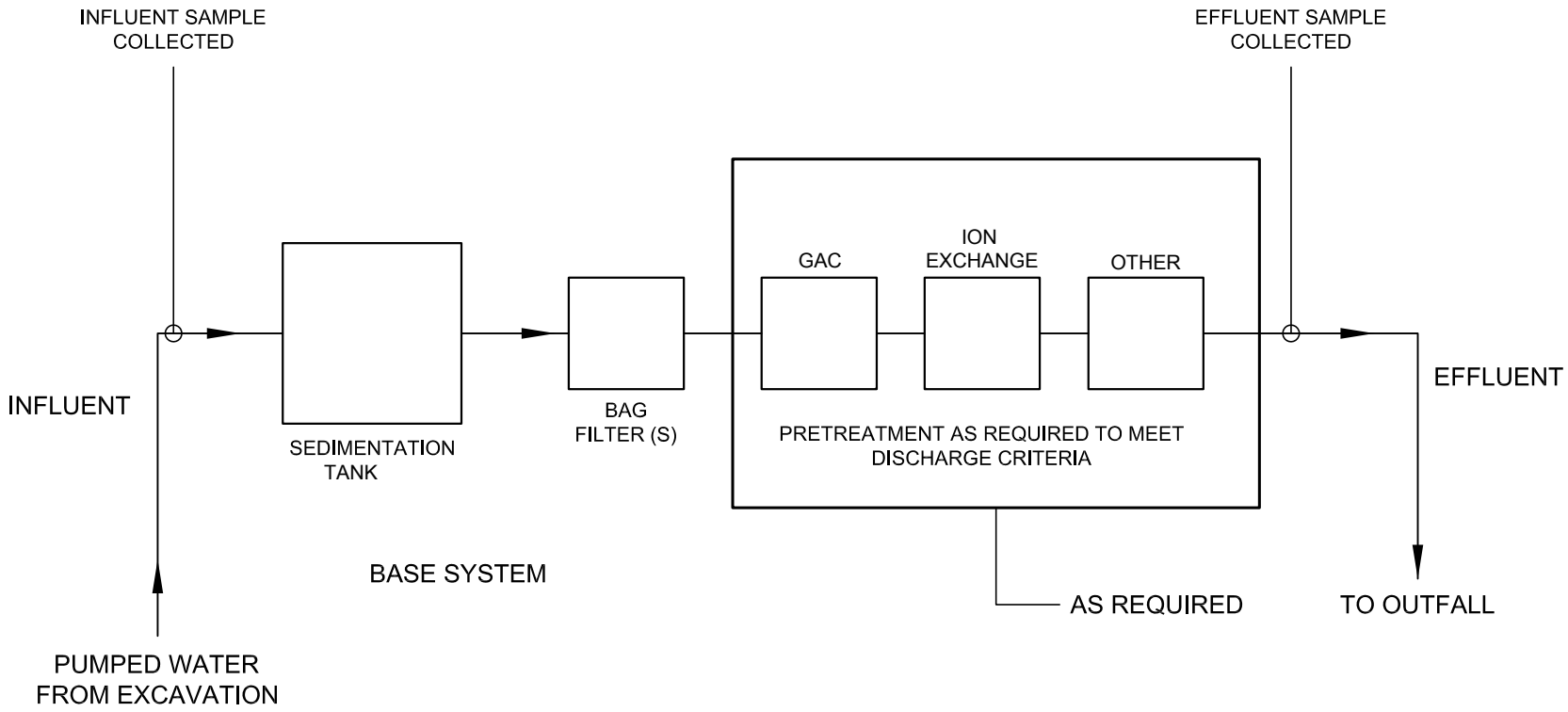
HALEY ALDRICH

50 CAMBRIDGEPARK DRIVE
CAMBRIDGE, MASSACHUSETTS

DISCHARGE ROUTE

SCALE: NONE
MAY 2019

FIGURE 3



LEGEND:

DIRECTION OF FLOW

NOTE:

1. DETAILS OF TREATMENT SYSTEM MAY VARY FROM SYSTEM INDICATED ABOVE. SPECIFIC MEANS AND METHODS OF TREATMENT TO BE SELECTED BY CONTRACTOR. WATER WILL BE TREATED TO MEET REQUIRED EFFLUENT STANDARDS.

HALEY ALDRICH

50 CAMBRIDGEPARK DRIVE
CAMBRIDGE, MASSACHUSETTS

PROPOSED TREATMENT SYSTEM SCHEMATIC

SCALE: NONE
MAY 2019

FIGURE 4

APPENDIX A

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:
50 Cambridgepark Drive</td><td colspan="3">Site address: 32-36 Cambridgepark Drive
Street:</td></tr>
<tr><td>City: Cambridge</td><td>State: MA</td><td>Zip: 02140</td></tr>
<tr><td rowspan="4">2. Site owner
50 CP Development Limited Partnership

Owner is (check one): ☐ Federal ☐ State/Tribal ■ Private
☐ Other; if so, specify:</td><td colspan="3">Contact Person: Kathy Binford</td></tr>
<tr><td colspan="2">Telephone: 713-267-2100</td><td>Email: kbinford@hanoverco.com</td></tr>
<tr><td colspan="3">Mailing address: 5847 San Felipe, Suite 3600
Street:</td></tr>
<tr><td>City: Houston</td><td>State: TX</td><td>Zip: 77057</td></tr>
<tr><td rowspan="4">3. Site operator, if different than owner</td><td colspan="3">Contact Person:</td></tr>
<tr><td colspan="2">Telephone:</td><td>Email:</td></tr>
<tr><td colspan="3">Mailing address:
Street:</td></tr>
<tr><td>City:</td><td>State:</td><td>Zip:</td></tr>
<tr><td colspan="2">4. NPDES permit number assigned by EPA:
not applicable

NPDES permit is (check all that apply: ■ RGP ☐ DGP ☐ CGP
☐ MSGP ☐ Individual NPDES permit ☐ Other; if so, specify:</td><td colspan="2">5. Other regulatory program(s) that apply to the site (check all that apply):
■ MA Chapter 21e; list RTN(s):
3-35590
☐ 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):
Little River (Alewife Brook)	MA71-04	Class 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. Indicated pollutants include: debris/floatables/trash, copper, E Coli, foam/flocks/scum/oil slick, lead, dissolved oxygen, PCB in fish tissue, total

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.	0.303 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.	1.91

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: 16 May 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: Iron, Zinc, Hydrocarbons	
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): Alewife Brook Outfall D45	Outfall location(s): (Latitude, Longitude) 42.3957, -71.1440
Discharges enter the receiving water(s) via (check any that apply): ☐ Direct discharge to the receiving water ■ Indirect discharge, if so, specify: Pump to catch basin, through Cambridge City combined sewer to outfall to Alewife Brook. ☐ 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: Application to City of Cambridge submitted concurrently with NOI to EPA. 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): July 2019 through June 2020 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="4">☐ 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		✔	1	121,4500N	0.075	428	428	Report mg/L	---
Chloride		✔	1	44,300.0	12.5	314000	314000	Report µg/l	---
Total Residual Chlorine	✔		1	121,4500C	20	<20	<20	0.2 mg/L	21 µg/l
Total Suspended Solids		✔	1	121,2540D		5300	5300	30 mg/L	---
Antimony	✔		1	3,200.8	4	<4	<4	206 µg/L	NA
Arsenic		✔	1	3,200.8	1	3.28	3.28	104 µg/L	NA
Cadmium	✔		1	3,200.8	0.2	<0.2	<0.2	10.2 µg/L	NA
Chromium III	✔		1	NA	10	<10	<10	323 µg/L	NA
Chromium VI	✔		1	1,7196A	10	<10	<10	323 µg/L	NA
Copper		✔	1	3,200.8	1	1.37	1.37	242 µg/L	NA
Iron		✔	1	19,200.7	50	6990	6990	5,000 µg/L	1.000
Lead	✔		1	3,200.8	1	<1	<1	160 µg/L	NA
Mercury	✔		1	3,245.1	0.2	<0.2	<0.2	0.739 µg/L	NA
Nickel	✔		1	3,200.8	2	<2	<2	1,450 µg/L	NA
Selenium	✔		1	3,200.8	5	<5	<5	235.8 µg/L	NA
Silver	✔		1	3,200.8	0.4	<0.4	<0.4	35.1 µg/L	NA
Zinc		✔	1	3,200.8	10	93.54	93.54	420 µg/L	NA
Cyanide	✔		1	121,4500C	5	<5	<5	178 mg/L	NA
B. Non-Halogenated VOCs									
Total BTEX		✔	4	128,624.1	1	<1.7	<1.175	100 µg/L	---
Benzene	✔		4	128,624.1	1	<1	<0.625	5.0 µg/L	---
1,4 Dioxane	✔		4	128,624.1-	250	<250	<200	200 µg/L	---
Acetone	✔		4	128,624.1	10	<10	<6.25	7.97 mg/L	---
Phenol	✔		1	4,420.1	30	<30	<30	1,080 µg/L	NA

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
C. Halogenated VOCs									
Carbon Tetrachloride	✔		4	128,624.1	1	<1	<1	4.4 µg/L	NA
1,2 Dichlorobenzene	✔		4	128,624.1	5	<5	<2	600 µg/L	---
1,3 Dichlorobenzene	✔		4	128,624.1	5	<5	<2	320 µg/L	---
1,4 Dichlorobenzene	✔		4	128,624.1	5	<5	<2	5.0 µg/L	---
Total dichlorobenzene	✔		4	NA	5	<5	<2	763 µg/L in NH	---
1,1 Dichloroethane	✔		4	128,624.1	1.5	<1.5	<1.125	70 µg/L	---
1,2 Dichloroethane	✔		4	128,624.1	1.5	<1.5	<1.125	5.0 µg/L	---
1,1 Dichloroethylene	✔		4	128,624.1	1	<1	<1	3.2 µg/L	---
Ethylene Dibromide	✔		1	14,504.1	0.01	<0.01	<0.01	0.05 µg/L	---
Methylene Chloride	✔		4	128,624.1	2	<2	<1.75	4.6 µg/L	---
1,1,1 Trichloroethane	✔		4	128,624.1	2	<2	<1.25	200 µg/L	---
1,1,2 Trichloroethane	✔		4	128,624.1	1.5	<1.5	<1.125	5.0 µg/L	---
Trichloroethylene	✔		4	128,624.1	1	<1	<1	5.0 µg/L	---
Tetrachloroethylene	✔		4	128,624.1	1	<1	<1	5.0 µg/L	NA
cis-1,2 Dichloroethylene	✔		4	128,624.1	1	<1	<1	70 µg/L	---
Vinyl Chloride	✔		4	128,624.1	1	<1	<1	2.0 µg/L	---
D. Non-Halogenated SVOCs									
Total Phthalates	✔		1	129,625.1	5	<5	<5	190 µg/L	NA
Diethylhexyl phthalate	✔		1	129,625.1	2.2	<2.2	<2.2	101 µg/L	NA
Total Group I PAHs	✔		1	129,625.1-	0.1	<0.1	<0.1	1.0 µg/L	---
Benzo(a)anthracene	✔		1	129,625.1-	0.1	<0.1	<0.1	As Total PAHs	NA
Benzo(a)pyrene	✔		1	129,625.1-	0.1	<0.1	<0.1		NA
Benzo(b)fluoranthene	✔		1	129,625.1-	0.1	<0.1	<0.1		NA
Benzo(k)fluoranthene	✔		1	129,625.1-	0.1	<0.1	<0.1		NA
Chrysene	✔		1	129,625.1-	0.1	<0.1	<0.1		NA
Dibenzo(a,h)anthracene	✔		1	129,625.1-	0.1	<0.1	<0.1		NA
Indeno(1,2,3-cd)pyrene	✔		1	129,625.1-	0.1	<0.1	<0.1		NA

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		✔	1	129,625.1-	0.1	0.11	<0.11	100 µg/L	---
Naphthalene		✔	1	129,625.1-	0.11	0.11	0.11	20 µg/L	---
E. Halogenated SVOCs									
Total PCBs	✔		1	127,608.3	0.25	<0.25	<0.25	0.000064 µg/L	---
Pentachlorophenol	✔		1	129,625.1-	0.1	<0.1	<0.1	1.0 µg/L	---
F. Fuels Parameters									
Total Petroleum Hydrocarbons		✔	1	74,1664A	4000	<4000	<4000	5.0 mg/L	---
Ethanol	✔		1	1671A	500	<500	<500	Report mg/L	---
Methyl-tert-Butyl Ether	✔		1	128,624.1	10	<10	<10	70 µg/L	NA
tert-Butyl Alcohol	✔		1	128,624.1	100	<100	<100	120 µg/L in MA 40 µg/L in NH	---
tert-Amyl Methyl Ether	✔		1	128,624.1	20	<20	<20	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		✔	1	121,4500N	NA	6.6	6.6		
Hardness		✔	1	19,200.7	660	155000	155000		
Total Chromium		✔	1	3,200.8	1	1.15	1.15		
Dissolved Arsenic		✔	3	97,6010C	5	12	9		
Dissolved Barium		✔	3	97,6010C	10	340	144		
Dissolved Nickel		✔	3	97,6010C	25	31	27		
Dissolved Zinc		✔	7	97,6010C	50	1900	513		
2-Methylnaphthalene		✔	26	18270D-SI	250	0	0		
Beryllium		✔	26	97,6010C	241	0	0		
Thallium		✔	26	97,6010C	2.740	0	0		
Vanadium		✔	26	97,6010C	473	0	0		
TCLP Lead		✔	16	1,6010C	500	0	0		
Dibenzofuran		✔	26	97,8270D	960	0	0		

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:

Ion exchange to address dissolved metals. Other treatments to be applied as necessary to meet necessary 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, collected water will be routed through a sedimentation tank, bag filters, and an ion exchange tank to remove suspended solids, undissolved chemical constituents and dissolved/undissolved metals. If additional treatment is needed to meet necessary effluent limits, a Notice of Change (NOC) will be submitted to the EPA for review and approval. After treatment, constituent concentrations in effluent are expected to range from non-detectable to less than effluent criteria. If authorized under the RGP, parameters to be monitored include one or more VOCs, SVOCs, metals/inorganics, pH, and other compounds known or believed present in the source water.

Identify each major treatment component (check any that apply):

■ Fractionation tanks☐ Equalization tank ☐ Oil/water separator ☐ Mechanical filter ☐ Media filter

☐ Chemical feed tank ☐ Air stripping unit ■ Bag filter ☐ Other; if so, specify:

Indicate if either of the following will occur (check any that apply):

☐ Chlorination ☐ De-chlorination

3. Provide the **design flow capacity** in gallons per minute (gpm) of the most limiting component. Indicate the most limiting component: Flowmeter Is use of a flow meter feasible? (check one): ■ Yes ☐ No, if so, provide justification:	150
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:

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.

Please refer to attached Haley & Aldrich, Inc. letter

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 upon initiation of discharge, and available for review at the site.

Notification provided to the appropriate State, including a copy of this NOI, if required.	Check one: Yes ☐ No ☐ N/A
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. 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 ☐ Application to discharge submitted concurrently with this NOI to the City of Cambridge. 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: Kathy K. Binford KATHY K. BINFORD VICE PRESIDENT Date: 5-21-19

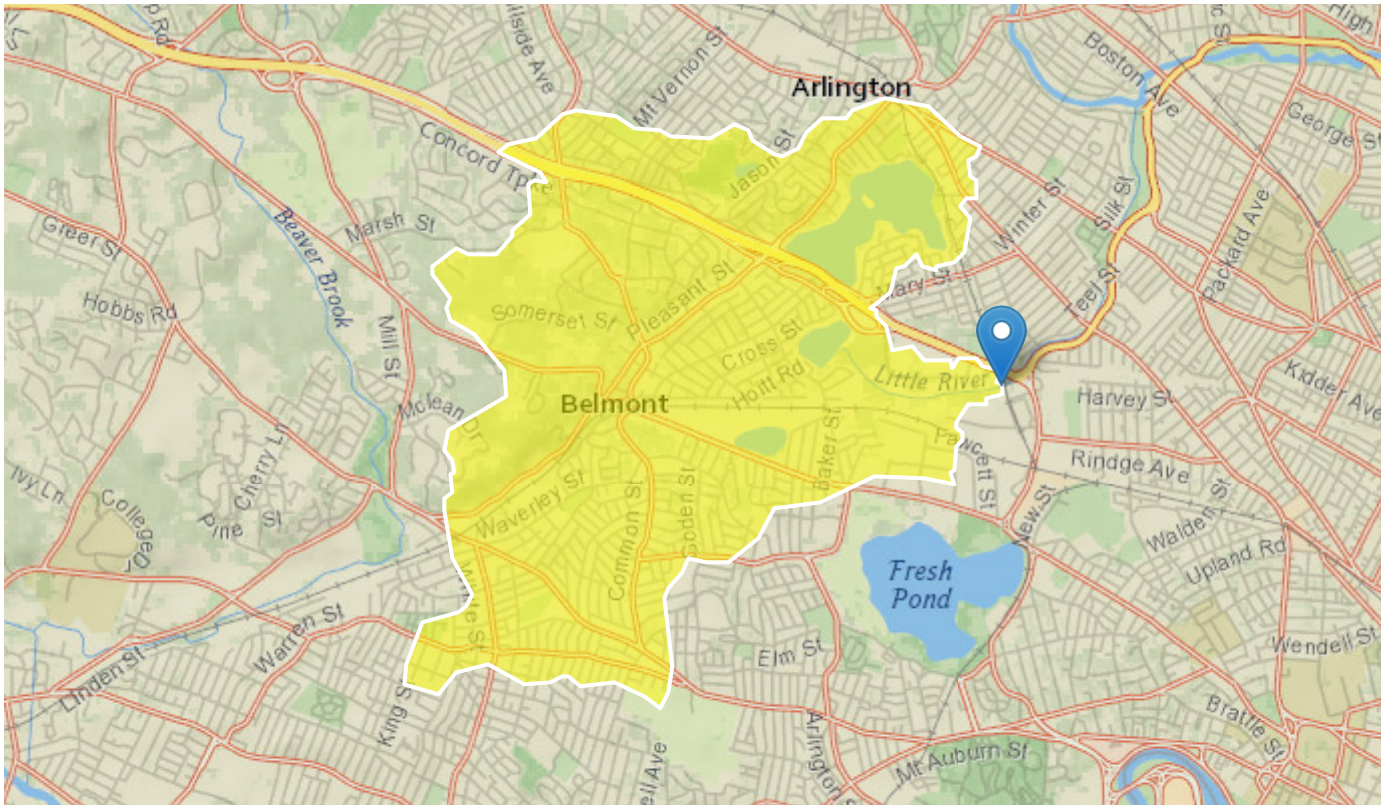
Print Name and Title: Kathy Binford, 50 CP Development Limited Partnership

APPENDIX B

Effluent Limitations Documentation

StreamStats Report - CPD

Region ID: MA
Workspace ID: MA20190402185016422000
Clicked Point (Latitude, Longitude): 42.39728, -71.14383
Time: 2019-04-02 14:50:30 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	4.24	square miles
BSLDEM250	Mean basin slope computed from 1:250K DEM	2.568	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0.39	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	4.24	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	2.568	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0.39	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

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

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

Statistic	Value	Unit	PIl	PIu	SE	SEp
7 Day 2 Year Low Flow	0.62	ft^3/s	0.185	2	49.5	49.5
7 Day 10 Year Low Flow	0.303	ft^3/s	0.0726	1.18	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: 4.3.0

HALEY & ALDRICH, INC.		**CALCULATIONS**	**FILE NO.**	**131188-006**	
			SHEET	**1 of 1**	
CLIENT	**50 CP DEVELOPMENT LIMITED PARTNERSHIP**		**DATE**	**16-May-19**	
PROJECT	**50 CAMBRIDGEPARK DRIVE**		**COMPUTED BY**	**KCS**	
SUBJECT	**DILUTION FACTOR CALCULATIONS**		**CHECKED BY**	**CV**	

PURPOSE: Calculate Dilution Factor (DF) for project based on 7 Day 10 Year (7Q10) Low Flow values.

APPROACH: Calculate DF based on EPA formula $(Q_S + Q_D)/Q_D$, where Q_S is 7Q10 in million gallons per day (MGD) and Q_D is discharge flow in MGD.

ASSUMPTIONS:
1. 7Q10 is 0.303 cfs (from StreamStats 4.0)
2. A conversion of 7.48 is used to convert cubic feet to gallons
3. A discharge flowrate of 150 gpm is assumed

CALCULATIONS:

7Q10 Low Flow Value (Q_S)

$$Q_S = \frac{0.303\ ft^3}{sec} \times \frac{7.48\ gallons}{ft^3} \times \frac{86{,}400\ sec}{day} \times \frac{1\ MG}{1{,}000{,}000\ gallons}$$

Q_S = 0.196 MGD

Discharge Flowrate (Q_D)

$$Q_D = \frac{150\ gallons}{min} \times \frac{1{,}440\ min}{day} \times \frac{1\ MG}{1{,}000{,}000\ gallons}$$

Q_D = 0.216 MGD

Dilution Factor (DF)

$$DF = \frac{Q_S + Q_D}{QD} = \frac{0.196\ MGD + 0.216\ MGD}{0.216\ MGD} = \mathbf{1.91}$$

CONCLUSION: The dilution factor for this project is calculated to be **1.91** based on the provided 7Q10 low flow value and discharge flowrate.

Enter number values in green boxes below

Enter values in the units specified

↓

0.196	Q_R = Enter upstream flow in **MGD**
0.216	Q_P = Enter discharge flow in **MGD**
0	Downstream 7Q10

Enter a dilution factor, if other than zero

↓

1.91

Enter values in the units specified

↓

155	C_d = Enter influent hardness in **mg/L** $CaCO_3$
242	C_s = Enter receiving water hardness in **mg/L** $CaCO_3$

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

↓

7.3	pH in **Standard Units**
7.1	Temperature in **°C**
2.6	Ammonia in **mg/L**
242	Hardness in **mg/L** $CaCO_3$
0	Salinity in **ppt**
0	Antimony in **µg/L**
1.47	Arsenic in **µg/L**
0.2	Cadmium in **µg/L**
0	Chromium III in **µg/L**
0	Chromium VI in **µg/L**
3.21	Copper in **µg/L**
2160	Iron in **µg/L**
0	Lead in **µg/L**
0	Mercury in **µg/L**
0	Nickel in **µg/L**
0	Selenium in **µg/L**
0	Silver in **µg/L**
19.62	Zinc in **µg/L**

Enter **influent** concentrations in the units specified

↓

0	TRC in **µg/L**
428	Ammonia in **mg/L**
0	Antimony in **µg/L**
3.28	Arsenic in **µg/L**
0	Cadmium in **µg/L**
0	Chromium III in **µg/L**
0	Chromium VI in **µg/L**
1.37	Copper in **µg/L**
6990	Iron in **µg/L**
0	Lead in **µg/L**
0	Mercury in **µg/L**
0	Nickel in **µg/L**
0	Selenium in **µg/L**
0	Silver in **µg/L**
93.54	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**
0	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
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	1.9			
	TBEL applies if bolded		WQBEL applies if bolded	
A. Inorganics				
Ammonia	**Report**	mg/L	---	
Chloride	**Report**	µg/L	---	
Total Residual Chlorine	0.2	mg/L	**21**	µg/L
Total Suspended Solids	**30**	mg/L	---	
Antimony	**206**	µg/L	1221	µg/L
Arsenic	**104**	µg/L	18	µg/L
Cadmium	**10.2**	µg/L	0.4462	µg/L
Chromium III	**323**	µg/L	285.7	µg/L
Chromium VI	**323**	µg/L	21.8	µg/L
Copper	**242**	µg/L	28.8	µg/L
Iron	5000	µg/L	**1000**	µg/L
Lead	**160**	µg/L	14.33	µg/L
Mercury	**0.739**	µg/L	1.73	µg/L
Nickel	**1450**	µg/L	176.1	µg/L
Selenium	**235.8**	µg/L	9.5	µg/L
Silver	**35.1**	µg/L	23.0	µg/L
Zinc	**420**	µg/L	387.1	µg/L
Cyanide	**178**	mg/L	9.9	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	572	µg/L
C. Halogenated VOCs				
Carbon Tetrachloride	**4.4**	µg/L	3.1	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	6.3	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	4.2	µg/L
Total Group I Polycyclic Aromatic Hydrocarbons	**1.0**	µg/L	---	
Benzo(a)anthracene	**1.0**	µg/L	0.0072	µg/L
Benzo(a)pyrene	**1.0**	µg/L	0.0072	µg/L
Benzo(b)fluoranthene	**1.0**	µg/L	0.0072	µg/L
Benzo(k)fluoranthene	**1.0**	µg/L	0.0072	µg/L
Chrysene	**1.0**	µg/L	0.0072	µg/L
Dibenzo(a,h)anthracene	**1.0**	µg/L	0.0072	µg/L
Indeno(1,2,3-cd)pyrene	**1.0**	µg/L	0.0072	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	---	
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	38	µg/L
tert-Butyl Alcohol	**120**	µg/L	---	
tert-Amyl Methyl Ether	**90**	µg/L	---	

Compliance Level applies if shown	
50	µg/L
---	µg/L

---	µg/L
---	µg/L
---	µg/L
---	µg/L
---	µg/L
---	µg/L
---	µg/L

0.5	µg/L

APPENDIX C

Additional Treatment Information

89 Crawford Street
Leominster, Massachusetts 01453
Tel: 774.450.7177
Fax: 888.835.0617
www.lrt-llc.net

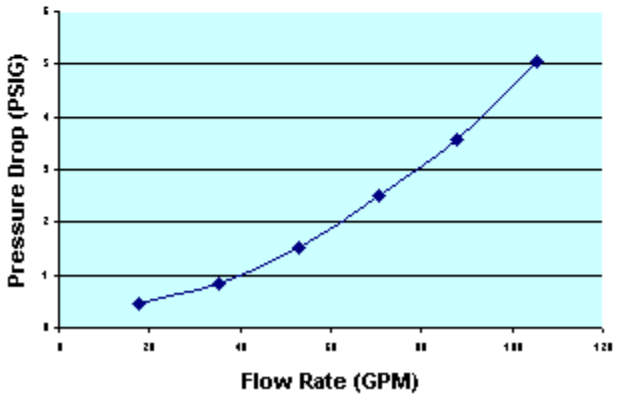
HPAF SERIES FILTERS
MODEL HPAF-2000

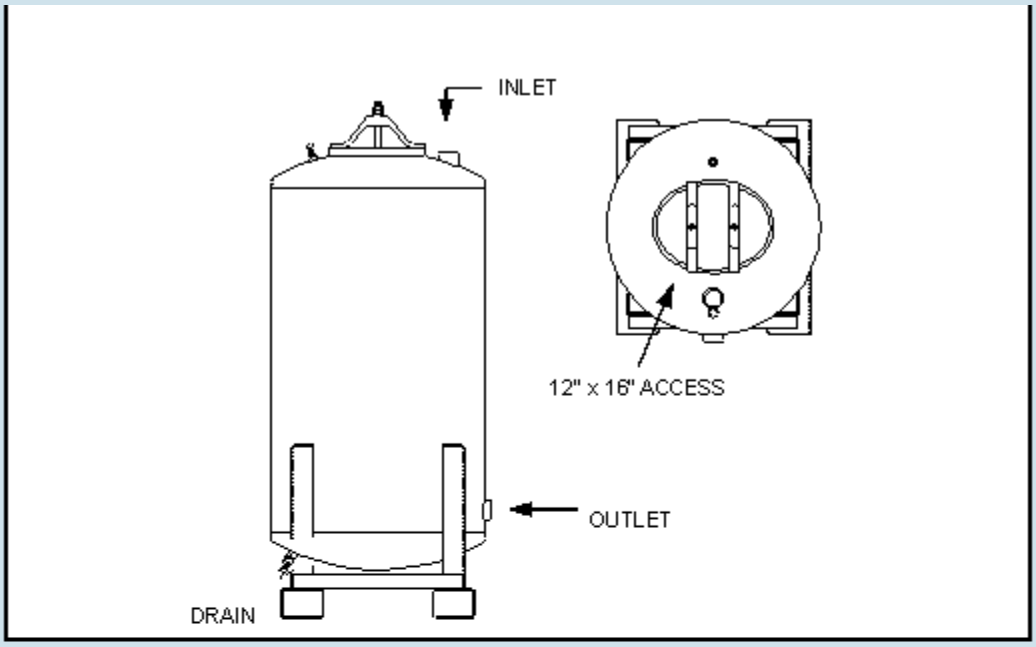
The HPAF-2000 filter is a media filter vessel designed to treat liquid streams. While the typical design application is a activated carbon adsorbtion unit, the filter can easily accommodate many medias. Some applications include:

- 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

PRESSURE DROP GRAPH

*(As Filled - 8*30 GAC)*





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	75 PSIG / 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

CGS

CATION EXCHANGE RESIN
SOFTENING GRADE
Na FORM

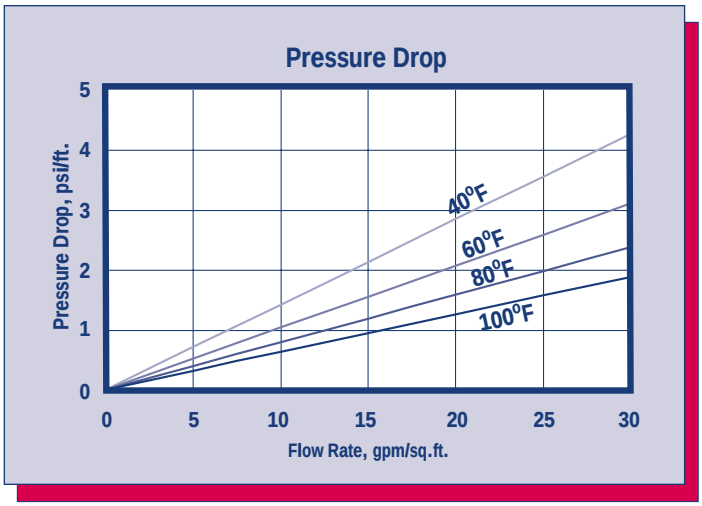
RESINTECH CGS is a high purity, light colored, high capacity, gel type sulfonated polystyrene cation resin supplied in the sodium form as moist, tough uniform spherical beads. *ResinTech CGS* specifically is intended for use in all water softening applications,including beverages, potable water and water 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.)

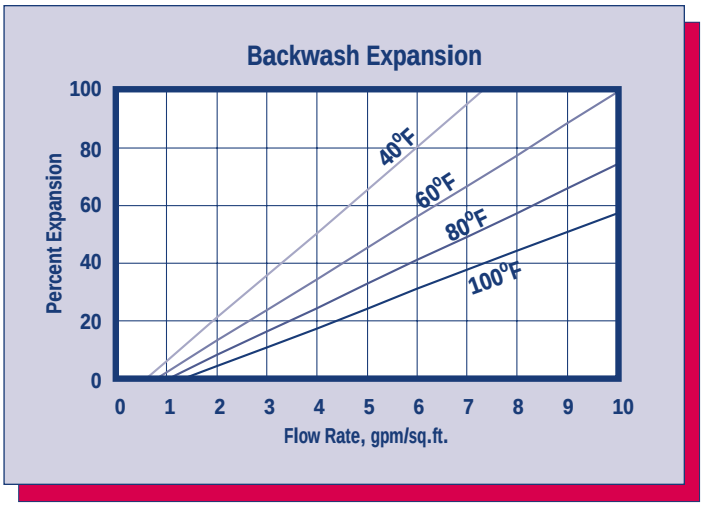
FEATURES & BENEFITS

- **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

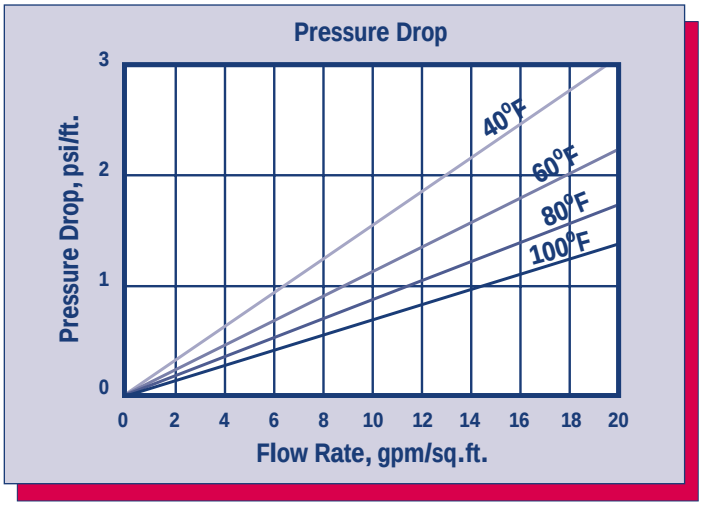
RESINTECH SBG1 is a high capacity, shock resistant, gelular, Type 1, strongly basic anion exchange resin supplied in the chloride or hydroxide form as moist, tough, uniform, spherical beads. *RESINTECH SBG1* is intended for use in all types of deionization systems and chemical processing applications. 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.

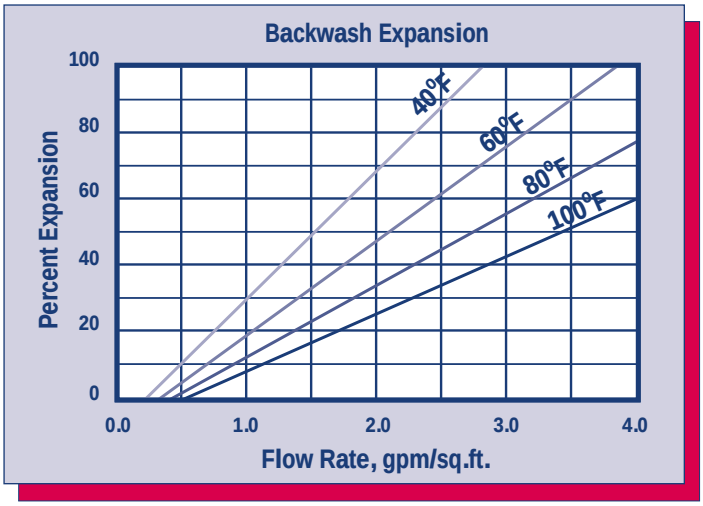
FEATURES & BENEFITS

- **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.

Section 2A: Hazard classification UN OSHA globally harmonized system

WARNING

(contains ion exchange resin)

H320: Causes eye irritation

Precautionary Statements

P264: Wash hands thoroughly after handling.

P280: Wear protective gloves/protective clothing/eye protection/face protection

P305+351+338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing.

P333+313: If skin irritation or a rash occurs: Get medical advice/attention.

P337+313: If eye irritation persists get medical advice/attention.

P403+233: Store in a well-ventilated place. Keep container tightly closed.

P411: Store at temperatures not exceeding 50 °C/ 122 °F.

Please refer to the safety data sheet for additional information regarding this product

ResinTech, Inc.
160 Cooper Road
West Berlin, NJ 08091-9234
856 768-9600
Ixresin@resintech.com

Section 3: Composition/ Information on Ingredients

3a	Chemical name	Trimethylamine functionalized chloromethylated copolymer of polystyrene in the chloride form.
3b	Ingredients	
	Trimethylamine functionalized Chloromethlyated copolymer of Styrene and divinylbenzene in the Chloride form	CAS# 60177-39-1 (35 - 65%)
	Water	CAS# 7732-18-5 (35 – 65%)

Section 4: First Aid Measures

4a	Inhalation	No adverse effects expected- normal use of product does not produce odors or vapors.
4b	Skin	Wash with soap and water- seek medical attention if a rash develops.
4c	Eye contact	Wash immediately with water-seek attention if discomfort continues.
4d	Ingestion	No adverse effects expected for small amounts, larger amounts can cause stomach irritation. Seek medical attention if discomfort occurs.

Section 5: Fire Fighting Measures

5a	Flammability	NFPA Fire rating = 1
5b	Extinguishing media	Water, CO2, foam, dry powder.
5c	Fire fighting Procedures	Follow general fire fighting procedures indicated in the work place. Seek medical attention if discomfort continues.
5d	Protective Equipment	MSHA/NIOSH approved self-contained breathing gear, full protective clothing.
5e	Combustion Products	Carbon oxides and other toxic gasses and vapors.
5f	Unusual Hazards	Product is not combustible until moisture is removed. Resin begins to burn at approximately 230º C. Auto ignition can occur above 500º C.

Section 6: Accidental Release Measures

6a	Personal Precautions	Keep people away, spilled resin can be a slipping hazard, wear gloves and safety glasses to minimize skin or eye contact.
6b	Incompatible Chemicals	Strong oxidants can create risk of combustion products similar to burning, exposure to strong bases can cause a rapid temperature increase.
6c	Environmental Precautions	Keep out of public sewers and waterways.
6d	Containment Materials	Use plastic or paper containers, unlined metal containers not recommended.
6e	Methods of Clean-up	Sweep up material and transfer to containers.

Section 7: Handling and Storage

7a	Handling	Avoid prolonged skin contact. Keep resin moist and avoid allowing resin to completely dry.
7b	Storage	Store in a cool dry place (0º to 45º C) in the original shipping container. This product is thermally sensitive and will have reduced shelf life if subjected to extended periods of time at temperatures exceeding 50º C. Although freezing does not usually damage ion exchange resins, avoid repeated freeze thaw cycles.
7c	TSCA considerations	Ion exchange resins should be listed on the TSCA Inventory in compliance with State and Federal Regulations.

Section 8: Exposure Controls/Personal Protection

8a	OSHA exposure limits	None noted.
8b	Engineering Controls	Provide adequate ventilation.
8c	Personal Protection Measures	
	Eye Protection	Safety glasses or goggles.
	Respiratory Protection	Not required for normal use.
	Protective Gloves	Not required for limited exposure but recommended for extended contact.

Section 9: Physical and Chemical Properties

Appearance	Amber, yellow, or red beads approx. 0.6 mm diameter.
Flammability or explosive limits	Flammable above 500º C
Odor	Little or no odor
Physical State	Solid
Vapor pressure	Not available
Odor threshold	Not available
Vapor density	Not available
pH	Near neutral (6 to 8 typical)
Relative density	Approx 710 grams/Liter
Melting point/freezing point	Does not melt, freezes at approx. 0 C
Solubility	Insoluble in water and most solvents
Boiling point	Does not boil
Flash point	Approx 500º C
Evaporation rate	Does not evaporate
Partition Coefficient (n-octonol/water)	Not applicable
Auto-ignition temperature	Approx 500º C
Decomposition temperature	Above 230º C
Viscosity	Not applicable

Section 10: Stability and Reactivity

10a Stability	Stable under normal conditions.
10b Conditions to Avoid	Heat, exposure to strong oxidants.
10c Hazardous by-products	Trimethylamine, charred polystyrene, aromatic acids and hydrocarbons, organic amines, nitrogen oxides, carbon oxides, chlorinated hydrocarbons.
10d Incompatible materials	Strong oxidizing agents, e.g. nitric acid (such as HNO_3)
10e Hazardous Polymerization	Does not occur

Section 11: Toxicological Information

11a Likely Routes of Exposure	Oral, skin or eye contact.
11b Effects of exposure	
Delayed	None known.
Immediate (acute)	None known.
Chronic	None known.
11c Toxicity Measures	
Skin Adsorption	Unlikely, some transfer of acidity is possible.
Ingestion	Oral toxicity believed to be low but no LD50 has been established.
Inhalation	Unknown, vapors are very unlikely due to physical properties (insoluble solid).
11d Toxicity Symptoms	
Skin Adsorption	Mild Rash.
Ingestion	Indigestion or general malaise.
Inhalation	Unknown.
11e Carcinogenicity	None known

Section 12: Ecological information

12a Eco toxicity	Not acutely harmful to plant or animal life.
12b Mobility	Insoluble, acidity or causticity may escape if wet.
12c Biodegradability	Not biodegradable.
12d Bioaccumulation	Insignificant.
12e Other adverse effects	Not Harmful to the environment.

Section 13: Disposal Considerations

13a General considerations	Material is non-hazardous. However, unused material can cause a pH change when wetted.
13b Disposal Containers	Most plastic and paper containers are suitable. Avoid use of unlined metal containers.
13c Disposal methods	No specific method necessary.
13d Sewage Disposal	Not recommended.

13e	Precautions for incineration	May release trimethylamine and toxic vapors when burned.
13f	Precautions for landfills	Resins used to remove hazardous materials may then become hazardous mixtures

Section 14: Transportation Information

14a	Transportation Class	Not classified as a dangerous good for transport by land, sea, or air.
14b	TDG	Not regulated.
14c	IATA	Not regulated.
14d	DOT (49 CFR 172.101)	Not Regulated.

Section 15: Regulatory Information

15a	CERCLA	Not regulated
15b	SARA Title III	Not regulated
15c	Clean Air act	Not regulated
15d	Clean Water Act	Not regulated
15e	TSCA	Not regulated
15f	Canadian Regulations	
	WHMIS	Not a controlled product
	TDG	Not regulated
15g	Mexican Regulations	Not Dangerous

Section 16: Other Information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features. Regulatory requirements are subject to change and may differ from one location to another. It is the buyer's responsibility to ensure that their activities comply with federal, state, and local laws.

16a Date of Revision 31 March 2015

Lockwood Remediation Technologies, LLC

One Controller for the Broadest Range of Sensors.

Choose from 30 digital and analog sensor families for up to 17 di:erent 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 o:ers 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.

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

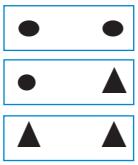
Choose from Hach's Broad Range of Digital and Analog Sensors

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	▲

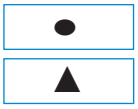
● = Digital ▲ = Analog

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



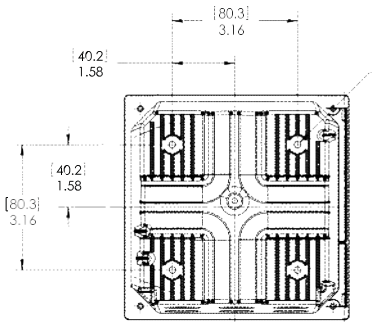
Specifications*

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

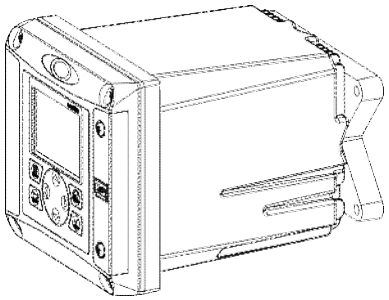
Surface Mounting Dimensions

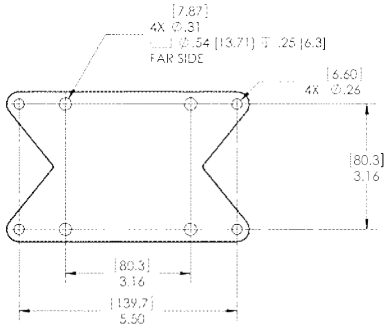


Mounting Dimensions
(Rear View)

4X Ø .17[4.2] ↧ .47[12]
M5X0.8 - 6H ↧ .39[10]

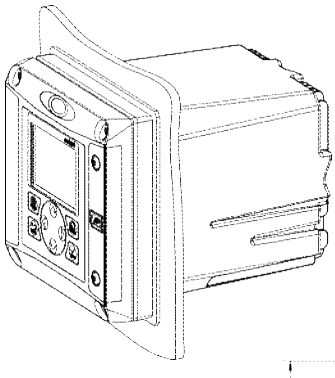
OR

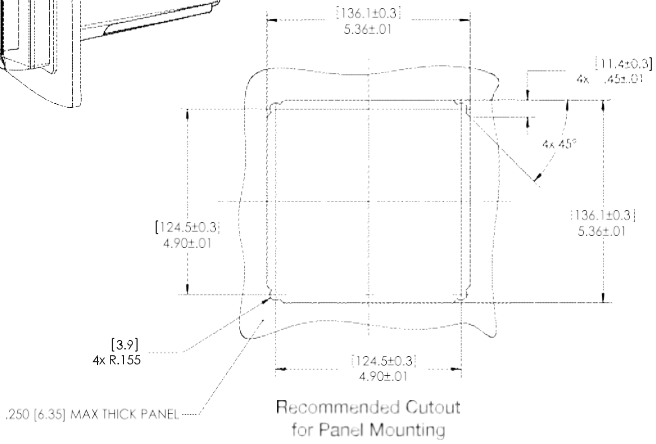




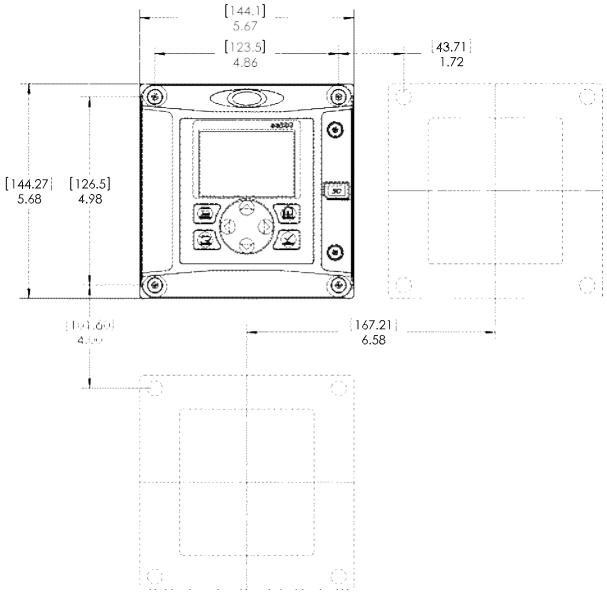
Bracket (supplied) for Surface Mounting
(Not compatible with Weather and Sun Shield
p/n 9220600 when surface mounting.)

Panel Mounting Dimensions



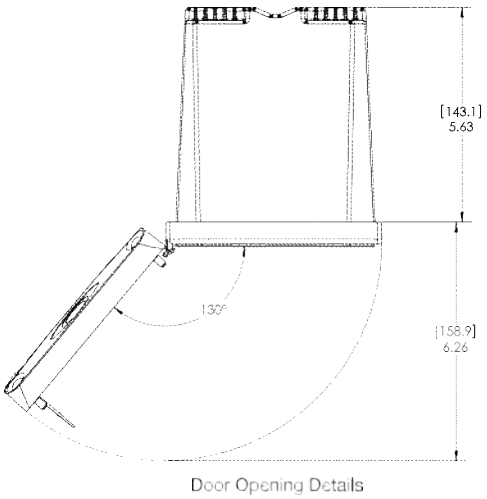


Recommended Cutout
for Panel Mounting

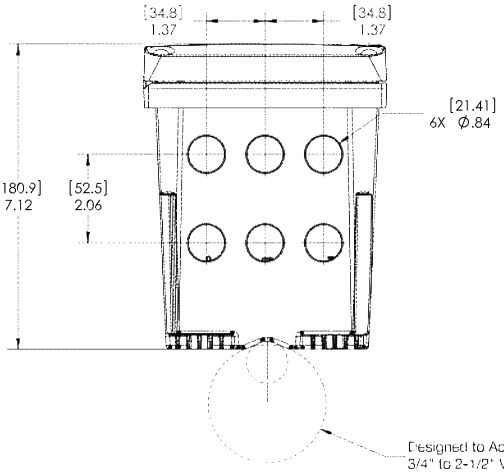


Minimum Spacing Dimensions
for Group Mounting

Top and Bottom Views

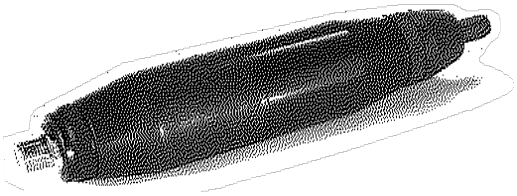


Door Opening Details

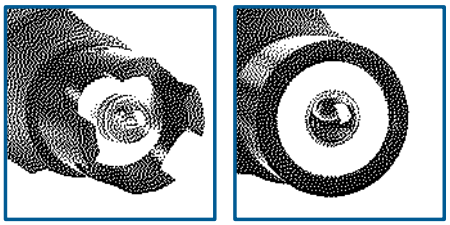


Designed to Accommodate
3/4" to 2-1/2" Vertical or Horizontal Pipe

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 Teflon®. 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 105ºC (32 to 221ºF)

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

Pressure Range
0 to 6.9 bar at 100ºC (0 to 100 psig at 212ºF)

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 Teflon 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 105ºC (32 to 221ºF)

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

Pressure Range
0 to 6.9 bar at 100ºC (0 to 100 psig at 212ºF)

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 Teflon 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 Teflon® 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.

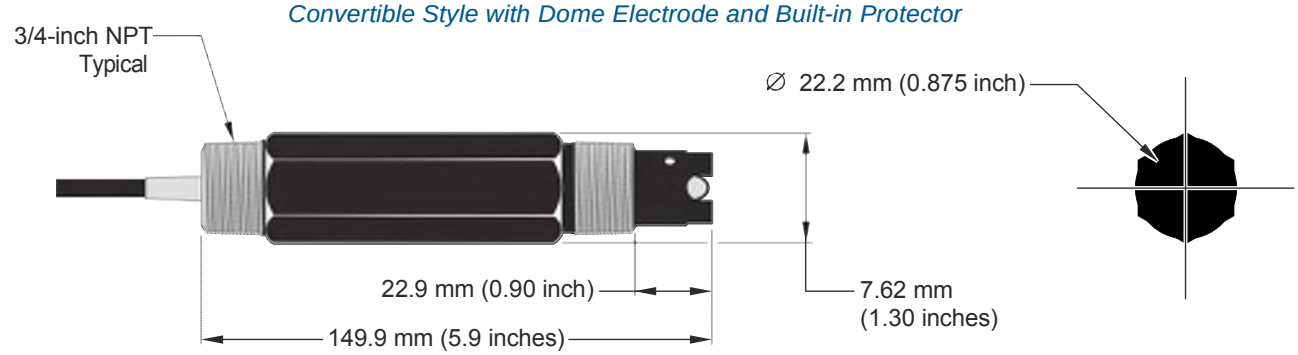
Insertion Style Sensor

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.

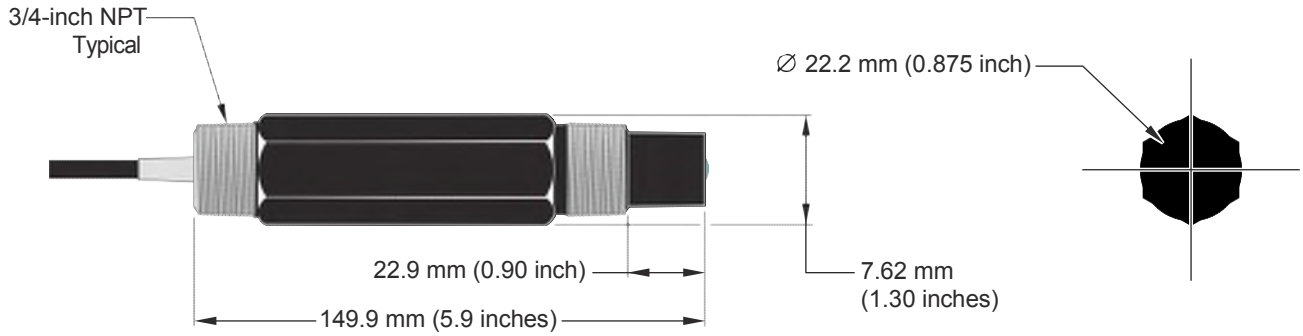
Sanitary Style Sensor

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



Lockwood Remediation Technologies, LLC

The Pulsatron Series A Plus offers manual function controls over stroke length and stroke rate as standard with the option to select external pace for automatic control.

Ten distinct models are available, having pressure capabilities to 250 PSIG (17 BAR) @ 12 GPO (1.9 lph), and flow capacities to 58 GPO (9.1 lph) @ 100 PSIG (7.0 BAR), with a standard turndown ratio of 100:1, and optional ratio of 1000:1. Metering performance is reproducible to within ± 3% of maximum capacity.

Features

- Manual Control by on-line adjustable stroke rate and stroke length.
- Highly Reliable timing circuit.
- Circuit Protection against voltage and current upsets.
- Solenoid Protection by thermal overload with auto-reset.
- Water Resistant, for outdoor and indoor applications.
- Internally Dampened To Reduce Noise.
- Guided Ball Check Valve Systems, to reduce back flow and enhance outstanding priming characteristics.
- Few Moving Parts and Wall Mountable.
- Safe & Easy Priming with durable leak-free bleed valve assembly (standard).
- Optional Control: External pace with auto/manual selection.

Controls

Manual Stroke Rate

Manual Stroke Length

External Pacing - Optional

External Pace With Stop - Optional (125 SPM only)

Controls Options		
Feature	Standard Configuration	Optional Configuration [1]
External Pacing	--	Auto / Manual Selection
External Pace w/ Stop (125 SPM only)	--	Auto / Manual Selection [2]
Manual Stroke Rate	10:1 Ratio	100:1 Raio
Manual Stroke Length	10:1 Ratio	10:1 Ratio
Total Turndown Ratio	100:1 Ratio	1000:1 Ratio

Note 1: On S2, S3 & S4 sizes only.

Note 2: Not available on 1000:1 turndown pumps.

Operating Benefits

- Reliable metering performance.
- Rated "hot" for continuous duty.
- High viscosity capability.
- Leak-free, sealless, liquid end.

Aftermarket

- KOPkits
- Gauges
- Dampeners
- Pressure Relief Valves
- Tanks
- Pre-Engineered Systems
- Process Controllers (PULSAblue, MicroVision)

Series A Plus
Electronic Metering Pumps

Lockwood Remediation Technologies, LLC

Series A Plus

Specifications and Model Selection

MODEL			LBC2	LB02	LBC3	LB03	LB04	LB64	LBC4	LBS2	LBS3	LBS4
Capacity nominal (max.)		GPH	0.25	0.25	0.42	0.50	1.00	1.25	2.00	0.50	1.38	2.42
		GPO	6	6	10	12	24	30	48	12	33	58
		LPH	0.9	0.9	1.6	1.9	3.8	4.7	7.6	1.9	5.2	9.14
Pressure[3] (max.)	GFPP, PVDF, 316SS or PVC <; N code) wITFE Seats)	PSIG (Bar)	250 (17)	150 (10)	250 (17)	150 (10)	100 (7)	100 (7)	50 (3.3)	250 (17)	150 (10)	100 (7)
	PVC (V code) Viton or CSPE Seats IDegas Liquid End		150 (10)							150 (10)		
Connections:		Tubina	1 14' ID X 3 8' OD						3 8' D X 1 2' OD	1 4' D X 3 8' OD		
		Pioina	1 4' FNPT									
Strokes/Minute		SPM	125							250		

Note 3: Pumps with rated pressure above 150 PSI will be de-rated to 150 PSI Max. when selecting certain valve options, see Price Book for details.

Engineering Data

Pump Head Materials Available:	GFPPL
	PVC
	PVDF
	316 SS
Diaphragm:	PTFE-faced CSPE-backed
Check Valves Materials Available:	
Seats/0-Rings:	PTFE
	CSPE
	Viton
Balls:	Ceramic
	PTFE
	316 SS
	Alloy C
Fittings Materials Available:	GFPPL
	PVC
	PVDF
Bleed Valve:	Same as fitting and check valve selected, except 316SS
Injection Valve & Foot Valve Assy:	Same as fitting and check valve selected
Tubing:	Clear PVC
	White PE

Important: Material Code - GFPPL=Glass-filled Polypropylene, PVC=Polyvinyl Chloride, PE=Polyethylene, PVDF=Polyvinylidene Fluoride, CSPE=Generic formulation of Hypalon, a registered trademark of E.I. DuPont Company. Viton is a registered trademark of E.I. DuPont Company. PVC wetted end recommended for sodium hypochlorite.

Engineering Data

Reproducibility:	+/- 3% at maximum capacity
Viscosity Max CPS:	1000 CPS
Stroke Frequency Max SPM:	125 / 250 by Model
Stroke Frequency Turn-Down Ratio:	10:1 / 100:1 by Model
Stroke Length Turn-Down Ratio:	10:1
Power Input:	115 VAC/50-60 HZ/1 ph
	230 VAC/50-60 HZ/1 ph
Average Current Draw:	
@ 115 VAC; Amps:	0.6 Amps
@ 230 VAC; Amps:	0.3 Amps
Peak hput Power:	130 Watts
Average Input Power @ Max SPM:	50 Watts

Custom Engineered Designs - Pre-Engineered Systems

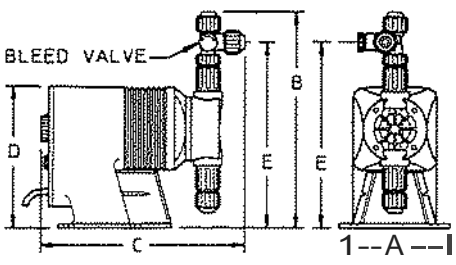
Pre-Engineered Systems

Pulsafeeder's Pre-Engineered Systems are designed to provide complete chemical feed solutions for all electronic metering applications. From stand alone simplex pH control applications to full-featured, redundant sodium hypochlorite disinfection metering, these rugged fabricated assemblies offer turn-key simplicity and industrial-grade durability. The UV-stabilized, high-grade HOPE frame offers maximum chemical compatibility and structural rigidity. Each system is factory assembled and hydrostatically tested prior to shipment.

Dimensions

Series A PLUS Dimensions (inches)						
Model No.	A	B	C	D	E	Shipping Weight
LB02 IS2	5.0	9.6	9.5	6.5	8.2	10
LBC2	5.0	9.9	9.5	6.5	8.5	10
LBC3	5.0	9.9	9.5	6.5	8.5	10
LB03 IS3	5.0	9.9	9.5	6.5	8.5	10
LB0[illegible]4	5.0	9.9	9.5	6.5	8.5	10
LB64	5.0	9.9	9.5	6.5	8.5	10
LBC4	5.0	9.9	9.5	6.5	8.5	10

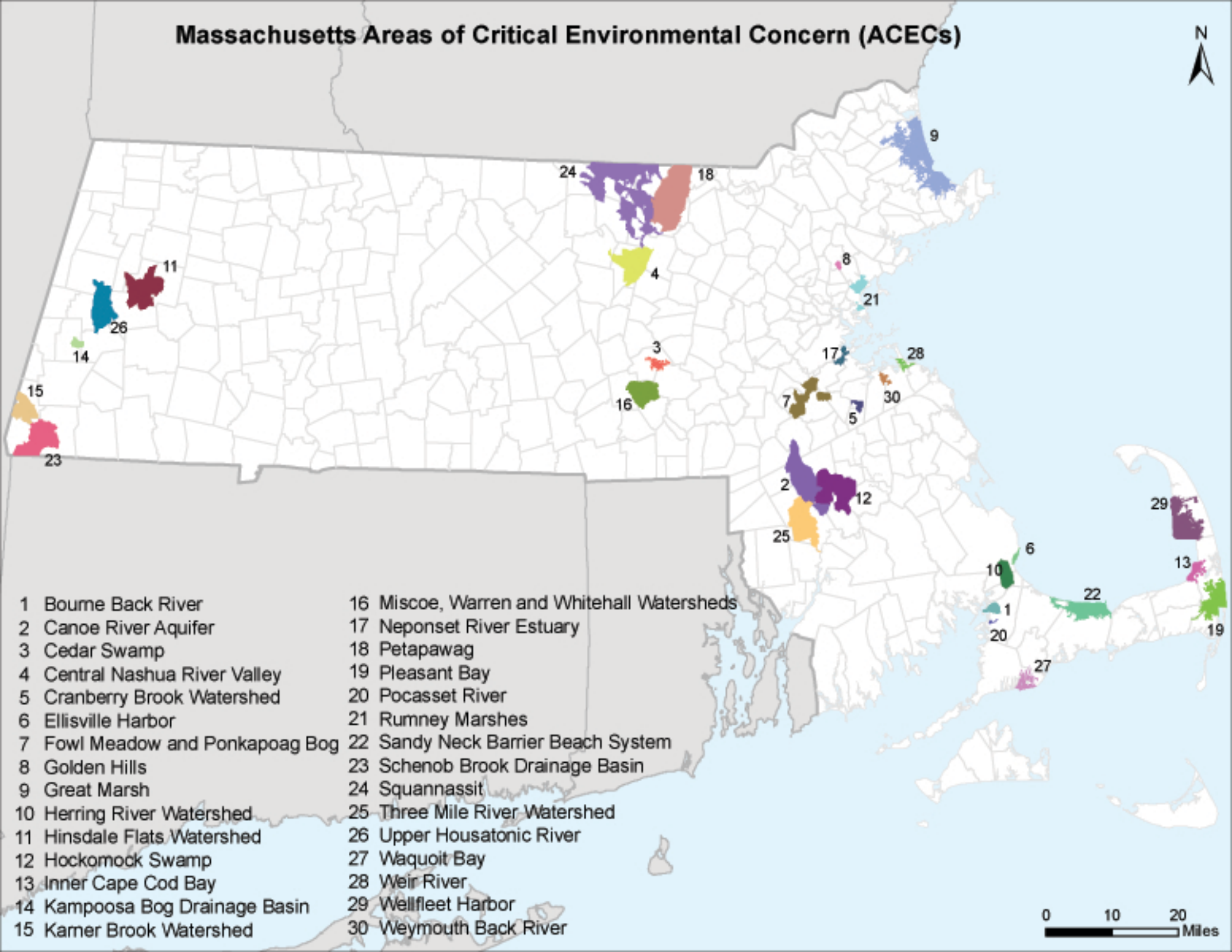
NOTE: Inches X 2.54 cm



APPENDIX D

Endangered Species Act Assessment

Massachusetts Areas of Critical Environmental Concern (ACECs)



1 Bourne Back River
2 Canoe River Aquifer
3 Cedar Swamp
4 Central Nashua River Valley
5 Cranberry Brook Watershed
6 Ellisville Harbor
7 Fowl Meadow and Ponkapoag Bog
8 Golden Hills
9 Great Marsh
10 Herring River Watershed
11 Hinsdale Flats Watershed
12 Hockomock Swamp
13 Inner Cape Cod Bay
14 Kampoosa Bog Drainage Basin
15 Karner Brook Watershed
16 Miscoe, Warren and Whitehall Watersheds
17 Neponset River Estuary
18 Petapawag
19 Pleasant Bay
20 Pocasset River
21 Rumney Marshes
22 Sandy Neck Barrier Beach System
23 Schenob Brook Drainage Basin
24 Squannassit
25 Three Mile River Watershed
26 Upper Housatonic River
27 Waquoit Bay
28 Weir River
29 Wellfleet Harbor
30 Weymouth Back River

Mass.gov

Rare Species by Town Viewer

We maintain a list of all documented MESA-listed species observations in the Commonwealth.

This Town Species Viewer provides the ability to:

1. Select a town from the dropdown to see a table of which rare species have been observed in that town. The selected town will also be highlighted on the map.
2. Select the Common Name or Scientific Name of a species to see it's distribution on the map and table showing the towns it has been observed in.

Clicking on a column header in the table will sort the column. Clicking again on the same column heading will reverse the sort order.

The Town List and Species Viewer are updated at regular intervals as new data is accepted and entered into the NHESP database.

First | Previous | 1 | Next | Last

Town	Taxonomic Group	Scientific Name	Common Name	MESA Status	Most Recent Obs
CAMBRIDGE	Amphibian	Ambystoma laterale	Blue-spotted Salamander	SC	1917
CAMBRIDGE	Bird	Botaurus lentiginosus	American Bittern	E	1906
CAMBRIDGE	Vascular Plant	Carex gracilescens	Slender Woodland Sedge	E	1891
CAMBRIDGE	Beetle	Cicindela duodecimguttata	Twelve-spotted Tiger Beetle	SC	1932
CAMBRIDGE	Bird	Cistothorus platensis	Sedge Wren	E	1840
CAMBRIDGE	Vascular Plant	Cyperus engelmannii	Engelmann's Umbrella-sedge	T	2008
CAMBRIDGE	Butterfly/Moth	Eacles imperialis	Imperial Moth	T	Historic
CAMBRIDGE	Bird	Falco peregrinus	Peregrine Falcon	T	2017
CAMBRIDGE	Bird	Gallinula chloropus	Common Moorhen	SC	1890
CAMBRIDGE	Vascular Plant	Gentiana andrewsii	Andrews' Bottle Gentian	E	2017
CAMBRIDGE	Reptile	Glyptemys insculpta	Wood Turtle	SC	Historic
CAMBRIDGE	Vascular Plant	Isoetes lacustris	Lake Quillwort	E	Historic
CAMBRIDGE	Bird	Ixobrychus exilis	Least Bittern	E	1890
CAMBRIDGE	Mussel	Ligumia nasuta	Eastern Pondmussel	SC	1941
CAMBRIDGE	Segmented Worm	Macrobdella sestertia	New England Medicinal Leech	SC	Historic
CAMBRIDGE	Fish	Notropis bifrenatus	Bridle Shiner	SC	1928
CAMBRIDGE	Vascular Plant	Platanthera flava var. herbiola	Pale Green Orchis	T	Historic
CAMBRIDGE	Vascular Plant	Potamogeton friesii	Fries' Pondweed	E	1880
CAMBRIDGE	Amphibian	Scaphiopus holbrookii	Eastern Spadefoot	T	1892
CAMBRIDGE	Vascular Plant	Scirpus longii	Long's Bulrush	T	1913
CAMBRIDGE	Vascular Plant	Suaeda calceoliformis	American Sea-blite	SC	1912
CAMBRIDGE	Reptile	Terrapene carolina	Eastern Box Turtle	SC	1892
CAMBRIDGE	Bird	Tyto alba	Barn Owl	SC	Historic
CAMBRIDGE	Vascular Plant	Viola brittoniana	Britton's Violet	T	1843

Additional Information

Status

- E = Endangered
- T = Threatened

- SC = Special Concern

Most Recent Observation

This field represents the most recent observation of that species in a town. However, because they are rare, many MESA-listed species are difficult to detect even when they are present. Natural Heritage does not have the resources to be able to conduct methodical species surveys in each town on a regular basis. Therefore, the fact that the 'Most Recent Observation' recorded for a species may be several years old should not be interpreted as meaning that the species no longer occurs in a town. However, Natural Heritage regards records older than twenty-five years historic.

For more information about a particular species, view the list of **Natural Heritage Fact Sheets** (/service-details/list-of-endangered-threatened-and-special-concern-species).

Additional Resources

Generate a .csv of NHESP Town List
(https://docs.google.com/spreadsheets/d/e/2PACX-1vRxWPhSYQ7J2btBSc5xsex8syVEobhvDIPJrZRUH5D29ZCLwTmVU09AD2zIT9w-01i-qxBqbjoQcnnK/pub?gid=0&single=t

Request Rare Species Information (/how-to/request-rare-species-information)

Report rare species & vernal pool observations (/how-to/report-rare-species-vernal-pool-observations)

CONTACT

Natural Heritage & Endangered Species Program

Address

MassWildlife Field Headquarters
1 Rabbit Hill Road, Westborough, MA 01581
directions (https://maps.google.com/?q=1+Rabbit+Hill+Road%2C+Westborough%2C+MA+01581)

Phone

Main (508) 389-6360 (tel:5083896360)
Open M-F, 8am-4:30pm

Regulatory Review Inquiries (508) 389-6357 (tel:5083896357)
North/Central/Western Massachusetts

(508) 389-6385 (tel:5083896385)
Southeastern Massachusetts/Cape & Islands

RELATED

List of Endangered, Threatened, and Special Concern species (/service-details/list-of-endangered-threatened-and-special-concern-species)

Did you find what you were looking for on this webpage? *

◯ Yes ◯ No

SEND FEEDBACK

FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES IN MASSACHUSETTS

COUNTY	SPECIES	FEDERAL STATUS	GENERAL LOCATION/HABITAT	TOWNS
Barnstable	Piping Plover	Threatened	Coastal Beaches	All Towns
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	All Towns
	Northeastern beach tiger beetle	Threatened	Coastal Beaches	Chatham
	Sandplain gerardia	Endangered	Open areas with sandy soils.	Sandwich and Falmouth.
	Northern Red-bellied Cooter	Endangered	Inland Ponds and Rivers	Bourne (north of the Cape Cod Canal)
	Red Knot[1]	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Berkshire	Bog Turtle	Threatened	Wetlands	Egremont and Sheffield
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Bristol	Piping Plover	Threatened	Coastal Beaches	Fairhaven, Dartmouth, Westport
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	Fairhaven, New Bedford, Dartmouth, Westport
	Northern Red-bellied Cooter	Endangered	Inland Ponds and Rivers	Taunton
	Red Knot[1]	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Dukes	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	All Towns
	Piping Plover	Threatened	Coastal Beaches	All Towns
	Northeastern beach tiger beetle	Threatened	Coastal Beaches	Aquinnah and Chilmark
	Sandplain gerardia	Endangered	Open areas with sandy soils.	West Tisbury
	Red Knot[1]	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide

Updated 02/05/2016

FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES IN MASSACHUSETTS

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

Updated 02/05/2016

FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES IN MASSACHUSETTS

COUNTY	SPECIES	FEDERAL STATUS	GENERAL LOCATION/HABITAT	TOWNS
Plymouth	Piping Plover	Threatened	Coastal Beaches	Scituate, Marshfield, Duxbury, Plymouth, Wareham and Mattapoisett
	Northern Red-bellied Cooter	Endangered	Inland Ponds and Rivers	Kingston, Middleborough, Carver, Plymouth, Bourne, Wareham, Halifax, and Pembroke
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	Plymouth, Marion, Wareham, and Mattapoisett.
	Red Knot[1]	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Suffolk	Piping Plover	Threatened	Coastal Beaches	Revere, Winthrop
	Red Knot[1]	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Worcester	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Leominster
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide

[1]Migratory only, scattered along the coast in small numbers

-Eastern cougar and gray wolf are considered extirpated in Massachusetts.
-Endangered gray wolves are not known to be present in Massachusetts, but dispersing individuals from source populations in Canada may occur statewide.
-Critical habitat for the Northern Red-bellied Cooter is present in Plymouth County.

Updated 02/05/2016

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

Middlesex 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.

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

Mammals

NAME	STATUS

Northern Long-eared Bat Myotis septentrionalis Threatened
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/9045

Critical habitats

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

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

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

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

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

Additional information can be found using the following links:

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

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see 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
Dunlin *Calidris alpina arcticola* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere

Evening Grosbeak Coccothraustes vespertinus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Kentucky Warbler Oporornis formosus — Breeds Apr 20 to Aug 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Lesser Yellowlegs Tringa flavipes — 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/9679

Nelson's Sparrow Ammodramus nelsoni — Breeds May 15 to Sep 5
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

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.

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

Saltmarsh Sparrow Ammospiza caudacuta — Breeds May 15 to Sep 5
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9719

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

Snowy Owl Bubo scandiacus — Breeds elsewhere
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.

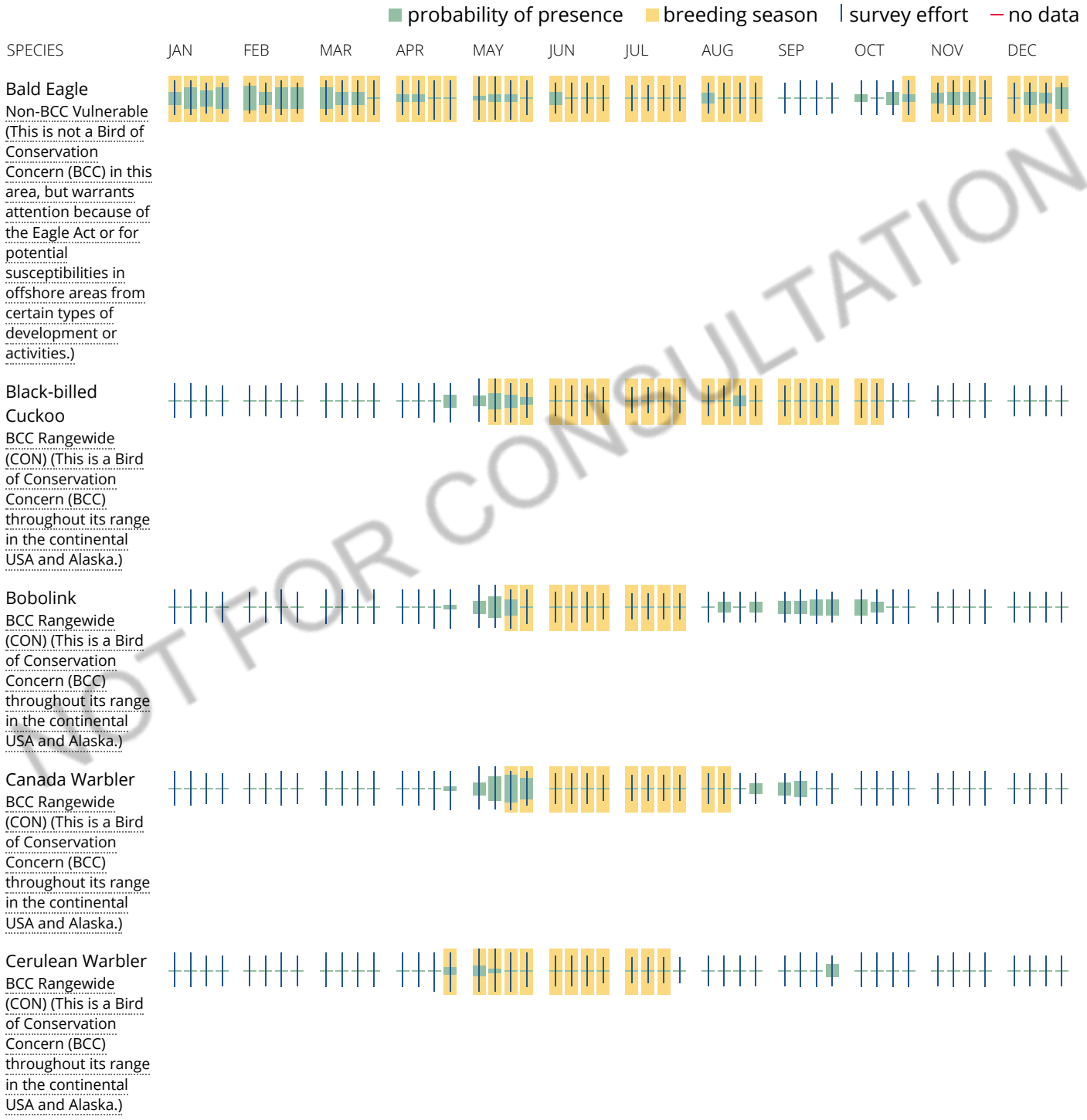
Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

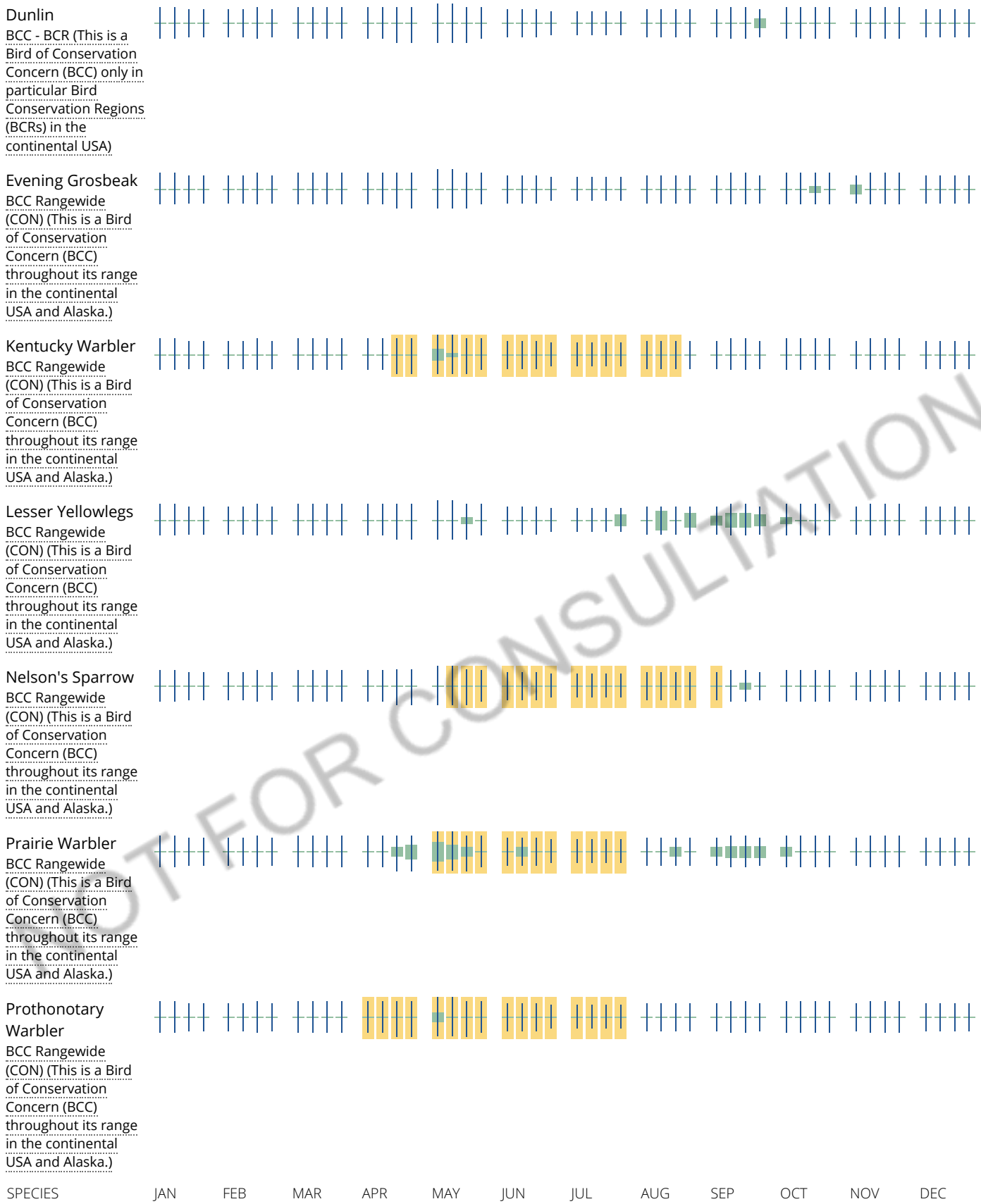
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

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.





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.)

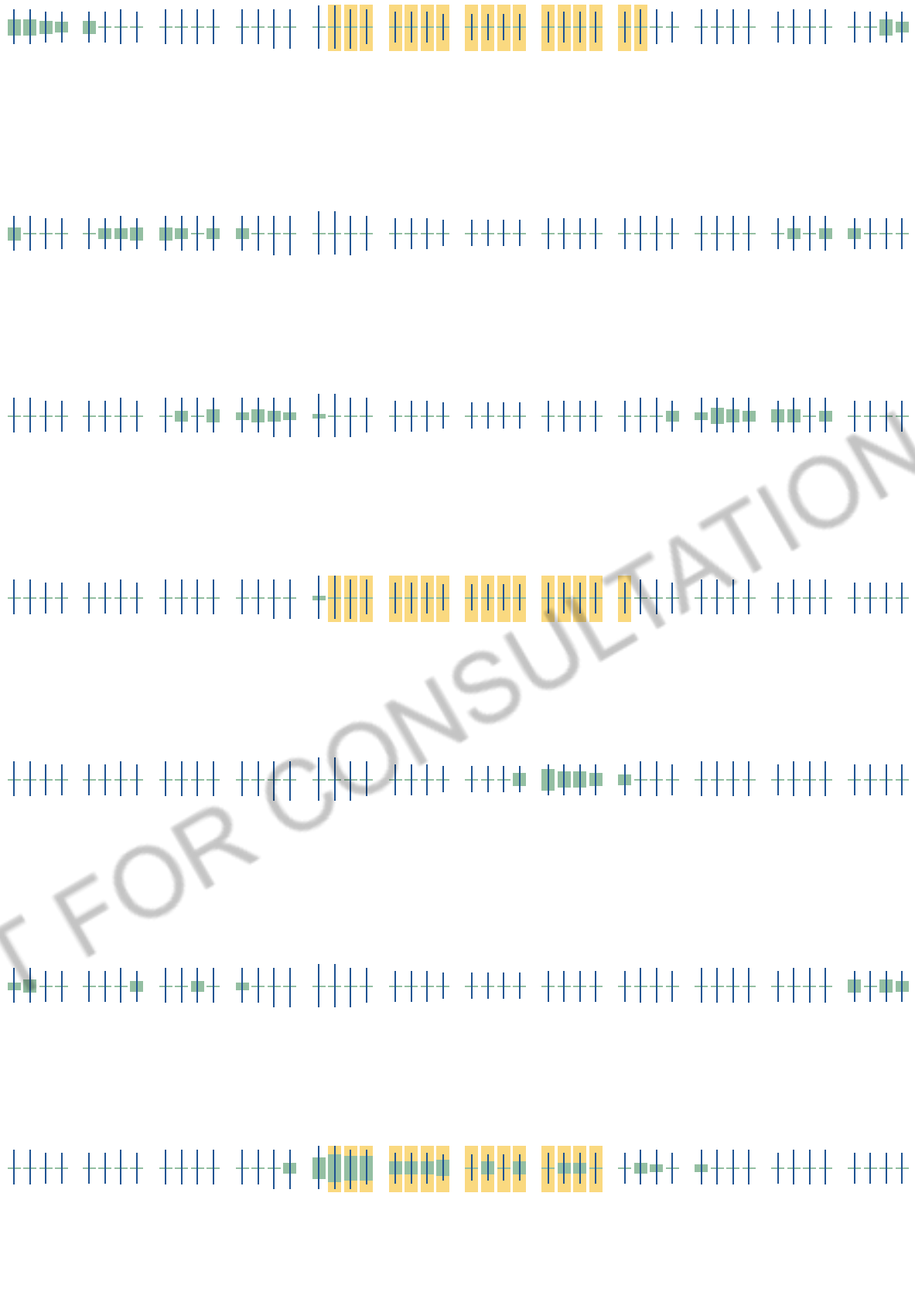
Rusty Blackbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Saltmarsh Sparrow
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.)

Snowy Owl
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.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

RIVERINE

R2UBHx

A full description for each wetland code can be found at the National Wetlands Inventory website

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.

Summary of the MESA list

Taxonomic Group	Endangered	Threatened	Special Concern	TOTALS
Mammals (including 6 whales)	11 (7 FE, 1 FT)	0	3	**14**
Birds (breeding)	9 (1 FE)	8 (1 FT)	10	**27**
Reptiles (including 5 sea turtles)	8 (4 FE, 1 FT)	5 (2 FT)	2	**15**
Amphibians	0	2	2	**4**
Fish	4 (1 FE, 1 FT)	2	4	**10**
Invertebrates (non-marine only)	30 (2 FE, 2 FT)	24	45	**99**
Plants (vascular)	153 (2 FE, 1 FT)	64	41	**258**
TOTALS	**215 (17 FE, 6 FT)**	**105 (3 FT)**	**107 0**	**427 (26 FE or FT)**

FE = species listed under the U.S. Endangered Species Act as Federally Endangered as of February 27, 2012.
FT = species listed under the U.S. Endangered Species Act as Federally Threatened as of April 2, 2015.

List of Vertebrates

Fish

Common Name	Scientific Name	MA Status	Fed Status	Notes
American Brook Lamprey	*Lampetra appendix*	T		
Shortnose Sturgeon	*Acipenser brevirostrum*	E	E	
Atlantic Sturgeon	*Acipenser oxyrinchus*	E	E (CT River), T (Merrimack River)	
Lake Chub	*Couesius plumbeus*	E		
Eastern Silvery Minnow	*Hybognathus regius*	SC		
Bridle Shiner	*Notropis bifrenatus*	SC		
Northern Redbelly Dace	*Phoxinus eos*	E		
Longnose Sucker	*Catostomus catostomus*	SC		
Burbot	*Lota lota*	SC		
Threespine Stickleback	*Gasterosteus aculeatus*	T		Trimorphic freshwater population only.

Amphibians

Common Name	Scientific Name	MA Status	Fed Status	Notes
Jefferson Salamander	*Ambystoma jeffersonianum*	SC		Including triploid and other polyploid forms within the *Ambystoma jeffersonianum* / *Ambystoma laterale* complex.
Blue-spotted Salamander	*Ambystoma laterale*	SC		Including triploid and other polyploid forms within the *Ambystoma jeffersonianum* / *Ambystoma laterale* complex.
Marbled Salamander	*Ambystoma opacum*	T		
Eastern Spadefoot	*Scaphiopus holbrookii*	T		

Reptiles

Common Name	Scientific Name	MA Status	Fed Status	Notes
Loggerhead Seaturtle	*Caretta caretta*	T	T	
Green Seaturtle	*Chelonia mydas*	T	T	
Hawksbill Seaturtle	*Eretmochelys imbricata*	E	E	
Kemp's Ridley Seaturtle	*Lepidochelys kempii*	E	E	
Leatherback Seaturtle	*Dermochelys coriacea*	E	E	

Wood Turtle	*Glyptemys insculpta*	SC		
Bog Turtle	*Glyptemys muhlenbergii*	E	T	
Blanding's Turtle	*Emydoidea blandingii*	T		
Diamond-backed Terrapin	*Malaclemys terrapin*	T		
Northern Red-bellied Cooter	*Pseudemys rubriventris*	E	E	This species is listed by the U. S. Fish and Wildlife Service as P. r. bangsi (Plymouth Redbelly Turtle) in 50 CFR 17.11.
Eastern Box Turtle	*Terrapene carolina*	SC		
Eastern Wormsnake	*Carphophis amoenus*	T		
Eastern Ratsnake	*Pantherophis alleghaniensis*	E		
Copperhead	*Agkistrodon contortrix*	E		
Timber Rattlesnake	*Crotalus horridus*	E		

Birds

Common Name	Scientific Name	MA Status	Fed Status	Notes
Common Loon	*Gavia immer*	SC		
Pied-billed Grebe	*Podilymbus podiceps*	E		
Leach's Storm-petrel	*Oceanodroma leucorhoa*	E		
American Bittern	*Botaurus lentiginosus*	E		
Least Bittern	*Ixobrychus exilis*	E		
Bald Eagle	*Haliaeetus leucocephalus*	T		
Northern Harrier	*Circus cyaneus*	T		
Peregrine Falcon	*Falco peregrinus*	T		
King Rail	*Rallus elegans*	T		
Common Moorhen	*Gallinula chloropus*	SC		
Piping Plover	*Charadrius melodus*	T	T	
Upland Sandpiper	*Bartramia longicauda*	E		
Roseate Tern	*Sterna dougallii*	E	E	
Common Tern	*Sterna hirundo*	SC		
Arctic Tern	*Sterna paradisaea*	SC		
Least Tern	*Sternula antillarum*	SC		
Barn Owl	*Tyto alba*	SC		
Long-eared Owl	*Asio otus*	SC		
Short-eared Owl	*Asio flammeus*	E		
Sedge Wren	*Cistothorus platensis*	E		
Golden-winged Warbler	*Vermivora chrysoptera*	E		
Northern Parula	*Parula americana*	T		
Blackpoll Warbler	*Dendroica striata*	SC		
Mourning Warbler	*Oporornis philadelphia*	SC		
Vesper Sparrow	*Pooecetes gramineus*	T		

Grasshopper Sparrow	*Ammodramus savannarum*	T		
Whip-poor-will	*Caprimulgus vociferus*	SC		

Mammals

Common Name	Scientific Name	MA Status	Fed Status	Notes
Water Shrew	*Sorex palustris*	SC		
Rock Shrew	*Sorex dispar*	SC		
Indiana Myotis	*Myotis sodalis*	E	E	
Small-footed Myotis	*Myotis leibii*	E		
Little Brown Myotis	*Myotis lucifugus*	E		
Tricolored Bat	*Perimyotis subflavus*	E		
Northern Long-eared Bat	*Myotis septentrionalis*	E	T	
Southern Bog Lemming	*Synaptomys cooperi*	SC		
Sperm Whale	*Physeter macrocephalus*	E	E	
Fin Whale	*Balaenoptera physalus*	E	E	
Sei Whale	*Balaenoptera borealis*	E	E	
Blue Whale	*Balaenoptera musculus*	E	E	
Humpback Whale	*Megaptera novaeangliae*	E	E	
Northern Right Whale	*Eubalaena glacialis*	E	E	

List of Invertebrates

Sponges

Common Name	Scientific Name	MA Status	Fed Status	Notes
Smooth Branched Sponge	*Spongilla aspinosa*	SC		

Flatworms

Common Name	Scientific Name	MA Status	Fed Status	Notes
New England Medicinal Leech	*Macrobdella sestertia*	SC		

Snails

Common Name	Scientific Name	MA Status	Fed Status	Notes
New England Siltsnail	*Floridobia winkleyi*	SC		
Coastal Marsh Snail	*Littoridinops tenuipes*	SC		
Slender Walker	*Pomatiopsis lapidaria*	E		
Boreal Marstonia	*Marstonia lustrica*	E		
Boreal Turret Snail	*Valvata sincera*	E		

Mussels

Common Name	Scientific Name	MA Status	Fed Status	Notes
Dwarf Wedgemussel	*Alasmidonta heterodon*	E	E	
Brook Floater (Swollen Wedgemussel)	*Alasmidonta varicosa*	E		
Yellow Lampmussel	*Lampsilis cariosa*	E		
Tidewater Mucket	*Leptodea ochracea*	SC		
Eastern Pondmussel	*Ligumia nasuta*	SC		
Creeper	*Strophitus undulatus*	SC		

Crustaceans

Common Name	Scientific Name	MA Status	Fed Status	Notes
Intricate Fairy Shrimp	*Eubranchipus intricatus*	SC		
Agassiz's Clam Shrimp	*Eulimnadia agassizii*	E		
Northern Spring Amphipod	*Gammarus pseudolimnaeus*	SC		
American Clam Shrimp	*Limnadia lenticularis*	SC		
Taconic Cave Amphipod	*Stygobromus borealis*	E		
Piedmont Groundwater Amphipod	*Stygobromus tenuis tenuis*	SC		
Coastal Swamp Amphipod	*Synurella chamberlaini*	SC		

Dragonflies

Common Name	Scientific Name	MA Status	Fed Status	Notes
Subarctic Darner	*Aeshna subarctica*	E		
Ocellated Darner	*Boyeria grafiana*	SC		
Spine-crowned Clubtail	*Gomphus abbreviatus*	SC		
Harpoon Clubtail	*Gomphus descriptus*	E		
Midland Clubtail	*Gomphus fraternus*	E		
Rapids Clubtail	*Gomphus quadricolor*	E		
Cobra Clubtail	*Gomphus vastus*	SC		
Skillet Clubtail	*Gomphus ventricosus*	T		
Umber Shadowdragon	*Neurocordulia obsoleta*	SC		
Stygian Shadowdragon	*Neurocordulia yamaskanensis*	SC		
Brook Snaketail	*Ophiogomphus aspersus*	SC		
Riffle Snaketail	*Ophiogomphus carolus*	T		
Ski-tipped Emerald	*Somatochlora elongata*	SC		
Forcipate Emerald	*Somatochlora forcipata*	E		
Coppery Emerald	*Somatochlora georgiana*	E		
Incurvate Emerald	*Somatochlora incurvata*	E		
Kennedy's Emerald	*Somatochlora kennedyi*	E		
Mocha Emerald	*Somatochlora linearis*	SC		
Riverine Clubtail	*Stylurus amnicola*	E		
Ebony Boghaunter	*Williamsonia fletcheri*	E		
Ringed Boghaunter	*Williamsonia lintneri*	T		

Damselflies

Common Name	Scientific Name	MA Status	Fed Status	Notes
Tule Bluet	*Enallagma carunculatum*	SC		
Attenuated Bluet	*Enallagma daeckii*	T		
Scarlet Bluet	*Enallagma pictum*	T		
Pine Barrens Bluet	*Enallagma recurvatum*	T		

Beetles

Common Name	Scientific Name	MA Status	Fed Status	Notes
Twelve-spotted Tiger Beetle	*Cicindela duodecimguttata*	SC		
Hentz's Redbelly Tiger Beetle	*Cicindela rufiventris hentzii*	T		
Northeastern Beach Tiger Beetle	*Cicindela dorsalis dorsalis*	E	T	
Bank Tiger Beetle	*Cicindela limbalis*	T		
Cobblestone Tiger Beetle	*Cicindela marginipennis*	E		
Barrens Tiger Beetle	*Cicindela patruela*	E		

Puritan Tiger Beetle	*Cicindela puritana*	E	T	
Purple Tiger Beetle	*Cicindela purpurea*	SC		
American Burying Beetle	*Nicrophorus americanus*	E	E	

Butterflies and Moths

Common Name	Scientific Name	MA Status	Fed Status	Notes
Coastal Heathland Cutworm	*Abagrotis nefascia*	SC		
Barrens Daggermoth	*Acronicta albarufa*	T		
Drunk Apamea Moth	*Apamea inebriata*	SC		
New Jersey Tea Inchworm	*Apodrepanulatrix liberaria*	E		
Hessel's Hairstreak	*Callophrys hesseli*	SC		
Frosted Elfin	*Callophrys irus*	SC		
Bog Elfin	*Callophrys lanoraieensis*	T		
Gerhard's Underwing	*Catocala herodias gerhardi*	SC		
Precious Underwing Moth	*Catocala pretiosa pretiosa*	E		
Waxed Sallow Moth	*Chaetaglaea cerata*	SC		
Melsheimer's Sack Bearer	*Cicinnus melsheimeri*	T		
Chain Dot Geometer	*Cingilia catenaria*	SC		
Unexpected Cycnia	*Cycnia inopinatus*	T		
The Pink Streak	*Dargida rubripennis*	T		
Imperial Moth	*Eacles imperialis*	T		
Early Hairstreak	*Erora laeta*	T		
Persius Duskywing	*Erynnis persius persius*	E		
Sandplain Euchlaena	*Euchlaena madusaria*	SC		
Dion Skipper	*Euphyes dion*	T		
Phyllira Tiger Moth	*Grammia phyllira*	E		
Slender Clearwing Sphinx Moth	*Hemaris gracilis*	SC		
Barrens Buckmoth	*Hemileuca maia*	SC		
Sandplain Heterocampa	*Heterocampa varia*	T		
Buchholz's Gray	*Hypomecis buchholzaria*	E		
Pale Green Pinion Moth	*Lithophane viridipallens*	SC		
Twilight Moth	*Lycia rachelae*	E		
Pine Barrens Lycia	*Lycia ypsilon*	T		
Barrens Metarranthis	*Metarranthis apiciaria*	E		
Coastal Swamp Metarranthis	*Metarranthis pilosaria*	SC		
Northern Brocade Moth	*Neoligia semicana*	SC		
Pitcher Plant Borer	*Papaipema appassionata*	T		
Ostrich Fern Borer	*Papaipema* sp. 2	SC		Undescribed species near P. pterisii
Chain Fern Borer	*Papaipema stenocelis*	T		

Water-willow Stem Borer	*Papaipema sulphurata*	T		
Spartina Borer	*Photedes inops*	SC		
Mustard White	*Pieris oleracea*	T		
Pink Sallow Moth	*Psectraglaea carnosa*	SC		
Southern Ptichodis	*Ptichodis bistrigata*	T		
Orange Sallow Moth	*Pyrrhia aurantiago*	SC		
Pine Barrens Speranza	*Speranza exonerata*	SC		
Faded Gray Geometer	*Stenoporpia polygrammaria*	T		
Dune Noctuid Moth	*Sympistis riparia*	SC		
Pine Barrens Zale	*Zale lunifera*	SC		True *Z. lunifera,* sensu Schmidt (2010)
Pine Barrens Zanclognatha	*Zanclognatha martha*	SC		

List of Plants

Plants

Taxonomic Group	Common Name	Scientific Name	MA Status	Fed Status	Notes
Adiantaceae (Cliff Ferns)	Fragile Rock-brake	*Cryptogramma stelleri*	E		
Alismataceae (Arrowheads)	Wapato	*Sagittaria cuneata*	T		
Alismataceae (Arrowheads)	Estuary Arrowhead	*Sagittaria montevidensis* ssp. *spongiosa*	E		
Alismataceae (Arrowheads)	Terete Arrowhead	*Sagittaria teres*	SC		
Apiaceae (Parsleys, Angelicas)	Hemlock Parsley	*Conioselinum chinense*	SC		
Apiaceae (Parsleys, Angelicas)	Saltpond Pennywort	*Hydrocotyle verticillata*	T		
Apiaceae (Parsleys, Angelicas)	Canadian Sanicle	*Sanicula canadensis*	T		
Apiaceae (Parsleys, Angelicas)	Long-styled Sanicle	*Sanicula odorata*	T		
Aquifoliaceae (Hollies)	Mountain Winterberry	*Ilex montana*	E		
Araceae (Arums)	Green Dragon	*Arisaema dracontium*	T		
Araceae (Arums)	Golden Club	*Orontium aquaticum*	E		
Araliaceae (Ginsengs)	Ginseng	*Panax quinquefolius*	SC		
Asclepiadaceae (Milkweeds)	Purple Milkweed	*Asclepias purpurascens*	E		
Asclepiadaceae (Milkweeds)	Linear-leaved Milkweed	*Asclepias verticillata*	T		
Aspleniaceae (Spleenworts)	Mountain Spleenwort	*Asplenium montanum*	E		
Aspleniaceae (Spleenworts)	Wall-rue Spleenwort	*Asplenium ruta-muraria*	T		
Asteraceae (Asters, Composites)	Lesser Snakeroot	*Ageratina aromatica*	E		
Asteraceae (Asters, Composites)	Eaton's Beggar-ticks	*Bidens eatonii*	E		
Asteraceae (Asters, Composites)	Estuary Beggar-ticks	*Bidens hyperborea*	E		

Asteraceae (Asters, Composites)	Cornel-leaved Aster	*Doellingeria infirma*	E		
Asteraceae (Asters, Composites)	New England Boneset	*Eupatorium novae-angliae*	E		
Asteraceae (Asters, Composites)	Purple Cudweed	*Gamochaeta purpurea*	E		
Asteraceae (Asters, Composites)	New England Blazing Star	*Liatris scariosa* var. *novae-angliae*	SC		
Asteraceae (Asters, Composites)	Lion's Foot	*Nabalus serpentarius*	E		
Asteraceae (Asters, Composites)	Upland White Aster	*Oligoneuron album*	E		
Asteraceae (Asters, Composites)	Sweet Coltsfoot	*Petasites frigidus* var. *palmatus*	E		
Asteraceae (Asters, Composites)	Sclerolepis	*Sclerolepis uniflora*	E		
Asteraceae (Asters, Composites)	Large-leaved Goldenrod	*Solidago macrophylla*	SC		
Asteraceae (Asters, Composites)	Rand's Goldenrod	*Solidago simplex* ssp. *randii* var. *monticola*	E		
Asteraceae (Asters, Composites)	Eastern Silvery Aster	*Symphyotrichum concolor*	E		
Asteraceae (Asters, Composites)	Crooked-stem Aster	*Symphyotrichum prenanthoides*	SC		
Asteraceae (Asters, Composites)	Tradescant's Aster	*Symphyotrichum tradescantii*	T		
Betulaceae (Birches, Alders)	Mountain Alder	*Alnus viridis* ssp. *crispa*	SC		
Betulaceae (Birches, Alders)	Swamp Birch	*Betula pumila*	E		
Boraginaceae (Borages)	Northern Wild Comfrey	*Cynoglossum virginianum* var. *boreale*	E		
Boraginaceae (Borages)	Oysterleaf	*Mertensia maritima*	E		
Brassicaceae (Mustards)	Lyre-leaved Rock-cress	*Arabidopsis lyrata*	E		
Brassicaceae (Mustards)	Smooth Rock-cress	*Boechera laevigata*	SC		
Brassicaceae (Mustards)	Green Rock-cress	*Boechera missouriensis*	T		
Brassicaceae (Mustards)	Fen Cuckoo Flower	*Cardamine dentata*	T		
Brassicaceae	Purple Cress	*Cardamine douglassii*	E		

(Mustards)					
Brassicaceae (Mustards)	Long's Bitter-cress	*Cardamine longii*	E		
Cactaceae (Cacti)	Prickly Pear	*Opuntia humifusa*	E		
Campanulaceae (Bluebells, Lobelias)	Great Blue Lobelia	*Lobelia siphilitica*	E		
Caprifoliaceae (Honeysuckles)	Hairy Honeysuckle	*Lonicera hirsuta*	E		
Caprifoliaceae (Honeysuckles)	American Twinflower	*Linnaea borealis* ssp. *americana*	SC		
Caprifoliaceae (Honeysuckles)	Snowberry	*Symphoricarpos albus* var. *albus*	E		
Caprifoliaceae (Honeysuckles)	Broad Tinker's-weed	*Triosteum perfoliatum*	E		
Caprifoliaceae (Honeysuckles)	Downy Arrow-wood	*Viburnum rafinesquianum*	E		
Caryophyllaceae (Pinks, Sandworts)	Nodding Chickweed	*Cerastium nutans*	E		
Caryophyllaceae (Pinks, Sandworts)	Michaux's Sandwort	*Minuartia michauxii*	T		
Caryophyllaceae (Pinks, Sandworts)	Large-leaved Sandwort	*Moehringia macrophylla*	E		
Caryophyllaceae (Pinks, Sandworts)	Silverling	*Paronychia argyrocoma*	E		
Celastraceae (Staff Tree Family)	American Bittersweet	*Celastrus scandens*	T		
Chenopodiaceae (Saltworts)	Fogg's Goosefoot	*Chenopodium foggii*	E		
Chenopodiaceae (Saltworts)	American Sea-blite	*Suaeda calceoliformis*	SC		
Cistaceae (Rockroses, Pinweeds)	Beaded Pinweed	*Lechea pulchella* var. *moniliformis*	E		
Clusiaceae (St. John's-worts)	Creeping St. John's-wort	*Hypericum adpressum*	T		
Clusiaceae (St. John's-worts)	Giant St. John's-wort	*Hypericum ascyron*	E		
Clusiaceae (St. John's-worts)	St. Andrew's Cross	*Hypericum stragulum*	E		
Convolvulaceae (Morning Glories)	Low Bindweed	*Calystegia spithamaea*	E		
Crassulaceae (Sedums)	Pygmyweed	*Crassula aquatica*	T		

Cupressaceae (Cedars, Junipers)	Arborvitae	*Thuja occidentalis*	E		
Cyperaceae (Sedges)	Foxtail Sedge	*Carex alopecoidea*	T		
Cyperaceae (Sedges)	Back's Sedge	*Carex backii*	E		
Cyperaceae (Sedges)	Bailey's Sedge	*Carex baileyi*	T		
Cyperaceae (Sedges)	Bush's Sedge	*Carex bushii*	E		
Cyperaceae (Sedges)	Chestnut-colored Sedge	*Carex castanea*	E		
Cyperaceae (Sedges)	Creeping Sedge	*Carex chordorrhiza*	E		
Cyperaceae (Sedges)	Davis' Sedge	*Carex davisii*	E		
Cyperaceae (Sedges)	Handsome Sedge	*Carex formosa*	T		
Cyperaceae (Sedges)	Glaucescent Sedge	*Carex glaucodea*	E		
Cyperaceae (Sedges)	Slender Woodland Sedge	*Carex gracilescens*	E		
Cyperaceae (Sedges)	Gray's Sedge	*Carex grayi*	T		
Cyperaceae (Sedges)	Hitchcock's Sedge	*Carex hitchcockiana*	SC		
Cyperaceae (Sedges)	Shore Sedge	*Carex lenticularis*	T		
Cyperaceae (Sedges)	Glaucous Sedge	*Carex livida*	E		
Cyperaceae (Sedges)	False Hop-sedge	*Carex lupuliformis*	E		
Cyperaceae (Sedges)	Midland Sedge	*Carex mesochorea*	E		
Cyperaceae (Sedges)	Michaux's Sedge	*Carex michauxiana*	E		
Cyperaceae (Sedges)	Mitchell's Sedge	*Carex mitchelliana*	T		
Cyperaceae (Sedges)	Rich Woods Sedge	*Carex oligocarpa*	T		
Cyperaceae (Sedges)	Few-seeded Sedge	*Carex oligosperma*	E		
Cyperaceae (Sedges)	Few-flowered Sedge	*Carex pauciflora*	E		
Cyperaceae (Sedges)	Variable Sedge	*Carex polymorpha*	E		
Cyperaceae	Schweinitz's Sedge	*Carex schweinitzii*	E		

(Sedges)					
Cyperaceae (Sedges)	Dioecious Sedge	*Carex sterilis*	T		
Cyperaceae (Sedges)	Walter's Sedge	*Carex striata*	E		
Cyperaceae (Sedges)	Fen Sedge	*Carex tetanica*	SC		
Cyperaceae (Sedges)	Hairy-fruited Sedge	*Carex trichocarpa*	SC		
Cyperaceae (Sedges)	Tuckerman's Sedge	*Carex tuckermanii*	E		
Cyperaceae (Sedges)	Cat-tail Sedge	*Carex typhina*	T		
Cyperaceae (Sedges)	Engelmann's Umbrella-sedge	*Cyperus engelmannii*	T		
Cyperaceae (Sedges)	Houghton's Flatsedge	*Cyperus houghtonii*	E		
Cyperaceae (Sedges)	Wright's Spike-rush	*Eleocharis diandra*	E		
Cyperaceae (Sedges)	Intermediate Spike-sedge	*Eleocharis intermedia*	T		
Cyperaceae (Sedges)	Tiny-fruited Spike-rush or Spike-sedge	*Eleocharis microcarpa* var. *filiculmis*	E		
Cyperaceae (Sedges)	Ovate Spike-rush or Spike-sedge	*Eleocharis ovata*	E		
Cyperaceae (Sedges)	Few-flowered Spike-sedge	*Eleocharis quinqueflora*	E		
Cyperaceae (Sedges)	Three-angled Spike-sedge	*Eleocharis tricostata*	E		
Cyperaceae (Sedges)	Slender Cotton-grass	*Eriophorum gracile*	T		
Cyperaceae (Sedges)	Dwarf Bulrush	*Lipocarpha micrantha*	T		
Cyperaceae (Sedges)	Capillary Beak-sedge	*Rhynchospora capillacea*	E		
Cyperaceae (Sedges)	Inundated Horned-sedge	*Rhynchospora inundata*	T		
Cyperaceae (Sedges)	Short-beaked Bald-sedge	*Rhynchospora nitens*	T		
Cyperaceae (Sedges)	Long-beaked Bald-sedge	*Rhynchospora scirpoides*	SC		
Cyperaceae (Sedges)	Torrey's Beak-sedge	*Rhynchospora torreyana*	E		
Cyperaceae (Sedges)	Northeastern Bulrush	*Scirpus ancistrochaetus*	E	E	
Cyperaceae	Long's Bulrush	*Scirpus longii*	T		

(Sedges)					
Cyperaceae (Sedges)	Papillose Nut-sedge	*Scleria pauciflora*	E		Includes s.p. var. pauciflora and s.p. var. caroliniana
Cyperaceae (Sedges)	Tall Nut-sedge	*Scleria triglomerata*	E		
Dryopteridaceae (Wood Ferns)	Braun's Holly-fern	*Polystichum braunii*	E		
Dryopteridaceae (Wood Ferns)	Smooth Woodsia	*Woodsia glabella*	E		
Elatinaceae (Waterworts)	American Waterwort	*Elatine americana*	E		
Equisetaceae (Horsetails)	Dwarf Scouring-rush	*Equisetum scirpoides*	SC		
Ericaceae (Laurels, Blueberries)	Pink Pyrola	*Pyrola asarifolia* ssp. *asarifolia*	E		
Ericaceae (Laurels, Blueberries)	One-flowered Pyrola	*Moneses uniflora*	SC		
Ericaceae (Laurels, Blueberries)	Great Laurel	*Rhododendron maximum*	T		
Ericaceae (Laurels, Blueberries)	Mountain Cranberry	*Vaccinium vitis-idaea* ssp. *minus*	E		
Eriocaulaceae (Pipeworts)	Parker's Pipewort	*Eriocaulon parkeri*	E		
Fabaceae (Beans, Peas, Clovers)	Large-bracted Tick-trefoil	*Desmodium cuspidatum*	T		
Fabaceae (Beans, Peas, Clovers)	Wild Senna	*Senna hebecarpa*	E		
Fagaceae (Oaks, Beeches)	Bur Oak	*Quercus macrocarpa*	SC		
Fagaceae (Oaks, Beeches)	Yellow Oak	*Quercus muehlenbergii*	T		
Fumariaceae (Fumitories)	Climbing Fumitory	*Adlumia fungosa*	SC		
Gentianaceae (Gentians)	Andrews' Bottle Gentian	*Gentiana andrewsii*	E		
Gentianaceae (Gentians)	Spurred Gentian	*Halenia deflexa*	E		
Gentianaceae (Gentians)	Slender Marsh Pink	*Sabatia campanulata*	E		
Gentianaceae (Gentians)	Plymouth Gentian	*Sabatia kennedyana*	SC		
Gentianaceae (Gentians)	Sea Pink	*Sabatia stellaris*	E		

Grossulariaceae (Currants)	Bristly Black Currant	*Ribes lacustre*	SC		
Haemodoraceae (Redroots)	Redroot	*Lachnanthes caroliana*	SC		
Haloragaceae (Water-milfoils)	Alternate-flowered Water-milfoil	*Myriophyllum alterniflorum*	E		
Haloragaceae (Water-milfoils)	Farwell's Water-milfoil	*Myriophyllum farwellii*	E		
Haloragaceae (Water-milfoils)	Pinnate Water-milfoil	*Myriophyllum pinnatum*	SC		
Haloragaceae (Water-milfoils)	Comb Water-milfoil	*Myriophyllum verticillatum*	E		
Hydrophyllaceae (Waterleaves)	Broad Waterleaf	*Hydrophyllum canadense*	E		
Hymenophyllaceae (Filmy-ferns)	Appalachian Bristle-fern	*Trichomanes intricatum*	E		
Iridaceae (Irises)	Sandplain Blue-eyed Grass	*Sisyrinchium fuscatum*	SC		
Iridaceae (Irises)	Slender Blue-eyed Grass	*Sisyrinchium mucronatum*	E		
Isoetaceae (Quillworts)	Acadian Quillwort	*Isoetes acadiensis*	E		
Isoetaceae (Quillworts)	Lake Quillwort	*Isoetes lacustris*	E		
Juncaceae (Rushes)	Weak Rush	*Juncus debilis*	E		
Juncaceae (Rushes)	Thread Rush	*Juncus filiformis*	E		
Juncaceae (Rushes)	Black-fruited Woodrush	*Luzula parviflora* ssp. *melanocarpa*	E		
Lamiaceae (Mints)	Purple Giant-hyssop	*Agastache scrophulariifolia*	E		
Lamiaceae (Mints)	Downy Wood-mint	*Blephilia ciliata*	E		
Lamiaceae (Mints)	Hairy Wood-mint	*Blephilia hirsuta*	E		
Lamiaceae (Mints)	Gypsywort	*Lycopus rubellus*	E		
Lamiaceae (Mints)	False Pennyroyal	*Trichostema brachiatum*	E		
Lentibulariaceae (Bladderworts)	Resupinate Bladderwort	*Utricularia resupinata*	T		
Lentibulariaceae (Bladderworts)	Subulate Bladderwort	*Utricularia subulata*	SC		
Liliaceae (Lilies)	Devil's-bit	*Chamaelirium luteum*	E		
Linaceae (Flaxes)	Rigid Flax	*Linum medium* var. *texanum*	T		
Lycopodiaceae (Clubmosses)	Foxtail Clubmoss	*Lycopodiella alopecuroides*	E		

Lycopodiaceae (Clubmosses)	Appalachian Firmoss	*Huperzia appressa*	E		
Lycopodiaceae (Clubmosses)	Mountain Firmoss	*Huperzia selago*	E		
Lythraceae (Loosestrifes)	Toothcup	*Rotala ramosior*	E		
Magnoliaceae (Magnolias)	Sweetbay Magnolia	*Magnolia virginiana*	E		
Melastomataceae (Meadow Beauties)	Maryland Meadow Beauty	*Rhexia mariana*	E		
Moraceae (Mulberries)	Red Mulberry	*Morus rubra*	E		
Nymphaeaceae (Water Lilies)	Tiny Cow-lily	*Nuphar microphylla*	E		
Onagraceae (Evening Primroses)	Many-fruited False-loosestrife	*Ludwigia polycarpa*	E		
Onagraceae (Evening Primroses)	Round-fruited False-loosestrife	*Ludwigia sphaerocarpa*	E		
Ophioglossaceae (Grape Ferns)	Adder's-tongue Fern	*Ophioglossum pusillum*	T		
Orchidaceae (Orchids)	Putty-root	*Aplectrum hyemale*	E		
Orchidaceae (Orchids)	Arethusa	*Arethusa bulbosa*	T		
Orchidaceae (Orchids)	Autumn Coralroot	*Corallorhiza odontorhiza*	SC		
Orchidaceae (Orchids)	Ram's-head Lady's-slipper	*Cypripedium arietinum*	E		
Orchidaceae (Orchids)	Yellow Lady's-slipper	*Cypripedium parviflorum*	E		
Orchidaceae (Orchids)	Showy Lady's-slipper	*Cypripedium reginae*	E		
Orchidaceae (Orchids)	Dwarf Rattlesnake-plantain	*Goodyera repens*	E		
Orchidaceae (Orchids)	Small Whorled Pogonia	*Isotria medeoloides*	E	T	
Orchidaceae (Orchids)	Lily-leaf Twayblade	*Liparis liliifolia*	T		
Orchidaceae (Orchids)	Heartleaf Twayblade	*Listera cordata*	E		
Orchidaceae (Orchids)	Bayard's Green Adder's-mouth	*Malaxis bayardii*	E		
Orchidaceae (Orchids)	White Adder's-mouth	*Malaxis monophyllos* var. *brachypoda*	E		

Orchidaceae (Orchids)	Green Adder's Mouth	*Malaxis unifolia*	T		
Orchidaceae (Orchids)	Southern Twayblade	*Neottia bifolia*	T		
Orchidaceae (Orchids)	Crested Fringed Orchid	*Platanthera cristata*	E		
Orchidaceae (Orchids)	Leafy White Orchis	*Platanthera dilatata*	T		
Orchidaceae (Orchids)	Pale Green Orchis	*Platanthera flava* var. *herbiola*	T		
Orchidaceae (Orchids)	Hooded Ladies'-tresses	*Spiranthes romanzoffiana*	E		
Orchidaceae (Orchids)	Grass-leaved Ladies'-tresses	*Spiranthes vernalis*	T		
Orchidaceae (Orchids)	Cranefly Orchid	*Tipularia discolor*	E		
Orchidaceae (Orchids)	Nodding Pogonia	*Triphora trianthophora*	E		
Oxalidaceae (Wood-sorrels)	Violet Wood-sorrel	*Oxalis violacea*	E		
Poaceae (Grasses)	Annual Peanutgrass	*Amphicarpum amphicarpon*	E		
Poaceae (Grasses)	Purple Needlegrass	*Aristida purpurascens*	T		
Poaceae (Grasses)	Seabeach Needlegrass	*Aristida tuberculosa*	T		
Poaceae (Grasses)	Reed Bentgrass	*Calamagrostis pickeringii*	E		
Poaceae (Grasses)	New England Northern Reedgrass	*Calamagrostis stricta* ssp. *inexpansa*	E		
Poaceae (Grasses)	Tufted Hairgrass	*Deschampsia cespitosa* ssp. *glauca*	E		
Poaceae (Grasses)	Mattamuskeet Panic-grass	*Dichanthelium dichotomum* ssp. *mattamuskeetense*	E		
Poaceae (Grasses)	Commons's Panic-grass	*Dichanthelium ovale* ssp. *pseudopubescens*	SC		
Poaceae (Grasses)	Rough Panic-grass	*Dichanthelium scabriusculum*	T		
Poaceae (Grasses)	Wright's Panic-grass	*Dichanthelium wrightianum*	SC		
Poaceae (Grasses)	Hairy Wild Rye	*Elymus villosus*	E		
Poaceae (Grasses)	Frank's Lovegrass	*Eragrostis frankii*	SC		
Poaceae (Grasses)	Saltpond Grass	*Leptochloa fusca* ssp. *fascicularis*	T		
Poaceae (Grasses)	Sea Lyme-grass	*Leymus mollis*	E		

Poaceae (Grasses)	Woodland Millet	*Milium effusum*	T		
Poaceae (Grasses)	Gattinger's Panic-grass	*Panicum philadelphicum* ssp. *gattingeri*	SC		
Poaceae (Grasses)	Philadelphia Panic-grass	*Panicum philadelphicum* ssp. *philadelphicum*	SC		
Poaceae (Grasses)	Long-leaved Panic-grass	*Panicum rigidulum* ssp. *pubescens*	T		
Poaceae (Grasses)	Drooping Speargrass	*Poa saltuensis* ssp. *languida*	E		
Poaceae (Grasses)	Bristly Foxtail	*Setaria parviflora*	SC		
Poaceae (Grasses)	Salt Reedgrass	*Spartina cynosuroides*	T		
Poaceae (Grasses)	Shining Wedgescale	*Sphenopholis nitida*	T		
Poaceae (Grasses)	Swamp Oats	*Sphenopholis pensylvanica*	T		
Poaceae (Grasses)	Small Dropseed	*Sporobolus neglectus*	E		
Poaceae (Grasses)	Northern Gama-grass	*Tripsacum dactyloides*	E		
Poaceae (Grasses)	Spiked False-oats	*Trisetum spicatum*	E		
Polygonaceae (Docks, Knotweeds)	Pondshore Knotweed	*Persicaria puritanorum*	SC		
Polygonaceae (Docks, Knotweeds)	Strigose Knotweed	*Persicaria setacea*	T		
Polygonaceae (Docks, Knotweeds)	Sea-beach Knotweed	*Polygonum glaucum*	SC		
Polygonaceae (Docks, Knotweeds)	Seabeach Dock	*Rumex pallidus*	T		
Polygonaceae (Docks, Knotweeds)	Swamp Dock	*Rumex verticillatus*	T		
Portulacaceae (Spring Beauties)	Narrow-leaved Spring Beauty	*Claytonia virginica*	E		
Potamogetonaceae (Pondweeds)	Algae-like Pondweed	*Potamogeton confervoides*	T		
Potamogetonaceae (Pondweeds)	Fries' Pondweed	*Potamogeton friesii*	E		
Potamogetonaceae (Pondweeds)	Hill's Pondweed	*Potamogeton hillii*	SC		
Potamogetonaceae (Pondweeds)	Ogden's Pondweed	*Potamogeton ogdenii*	E		
Potamogetonaceae (Pondweeds)	Straight-leaved Pondweed	*Potamogeton strictifolius*	E		
Potamogetonaceae (Pondweeds)	Vasey's Pondweed	*Potamogeton vaseyi*	E		
Ranunculaceae (Buttercups)	Black Cohosh	*Actaea racemosa*	E		

Ranunculaceae (Buttercups)	Purple Clematis	*Clematis occidentalis*	SC		
Ranunculaceae (Buttercups)	Golden Seal	*Hydrastis canadensis*	E		
Ranunculaceae (Buttercups)	Tiny-flowered Buttercup	*Ranunculus micranthus*	E		
Ranunculaceae (Buttercups)	Bristly Buttercup	*Ranunculus pensylvanicus*	SC		
Rosaceae (Roses, Shadbushes)	Small-flowered Agrimony	*Agrimonia parviflora*	E		
Rosaceae (Roses, Shadbushes)	Hairy Agrimony	*Agrimonia pubescens*	T		
Rosaceae (Roses, Shadbushes)	Bartram's Shadbush	*Amelanchier bartramiana*	T		
Rosaceae (Roses, Shadbushes)	Roundleaf Shadbush	*Amelanchier sanguinea*	SC		
Rosaceae (Roses, Shadbushes)	Bicknell's Hawthorn	*Crataegus bicknellii*	E		
Rosaceae (Roses, Shadbushes)	Barren Strawberry	*Geum fragarioides*	SC		
Rosaceae (Roses, Shadbushes)	Sandbar Cherry	*Prunus pumila* var. *depressa*	T		
Rosaceae (Roses, Shadbushes)	Northern Prickly Rose	*Rosa acicularis* ssp. *sayi*	E		
Rosaceae (Roses, Shadbushes)	Northern Mountain-ash	*Sorbus decora*	E		
Rubiaceae (Bedstraws, Bluets)	Northern Bedstraw	*Galium boreale*	E		
Rubiaceae (Bedstraws, Bluets)	Labrador Bedstraw	*Galium labradoricum*	T		
Rubiaceae (Bedstraws, Bluets)	Long-leaved Bluet	*Houstonia longifolia*	E		
Salicaceae (Willows)	Swamp Cottonwood	*Populus heterophylla*	E		
Salicaceae (Willows)	Sandbar Willow	*Salix exigua* ssp. *interior*	T		
Scheuchzeriaceae (Pod-grasses)	Pod-grass	*Scheuchzeria palustris*	E		
Schizaeaceae (Climbing Ferns)	Climbing Fern	*Lygodium palmatum*	SC		
Scrophulariaceae (Figworts)	Sandplain Gerardia	*Agalinis acuta*	E	E	
Scrophulariaceae (Figworts)	Winged Monkey-flower	*Mimulus alatus*	E		

Scrophularceae (Figworts)	Muskflower	*Mimulus moschatus*	T		
Scrophulariaceae (Figworts)	Swamp Lousewort	*Pedicularis lanceolata*	E		
Scrophulariaceae (Figworts)	Hairy Beardtongue	*Penstemon hirsutus*	E		
Scrophulariaceae (Figworts)	Sessile Water-speedwell	*Veronica catenata*	E		
Scrophulariaceae (Figworts)	Culver's-root	*Veronicastrum virginicum*	T		
Sparganiaceae (Bur-reeds)	Small Bur-reed	*Sparganium natans*	E		
Verbenaceae (Vervains)	Narrow-leaved Vervain	*Verbena simplex*	E		
Violaceae (Violets)	Sand Violet	*Viola adunca*	SC		
Violaceae (Violets)	Britton's Violet	*Viola brittoniana*	T		
Viscaceae (Christmas-mistletoes)	Dwarf Mistletoe	*Arceuthobium pusillum*	SC		

MassDEP - Bureau of Waste Site Cleanup

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

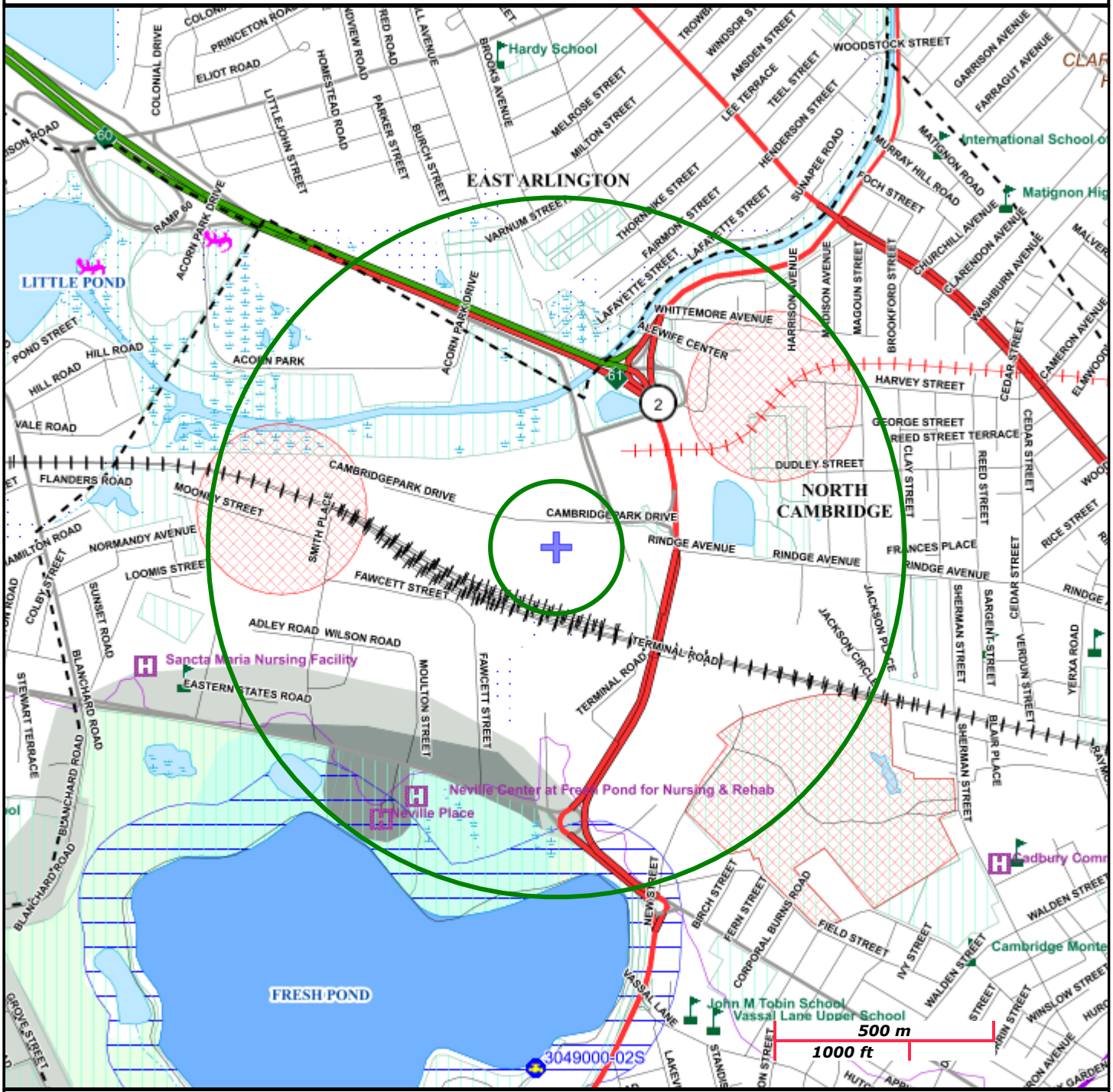
Site Information:

32 CAMBRIDGEPARK DRIVE CAMBRIDGE, MA

NAD83 UTM Meters:
4695763mN , 323545mE (Zone: 19)
May 6, 2019

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

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection



Roads: Limited Access, Divided, Other Hwy, Major Road, Minor Road, Track, Trail

Boundaries: Town, County, DEP Region; Train; Powerline; Pipeline; Aqueduct

Basins: Major, PWS; Streams: Perennial, Intermittent, Man Made Shore, Dam

Aquifers: Medium Yield, High Yield, EPA Sole Source

Non Potential Drinking Water Source Area: Medium, High (Yield)

PWS Protection Areas: Zone II, IWPA, Zone A

Hydrography: Open Water, PWS Reservoir, Tidal Flat

Wetlands: Freshwater, Saltwater, Cranberry Bog

FEMA 100yr Floodplain; Protected Open Space; ACEC

Est. Rare Wetland Wildlife Hab; Vernal Pool: Cert., Potential

Solid Waste Landfill; PWS: Com.GW,SW, Emerg., Non-Com.

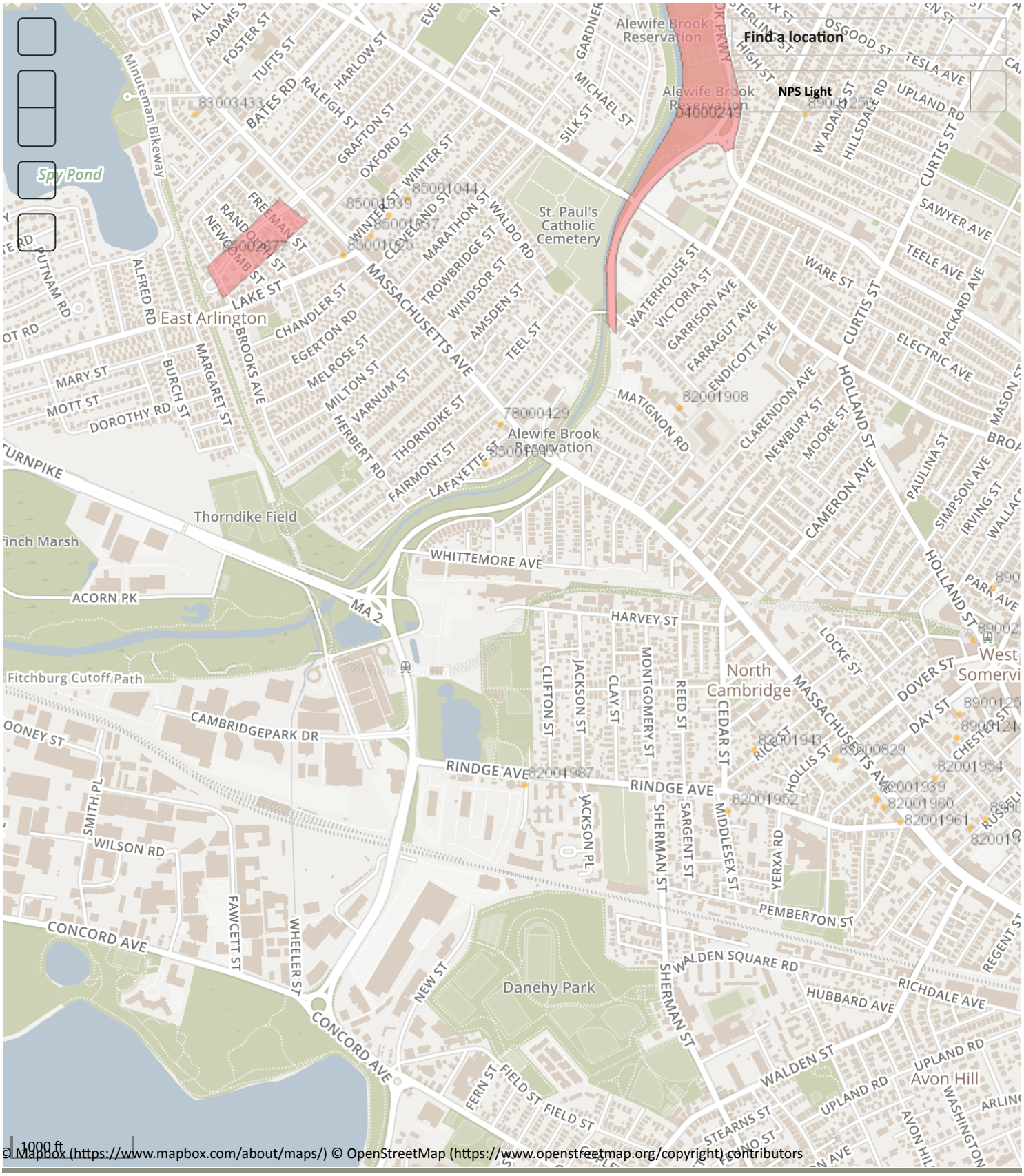
APPENDIX E

National Historic Preservation Act Review

National Register of Histori...

National Park Service
U.S. Department of the Interior

Public, non-restricted data depicting National Register spatial data proce...



Massachusetts Cultural Resource Information System

MACRIS

MACRIS Search Results

Search Criteria: Town(s): Cambridge; Street Name: Cambridgepark Dr; Resource Type(s): Area, Building, Object, Burial Ground, Structure;

Inv. No.	Property Name	Street	Town	Year

Massachusetts Cultural Resource Information System

MACRIS

MACRIS Search Results

Search Criteria: Town(s): Cambridge; Place: North Cambridge; Resource Type(s): Building, Area, Burial Ground, Object, Structure;

Inv. No.	Property Name	Street	Town	Year
CAM.101	Kingsley, Chester House	10 Chester St	Cambridge	1866
CAM.910	Fitchburg Railroad Signal Bridge	Fitchburg Railroad	Cambridge	c 1930
CAM.1383	Chadwick, Samuel E. House	10 Hollis St	Cambridge	1853
CAM.245	Henderson Carriage Repository	2067-2089 Massachusetts Ave	Cambridge	1892
CAM.247	Mead, Alpheus House	2200 Massachusetts Ave	Cambridge	1867
CAM.248	Snow, Daniel House	2210 Massachusetts Ave	Cambridge	1868
CAM.249	McLean, Isaac House	2218 Massachusetts Ave	Cambridge	1894
CAM.250	Farwell, R. H. Double House	2222-2224 Massachusetts Ave	Cambridge	1891
CAM.251	Saint John's Roman Catholic Church	2270 Massachusetts Ave	Cambridge	1904
CAM.301		59 Rice St	Cambridge	1847
CAM.306	Soule, Lawrence Porter House	11 Russell St	Cambridge	1879

APPENDIX F

Laboratory Data Reports

ANALYTICAL REPORT

Lab Number:	L1904244
Client:	Haley & Aldrich, Inc. 465 Medford Street, Suite 2200 Charlestown, MA 02129-1400
ATTN:	Lee Vanzler
Phone:	(617) 886-7561
Project Name:	50 CAMBRIDGEPARK DR.
Project Number:	131188-005
Report Date:	02/12/19

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: 50 CAMBRIDGEPARK DR.
Project Number: 131188-005

Lab Number: L1904244
Report Date: 02/12/19

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1904244-01	HA17-GP4 OW	WATER	CAMBRIDGE, MA	02/01/19 12:00	02/01/19
L1904244-02	OUTFALL	WATER	CAMBRIDGE, MA	02/01/19 13:00	02/01/19

Project Name:	50 CAMBRIDGEPARK DR.	**Lab Number:**	L1904244
Project Number:	131188-005	**Report Date:**	02/12/19

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	50 CAMBRIDGEPARK DR.	**Lab Number:**	L1904244
Project Number:	131188-005	**Report Date:**	02/12/19

Case Narrative (continued)

Report Submission

February 12, 2019: This final report includes the results of all requested analyses.

February 07, 2019: This is a preliminary report.

The analysis of Ethanol was subcontracted. A copy of the laboratory report is included as an addendum.

Please note: This data is only available in PDF format and is not available on Data Merger.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Michelle M. Morris

Title: Technical Director/Representative Date: 02/12/19

ORGANICS

VOLATILES

Project Name: 50 CAMBRIDGEPARK DR.
Lab Number: L1904244
Project Number: 131188-005
Report Date: 02/12/19

SAMPLE RESULTS

Lab ID: L1904244-01
Client ID: HA17-GP4 OW
Sample Location: CAMBRIDGE, MA
Date Collected: 02/01/19 12:00
Date Received: 02/01/19
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1
Analytical Date: 02/04/19 18:42
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	1.0	--	1
1,1-Dichloroethane	ND		ug/l	1.5	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.5	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
1,2-Dichloroethane	ND		ug/l	1.5	--	1
1,1,1-Trichloroethane	ND		ug/l	2.0	--	1
Benzene	ND		ug/l	1.0	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	5.0	--	1
1,3-Dichlorobenzene	ND		ug/l	5.0	--	1
1,4-Dichlorobenzene	ND		ug/l	5.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
Acetone	ND		ug/l	10	--	1
Methyl tert butyl ether	ND		ug/l	10	--	1
Tert-Butyl Alcohol	ND		ug/l	100	--	1
Tertiary-Amyl Methyl Ether	ND		ug/l	20	--	1

Project Name: 50 CAMBRIDGEPARK DR. **Lab Number:** L1904244

Project Number: 131188-005 **Report Date:** 02/12/19

SAMPLE RESULTS

Lab ID: L1904244-01 Date Collected: 02/01/19 12:00

Client ID: HA17-GP4 OW Date Received: 02/01/19

Sample Location: CAMBRIDGE, MA Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	95		60-140
Fluorobenzene	106		60-140
4-Bromofluorobenzene	99		60-140

Project Name: 50 CAMBRIDGEPARK DR.
Lab Number: L1904244
Project Number: 131188-005
Report Date: 02/12/19

SAMPLE RESULTS

Lab ID: L1904244-01
Client ID: HA17-GP4 OW
Sample Location: CAMBRIDGE, MA

Date Collected: 02/01/19 12:00
Date Received: 02/01/19
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1-SIM
Analytical Date: 02/04/19 18:42
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS-SIM - Westborough Lab						
1,4-Dioxane	ND		ug/l	50	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Fluorobenzene	116		60-140
4-Bromofluorobenzene	74		60-140

Project Name: 50 CAMBRIDGEPARK DR.
Lab Number: L1904244
Project Number: 131188-005
Report Date: 02/12/19

SAMPLE RESULTS

Lab ID: L1904244-01
Client ID: HA17-GP4 OW
Sample Location: CAMBRIDGE, MA

Date Collected: 02/01/19 12:00
Date Received: 02/01/19
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 14,504.1
Analytical Date: 02/07/19 13:11
Analyst: AWS

Extraction Method: EPA 504.1
Extraction Date: 02/07/19 11:16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Microextractables by GC - Westborough Lab							
1,2-Dibromoethane	ND		ug/l	0.010	--	1	A
1,2-Dibromo-3-chloropropane	ND		ug/l	0.010	--	1	A

Project Name: 50 CAMBRIDGEPARK DR. **Lab Number:** L1904244

Project Number: 131188-005 **Report Date:** 02/12/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1-SIM
Analytical Date: 02/04/19 17:29
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01 Batch: WG1203299-8					
1,4-Dioxane	ND		ug/l	50	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Fluorobenzene	117		60-140
4-Bromofluorobenzene	74		60-140

Project Name: 50 CAMBRIDGEPARK DR. **Lab Number:** L1904244

Project Number: 131188-005 **Report Date:** 02/12/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 02/04/19 17:29
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1203459-8					
Methylene chloride	ND		ug/l	1.0	--
1,1-Dichloroethane	ND		ug/l	1.5	--
Carbon tetrachloride	ND		ug/l	1.0	--
1,1,2-Trichloroethane	ND		ug/l	1.5	--
Tetrachloroethene	ND		ug/l	1.0	--
1,2-Dichloroethane	ND		ug/l	1.5	--
1,1,1-Trichloroethane	ND		ug/l	2.0	--
Benzene	ND		ug/l	1.0	--
Toluene	ND		ug/l	1.0	--
Ethylbenzene	ND		ug/l	1.0	--
Vinyl chloride	ND		ug/l	1.0	--
1,1-Dichloroethene	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--
1,2-Dichlorobenzene	ND		ug/l	5.0	--
1,3-Dichlorobenzene	ND		ug/l	5.0	--
1,4-Dichlorobenzene	ND		ug/l	5.0	--
p/m-Xylene	ND		ug/l	2.0	--
o-xylene	ND		ug/l	1.0	--
Xylenes, Total	ND		ug/l	1.0	--
Acetone	ND		ug/l	10	--
Methyl tert butyl ether	ND		ug/l	10	--
Tert-Butyl Alcohol	ND		ug/l	100	--
Tertiary-Amyl Methyl Ether	ND		ug/l	20	--

Project Name: 50 CAMBRIDGEPARK DR.
Project Number: 131188-005
Lab Number: L1904244
Report Date: 02/12/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 02/04/19 17:29
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1203459-8					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	95		60-140
Fluorobenzene	107		60-140
4-Bromofluorobenzene	96		60-140

Project Name: 50 CAMBRIDGEPARK DR.
Project Number: 131188-005
Lab Number: L1904244
Report Date: 02/12/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 14,504.1
Analytical Date: 02/07/19 12:00
Analyst: AWS

Extraction Method: EPA 504.1
Extraction Date: 02/07/19 11:16

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 01 Batch: WG1204559-1						
1,2-Dibromoethane	ND		ug/l	0.010	--	A
1,2-Dibromo-3-chloropropane	ND		ug/l	0.010	--	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: 50 CAMBRIDGEPARK DR.

Project Number: 131188-005

Lab Number: L1904244

Report Date: 02/12/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01 Batch: WG1203299-7								
1,4-Dioxane	110		-		60-140	-		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Fluorobenzene	117				60-140
4-Bromofluorobenzene	75				60-140

Lab Control Sample Analysis

Batch Quality Control

Project Name: 50 CAMBRIDGEPARK DR.

Project Number: 131188-005

Lab Number: L1904244

Report Date: 02/12/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1203459-7								
Methylene chloride	90		-		60-140	-		28
1,1-Dichloroethane	90		-		50-150	-		49
Carbon tetrachloride	105		-		70-130	-		41
1,1,2-Trichloroethane	85		-		70-130	-		45
Tetrachloroethene	85		-		70-130	-		39
1,2-Dichloroethane	100		-		70-130	-		49
1,1,1-Trichloroethane	100		-		70-130	-		36
Benzene	100		-		65-135	-		61
Toluene	90		-		70-130	-		41
Ethylbenzene	90		-		60-140	-		63
Vinyl chloride	95		-		5-195	-		66
1,1-Dichloroethene	90		-		50-150	-		32
cis-1,2-Dichloroethene	85		-		60-140	-		30
Trichloroethene	95		-		65-135	-		48
1,2-Dichlorobenzene	85		-		65-135	-		57
1,3-Dichlorobenzene	80		-		70-130	-		43
1,4-Dichlorobenzene	85		-		65-135	-		57
p/m-Xylene	88		-		60-140	-		30
o-xylene	85		-		60-140	-		30
Acetone	106		-		40-160	-		30
Methyl tert butyl ether	95		-		60-140	-		30
Tert-Butyl Alcohol	110		-		60-140	-		30
Tertiary-Amyl Methyl Ether	95		-		60-140	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: 50 CAMBRIDGEPARK DR.
Project Number: 131188-005

Lab Number: L1904244
Report Date: 02/12/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1203459-7								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Pentafluorobenzene	99				60-140
Fluorobenzene	107				60-140
4-Bromofluorobenzene	96				60-140

Lab Control Sample Analysis

Batch Quality Control

Project Name: 50 CAMBRIDGEPARK DR.

Project Number: 131188-005

Lab Number: L1904244

Report Date: 02/12/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab	Associated sample(s): 01		Batch: WG1204559-2						
1,2-Dibromoethane	100		-		80-120	-			A
1,2-Dibromo-3-chloropropane	92		-		80-120	-			A

Matrix Spike Analysis

Batch Quality Control

Project Name: 50 CAMBRIDGEPARK DR.

Project Number: 131188-005

Lab Number: L1904244

Report Date: 02/12/19

Parameter	*Native Sample*	*MS Added*	*MS Found*	*MS %Recovery*	*Qual*	*MSD Found*	*MSD %Recovery*	*Qual*	*Recovery Limits*	*RPD*	*Qual*	*RPD Limits*	*Column*
Microextractables by GC - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1204559-3 QC Sample: L1904083-01 Client ID: MS Sample													
1,2-Dibromoethane	ND	0.249	0.242	97		-	-		80-120	-		20	A
1,2-Dibromo-3-chloropropane	ND	0.249	0.232	93		-	-		80-120	-		20	A

SEMIVOLATILES

Project Name: 50 CAMBRIDGEPARK DR.
Lab Number: L1904244
Project Number: 131188-005
Report Date: 02/12/19

SAMPLE RESULTS

Lab ID: L1904244-01
Client ID: HA17-GP4 OW
Sample Location: CAMBRIDGE, MA

Date Collected: 02/01/19 12:00
Date Received: 02/01/19
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1
Analytical Date: 02/05/19 20:17
Analyst: CB

Extraction Method: EPA 625.1
Extraction Date: 02/05/19 09:37

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Bis(2-ethylhexyl)phthalate	ND		ug/l	2.2	--	1
Butyl benzyl phthalate	ND		ug/l	5.0	--	1
Di-n-butylphthalate	ND		ug/l	5.0	--	1
Di-n-octylphthalate	ND		ug/l	5.0	--	1
Diethyl phthalate	ND		ug/l	5.0	--	1
Dimethyl phthalate	ND		ug/l	5.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	72		42-122
2-Fluorobiphenyl	72		46-121
4-Terphenyl-d14	76		47-138

Project Name: 50 CAMBRIDGEPARK DR.
Lab Number: L1904244
Project Number: 131188-005
Report Date: 02/12/19

SAMPLE RESULTS

Lab ID: L1904244-01
Client ID: HA17-GP4 OW
Sample Location: CAMBRIDGE, MA

Date Collected: 02/01/19 12:00
Date Received: 02/01/19
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1-SIM
Analytical Date: 02/06/19 17:58
Analyst: DV

Extraction Method: EPA 625.1
Extraction Date: 02/05/19 09:35

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Acenaphthene	ND		ug/l	0.10	--	1
Fluoranthene	ND		ug/l	0.10	--	1
Naphthalene	0.11		ug/l	0.10	--	1
Benzo(a)anthracene	ND		ug/l	0.10	--	1
Benzo(a)pyrene	ND		ug/l	0.10	--	1
Benzo(b)fluoranthene	ND		ug/l	0.10	--	1
Benzo(k)fluoranthene	ND		ug/l	0.10	--	1
Chrysene	ND		ug/l	0.10	--	1
Acenaphthylene	ND		ug/l	0.10	--	1
Anthracene	ND		ug/l	0.10	--	1
Benzo(ghi)perylene	ND		ug/l	0.10	--	1
Fluorene	ND		ug/l	0.10	--	1
Phenanthrene	ND		ug/l	0.10	--	1
Dibenzo(a,h)anthracene	ND		ug/l	0.10	--	1
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	--	1
Pyrene	ND		ug/l	0.10	--	1
Pentachlorophenol	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	36		25-87
Phenol-d6	24		16-65
Nitrobenzene-d5	62		42-122
2-Fluorobiphenyl	51		46-121
2,4,6-Tribromophenol	66		45-128
4-Terphenyl-d14	47		47-138

Project Name: 50 CAMBRIDGEPARK DR.
Project Number: 131188-005
Lab Number: L1904244
Report Date: 02/12/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1-SIM
Analytical Date: 02/06/19 15:20
Analyst: DV

Extraction Method: EPA 625.1
Extraction Date: 02/05/19 09:35

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01 Batch: WG1203834-1					
Acenaphthene	ND		ug/l	0.10	--
Fluoranthene	ND		ug/l	0.10	--
Naphthalene	ND		ug/l	0.10	--
Benzo(a)anthracene	ND		ug/l	0.10	--
Benzo(a)pyrene	ND		ug/l	0.10	--
Benzo(b)fluoranthene	ND		ug/l	0.10	--
Benzo(k)fluoranthene	ND		ug/l	0.10	--
Chrysene	ND		ug/l	0.10	--
Acenaphthylene	ND		ug/l	0.10	--
Anthracene	ND		ug/l	0.10	--
Benzo(ghi)perylene	ND		ug/l	0.10	--
Fluorene	ND		ug/l	0.10	--
Phenanthrene	ND		ug/l	0.10	--
Dibenzo(a,h)anthracene	ND		ug/l	0.10	--
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	--
Pyrene	ND		ug/l	0.10	--
Pentachlorophenol	ND		ug/l	1.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	44		25-87
Phenol-d6	31		16-65
Nitrobenzene-d5	76		42-122
2-Fluorobiphenyl	61		46-121
2,4,6-Tribromophenol	74		45-128
4-Terphenyl-d14	58		47-138

Project Name: 50 CAMBRIDGEPARK DR.
Project Number: 131188-005
Lab Number: L1904244
Report Date: 02/12/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1
Analytical Date: 02/05/19 19:01
Analyst: CB

Extraction Method: EPA 625.1
Extraction Date: 02/05/19 09:37

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1203837-1					
Bis(2-ethylhexyl)phthalate	ND		ug/l	2.2	--
Butyl benzyl phthalate	ND		ug/l	5.0	--
Di-n-butylphthalate	ND		ug/l	5.0	--
Di-n-octylphthalate	ND		ug/l	5.0	--
Diethyl phthalate	ND		ug/l	5.0	--
Dimethyl phthalate	ND		ug/l	5.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Nitrobenzene-d5	92		42-122
2-Fluorobiphenyl	91		46-121
4-Terphenyl-d14	94		47-138

Lab Control Sample Analysis
Batch Quality Control

Project Name: 50 CAMBRIDGEPARK DR.
Project Number: 131188-005
Lab Number: L1904244
Report Date: 02/12/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01 Batch: WG1203834-3								
Acenaphthene	75		-		60-132	-		30
Fluoranthene	75		-		43-121	-		30
Naphthalene	74		-		36-120	-		30
Benzo(a)anthracene	74		-		42-133	-		30
Benzo(a)pyrene	83		-		32-148	-		30
Benzo(b)fluoranthene	80		-		42-140	-		30
Benzo(k)fluoranthene	80		-		25-146	-		30
Chrysene	73		-		44-140	-		30
Acenaphthylene	80		-		54-126	-		30
Anthracene	76		-		43-120	-		30
Benzo(ghi)perylene	76		-		1-195	-		30
Fluorene	80		-		70-120	-		30
Phenanthrene	72		-		65-120	-		30
Dibenzo(a,h)anthracene	80		-		1-200	-		30
Indeno(1,2,3-cd)pyrene	82		-		1-151	-		30
Pyrene	79		-		70-120	-		30
Pentachlorophenol	66		-		38-152	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: 50 CAMBRIDGEPARK DR.
Project Number: 131188-005

Lab Number: L1904244
Report Date: 02/12/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01 Batch: WG1203834-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	50				25-87
Phenol-d6	35				16-65
Nitrobenzene-d5	84				42-122
2-Fluorobiphenyl	68				46-121
2,4,6-Tribromophenol	83				45-128
4-Terphenyl-d14	64				47-138

Lab Control Sample Analysis
Batch Quality Control

Project Name: 50 CAMBRIDGEPARK DR.
Project Number: 131188-005

Lab Number: L1904244
Report Date: 02/12/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1203837-2								
Bis(2-ethylhexyl)phthalate	94		-		29-137	-		30
Butyl benzyl phthalate	103		-		1-140	-		30
Di-n-butylphthalate	99		-		8-120	-		30
Di-n-octylphthalate	97		-		19-132	-		30
Diethyl phthalate	88		-		1-120	-		30
Dimethyl phthalate	84		-		1-120	-		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	79				42-122
2-Fluorobiphenyl	77				46-121
4-Terphenyl-d14	78				47-138

PCBS

Project Name: 50 CAMBRIDGEPARK DR.
Lab Number: L1904244
Project Number: 131188-005
Report Date: 02/12/19

SAMPLE RESULTS

Lab ID: L1904244-01
Client ID: HA17-GP4 OW
Sample Location: CAMBRIDGE, MA

Date Collected: 02/01/19 12:00
Date Received: 02/01/19
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 127,608.3
Analytical Date: 02/07/19 09:46
Analyst: WR

Extraction Method: EPA 608.3
Extraction Date: 02/02/19 10:26
Cleanup Method: EPA 3665A
Cleanup Date: 02/02/19
Cleanup Method: EPA 3660B
Cleanup Date: 02/02/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Polychlorinated Biphenyls by GC - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.200	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	84		37-123	B
Decachlorobiphenyl	73		38-114	B
2,4,5,6-Tetrachloro-m-xylene	83		37-123	A
Decachlorobiphenyl	65		38-114	A

Project Name: 50 CAMBRIDGEPARK DR.
Project Number: 131188-005
Lab Number: L1904244
Report Date: 02/12/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 127,608.3
Analytical Date: 02/07/19 08:41
Analyst: WR

Extraction Method: EPA 608.3
Extraction Date: 02/02/19 10:26
Cleanup Method: EPA 3665A
Cleanup Date: 02/02/19
Cleanup Method: EPA 3660B
Cleanup Date: 02/02/19

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 01 Batch: WG1203293-1						
Aroclor 1016	ND		ug/l	0.250	--	A
Aroclor 1221	ND		ug/l	0.250	--	A
Aroclor 1232	ND		ug/l	0.250	--	A
Aroclor 1242	ND		ug/l	0.250	--	A
Aroclor 1248	ND		ug/l	0.250	--	A
Aroclor 1254	ND		ug/l	0.250	--	A
Aroclor 1260	ND		ug/l	0.200	--	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	94		37-123	B
Decachlorobiphenyl	80		38-114	B
2,4,5,6-Tetrachloro-m-xylene	92		37-123	A
Decachlorobiphenyl	69		38-114	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: 50 CAMBRIDGEPARK DR.

Project Number: 131188-005

Lab Number: L1904244

Report Date: 02/12/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 01 Batch: WG1203293-2									
Aroclor 1016	84		-		50-140	-		36	A
Aroclor 1260	80		-		8-140	-		38	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	101				37-123	B
Decachlorobiphenyl	93				38-114	B
2,4,5,6-Tetrachloro-m-xylene	100				37-123	A
Decachlorobiphenyl	76				38-114	A

METALS

Project Name: 50 CAMBRIDGEPARK DR.
Lab Number: L1904244
Project Number: 131188-005
Report Date: 02/12/19

SAMPLE RESULTS

Lab ID: L1904244-01
Client ID: HA17-GP4 OW
Sample Location: CAMBRIDGE, MA
Date Collected: 02/01/19 12:00
Date Received: 02/01/19
Field Prep: Refer to COC

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Antimony, Total	ND		mg/l	0.00400	--	1	02/02/19 10:40	02/04/19 11:08	EPA 3005A	3,200.8	AM
Arsenic, Total	0.00328		mg/l	0.00100	--	1	02/02/19 10:40	02/04/19 11:08	EPA 3005A	3,200.8	AM
Cadmium, Total	ND		mg/l	0.00020	--	1	02/02/19 10:40	02/04/19 11:08	EPA 3005A	3,200.8	AM
Chromium, Total	0.00115		mg/l	0.00100	--	1	02/02/19 10:40	02/04/19 11:08	EPA 3005A	3,200.8	AM
Copper, Total	0.00137		mg/l	0.00100	--	1	02/02/19 10:40	02/04/19 11:08	EPA 3005A	3,200.8	AM
Iron, Total	6.99		mg/l	0.050	--	1	02/02/19 10:40	02/04/19 12:59	EPA 3005A	19,200.7	LC
Lead, Total	ND		mg/l	0.00100	--	1	02/02/19 10:40	02/04/19 11:08	EPA 3005A	3,200.8	AM
Mercury, Total	ND		mg/l	0.00020	--	1	02/04/19 10:56	02/04/19 16:37	EPA 245.1	3,245.1	GD
Nickel, Total	ND		mg/l	0.00200	--	1	02/02/19 10:40	02/04/19 11:08	EPA 3005A	3,200.8	AM
Selenium, Total	ND		mg/l	0.00500	--	1	02/02/19 10:40	02/04/19 11:08	EPA 3005A	3,200.8	AM
Silver, Total	ND		mg/l	0.00040	--	1	02/02/19 10:40	02/04/19 11:08	EPA 3005A	3,200.8	AM
Zinc, Total	0.09354		mg/l	0.01000	--	1	02/02/19 10:40	02/04/19 11:08	EPA 3005A	3,200.8	AM
Total Hardness by SM 2340B - Mansfield Lab											
Hardness	155		mg/l	0.660	NA	1	02/02/19 10:40	02/04/19 12:59	EPA 3005A	19,200.7	LC
General Chemistry - Mansfield Lab											
Chromium, Trivalent	ND		mg/l	0.010	--	1		02/04/19 11:08	NA	107,-	

Project Name: 50 CAMBRIDGEPARK DR.
Lab Number: L1904244
Project Number: 131188-005
Report Date: 02/12/19

SAMPLE RESULTS

Lab ID: L1904244-02
Client ID: OUTFALL
Sample Location: CAMBRIDGE, MA
Date Collected: 02/01/19 13:00
Date Received: 02/01/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Antimony, Total	ND		mg/l	0.00400	--	1	02/02/19 10:40	02/04/19 11:12	EPA 3005A	3,200.8	AM
Arsenic, Total	0.00147		mg/l	0.00100	--	1	02/02/19 10:40	02/04/19 11:12	EPA 3005A	3,200.8	AM
Cadmium, Total	0.00020		mg/l	0.00020	--	1	02/02/19 10:40	02/04/19 11:12	EPA 3005A	3,200.8	AM
Chromium, Total	ND		mg/l	0.00100	--	1	02/02/19 10:40	02/04/19 11:12	EPA 3005A	3,200.8	AM
Copper, Total	0.00321		mg/l	0.00100	--	1	02/02/19 10:40	02/04/19 11:12	EPA 3005A	3,200.8	AM
Iron, Total	2.16		mg/l	0.050	--	1	02/02/19 10:40	02/04/19 13:04	EPA 3005A	19,200.7	LC
Lead, Total	ND		mg/l	0.00100	--	1	02/02/19 10:40	02/04/19 11:12	EPA 3005A	3,200.8	AM
Mercury, Total	ND		mg/l	0.00020	--	1	02/04/19 10:56	02/04/19 16:39	EPA 245.1	3,245.1	GD
Nickel, Total	ND		mg/l	0.00200	--	1	02/02/19 10:40	02/04/19 11:12	EPA 3005A	3,200.8	AM
Selenium, Total	ND		mg/l	0.00500	--	1	02/02/19 10:40	02/04/19 11:12	EPA 3005A	3,200.8	AM
Silver, Total	ND		mg/l	0.00040	--	1	02/02/19 10:40	02/04/19 11:12	EPA 3005A	3,200.8	AM
Zinc, Total	0.01962		mg/l	0.01000	--	1	02/02/19 10:40	02/04/19 11:12	EPA 3005A	3,200.8	AM
Total Hardness by SM 2340B - Mansfield Lab											
Hardness	242		mg/l	0.660	NA	1	02/02/19 10:40	02/04/19 13:04	EPA 3005A	19,200.7	LC
General Chemistry - Mansfield Lab											
Chromium, Trivalent	ND		mg/l	0.010	--	1		02/04/19 11:12	NA	107,-	

Project Name: 50 CAMBRIDGEPARK DR. **Lab Number:** L1904244

Project Number: 131188-005 **Report Date:** 02/12/19

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1203284-1										
Antimony, Total	ND		mg/l	0.00400	--	1	02/02/19 10:40	02/04/19 09:54	3,200.8	AM
Arsenic, Total	ND		mg/l	0.00100	--	1	02/02/19 10:40	02/04/19 09:54	3,200.8	AM
Cadmium, Total	ND		mg/l	0.00020	--	1	02/02/19 10:40	02/04/19 09:54	3,200.8	AM
Chromium, Total	ND		mg/l	0.00100	--	1	02/02/19 10:40	02/04/19 09:54	3,200.8	AM
Copper, Total	ND		mg/l	0.00100	--	1	02/02/19 10:40	02/04/19 09:54	3,200.8	AM
Lead, Total	ND		mg/l	0.00100	--	1	02/02/19 10:40	02/04/19 09:54	3,200.8	AM
Nickel, Total	ND		mg/l	0.00200	--	1	02/02/19 10:40	02/04/19 09:54	3,200.8	AM
Selenium, Total	ND		mg/l	0.00500	--	1	02/02/19 10:40	02/04/19 09:54	3,200.8	AM
Silver, Total	ND		mg/l	0.00040	--	1	02/02/19 10:40	02/04/19 09:54	3,200.8	AM
Zinc, Total	ND		mg/l	0.01000	--	1	02/02/19 10:40	02/04/19 09:54	3,200.8	AM

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1203290-1										
Iron, Total	ND		mg/l	0.050	--	1	02/02/19 10:40	02/04/19 09:31	19,200.7	LC

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Hardness by SM 2340B - Mansfield Lab for sample(s): 01-02 Batch: WG1203290-1										
Hardness	ND		mg/l	0.660	NA	1	02/02/19 10:40	02/04/19 09:31	19,200.7	LC

Prep Information

Digestion Method: EPA 3005A

Project Name: 50 CAMBRIDGEPARK DR.
Lab Number: L1904244
Project Number: 131188-005
Report Date: 02/12/19

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1203570-1										
Mercury, Total	ND		mg/l	0.0002	--	1	02/04/19 10:56	02/04/19 16:06	3,245.1	GD

Prep Information

Digestion Method: EPA 245.1

Lab Control Sample Analysis

Batch Quality Control

Project Name: 50 CAMBRIDGEPARK DR.

Project Number: 131188-005

Lab Number: L1904244

Report Date: 02/12/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1203284-2								
Antimony, Total	96		-		85-115	-		
Arsenic, Total	107		-		85-115	-		
Cadmium, Total	111		-		85-115	-		
Chromium, Total	102		-		85-115	-		
Copper, Total	98		-		85-115	-		
Lead, Total	110		-		85-115	-		
Nickel, Total	103		-		85-115	-		
Selenium, Total	108		-		85-115	-		
Silver, Total	107		-		85-115	-		
Zinc, Total	113		-		85-115	-		
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1203290-2								
Iron, Total	102		-		85-115	-		
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-02 Batch: WG1203290-2								
Hardness	99		-		85-115	-		
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1203570-2								
Mercury, Total	100		-		85-115	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: 50 CAMBRIDGEPARK DR.
Project Number: 131188-005

Lab Number: L1904244
Report Date: 02/12/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1203284-3 QC Sample: L1904140-01 Client ID: MS Sample												
Antimony, Total	ND	0.5	0.5527	110		-	-		70-130	-		20
Arsenic, Total	ND	0.12	0.1291	108		-	-		70-130	-		20
Cadmium, Total	ND	0.051	0.05460	107		-	-		70-130	-		20
Chromium, Total	ND	0.2	0.1962	98		-	-		70-130	-		20
Copper, Total	ND	0.25	0.2440	98		-	-		70-130	-		20
Lead, Total	ND	0.51	0.5452	107		-	-		70-130	-		20
Nickel, Total	ND	0.5	0.5018	100		-	-		70-130	-		20
Selenium, Total	ND	0.12	0.1365	114		-	-		70-130	-		20
Silver, Total	ND	0.05	0.05287	106		-	-		70-130	-		20
Zinc, Total	0.01244	0.5	0.5524	108		-	-		70-130	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1203290-3 QC Sample: L1904216-01 Client ID: MS Sample												
Iron, Total	0.436	1	1.36	92		-	-		75-125	-		20
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1203290-3 QC Sample: L1904216-01 Client ID: MS Sample												
Hardness	20.8	66.2	77.3	85		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1203570-3 QC Sample: L1904151-01 Client ID: MS Sample												
Mercury, Total	ND	0.005	0.0031	**63**	Q	-	-		70-130	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1203570-5 QC Sample: L1904151-02 Client ID: MS Sample												
Mercury, Total	ND	0.005	0.0039	77		-	-		70-130	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: 50 CAMBRIDGEPARK DR.

Project Number: 131188-005

Lab Number: L1904244

Report Date: 02/12/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1203284-4 QC Sample: L1904140-01 Client ID: DUP Sample						
Antimony, Total	ND	ND	mg/l	NC		20
Arsenic, Total	ND	ND	mg/l	NC		20
Cadmium, Total	ND	ND	mg/l	NC		20
Chromium, Total	ND	ND	mg/l	NC		20
Copper, Total	ND	ND	mg/l	NC		20
Lead, Total	ND	ND	mg/l	NC		20
Nickel, Total	ND	ND	mg/l	NC		20
Selenium, Total	ND	ND	mg/l	NC		20
Silver, Total	ND	ND	mg/l	NC		20
Zinc, Total	0.01244	0.01222	mg/l	2		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1203570-4 QC Sample: L1904151-01 Client ID: DUP Sample						
Mercury, Total	ND	ND	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1203570-6 QC Sample: L1904151-02 Client ID: DUP Sample						
Mercury, Total	ND	ND	mg/l	NC		20

INORGANICS
&
MISCELLANEOUS

Project Name: 50 CAMBRIDGEPARK DR.
Project Number: 131188-005
Lab Number: L1904244
Report Date: 02/12/19

SAMPLE RESULTS

Lab ID: L1904244-01
Client ID: HA17-GP4 OW
Sample Location: CAMBRIDGE, MA
Sample Depth:
Matrix: Water

Date Collected: 02/01/19 12:00
Date Received: 02/01/19
Field Prep: Refer to COC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total Suspended	5.3		mg/l	5.0	NA	1	-	02/04/19 15:00	121,2540D	DR
Cyanide, Total	ND		mg/l	0.005	--	1	02/04/19 10:00	02/04/19 13:15	121,4500CN-CE	LH
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	02/02/19 03:47	121,4500CL-D	MA
pH (H)	6.6		SU	-	NA	1	-	02/02/19 04:15	121,4500H+-B	MA
Nitrogen, Ammonia	0.428		mg/l	0.075	--	1	02/03/19 14:30	02/04/19 20:05	121,4500NH3-BH	AT
TPH, SGT-HEM	ND		mg/l	4.00	--	1	02/04/19 19:55	02/04/19 23:50	74,1664A	MM
Phenolics, Total	ND		mg/l	0.030	--	1	02/04/19 07:42	02/05/19 05:51	4,420.1	GD
Chromium, Hexavalent	ND		mg/l	0.010	--	1	02/01/19 22:45	02/01/19 23:09	1,7196A	AS
Anions by Ion Chromatography - Westborough Lab										
Chloride	314.		mg/l	12.5	--	25	-	02/02/19 18:51	44,300.0	JR

Project Name: 50 CAMBRIDGEPARK DR.
Project Number: 131188-005

Lab Number: L1904244
Report Date: 02/12/19

SAMPLE RESULTS

Lab ID: L1904244-02
Client ID: OUTFALL
Sample Location: CAMBRIDGE, MA

Date Collected: 02/01/19 13:00
Date Received: 02/01/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
pH (H)	7.3		SU	-	NA	1	-	02/02/19 04:15	121,4500H+-B	MA
Nitrogen, Ammonia	2.60		mg/l	0.075	--	1	02/03/19 14:30	02/04/19 20:06	121,4500NH3-BH	AT
Chromium, Hexavalent	ND		mg/l	0.010	--	1	02/01/19 22:45	02/01/19 23:09	1,7196A	AS

Project Name: 50 CAMBRIDGEPARK DR.
Project Number: 131188-005
Lab Number: L1904244
Report Date: 02/12/19

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1203219-1										
Chromium, Hexavalent	ND		mg/l	0.010	--	1	02/01/19 22:45	02/01/19 23:06	1,7196A	AS
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1203253-1										
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	02/02/19 03:47	121,4500CL-D	MA
General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1203438-1										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	02/03/19 14:30	02/04/19 19:25	121,4500NH3-BH	AT
Anions by Ion Chromatography - Westborough Lab for sample(s): 01 Batch: WG1203484-1										
Chloride	ND		mg/l	0.500	--	1	-	02/02/19 15:27	44,300.0	JR
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1203529-1										
Phenolics, Total	ND		mg/l	0.030	--	1	02/04/19 07:42	02/05/19 05:43	4,420.1	GD
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1203534-1										
Solids, Total Suspended	ND		mg/l	5.0	NA	1	-	02/04/19 15:00	121,2540D	DR
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1203541-1										
Cyanide, Total	ND		mg/l	0.005	--	1	02/04/19 10:00	02/04/19 12:52	121,4500CN-CE	LH
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1203698-1										
TPH, SGT-HEM	ND		mg/l	4.00	--	1	02/04/19 19:55	02/04/19 23:50	74,1664A	MM

Lab Control Sample Analysis

Batch Quality Control

Project Name: 50 CAMBRIDGEPARK DR.
Project Number: 131188-005

Lab Number: L1904244
Report Date: 02/12/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1203219-2								
Chromium, Hexavalent	98		-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1203248-1								
pH	100		-		99-101	-		5
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1203253-2								
Chlorine, Total Residual	100		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1203438-2								
Nitrogen, Ammonia	90		-		80-120	-		20
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 Batch: WG1203484-2								
Chloride	100		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1203529-2								
Phenolics, Total	88		-		70-130	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1203541-2								
Cyanide, Total	95		-		90-110	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: 50 CAMBRIDGEPARK DR.

Project Number: 131188-005

Lab Number: L1904244

Report Date: 02/12/19

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1203698-2					
TPH	87	-	64-132	-	34

Matrix Spike Analysis
Batch Quality Control

Project Name: 50 CAMBRIDGEPARK DR.
Project Number: 131188-005

Lab Number: L1904244
Report Date: 02/12/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1203219-4 QC Sample: L1904244-02 Client ID: OUTFALL												
Chromium, Hexavalent	ND	0.1	0.099	99		-	-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1203253-4 QC Sample: L1904159-01 Client ID: MS Sample												
Chlorine, Total Residual	ND	0.25	0.24	96		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1203438-4 QC Sample: L1904006-01 Client ID: MS Sample												
Nitrogen, Ammonia	ND	4	3.60	90		-	-		80-120	-		20
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1203484-3 QC Sample: L1904055-01 Client ID: MS Sample												
Chloride	69.2	40	108	97		-	-		90-110	-		18
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1203529-4 QC Sample: L1904083-01 Client ID: MS Sample												
Phenolics, Total	ND	0.4	0.38	96		-	-		70-130	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1203541-4 QC Sample: L1904169-02 Client ID: MS Sample												
Cyanide, Total	ND	0.2	0.196	98		-	-		90-110	-		30
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1203698-4 QC Sample: L1904140-02 Client ID: MS Sample												
TPH	ND	21.1	15.5	73		-	-		64-132	-		34

Lab Duplicate Analysis
Batch Quality Control

Project Name: 50 CAMBRIDGEPARK DR.
Project Number: 131188-005

Lab Number: L1904244
Report Date: 02/12/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1203219-3 QC Sample: L1904244-01 Client ID: HA17-GP4 OW						
Chromium, Hexavalent	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1203248-2 QC Sample: L1904137-01 Client ID: DUP Sample						
pH	7.5	7.5	SU	0		5
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1203253-3 QC Sample: L1904159-04 Client ID: DUP Sample						
Chlorine, Total Residual	0.30	0.30	mg/l	0		20
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1203438-3 QC Sample: L1904006-01 Client ID: DUP Sample						
Nitrogen, Ammonia	ND	ND	mg/l	NC		20
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1203484-4 QC Sample: L1904055-01 Client ID: DUP Sample						
Chloride	69.2	69.8	mg/l	1		18
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1203529-3 QC Sample: L1904083-01 Client ID: DUP Sample						
Phenolics, Total	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1203534-2 QC Sample: L1904106-01 Client ID: DUP Sample						
Solids, Total Suspended	60	62	mg/l	3		29
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1203541-3 QC Sample: L1904166-01 Client ID: DUP Sample						
Cyanide, Total	ND	ND	mg/l	NC		30
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1203698-3 QC Sample: L1904140-01 Client ID: DUP Sample						
TPH	ND	ND	mg/l	NC		34

Project Name: 50 CAMBRIDGEPARK DR.
Project Number: 131188-005

Lab Number: L1904244
Report Date: 02/12/19

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1904244-01A	Vial Na2S2O3 preserved	A	NA		3.3	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1904244-01B	Vial Na2S2O3 preserved	A	NA		3.3	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1904244-01C	Vial Na2S2O3 preserved	A	NA		3.3	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1904244-01D	Vial Na2S2O3 preserved	A	NA		3.3	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1904244-01E	Vial Na2S2O3 preserved	A	NA		3.3	Y	Absent		504(14)
L1904244-01F	Vial Na2S2O3 preserved	A	NA		3.3	Y	Absent		504(14)
L1904244-01G	Vial Na2S2O3 preserved	A	NA		3.3	Y	Absent		504(14)
L1904244-01H	Vial Na2S2O3 preserved	A	NA		3.3	Y	Absent		504(14)
L1904244-01I	Vial HCl preserved	A	NA		3.3	Y	Absent		SUB-ETHANOL(14)
L1904244-01J	Vial HCl preserved	A	NA		3.3	Y	Absent		SUB-ETHANOL(14)
L1904244-01K	Vial HCl preserved	A	NA		3.3	Y	Absent		SUB-ETHANOL(14)
L1904244-01L	Plastic 250ml NaOH preserved	A	>12	>12	3.3	Y	Absent		TCN-4500(14)
L1904244-01M	Plastic 250ml HNO3 preserved	A	<2	<2	3.3	Y	Absent		CD-2008T(180),NI-2008T(180),ZN-2008T(180),CU-2008T(180),FE-UI(180),HARDU(180),AG-2008T(180),AS-2008T(180),HG-U(28),SE-2008T(180),CR-2008T(180),PB-2008T(180),SB-2008T(180)
L1904244-01N	Plastic 250ml HNO3 preserved	A	<2	<2	3.3	Y	Absent		HOLD-METAL-DISSOLVED(180)
L1904244-01O	Plastic 500ml H2SO4 preserved	A	<2	<2	3.3	Y	Absent		NH3-4500(28)
L1904244-01P	Plastic 950ml unpreserved	A	7	7	3.3	Y	Absent		CL-300(28),HEXCR-7196(1),TRC-4500(1),PH-4500(.01)
L1904244-01Q	Plastic 950ml unpreserved	A	7	7	3.3	Y	Absent		TSS-2540(7)
L1904244-01R	Amber 950ml H2SO4 preserved	A	<2	<2	3.3	Y	Absent		TPHENOL-420(28)
L1904244-01S	Amber 1000ml Na2S2O3	A	7	7	3.3	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L1904244-01T	Amber 1000ml Na2S2O3	A	7	7	3.3	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L1904244-01U	Amber 1000ml Na2S2O3	A	7	7	3.3	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)

*Values in parentheses indicate holding time in days

Project Name: 50 CAMBRIDGEPARK DR.
Project Number: 131188-005

Lab Number: L1904244
Report Date: 02/12/19

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1904244-01V	Amber 1000ml Na2S2O3	A	7	7	3.3	Y	Absent		PCB-608.3(7)
L1904244-01W	Amber 1000ml Na2S2O3	A	7	7	3.3	Y	Absent		PCB-608.3(7)
L1904244-01X	Amber 1000ml Na2S2O3	A	7	7	3.3	Y	Absent		PCB-608.3(7)
L1904244-01Y	Amber 1000ml HCl preserved	A	NA		3.3	Y	Absent		TPH-1664(28)
L1904244-01Z	Amber 1000ml HCl preserved	A	NA		3.3	Y	Absent		TPH-1664(28)
L1904244-02A	Plastic 250ml unpreserved	A	7	7	3.3	Y	Absent		HEXCR-7196(1),PH-4500(.01)
L1904244-02B	Plastic 250ml HNO3 preserved	A	<2	<2	3.3	Y	Absent		CD-2008T(180),NI-2008T(180),ZN-2008T(180),CU-2008T(180),FE-UI(180),HARDU(180),AG-2008T(180),AS-2008T(180),HG-U(28),SE-2008T(180),CR-2008T(180),PB-2008T(180),SB-2008T(180)
L1904244-02C	Plastic 500ml H2SO4 preserved	A	<2	<2	3.3	Y	Absent		NH3-4500(28)

*Values in parentheses indicate holding time in days

Project Name:	50 CAMBRIDGEPARK DR.	**Lab Number:**	L1904244
Project Number:	131188-005	**Report Date:**	02/12/19

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total'

result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

Project Name:	50 CAMBRIDGEPARK DR.	**Lab Number:**	L1904244
Project Number:	131188-005	**Report Date:**	02/12/19

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

3 Methods for the Determination of Metals in Environmental Samples, Supplement I. EPA/600/R-94/111. May 1994.

4 Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020. Revised March 1983.

14 Methods for the Determination of Organic Compounds in Finished Drinking Water and Raw Source Water. EPA/600/4-88/039, Revised July 1991.

19 Inductively Coupled Plasma Atomic Emission Spectrometric Method for Trace Element Analysis of Water and Wastes. Appendix C, Part 136, 40 CFR (Code of Federal Regulations). July 1, 1999 edition.

44 Methods for the Determination of Inorganic Substances in Environmental Samples, EPA/600/R-93/100, August 1993.

74 Method 1664,Revision A: N-Hexane Extractable Material (HEM; Oil & Grease) and Silica Gel Treated N-Hexane Extractable Material (SGT-HEM; Non-polar Material) by Extraction and Gravimetry, EPA-821-R-98-002, February 1999.

107 Alpha Analytical - In-house calculation method.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

127 Method 608.3: Organochlorine Pesticides and PCBs by GC/HSD, EPA 821-R-16-009, December 2016.

128 Method 624.1: Purgeables by GC/MS, EPA 821-R-16-008, December 2016.

129 Method 625.1: Base/Neutrals and Acids by GC/MS, EPA 821-R-16-007, December 2016.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.

EPA 6860: SCM: Perchlorate

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581, 8 Walkup Dr., TEL: 508-898-9220, FAX: 508-898-9193

Mansfield, MA 02048, 320 Forbes Blvd, TEL: 508-822-9300, FAX: 508-822-3288

Service Centers
Brewer, ME 04412 Portsmouth, NH 03801 Mahwah, NJ 07430
Albany, NY 12205
Tonawanda, NY 14150 Holmes, PA 19043

Page 1 of 1

Date Rec'd in Lab: 2/1/19

ALPHA Job #: L1904244

H&A Information

H&A Client:	Hanover RS
H&A Address:	465 Medford Street, #220
	Boston, MA 02129
H&A Phone:	617-886-7400
H&A Fax:	
H&A Email:	lvanzler, kscalise

Project Information

Project Name:	50 Cambridgepark Dr
Project Location:	Cambridge, MA
Project #	131188-005
(Use Project name as Project #) ☐	
Project Manager:	Lee Vanzler
ALPHAQuote #:	

Turn-Around Time

Standard ☑ Due Date:
Rush (only if pre approved) ☐ # of Days:

Deliverables

☑ Email ☐ Fax
☐ EQuIS (1 File) ☑ EQuIS (4 File)
☐ Other:

Billing Information

☐ Same as Client Info
PO #

Regulatory Requirements (Program/Criteria)

Note: Select State from menu & identify criteria.

Disposal Site Information

Please identify below location of applicable disposal facilities.

Disposal Facility:
☐ NJ ☐ NY
☐ Other:

These samples have been previously analyzed by Alpha ☐

Other project specific requirements/comments:
Please refer to attached NPDES RGP parameters list.
Total NPDES Metals: Sb, As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Se, Ag, Zn

Please specify Metals or TAL.

Sample Filtration
☒ Done
☐ Lab to do
Preservation
☐ Lab to do
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	NPDES RGP Parameters	Ethanol by 1671	Ammonia Nitrogen - SM 4500	Dissolved NPDES Metals	Total Hardness	Total NPDES Metals	pH	Hex. Cr + Tri. Cr	Sample Specific Comments	Total Bottles
04244-01	HA17-GP4 OW	2/1/19	1200	aq	SRP	x	x	x	x	x		x		1. HOLD, field filtered	26
02	Outfall	↓	1300	↓	↓			x		x	x	x	x		3

	NPDES RGP Parameters	Ethanol by 1671	Ammonia Nitrogen - SM 4500	Dissolved NPDES Metals	Total Hardness	Total NPDES Metals	pH	Hex. Cr + Tri. Cr
Container Type		V	P	P	P	P	P	P
Preservative								

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Relinquished By:	Date/Time	Received By:	Date/Time
A. Paul	2/1/19 1400	M. Cotter	2/1/19 16:30
M. Cotter	2/1/19 16:30	[signature] AAL	2/1/19 1630
[signature]	2/1/19 1830	[signature]	2/1/19 18:30

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. Alpha Analytical's services under this Chain of Custody shall be performed in accordance with terms and conditions within Blanket Service Agreement# 2015-18-Alpha Analytical by and between Haley & Aldrich, Inc., its subsidiaries and affiliates and Alpha Analytical.

Document ID: 20455 Rev 1 (1/28/2016)

1. Chemical-Specific Effluent Limitations in Massachusetts and New Hampshire

During the period beginning on the effective date and lasting through the expiration date, EPA will authorize the discharges under Part 1.1 of this general permit to receiving waters in Massachusetts and New Hampshire. The effective date of authorization for each discharge covered under this general permit is the date indicated in EPA's written authorization to discharge, lasting through the expiration date of this general permit or written termination of coverage, whichever occurs first. Each discharge shall be limited and monitored as specified in Table 2, below. The applicability of effluent limitations for each Activity Category listed in Table 1 is included in footnote 2, below. Additional limitations and monitoring requirements are specified in Parts 2.2 through 2.5 and Part 4, below.

Table 2: Chemical-Specific Effluent Limitations and Monitor-Only Requirements[1]

Parameter[2]	Effluent Limitation[3,4]	
	TBEL[5]	WQBEL[6]
A. Inorganics		
Ammonia[7]	Report mg/L	
Chloride[8]	Report µg/L	
Total Residual Chlorine[9]	0.2 mg/L	FW= 11 µg/L SW= 7.5 µg/L
Total Suspended Solids	30 mg/L	
Antimony[10]	206 µg/L	640 µg/L in MA 4.3 mg/L in NH
Arsenic[10]	104 µg/L	FW= 10 µg/L SW= 36 µg/L
Cadmium[11,12]	10.2 µg/L	FW= 0.25 µg/L SW= 8.8 µg/L in MA SW= 9.3 µg/L in NH
Chromium III[11,12]	323 µg/L	FW= 74 µg/L SW= 100 µg/L
Chromium VI[11,13]	323 µg/L	FW= 11 µg/L SW= 50 µg/L
Copper[11,12]	242 µg/L	FW= 9 µg/L SW= 3.1 µg/L
Iron[10]	5,000 µg/L	FW = 1,000 µg/L
Lead[11,12]	160 µg/L	FW= 2.5 µg/L SW= 8.1 µg/L
Mercury[11]	0.739 µg/L	FW= 0.77 µg/L SW= 0.94 µg/L
Nickel[11,12]	1,450 µg/L	FW= 52 µg/L SW= 8.2 µg/L
Selenium	235.8 µg/L	FW= 5.0 µg/L[10] SW= 71 µg/L[11]
Silver[11,12]	35.1 µg/L	FW= 3.2 µg/L SW= 1.9 µg/L
Zinc[11,12]	420 µg/L	FW= 120 µg/L SW= 81 µg/L

Parameter[2]	Effluent Limitation[3,4]	
	TBEL[5]	WQBEL[6]
F. Fuels Parameters		
Total Petroleum Hydrocarbons[22]	5.0 mg/L	
Ethanol[23]	Report mg/L	
Methyl-tert-Butyl Ether[24]	70 µg/L	20 µg/L in MA
tert-Butyl Alcohol	120 µg/L in MA 40 µg/L in NH	
tert-Amyl Methyl Ether[24]	90 µg/L in MA 140 µg/L in NH	

Table 2 Footnotes:

[1] The following abbreviations are used in Table 2, above:
- [a] TBEL = technology-based effluent limitation
- [b] WQBEL = water quality-based effluent limitation
- [c] mg/L = milligrams per liter
- [d] avg = average
- [e] µg/L = micrograms per liter
- [f] FW = freshwater
- [g] SW = saltwater

[2] The sample type required for all parameters is grab. Grab samples must be analyzed individually and cannot be composited. See Appendix IX for additional definitions.

[3] The effluent limitation and/or monitor-only requirement for any parameter listed applies to any site if the given parameter is present at that site. The effluent limitations and monitor-only requirements also apply to Activity Categories as follows:

[a] Activity Category I:
all parameters in contamination type A. Inorganics;
any present in contamination type B. non-halogenated VOCs;
if present in contamination type C. halogenated VOCs;
any present in contamination type D. non-halogenated SVOCs;
if present in contamination type E. halogenated SVOCs; and
any present in contamination type F. fuels parameters.

[b] Activity Category II:
all parameters in contamination type A. Inorganics;
any present in contamination type B. non-halogenated VOCs;
any present in contamination type C. halogenated VOCs;
any present in contamination type D. non-halogenated SVOCs;
if present in contamination type E. halogenated SVOCs; and
if present in contamination type F. fuels parameters.

ALPHA ANALYTICAL
World Class Chemistry

Subcontract Chain of Custody

Test America (Nashville)
2960 Foster Creighton Drive
Nashville, TN 37204

Alpha Job Number
L1904244

Client Information

Client: Alpha Analytical Labs
Address: Eight Walkup Drive
Westborough, MA 01581-1019

Phone: 603.319.5010
Email: mgulli@alphalab.com

Project Information

Project Location: MA
Project Manager: Melissa Gulli

Turnaround & Deliverables Information

Due Date: 02/12/19
Deliverables:

Regulatory Requirements/Report Limits

State/Federal Program:
Regulatory Criteria:

Project Specific Requirements and/or Report Requirements

Reference following Alpha Job Number on final report/deliverables: L1904244

Report to include Method Blank, LCS/LCSD:

Additional Comments: Send all results/reports to subreports@alphalab.com

Lab ID	Client ID	Collection Date/Time	Sample Matrix	Analysis	Batch QC
	HA17-GP4 OW	02-01-19 12:00	WATER	Ethanol by EPA 1671 Revision A	

	Relinquished By:	Date/Time:	Received By:	Date/Time:
		2/4/19 14:08		
Form No: AL_subcoc				

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Nashville
2960 Foster Creighton Drive
Nashville, TN 37204
Tel: (615)726-0177

TestAmerica Job ID: 490-167916-1
Client Project/Site: L1904244

For:
Alpha Analytical Inc
145 Flanders Road
Westborough, Massachusetts 01581-1019

Attn: Reports Dept.

Authorized for release by:
2/11/2019 5:11:04 PM

Ken Hayes, Project Manager II
(615)301-5035
ken.hayes@testamericainc.com

Table of Contents

Sample Summary

Client: Alpha Analytical Inc
Project/Site: L1904244

TestAmerica Job ID: 490-167916-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
490-167916-1	HA17-GP4 OW	Water	02/01/19 12:00	02/05/19 09:00

Case Narrative

Client: Alpha Analytical Inc
Project/Site: L1904244

TestAmerica Job ID: 490-167916-1

Job ID: 490-167916-1

Laboratory: TestAmerica Nashville

Narrative

Job Narrative
490-167916-1

Comments
No additional comments.

Receipt
The sample was received on 2/5/2019 9:00 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.4º C.

GC Semi VOA
Method 1671A: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batch 490-573728.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Alpha Analytical Inc
Project/Site: L1904244

TestAmerica Job ID: 490-167916-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: Alpha Analytical Inc
Project/Site: L1904244

TestAmerica Job ID: 490-167916-1

Client Sample ID: HA17-GP4 OW
Date Collected: 02/01/19 12:00
Date Received: 02/05/19 09:00

Lab Sample ID: 490-167916-1
Matrix: Water

Method: 1671A - Ethanol (GC/FID)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethanol	ND		2000	500	ug/L			02/05/19 15:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Isopropyl acetate (Surr)	*87*		*70 - 130*		*02/05/19 15:49*	*1*

QC Sample Results

Client: Alpha Analytical Inc
Project/Site: L1904244

TestAmerica Job ID: 490-167916-1

Method: 1671A - Ethanol (GC/FID)

Lab Sample ID: MB 490-573728/4
Matrix: Water
Analysis Batch: 573728

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethanol	ND		2000	500	ug/L			02/05/19 15:12	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Isopropyl acetate (Surr)	*89*		*70 - 130*		*02/05/19 15:12*	*1*

Lab Sample ID: LCS 490-573728/5
Matrix: Water
Analysis Batch: 573728

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Ethanol			50200	53870		ug/L		107	70 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Isopropyl acetate (Surr)	*84*		*70 - 130*

Lab Sample ID: LCSD 490-573728/6
Matrix: Water
Analysis Batch: 573728

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ethanol			50200	51040		ug/L		102	70 - 130	5	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Isopropyl acetate (Surr)	*81*		*70 - 130*

QC Association Summary

Client: Alpha Analytical Inc
Project/Site: L1904244

TestAmerica Job ID: 490-167916-1

GC VOA

Analysis Batch: 573728

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-167916-1	HA17-GP4 OW	Total/NA	Water	1671A	
MB 490-573728/4	Method Blank	Total/NA	Water	1671A	
LCS 490-573728/5	Lab Control Sample	Total/NA	Water	1671A	
LCSD 490-573728/6	Lab Control Sample Dup	Total/NA	Water	1671A	

Lab Chronicle

Client: Alpha Analytical Inc
Project/Site: L1904244

TestAmerica Job ID: 490-167916-1

Client Sample ID: HA17-GP4 OW

Date Collected: 02/01/19 12:00
Date Received: 02/05/19 09:00

Lab Sample ID: 490-167916-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	1671A		1			573728	02/05/19 15:49	ZXS	TAL NSH

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Method Summary

Client: Alpha Analytical Inc
Project/Site: L1904244

TestAmerica Job ID: 490-167916-1

Method	Method Description	Protocol	Laboratory
1671A	Ethanol (GC/FID)	EPA	TAL NSH

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Accreditation/Certification Summary

Client: Alpha Analytical Inc
Project/Site: L1904244

TestAmerica Job ID: 490-167916-1

Laboratory: TestAmerica Nashville

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
California	State Program	9	2938	06-30-19 *

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
1671A		Water	Ethanol

Maine	State Program	1	TN00032	11-03-19

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
1671A		Water	Ethanol

Massachusetts	State Program	1	M-TN032	06-30-19

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
1671A		Water	Ethanol

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica
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Nashville, TN

COOLER RECEIPT FORM

490-167916 Chain of Custody

Cooler Received/Opened On 2/5/2019 @ 9:00

Time Samples Removed From Cooler 12:54 Time Samples Placed In Storage 13:02 (2 Hour Window)

1. Tracking # 1ZE306940191785686 (last 4 digits, FedEx) Courier: UPS NDA

IR Gun ID 31470368 pH Strip Lot _____ Chlorine Strip Lot _____

2. Temperature of rep. sample or temp blank when opened: 0.4 Degrees Celsius

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO...NA

4. Were custody seals on outside of cooler? YES...NO...NA

If yes, how many and where: _____

5. Were the seals intact, signed, and dated correctly? YES...NO...NA

6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial) _____

7. Were custody seals on containers: YES NO and Intact YES...NO...NA

Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: Ice Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES...NO...NA

b. Was there any observable headspace present in any VOA vial? YES...NO...NA

● ⬅ Larger than this.

14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence # _____

I certify that I unloaded the cooler and answered questions 7-14 (intial) JA

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO...NA

b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial) JA

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES...NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial) JA

I certify that I attached a label with the unique LIMS number to each container (intial) JA

21. Were there Non-Conformance issues at login? YES...NO Was a NCM generated? YES...NO...#_____

BIS = Broken in shipment
Cooler Receipt Form.doc

LF-1
End of Form

Revised 8/23/17

ALPHA ANALYTICAL
World Class Chemistry

Subcontract Chain of Custody

Test America (Nashville)
2960 Foster Creighton Drive
Nashville, TN 37204

Loc: 490
167916

Alpha Job Number
L1904244

Client Information	Project Information	Regulatory Requirements/Report Limits
Client: Alpha Analytical Labs Address: Eight Walkup Drive Westborough, MA 01581-1019 Phone: 603.319.5010 Email: mgulli@alphalab.com	Project Location: MA Project Manager: Melissa Gulli **Turnaround & Deliverables Information** Due Date: 02/12/19 Deliverables:	State/Federal Program: Regulatory Criteria:

Project Specific Requirements and/or Report Requirements

Reference following Alpha Job Number on final report/deliverables: L1904244

Report to include Method Blank, LCS/LCSD:

Additional Comments: Send all results/reports to subreports@alphalab.com

Lab ID	Client ID	Collection Date/Time	Sample Matrix	Analysis	Batch QC
	HA17-GP4 OW	02-01-19 12:00	WATER	Ethanol by EPA 1671 Revision A	

	Relinquished By:	Date/Time:	Received By:	Date/Time:
		2/4/19 14:08		02/05/19 0410
Form No: AL_subcoc				

TA-WAS/0.4

ANALYTICAL REPORT

Lab Number:	L1738018
Client:	Haley & Aldrich, Inc. 465 Medford Street, Suite 2200 Charlestown, MA 02129-1400
ATTN:	Lee Vanzler
Phone:	(617) 886-7561
Project Name:	60 CAMBRIDGEPARK DRIVE
Project Number:	131188-002
Report Date:	10/23/17

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), NJ NELAP (MA935), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-14-00197).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: 60 CAMBRIDGEPARK DRIVE
Project Number: 131188-002

Lab Number: L1738018
Report Date: 10/23/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1738018-01	HA17-GP4(OW)	WATER	CAMBRIDGE, MA	10/19/17 10:00	10/19/17
L1738018-02	HA17-GP6(OW)	WATER	CAMBRIDGE, MA	10/19/17 11:35	10/19/17
L1738018-03	HA17-GP1(OW)	WATER	CAMBRIDGE, MA	10/19/17 14:25	10/19/17

Project Name:	60 CAMBRIDGEPARK DRIVE	**Lab Number:**	L1738018
Project Number:	131188-002	**Report Date:**	10/23/17

MADEP MCP Response Action Analytical Report Certification

This form provides certifications for all samples performed by MCP methods. Please refer to the Sample Results and Container Information sections of this report for specification of MCP methods used for each analysis. The following questions pertain only to MCP Analytical Methods.

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

A response to questions G, H and I is required for "Presumptive Certainty" status		
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	NO
H	Were all QC performance standards specified in the CAM protocol(s) achieved?	NO
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	NO

For any questions answered "No", please refer to the case narrative section on the following page(s).

Please note that sample matrix information is located in the Sample Results section of this report.

Project Name: 60 CAMBRIDGEPARK DRIVE **Lab Number:** L1738018
Project Number: 131188-002 **Report Date:** 10/23/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name:	60 CAMBRIDGEPARK DRIVE	**Lab Number:**	L1738018
Project Number:	131188-002	**Report Date:**	10/23/17

Case Narrative (continued)

MCP Related Narratives

Volatile Organics

In reference to question H:

The initial calibration, associated with L1738018-01 through -03 (all submitted samples), did not meet the method required minimum response factor on the lowest calibration standard for 1,4-dioxane (0.0013), as well as the average response factor for 1,4-dioxane.

The continuing calibration standard, associated with L1738018-01 through -03 (all submitted samples), is outside the acceptance criteria for several compounds; however, it is within overall method allowances. A copy of the continuing calibration standard is included as an addendum to this report.

VPH

In reference to question I:

All samples were analyzed for a subset of MCP analytes per the Chain of Custody.

EPH

In reference to question I:

All samples were analyzed for a subset of MCP analytes per the Chain of Custody.

Dissolved Metals

In reference to question G:

L1738018-01 through -03 (all submitted samples): One or more of the target analytes did not achieve the requested CAM reporting limits.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Michelle M. Morris

Title: Technical Director/Representative Date: 10/23/17

ORGANICS

VOLATILES

Project Name: 60 CAMBRIDGEPARK DRIVE **Lab Number:** L1738018

Project Number: 131188-002 **Report Date:** 10/23/17

SAMPLE RESULTS

Lab ID: L1738018-01
Client ID: HA17-GP4(OW)
Sample Location: CAMBRIDGE, MA

Date Collected: 10/19/17 10:00
Date Received: 10/19/17
Field Prep: Field Filtered (Dissolved Metals)

Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 10/20/17 13:37
Analyst: PK

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	ND		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	1.0	--	1
Trichlorofluoromethane	ND		ug/l	2.0	--	1
1,2-Dichloroethane	ND		ug/l	1.0	--	1
1,1,1-Trichloroethane	ND		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
1,1-Dichloropropene	ND		ug/l	2.0	--	1
Bromoform	ND		ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	0.50	--	1
Toluene	1.7		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Bromomethane	ND		ug/l	2.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	ND		ug/l	1.0	--	1

Project Name: 60 CAMBRIDGEPARK DRIVE **Lab Number:** L1738018

Project Number: 131188-002 **Report Date:** 10/23/17

SAMPLE RESULTS

Lab ID: L1738018-01 Date Collected: 10/19/17 10:00

Client ID: HA17-GP4(OW) Date Received: 10/19/17

Sample Location: CAMBRIDGE, MA Field Prep: Field Filtered (Dissolved Metals)

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	ND		ug/l	1.0	--	1
1,4-Dichlorobenzene	ND		ug/l	1.0	--	1
Methyl tert butyl ether	ND		ug/l	2.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-Xylene	ND		ug/l	1.0	--	1
Xylene (Total)	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1
1,2-Dichloroethene (total)	ND		ug/l	1.0	--	1
Dibromomethane	ND		ug/l	2.0	--	1
1,2,3-Trichloropropane	ND		ug/l	2.0	--	1
Styrene	ND		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
Acetone	ND		ug/l	5.0	--	1
Carbon disulfide	ND		ug/l	2.0	--	1
2-Butanone	ND		ug/l	5.0	--	1
4-Methyl-2-pentanone	ND		ug/l	5.0	--	1
2-Hexanone	ND		ug/l	5.0	--	1
Bromochloromethane	ND		ug/l	2.0	--	1
Tetrahydrofuran	ND		ug/l	2.0	--	1
2,2-Dichloropropane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Bromobenzene	ND		ug/l	2.0	--	1
n-Butylbenzene	ND		ug/l	2.0	--	1
sec-Butylbenzene	ND		ug/l	2.0	--	1
tert-Butylbenzene	ND		ug/l	2.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
Isopropylbenzene	ND		ug/l	2.0	--	1
p-Isopropyltoluene	ND		ug/l	2.0	--	1
Naphthalene	ND		ug/l	2.0	--	1
n-Propylbenzene	ND		ug/l	2.0	--	1
1,2,3-Trichlorobenzene	ND		ug/l	2.0	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--	1

Project Name: 60 CAMBRIDGEPARK DRIVE **Lab Number:** L1738018

Project Number: 131188-002 **Report Date:** 10/23/17

SAMPLE RESULTS

Lab ID: L1738018-01 Date Collected: 10/19/17 10:00

Client ID: HA17-GP4(OW) Date Received: 10/19/17

Sample Location: CAMBRIDGE, MA Field Prep: Field Filtered (Dissolved Metals)

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3,5-Trimethylbenzene	ND		ug/l	2.0	--	1
1,2,4-Trimethylbenzene	ND		ug/l	2.0	--	1
Ethyl ether	ND		ug/l	2.0	--	1
Isopropyl Ether	ND		ug/l	2.0	--	1
Ethyl-Tert-Butyl-Ether	ND		ug/l	2.0	--	1
Tertiary-Amyl Methyl Ether	ND		ug/l	2.0	--	1
1,4-Dioxane	ND		ug/l	250	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	117		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	106		70-130

Project Name: 60 CAMBRIDGEPARK DRIVE **Lab Number:** L1738018

Project Number: 131188-002 **Report Date:** 10/23/17

SAMPLE RESULTS

Lab ID: L1738018-02
Client ID: HA17-GP6(OW)
Sample Location: CAMBRIDGE, MA

Date Collected: 10/19/17 11:35
Date Received: 10/19/17
Field Prep: Field Filtered (Dissolved Metals)

Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 10/20/17 13:05
Analyst: PK

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	ND		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	1.0	--	1
Trichlorofluoromethane	ND		ug/l	2.0	--	1
1,2-Dichloroethane	ND		ug/l	1.0	--	1
1,1,1-Trichloroethane	ND		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
1,1-Dichloropropene	ND		ug/l	2.0	--	1
Bromoform	ND		ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	0.50	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Bromomethane	ND		ug/l	2.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	ND		ug/l	1.0	--	1

Project Name: 60 CAMBRIDGEPARK DRIVE **Lab Number:** L1738018

Project Number: 131188-002 **Report Date:** 10/23/17

SAMPLE RESULTS

Lab ID: L1738018-02 Date Collected: 10/19/17 11:35

Client ID: HA17-GP6(OW) Date Received: 10/19/17

Sample Location: CAMBRIDGE, MA Field Prep: Field Filtered (Dissolved Metals)

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	ND		ug/l	1.0	--	1
1,4-Dichlorobenzene	ND		ug/l	1.0	--	1
Methyl tert butyl ether	ND		ug/l	2.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-Xylene	ND		ug/l	1.0	--	1
Xylene (Total)	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1
1,2-Dichloroethene (total)	ND		ug/l	1.0	--	1
Dibromomethane	ND		ug/l	2.0	--	1
1,2,3-Trichloropropane	ND		ug/l	2.0	--	1
Styrene	ND		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
Acetone	ND		ug/l	5.0	--	1
Carbon disulfide	ND		ug/l	2.0	--	1
2-Butanone	ND		ug/l	5.0	--	1
4-Methyl-2-pentanone	ND		ug/l	5.0	--	1
2-Hexanone	ND		ug/l	5.0	--	1
Bromochloromethane	ND		ug/l	2.0	--	1
Tetrahydrofuran	ND		ug/l	2.0	--	1
2,2-Dichloropropane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Bromobenzene	ND		ug/l	2.0	--	1
n-Butylbenzene	ND		ug/l	2.0	--	1
sec-Butylbenzene	ND		ug/l	2.0	--	1
tert-Butylbenzene	ND		ug/l	2.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
Isopropylbenzene	ND		ug/l	2.0	--	1
p-Isopropyltoluene	ND		ug/l	2.0	--	1
Naphthalene	ND		ug/l	2.0	--	1
n-Propylbenzene	ND		ug/l	2.0	--	1
1,2,3-Trichlorobenzene	ND		ug/l	2.0	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--	1

Project Name: 60 CAMBRIDGEPARK DRIVE **Lab Number:** L1738018

Project Number: 131188-002 **Report Date:** 10/23/17

SAMPLE RESULTS

Lab ID: L1738018-02 Date Collected: 10/19/17 11:35

Client ID: HA17-GP6(OW) Date Received: 10/19/17

Sample Location: CAMBRIDGE, MA Field Prep: Field Filtered (Dissolved Metals)

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3,5-Trimethylbenzene	ND		ug/l	2.0	--	1
1,2,4-Trimethylbenzene	ND		ug/l	2.0	--	1
Ethyl ether	ND		ug/l	2.0	--	1
Isopropyl Ether	ND		ug/l	2.0	--	1
Ethyl-Tert-Butyl-Ether	ND		ug/l	2.0	--	1
Tertiary-Amyl Methyl Ether	ND		ug/l	2.0	--	1
1,4-Dioxane	ND		ug/l	250	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	114		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	108		70-130

Project Name: 60 CAMBRIDGEPARK DRIVE **Lab Number:** L1738018

Project Number: 131188-002 **Report Date:** 10/23/17

SAMPLE RESULTS

Lab ID: L1738018-03
Client ID: HA17-GP1(OW)
Sample Location: CAMBRIDGE, MA

Date Collected: 10/19/17 14:25
Date Received: 10/19/17
Field Prep: Field Filtered (Dissolved Metals)

Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 10/20/17 12:34
Analyst: PK

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	ND		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	1.0	--	1
Trichlorofluoromethane	ND		ug/l	2.0	--	1
1,2-Dichloroethane	ND		ug/l	1.0	--	1
1,1,1-Trichloroethane	ND		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
1,1-Dichloropropene	ND		ug/l	2.0	--	1
Bromoform	ND		ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	0.50	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Bromomethane	ND		ug/l	2.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	ND		ug/l	1.0	--	1

Project Name: 60 CAMBRIDGEPARK DRIVE **Lab Number:** L1738018

Project Number: 131188-002 **Report Date:** 10/23/17

SAMPLE RESULTS

Lab ID: L1738018-03 Date Collected: 10/19/17 14:25

Client ID: HA17-GP1(OW) Date Received: 10/19/17

Sample Location: CAMBRIDGE, MA Field Prep: Field Filtered (Dissolved Metals)

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	ND		ug/l	1.0	--	1
1,4-Dichlorobenzene	ND		ug/l	1.0	--	1
Methyl tert butyl ether	ND		ug/l	2.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-Xylene	ND		ug/l	1.0	--	1
Xylene (Total)	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1
1,2-Dichloroethene (total)	ND		ug/l	1.0	--	1
Dibromomethane	ND		ug/l	2.0	--	1
1,2,3-Trichloropropane	ND		ug/l	2.0	--	1
Styrene	ND		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
Acetone	ND		ug/l	5.0	--	1
Carbon disulfide	ND		ug/l	2.0	--	1
2-Butanone	ND		ug/l	5.0	--	1
4-Methyl-2-pentanone	ND		ug/l	5.0	--	1
2-Hexanone	ND		ug/l	5.0	--	1
Bromochloromethane	ND		ug/l	2.0	--	1
Tetrahydrofuran	ND		ug/l	2.0	--	1
2,2-Dichloropropane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Bromobenzene	ND		ug/l	2.0	--	1
n-Butylbenzene	ND		ug/l	2.0	--	1
sec-Butylbenzene	ND		ug/l	2.0	--	1
tert-Butylbenzene	ND		ug/l	2.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
Isopropylbenzene	ND		ug/l	2.0	--	1
p-Isopropyltoluene	ND		ug/l	2.0	--	1
Naphthalene	ND		ug/l	2.0	--	1
n-Propylbenzene	ND		ug/l	2.0	--	1
1,2,3-Trichlorobenzene	ND		ug/l	2.0	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--	1

Project Name: 60 CAMBRIDGEPARK DRIVE **Lab Number:** L1738018

Project Number: 131188-002 **Report Date:** 10/23/17

SAMPLE RESULTS

Lab ID: L1738018-03 Date Collected: 10/19/17 14:25

Client ID: HA17-GP1(OW) Date Received: 10/19/17

Sample Location: CAMBRIDGE, MA Field Prep: Field Filtered (Dissolved Metals)

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3,5-Trimethylbenzene	ND		ug/l	2.0	--	1
1,2,4-Trimethylbenzene	ND		ug/l	2.0	--	1
Ethyl ether	ND		ug/l	2.0	--	1
Isopropyl Ether	ND		ug/l	2.0	--	1
Ethyl-Tert-Butyl-Ether	ND		ug/l	2.0	--	1
Tertiary-Amyl Methyl Ether	ND		ug/l	2.0	--	1
1,4-Dioxane	ND		ug/l	250	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	115		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	106		70-130

Project Name: 60 CAMBRIDGEPARK DRIVE **Lab Number:** L1738018

Project Number: 131188-002 **Report Date:** 10/23/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 10/20/17 05:14
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 01-03 Batch: WG1054501-5					
Methylene chloride	ND		ug/l	2.0	--
1,1-Dichloroethane	ND		ug/l	1.0	--
Chloroform	ND		ug/l	1.0	--
Carbon tetrachloride	ND		ug/l	1.0	--
1,2-Dichloropropane	ND		ug/l	1.0	--
Dibromochloromethane	ND		ug/l	1.0	--
1,1,2-Trichloroethane	ND		ug/l	1.0	--
Tetrachloroethene	ND		ug/l	1.0	--
Chlorobenzene	ND		ug/l	1.0	--
Trichlorofluoromethane	ND		ug/l	2.0	--
1,2-Dichloroethane	ND		ug/l	1.0	--
1,1,1-Trichloroethane	ND		ug/l	1.0	--
Bromodichloromethane	ND		ug/l	1.0	--
trans-1,3-Dichloropropene	ND		ug/l	0.50	--
cis-1,3-Dichloropropene	ND		ug/l	0.50	--
1,3-Dichloropropene, Total	ND		ug/l	0.50	--
1,1-Dichloropropene	ND		ug/l	2.0	--
Bromoform	ND		ug/l	2.0	--
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--
Benzene	ND		ug/l	0.50	--
Toluene	ND		ug/l	1.0	--
Ethylbenzene	ND		ug/l	1.0	--
Chloromethane	ND		ug/l	2.0	--
Bromomethane	ND		ug/l	2.0	--
Vinyl chloride	ND		ug/l	1.0	--
Chloroethane	ND		ug/l	2.0	--
1,1-Dichloroethene	ND		ug/l	1.0	--
trans-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--

Project Name: 60 CAMBRIDGEPARK DRIVE **Lab Number:** L1738018

Project Number: 131188-002 **Report Date:** 10/23/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 10/20/17 05:14
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 01-03 Batch: WG1054501-5					
1,2-Dichlorobenzene	ND		ug/l	1.0	--
1,3-Dichlorobenzene	ND		ug/l	1.0	--
1,4-Dichlorobenzene	ND		ug/l	1.0	--
Methyl tert butyl ether	ND		ug/l	2.0	--
p/m-Xylene	ND		ug/l	2.0	--
o-Xylene	ND		ug/l	1.0	--
Xylene (Total)	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--
1,2-Dichloroethene (total)	ND		ug/l	1.0	--
Dibromomethane	ND		ug/l	2.0	--
1,2,3-Trichloropropane	ND		ug/l	2.0	--
Styrene	ND		ug/l	1.0	--
Dichlorodifluoromethane	ND		ug/l	2.0	--
Acetone	ND		ug/l	5.0	--
Carbon disulfide	ND		ug/l	2.0	--
2-Butanone	ND		ug/l	5.0	--
4-Methyl-2-pentanone	ND		ug/l	5.0	--
2-Hexanone	ND		ug/l	5.0	--
Bromochloromethane	ND		ug/l	2.0	--
Tetrahydrofuran	ND		ug/l	2.0	--
2,2-Dichloropropane	ND		ug/l	2.0	--
1,2-Dibromoethane	ND		ug/l	2.0	--
1,3-Dichloropropane	ND		ug/l	2.0	--
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--
Bromobenzene	ND		ug/l	2.0	--
n-Butylbenzene	ND		ug/l	2.0	--
sec-Butylbenzene	ND		ug/l	2.0	--
tert-Butylbenzene	ND		ug/l	2.0	--
o-Chlorotoluene	ND		ug/l	2.0	--

Project Name: 60 CAMBRIDGEPARK DRIVE **Lab Number:** L1738018

Project Number: 131188-002 **Report Date:** 10/23/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 10/20/17 05:14
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 01-03 Batch: WG1054501-5					
p-Chlorotoluene	ND		ug/l	2.0	--
1,2-Dibromo-3-chloropropane	ND		ug/l	2.0	--
Hexachlorobutadiene	ND		ug/l	0.60	--
Isopropylbenzene	ND		ug/l	2.0	--
p-Isopropyltoluene	ND		ug/l	2.0	--
Naphthalene	ND		ug/l	2.0	--
n-Propylbenzene	ND		ug/l	2.0	--
1,2,3-Trichlorobenzene	ND		ug/l	2.0	--
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--
1,3,5-Trimethylbenzene	ND		ug/l	2.0	--
1,2,4-Trimethylbenzene	ND		ug/l	2.0	--
Ethyl ether	ND		ug/l	2.0	--
Isopropyl Ether	ND		ug/l	2.0	--
Ethyl-Tert-Butyl-Ether	ND		ug/l	2.0	--
Tertiary-Amyl Methyl Ether	ND		ug/l	2.0	--
1,4-Dioxane	ND		ug/l	250	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	109		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	98		70-130
Dibromofluoromethane	100		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: 60 CAMBRIDGEPARK DRIVE

Project Number: 131188-002

Lab Number: L1738018

Report Date: 10/23/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01-03 Batch: WG1054501-3 WG1054501-4								
Methylene chloride	97		98		70-130	1		20
1,1-Dichloroethane	110		110		70-130	0		20
Chloroform	100		100		70-130	0		20
Carbon tetrachloride	78		80		70-130	3		20
1,2-Dichloropropane	110		110		70-130	0		20
Dibromochloromethane	84		83		70-130	1		20
1,1,2-Trichloroethane	110		100		70-130	10		20
Tetrachloroethene	96		97		70-130	1		20
Chlorobenzene	99		100		70-130	1		20
Trichlorofluoromethane	89		88		70-130	1		20
1,2-Dichloroethane	110		110		70-130	0		20
1,1,1-Trichloroethane	89		90		70-130	1		20
Bromodichloromethane	97		97		70-130	0		20
trans-1,3-Dichloropropene	84		81		70-130	4		20
cis-1,3-Dichloropropene	87		88		70-130	1		20
1,1-Dichloropropene	100		100		70-130	0		20
Bromoform	74		74		70-130	0		20
1,1,2,2-Tetrachloroethane	110		100		70-130	10		20
Benzene	100		100		70-130	0		20
Toluene	100		100		70-130	0		20
Ethylbenzene	100		100		70-130	0		20
Chloromethane	85		84		70-130	1		20
Bromomethane	86		81		70-130	6		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: 60 CAMBRIDGEPARK DRIVE
Project Number: 131188-002

Lab Number: L1738018
Report Date: 10/23/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01-03 Batch: WG1054501-3 WG1054501-4								
Vinyl chloride	120		130		70-130	8		20
Chloroethane	110		110		70-130	0		20
1,1-Dichloroethene	96		95		70-130	1		20
trans-1,2-Dichloroethene	100		99		70-130	1		20
Trichloroethene	96		96		70-130	0		20
1,2-Dichlorobenzene	99		99		70-130	0		20
1,3-Dichlorobenzene	98		99		70-130	1		20
1,4-Dichlorobenzene	98		97		70-130	1		20
Methyl tert butyl ether	90		88		70-130	2		20
p/m-Xylene	95		95		70-130	0		20
o-Xylene	95		95		70-130	0		20
cis-1,2-Dichloroethene	100		100		70-130	0		20
Dibromomethane	100		100		70-130	0		20
1,2,3-Trichloropropane	100		100		70-130	0		20
Styrene	100		100		70-130	0		20
Dichlorodifluoromethane	**51**	Q	**52**	Q	70-130	2		20
Acetone	110		110		70-130	0		20
Carbon disulfide	85		86		70-130	1		20
2-Butanone	110		110		70-130	0		20
4-Methyl-2-pentanone	94		89		70-130	5		20
2-Hexanone	94		91		70-130	3		20
Bromochloromethane	96		94		70-130	2		20
Tetrahydrofuran	100		99		70-130	1		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: 60 CAMBRIDGEPARK DRIVE
Project Number: 131188-002

Lab Number: L1738018
Report Date: 10/23/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01-03 Batch: WG1054501-3 WG1054501-4								
2,2-Dichloropropane	77		76		70-130	1		20
1,2-Dibromoethane	94		91		70-130	3		20
1,3-Dichloropropane	100		100		70-130	0		20
1,1,1,2-Tetrachloroethane	84		84		70-130	0		20
Bromobenzene	98		99		70-130	1		20
n-Butylbenzene	110		110		70-130	0		20
sec-Butylbenzene	100		100		70-130	0		20
tert-Butylbenzene	94		96		70-130	2		20
o-Chlorotoluene	100		99		70-130	1		20
p-Chlorotoluene	96		96		70-130	0		20
1,2-Dibromo-3-chloropropane	80		82		70-130	2		20
Hexachlorobutadiene	94		94		70-130	0		20
Isopropylbenzene	99		100		70-130	1		20
p-Isopropyltoluene	100		100		70-130	0		20
Naphthalene	110		100		70-130	10		20
n-Propylbenzene	100		100		70-130	0		20
1,2,3-Trichlorobenzene	110		110		70-130	0		20
1,2,4-Trichlorobenzene	110		110		70-130	0		20
1,3,5-Trimethylbenzene	100		100		70-130	0		20
1,2,4-Trimethylbenzene	110		100		70-130	10		20
Ethyl ether	100		100		70-130	0		20
Isopropyl Ether	110		110		70-130	0		20
Ethyl-Tert-Butyl-Ether	92		91		70-130	1		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: 60 CAMBRIDGEPARK DRIVE

Project Number: 131188-002

Lab Number: L1738018

Report Date: 10/23/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01-03 Batch: WG1054501-3 WG1054501-4								
Tertiary-Amyl Methyl Ether	84		82		70-130	2		20
1,4-Dioxane	86		96		70-130	11		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	102		101		70-130
Toluene-d8	101		101		70-130
4-Bromofluorobenzene	93		96		70-130
Dibromofluoromethane	100		98		70-130

PETROLEUM HYDROCARBONS

Project Name: 60 CAMBRIDGEPARK DRIVE
Lab Number: L1738018
Project Number: 131188-002
Report Date: 10/23/17

SAMPLE RESULTS

Lab ID:	L1738018-01	Date Collected:	10/19/17 10:00
Client ID:	HA17-GP4(OW)	Date Received:	10/19/17
Sample Location:	CAMBRIDGE, MA	Field Prep:	Field Filtered (Dissolved Metals)
Matrix:	Water		
Analytical Method:	100,VPH-04-1.1		
Analytical Date:	10/20/17 12:21		
Analyst:	MKS		

Quality Control Information

Condition of sample received:	Satisfactory
Aqueous Preservative:	Laboratory Provided Preserved Container
Sample Temperature upon receipt:	Received on Ice

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Petroleum Hydrocarbons - Westborough Lab						
C5-C8 Aliphatics	ND		ug/l	50.0	--	1
C9-C12 Aliphatics	ND		ug/l	50.0	--	1
C9-C10 Aromatics	ND		ug/l	50.0	--	1
C5-C8 Aliphatics, Adjusted	ND		ug/l	50.0	--	1
C9-C12 Aliphatics, Adjusted	ND		ug/l	50.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,5-Dibromotoluene-PID	116		70-130
2,5-Dibromotoluene-FID	125		70-130

Project Name: 60 CAMBRIDGEPARK DRIVE
Lab Number: L1738018
Project Number: 131188-002
Report Date: 10/23/17

SAMPLE RESULTS

Lab ID:	L1738018-01	Date Collected:	10/19/17 10:00
Client ID:	HA17-GP4(OW)	Date Received:	10/19/17
Sample Location:	CAMBRIDGE, MA	Field Prep:	Field Filtered (Dissolved Metals)
Matrix:	Water	Extraction Method:	EPA 3510C
Analytical Method:	98,EPH-04-1.1	Extraction Date:	10/20/17 03:14
Analytical Date:	10/21/17 20:44	Cleanup Method1:	EPH-04-1
Analyst:	DG	Cleanup Date1:	10/21/17

Quality Control Information

Condition of sample received:	Satisfactory
Aqueous Preservative:	Laboratory Provided Preserved Container
Sample Temperature upon receipt:	Received on Ice
Sample Extraction method:	Extracted Per the Method

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Extractable Petroleum Hydrocarbons - Westborough Lab						
C9-C18 Aliphatics	ND		ug/l	100	--	1
C19-C36 Aliphatics	ND		ug/l	100	--	1
C11-C22 Aromatics	ND		ug/l	100	--	1
C11-C22 Aromatics, Adjusted	ND		ug/l	100	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Chloro-Octadecane	47		40-140
o-Terphenyl	68		40-140
2-Fluorobiphenyl	75		40-140
2-Bromonaphthalene	76		40-140

Project Name: 60 CAMBRIDGEPARK DRIVE
Lab Number: L1738018
Project Number: 131188-002
Report Date: 10/23/17

SAMPLE RESULTS

Lab ID:	L1738018-02	Date Collected:	10/19/17 11:35
Client ID:	HA17-GP6(OW)	Date Received:	10/19/17
Sample Location:	CAMBRIDGE, MA	Field Prep:	Field Filtered (Dissolved Metals)
Matrix:	Water		
Analytical Method:	100,VPH-04-1.1		
Analytical Date:	10/20/17 13:01		
Analyst:	MKS		

Quality Control Information

Condition of sample received:	Satisfactory
Aqueous Preservative:	Laboratory Provided Preserved Container
Sample Temperature upon receipt:	Received on Ice

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Petroleum Hydrocarbons - Westborough Lab						
C5-C8 Aliphatics	ND		ug/l	50.0	--	1
C9-C12 Aliphatics	ND		ug/l	50.0	--	1
C9-C10 Aromatics	ND		ug/l	50.0	--	1
C5-C8 Aliphatics, Adjusted	ND		ug/l	50.0	--	1
C9-C12 Aliphatics, Adjusted	ND		ug/l	50.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,5-Dibromotoluene-PID	106		70-130
2,5-Dibromotoluene-FID	114		70-130

Project Name: 60 CAMBRIDGEPARK DRIVE
Lab Number: L1738018
Project Number: 131188-002
Report Date: 10/23/17

SAMPLE RESULTS

Lab ID:	L1738018-02	Date Collected:	10/19/17 11:35
Client ID:	HA17-GP6(OW)	Date Received:	10/19/17
Sample Location:	CAMBRIDGE, MA	Field Prep:	Field Filtered (Dissolved Metals)
Matrix:	Water	Extraction Method:	EPA 3510C
Analytical Method:	98,EPH-04-1.1	Extraction Date:	10/20/17 03:14
Analytical Date:	10/21/17 21:15	Cleanup Method1:	EPH-04-1
Analyst:	DG	Cleanup Date1:	10/21/17

Quality Control Information

Condition of sample received:	Satisfactory
Aqueous Preservative:	Laboratory Provided Preserved Container
Sample Temperature upon receipt:	Received on Ice
Sample Extraction method:	Extracted Per the Method

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Extractable Petroleum Hydrocarbons - Westborough Lab						
C9-C18 Aliphatics	ND		ug/l	100	--	1
C19-C36 Aliphatics	ND		ug/l	100	--	1
C11-C22 Aromatics	ND		ug/l	100	--	1
C11-C22 Aromatics, Adjusted	ND		ug/l	100	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Chloro-Octadecane	42		40-140
o-Terphenyl	55		40-140
2-Fluorobiphenyl	77		40-140
2-Bromonaphthalene	79		40-140

Project Name: 60 CAMBRIDGEPARK DRIVE
Lab Number: L1738018
Project Number: 131188-002
Report Date: 10/23/17

SAMPLE RESULTS

Lab ID:	L1738018-03	Date Collected:	10/19/17 14:25
Client ID:	HA17-GP1(OW)	Date Received:	10/19/17
Sample Location:	CAMBRIDGE, MA	Field Prep:	Field Filtered (Dissolved Metals)
Matrix:	Water		
Analytical Method:	100,VPH-04-1.1		
Analytical Date:	10/20/17 13:41		
Analyst:	MKS		

Quality Control Information

Condition of sample received:	Satisfactory
Aqueous Preservative:	Laboratory Provided Preserved Container
Sample Temperature upon receipt:	Received on Ice

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Petroleum Hydrocarbons - Westborough Lab						
C5-C8 Aliphatics	ND		ug/l	50.0	--	1
C9-C12 Aliphatics	ND		ug/l	50.0	--	1
C9-C10 Aromatics	ND		ug/l	50.0	--	1
C5-C8 Aliphatics, Adjusted	ND		ug/l	50.0	--	1
C9-C12 Aliphatics, Adjusted	ND		ug/l	50.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,5-Dibromotoluene-PID	95		70-130
2,5-Dibromotoluene-FID	103		70-130

Project Name: 60 CAMBRIDGEPARK DRIVE **Lab Number:** L1738018

Project Number: 131188-002 **Report Date:** 10/23/17

SAMPLE RESULTS

Lab ID:	L1738018-03	Date Collected:	10/19/17 14:25
Client ID:	HA17-GP1(OW)	Date Received:	10/19/17
Sample Location:	CAMBRIDGE, MA	Field Prep:	Field Filtered (Dissolved Metals)
Matrix:	Water	Extraction Method:	EPA 3510C
Analytical Method:	98,EPH-04-1.1	Extraction Date:	10/20/17 03:14
Analytical Date:	10/23/17 08:36	Cleanup Method1:	EPH-04-1
Analyst:	SR	Cleanup Date1:	10/22/17

Quality Control Information

Condition of sample received:	Satisfactory
Aqueous Preservative:	Laboratory Provided Preserved Container
Sample Temperature upon receipt:	Received on Ice
Sample Extraction method:	Extracted Per the Method

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Extractable Petroleum Hydrocarbons - Westborough Lab						
C9-C18 Aliphatics	ND		ug/l	100	--	1
C19-C36 Aliphatics	ND		ug/l	100	--	1
C11-C22 Aromatics	ND		ug/l	100	--	1
C11-C22 Aromatics, Adjusted	ND		ug/l	100	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Chloro-Octadecane	47		40-140
o-Terphenyl	69		40-140
2-Fluorobiphenyl	77		40-140
2-Bromonaphthalene	80		40-140

Project Name: 60 CAMBRIDGEPARK DRIVE
Project Number: 131188-002
Lab Number: L1738018
Report Date: 10/23/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 98,EPH-04-1.1
Analytical Date: 10/19/17 17:54
Analyst: SR

Extraction Method: EPA 3510C
Extraction Date: 10/19/17 04:50
Cleanup Method: EPH-04-1
Cleanup Date: 10/19/17

Parameter	Result	Qualifier	Units	RL	MDL
Extractable Petroleum Hydrocarbons - Westborough Lab for sample(s): 01-02 Batch: WG1053902-1					
C9-C18 Aliphatics	ND		ug/l	100	--
C19-C36 Aliphatics	ND		ug/l	100	--
C11-C22 Aromatics	ND		ug/l	100	--
C11-C22 Aromatics, Adjusted	ND		ug/l	100	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Chloro-Octadecane	62		40-140
o-Terphenyl	93		40-140
2-Fluorobiphenyl	101		40-140
2-Bromonaphthalene	99		40-140

Project Name: 60 CAMBRIDGEPARK DRIVE
Project Number: 131188-002
Lab Number: L1738018
Report Date: 10/23/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 98,EPH-04-1.1
Analytical Date: 10/23/17 09:08
Analyst: SR

Extraction Method: EPA 3510C
Extraction Date: 10/19/17 04:50
Cleanup Method: EPH-04-1
Cleanup Date: 10/22/17

Parameter	Result	Qualifier	Units	RL	MDL
Extractable Petroleum Hydrocarbons - Westborough Lab for sample(s): 03 Batch: WG1055008-1					
C9-C18 Aliphatics	ND		ug/l	100	--
C19-C36 Aliphatics	ND		ug/l	100	--
C11-C22 Aromatics	ND		ug/l	100	--
C11-C22 Aromatics, Adjusted	ND		ug/l	100	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Chloro-Octadecane	67		40-140
o-Terphenyl	65		40-140
2-Fluorobiphenyl	67		40-140
2-Bromonaphthalene	73		40-140

Project Name: 60 CAMBRIDGEPARK DRIVE **Lab Number:** L1738018

Project Number: 131188-002 **Report Date:** 10/23/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 100,VPH-04-1.1
Analytical Date: 10/20/17 11:01
Analyst: MZ

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Petroleum Hydrocarbons - Westborough Lab for sample(s): 01-03 Batch: WG1055141-4					
C5-C8 Aliphatics	ND		ug/l	50.0	--
C9-C12 Aliphatics	ND		ug/l	50.0	--
C9-C10 Aromatics	ND		ug/l	50.0	--
C5-C8 Aliphatics, Adjusted	ND		ug/l	50.0	--
C9-C12 Aliphatics, Adjusted	ND		ug/l	50.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2,5-Dibromotoluene-PID	109		70-130
2,5-Dibromotoluene-FID	119		70-130

Lab Control Sample Analysis
Batch Quality Control

Project Name: 60 CAMBRIDGEPARK DRIVE
Project Number: 131188-002

Lab Number: L1738018
Report Date: 10/23/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Extractable Petroleum Hydrocarbons - Westborough Lab Associated sample(s): 01-02 Batch: WG1053902-2 WG1053902-3								
C9-C18 Aliphatics	68		75		40-140	10		25
C19-C36 Aliphatics	83		82		40-140	1		25
C11-C22 Aromatics	94		75		40-140	22		25
Naphthalene	80		69		40-140	15		25
2-Methylnaphthalene	83		70		40-140	17		25
Acenaphthylene	88		74		40-140	17		25
Acenaphthene	93		74		40-140	23		25
Fluorene	90		74		40-140	20		25
Phenanthrene	95		76		40-140	22		25
Anthracene	95		75		40-140	24		25
Fluoranthene	96		74		40-140	**26**	Q	25
Pyrene	100		76		40-140	**27**	Q	25
Benzo(a)anthracene	94		72		40-140	**27**	Q	25
Chrysene	101		79		40-140	24		25
Benzo(b)fluoranthene	91		70		40-140	**26**	Q	25
Benzo(k)fluoranthene	91		70		40-140	**26**	Q	25
Benzo(a)pyrene	87		67		40-140	**26**	Q	25
Indeno(1,2,3-cd)Pyrene	81		64		40-140	23		25
Dibenzo(a,h)anthracene	90		72		40-140	22		25
Benzo(ghi)perylene	79		62		40-140	24		25
Nonane (C9)	50		59		30-140	17		25
Decane (C10)	58		68		40-140	16		25
Dodecane (C12)	64		73		40-140	13		25

Lab Control Sample Analysis

Batch Quality Control

Project Name: 60 CAMBRIDGEPARK DRIVE

Project Number: 131188-002

Lab Number: L1738018

Report Date: 10/23/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Extractable Petroleum Hydrocarbons - Westborough Lab Associated sample(s): 01-02 Batch: WG1053902-2 WG1053902-3								
Tetradecane (C14)	69		76		40-140	10		25
Hexadecane (C16)	73		78		40-140	7		25
Octadecane (C18)	77		79		40-140	3		25
Nonadecane (C19)	78		79		40-140	1		25
Eicosane (C20)	79		79		40-140	0		25
Docosane (C22)	80		79		40-140	1		25
Tetracosane (C24)	80		78		40-140	3		25
Hexacosane (C26)	80		78		40-140	3		25
Octacosane (C28)	79		77		40-140	3		25
Triacontane (C30)	79		78		40-140	1		25
Hexatriacontane (C36)	77		75		40-140	3		25

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Chloro-Octadecane	60		58		40-140
o-Terphenyl	93		73		40-140
2-Fluorobiphenyl	100		80		40-140
2-Bromonaphthalene	101		78		40-140
% Naphthalene Breakthrough	0		0		
% 2-Methylnaphthalene Breakthrough	0		0		

Lab Control Sample Analysis
Batch Quality Control

Project Name: 60 CAMBRIDGEPARK DRIVE
Project Number: 131188-002

Lab Number: L1738018
Report Date: 10/23/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Extractable Petroleum Hydrocarbons - Westborough Lab Associated sample(s): 03 Batch: WG1055008-2 WG1055008-3								
C9-C18 Aliphatics	74		73		40-140	1		25
C19-C36 Aliphatics	91		81		40-140	12		25
C11-C22 Aromatics	76		76		40-140	0		25
Naphthalene	60		64		40-140	6		25
2-Methylnaphthalene	62		66		40-140	6		25
Acenaphthylene	67		71		40-140	6		25
Acenaphthene	67		71		40-140	6		25
Fluorene	70		73		40-140	4		25
Phenanthrene	73		75		40-140	3		25
Anthracene	74		76		40-140	3		25
Fluoranthene	76		77		40-140	1		25
Pyrene	77		78		40-140	1		25
Benzo(a)anthracene	77		77		40-140	0		25
Chrysene	82		83		40-140	1		25
Benzo(b)fluoranthene	78		78		40-140	0		25
Benzo(k)fluoranthene	77		77		40-140	0		25
Benzo(a)pyrene	74		75		40-140	1		25
Indeno(1,2,3-cd)Pyrene	76		77		40-140	1		25
Dibenzo(a,h)anthracene	79		82		40-140	4		25
Benzo(ghi)perylene	70		72		40-140	3		25
Nonane (C9)	56		60		30-140	7		25
Decane (C10)	66		68		40-140	3		25
Dodecane (C12)	70		72		40-140	3		25

Lab Control Sample Analysis
Batch Quality Control

Project Name: 60 CAMBRIDGEPARK DRIVE
Project Number: 131188-002

Lab Number: L1738018
Report Date: 10/23/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Extractable Petroleum Hydrocarbons - Westborough Lab Associated sample(s): 03 Batch: WG1055008-2 WG1055008-3								
Tetradecane (C14)	74		74		40-140	0		25
Hexadecane (C16)	79		75		40-140	5		25
Octadecane (C18)	86		80		40-140	7		25
Nonadecane (C19)	86		78		40-140	10		25
Eicosane (C20)	89		80		40-140	11		25
Docosane (C22)	90		80		40-140	12		25
Tetracosane (C24)	90		80		40-140	12		25
Hexacosane (C26)	91		80		40-140	13		25
Octacosane (C28)	91		81		40-140	12		25
Triacontane (C30)	90		80		40-140	12		25
Hexatriacontane (C36)	92		82		40-140	11		25

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Chloro-Octadecane	77		70		40-140
o-Terphenyl	73		72		40-140
2-Fluorobiphenyl	76		76		40-140
2-Bromonaphthalene	81		84		40-140
% Naphthalene Breakthrough	0		0		
% 2-Methylnaphthalene Breakthrough	0		0		

Lab Control Sample Analysis
Batch Quality Control

Project Name: 60 CAMBRIDGEPARK DRIVE
Project Number: 131188-002

Lab Number: L1738018
Report Date: 10/23/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Petroleum Hydrocarbons - Westborough Lab Associated sample(s): 01-03 Batch: WG1055141-2 WG1055141-3								
C5-C8 Aliphatics	100		99		70-130	1		25
C9-C12 Aliphatics	111		108		70-130	3		25
C9-C10 Aromatics	97		95		70-130	2		25
Benzene	92		91		70-130	1		25
Toluene	93		91		70-130	2		25
Ethylbenzene	96		94		70-130	2		25
p/m-Xylene	95		93		70-130	2		25
o-Xylene	94		92		70-130	2		25
Methyl tert butyl ether	87		88		70-130	1		25
Naphthalene	93		96		70-130	2		25
1,2,4-Trimethylbenzene	97		95		70-130	2		25
Pentane	109		106		70-130	3		25
2-Methylpentane	105		103		70-130	2		25
2,2,4-Trimethylpentane	105		103		70-130	2		25
n-Nonane	108		105		30-130	3		25
n-Decane	112		109		70-130	3		25
n-Butylcyclohexane	112		110		70-130	2		25

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2,5-Dibromotoluene-PID	96		93		70-130
2,5-Dibromotoluene-FID	103		99		70-130

METALS

Project Name: 60 CAMBRIDGEPARK DRIVE
Lab Number: L1738018
Project Number: 131188-002
Report Date: 10/23/17

SAMPLE RESULTS

Lab ID: L1738018-01
Client ID: HA17-GP4(OW)
Sample Location: CAMBRIDGE, MA
Matrix: Water
Date Collected: 10/19/17 10:00
Date Received: 10/19/17
Field Prep: Field Filtered (Dissolved Metals)

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Dissolved Metals - Mansfield Lab											
Antimony, Dissolved	ND		mg/l	0.0040	--	1	10/20/17 10:15	10/20/17 15:25	EPA 3005A	97,6020A	AM
Arsenic, Dissolved	0.009		mg/l	0.005	--	1	10/20/17 10:15	10/21/17 13:44	EPA 3005A	97,6010C	BV
Barium, Dissolved	0.055		mg/l	0.010	--	1	10/20/17 10:15	10/21/17 13:44	EPA 3005A	97,6010C	BV
Beryllium, Dissolved	ND		mg/l	0.0005	--	1	10/20/17 10:15	10/20/17 15:25	EPA 3005A	97,6020A	AM
Cadmium, Dissolved	ND		mg/l	0.004	--	1	10/20/17 10:15	10/21/17 13:44	EPA 3005A	97,6010C	BV
Chromium, Dissolved	ND		mg/l	0.010	--	1	10/20/17 10:15	10/21/17 13:44	EPA 3005A	97,6010C	BV
Lead, Dissolved	ND		mg/l	0.010	--	1	10/20/17 10:15	10/21/17 13:44	EPA 3005A	97,6010C	BV
Mercury, Dissolved	ND		mg/l	0.0002	--	1	10/20/17 11:07	10/21/17 15:29	EPA 7470A	97,7470A	MG
Nickel, Dissolved	ND		mg/l	0.025	--	1	10/20/17 10:15	10/21/17 13:44	EPA 3005A	97,6010C	BV
Selenium, Dissolved	ND		mg/l	0.010	--	1	10/20/17 10:15	10/21/17 13:44	EPA 3005A	97,6010C	BV
Silver, Dissolved	ND		mg/l	0.007	--	1	10/20/17 10:15	10/21/17 13:44	EPA 3005A	97,6010C	BV
Thallium, Dissolved	ND		mg/l	0.0005	--	1	10/20/17 10:15	10/20/17 15:25	EPA 3005A	97,6020A	AM
Vanadium, Dissolved	ND		mg/l	0.010	--	1	10/20/17 10:15	10/21/17 13:44	EPA 3005A	97,6010C	BV
Zinc, Dissolved	ND		mg/l	0.050	--	1	10/20/17 10:15	10/21/17 13:44	EPA 3005A	97,6010C	BV

Project Name: 60 CAMBRIDGEPARK DRIVE
Lab Number: L1738018
Project Number: 131188-002
Report Date: 10/23/17

SAMPLE RESULTS

Lab ID: L1738018-02
Client ID: HA17-GP6(OW)
Sample Location: CAMBRIDGE, MA
Matrix: Water
Date Collected: 10/19/17 11:35
Date Received: 10/19/17
Field Prep: Field Filtered (Dissolved Metals)

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Dissolved Metals - Mansfield Lab											
Antimony, Dissolved	ND		mg/l	0.0040	--	1	10/20/17 10:15	10/20/17 15:29	EPA 3005A	97,6020A	AM
Arsenic, Dissolved	ND		mg/l	0.005	--	1	10/20/17 10:15	10/21/17 13:49	EPA 3005A	97,6010C	BV
Barium, Dissolved	0.340		mg/l	0.010	--	1	10/20/17 10:15	10/21/17 13:49	EPA 3005A	97,6010C	BV
Beryllium, Dissolved	ND		mg/l	0.0005	--	1	10/20/17 10:15	10/20/17 15:29	EPA 3005A	97,6020A	AM
Cadmium, Dissolved	ND		mg/l	0.004	--	1	10/20/17 10:15	10/21/17 13:49	EPA 3005A	97,6010C	BV
Chromium, Dissolved	ND		mg/l	0.010	--	1	10/20/17 10:15	10/21/17 13:49	EPA 3005A	97,6010C	BV
Lead, Dissolved	ND		mg/l	0.010	--	1	10/20/17 10:15	10/21/17 13:49	EPA 3005A	97,6010C	BV
Mercury, Dissolved	ND		mg/l	0.0002	--	1	10/20/17 11:07	10/21/17 15:31	EPA 7470A	97,7470A	MG
Nickel, Dissolved	0.031		mg/l	0.025	--	1	10/20/17 10:15	10/21/17 13:49	EPA 3005A	97,6010C	BV
Selenium, Dissolved	ND		mg/l	0.010	--	1	10/20/17 10:15	10/21/17 13:49	EPA 3005A	97,6010C	BV
Silver, Dissolved	ND		mg/l	0.007	--	1	10/20/17 10:15	10/21/17 13:49	EPA 3005A	97,6010C	BV
Thallium, Dissolved	ND		mg/l	0.0005	--	1	10/20/17 10:15	10/20/17 15:29	EPA 3005A	97,6020A	AM
Vanadium, Dissolved	ND		mg/l	0.010	--	1	10/20/17 10:15	10/21/17 13:49	EPA 3005A	97,6010C	BV
Zinc, Dissolved	1.01		mg/l	0.050	--	1	10/20/17 10:15	10/21/17 13:49	EPA 3005A	97,6010C	BV

Project Name: 60 CAMBRIDGEPARK DRIVE
Lab Number: L1738018
Project Number: 131188-002
Report Date: 10/23/17

SAMPLE RESULTS

Lab ID: L1738018-03
Client ID: HA17-GP1(OW)
Sample Location: CAMBRIDGE, MA
Matrix: Water
Date Collected: 10/19/17 14:25
Date Received: 10/19/17
Field Prep: Field Filtered (Dissolved Metals)

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Dissolved Metals - Mansfield Lab											
Antimony, Dissolved	ND		mg/l	0.0040	--	1	10/20/17 10:15	10/20/17 15:33	EPA 3005A	97,6020A	AM
Arsenic, Dissolved	0.012		mg/l	0.005	--	1	10/20/17 10:15	10/21/17 13:53	EPA 3005A	97,6010C	BV
Barium, Dissolved	0.037		mg/l	0.010	--	1	10/20/17 10:15	10/21/17 13:53	EPA 3005A	97,6010C	BV
Beryllium, Dissolved	ND		mg/l	0.0005	--	1	10/20/17 10:15	10/20/17 15:33	EPA 3005A	97,6020A	AM
Cadmium, Dissolved	ND		mg/l	0.004	--	1	10/20/17 10:15	10/21/17 13:53	EPA 3005A	97,6010C	BV
Chromium, Dissolved	ND		mg/l	0.010	--	1	10/20/17 10:15	10/21/17 13:53	EPA 3005A	97,6010C	BV
Lead, Dissolved	ND		mg/l	0.010	--	1	10/20/17 10:15	10/21/17 13:53	EPA 3005A	97,6010C	BV
Mercury, Dissolved	ND		mg/l	0.0002	--	1	10/20/17 11:07	10/21/17 15:33	EPA 7470A	97,7470A	MG
Nickel, Dissolved	ND		mg/l	0.025	--	1	10/20/17 10:15	10/21/17 13:53	EPA 3005A	97,6010C	BV
Selenium, Dissolved	ND		mg/l	0.010	--	1	10/20/17 10:15	10/21/17 13:53	EPA 3005A	97,6010C	BV
Silver, Dissolved	ND		mg/l	0.007	--	1	10/20/17 10:15	10/21/17 13:53	EPA 3005A	97,6010C	BV
Thallium, Dissolved	ND		mg/l	0.0005	--	1	10/20/17 10:15	10/20/17 15:33	EPA 3005A	97,6020A	AM
Vanadium, Dissolved	ND		mg/l	0.0100	--	1	10/20/17 10:15	10/21/17 13:53	EPA 3005A	97,6010C	BV
Zinc, Dissolved	ND		mg/l	0.050	--	1	10/20/17 10:15	10/21/17 13:53	EPA 3005A	97,6010C	BV

Project Name: 60 CAMBRIDGEPARK DRIVE **Lab Number:** L1738018

Project Number: 131188-002 **Report Date:** 10/23/17

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
MCP Dissolved Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1054448-1										
Arsenic, Dissolved	ND		mg/l	0.005	--	1	10/20/17 10:15	10/21/17 11:18	97,6010C	BV
Barium, Dissolved	ND		mg/l	0.010	--	1	10/20/17 10:15	10/21/17 11:18	97,6010C	BV
Cadmium, Dissolved	ND		mg/l	0.004	--	1	10/20/17 10:15	10/21/17 11:18	97,6010C	BV
Chromium, Dissolved	ND		mg/l	0.010	--	1	10/20/17 10:15	10/21/17 11:18	97,6010C	BV
Lead, Dissolved	ND		mg/l	0.010	--	1	10/20/17 10:15	10/21/17 11:18	97,6010C	BV
Nickel, Dissolved	ND		mg/l	0.025	--	1	10/20/17 10:15	10/21/17 11:18	97,6010C	BV
Selenium, Dissolved	ND		mg/l	0.010	--	1	10/20/17 10:15	10/21/17 11:18	97,6010C	BV
Silver, Dissolved	ND		mg/l	0.007	--	1	10/20/17 10:15	10/21/17 11:18	97,6010C	BV
Vanadium, Dissolved	ND		mg/l	0.010	--	1	10/20/17 10:15	10/21/17 11:18	97,6010C	BV
Zinc, Dissolved	ND		mg/l	0.050	--	1	10/20/17 10:15	10/21/17 11:18	97,6010C	BV

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
MCP Dissolved Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1054485-1										
Mercury, Dissolved	ND		mg/l	0.0002	--	1	10/20/17 11:07	10/21/17 15:24	97,7470A	MG

Prep Information

Digestion Method: EPA 7470A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
MCP Dissolved Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1054595-1										
Antimony, Dissolved	ND		mg/l	0.0040	--	1	10/20/17 10:15	10/20/17 15:12	97,6020A	AM
Beryllium, Dissolved	ND		mg/l	0.0005	--	1	10/20/17 10:15	10/20/17 15:12	97,6020A	AM
Thallium, Dissolved	ND		mg/l	0.0005	--	1	10/20/17 10:15	10/20/17 15:12	97,6020A	AM

Project Name: 60 CAMBRIDGEPARK DRIVE
Lab Number: L1738018
Project Number: 131188-002
Report Date: 10/23/17

Method Blank Analysis
Batch Quality Control

Prep Information

Digestion Method: EPA 3005A

Lab Control Sample Analysis

Batch Quality Control

Project Name: 60 CAMBRIDGEPARK DRIVE

Project Number: 131188-002

Lab Number: L1738018

Report Date: 10/23/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Dissolved Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1054448-2 WG1054448-3								
Arsenic, Dissolved	108		110		80-120	2		20
Barium, Dissolved	98		98		80-120	0		20
Cadmium, Dissolved	106		107		80-120	1		20
Chromium, Dissolved	97		98		80-120	1		20
Lead, Dissolved	99		100		80-120	1		20
Nickel, Dissolved	94		95		80-120	1		20
Selenium, Dissolved	109		109		80-120	0		20
Silver, Dissolved	101		103		80-120	2		20
Vanadium, Dissolved	99		101		80-120	2		20
Zinc, Dissolved	100		101		80-120	1		20
MCP Dissolved Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1054485-2 WG1054485-3								
Mercury, Dissolved	104		103		80-120	1		20
MCP Dissolved Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1054595-2 WG1054595-3								
Antimony, Dissolved	95		96		80-120	1		20
Beryllium, Dissolved	104		102		80-120	2		20
Thallium, Dissolved	94		95		80-120	1		20

Project Name: 60 CAMBRIDGEPARK DRIVE
Project Number: 131188-002

Lab Number: L1738018
Report Date: 10/23/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
B	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1738018-01A	Vial HCl preserved	B	NA		3.2	Y	Absent		MCP-8260-10(14)
L1738018-01B	Vial HCl preserved	B	NA		3.2	Y	Absent		MCP-8260-10(14)
L1738018-01C	Vial HCl preserved	B	NA		3.2	Y	Absent		MCP-8260-10(14)
L1738018-01D	Vial HCl preserved	B	NA		3.2	Y	Absent		VPH-10(14)
L1738018-01E	Vial HCl preserved	B	NA		3.2	Y	Absent		VPH-10(14)
L1738018-01F	Vial HCl preserved	B	NA		3.2	Y	Absent		VPH-10(14)
L1738018-01G	Plastic 250ml HNO3 preserved	B	<2	<2	3.2	Y	Absent		MCP-CD-6010S-10(180),MCP-7470S-10(28),MCP-AG-6010S-10(180),MCP-SB-6020S-10(180),MCP-ZN-6010S-10(180),MCP-AS-6010S-10(180),MCP-CR-6010S-10(180),MCP-TL-6020S-10(180),MCP-BA-6010S-10(180),MCP-PB-6010S-10(180),MCP-NI-6010S-10(180),MCP-SE-6010S-10(180),MCP-V-6010S-10(180)
L1738018-01H	Amber 1000ml HCl preserved	B	<2	<2	3.2	Y	Absent		EPH-10(14)
L1738018-01I	Amber 1000ml HCl preserved	B	<2	<2	3.2	Y	Absent		EPH-10(14)
L1738018-02A	Vial HCl preserved	B	NA		3.2	Y	Absent		MCP-8260-10(14)
L1738018-02B	Vial HCl preserved	B	NA		3.2	Y	Absent		MCP-8260-10(14)
L1738018-02C	Vial HCl preserved	B	NA		3.2	Y	Absent		MCP-8260-10(14)
L1738018-02D	Vial HCl preserved	B	NA		3.2	Y	Absent		VPH-10(14)
L1738018-02E	Vial HCl preserved	B	NA		3.2	Y	Absent		VPH-10(14)
L1738018-02F	Vial HCl preserved	B	NA		3.2	Y	Absent		VPH-10(14)
L1738018-02G	Plastic 250ml HNO3 preserved	B	<2	<2	3.2	Y	Absent		MCP-BE-6020S-10(180),MCP-CD-6010S-10(180),MCP-7470S-10(28),MCP-AG-6010S-10(180),MCP-SB-6020S-10(180),MCP-ZN-6010S-10(180),MCP-AS-6010S-10(180),MCP-CR-6010S-10(180),MCP-TL-6020S-10(180),MCP-BA-6010S-10(180),MCP-PB-6010S-10(180),MCP-NI-6010S-10(180),MCP-SE-6010S-10(180),MCP-V-6010S-10(180)

*Values in parentheses indicate holding time in days

Project Name: 60 CAMBRIDGEPARK DRIVE
Project Number: 131188-002

Lab Number: L1738018
Report Date: 10/23/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1738018-02H	Amber 1000ml HCl preserved	B	<2	<2	3.2	Y	Absent		EPH-10(14)
L1738018-02I	Amber 1000ml HCl preserved	B	<2	<2	3.2	Y	Absent		EPH-10(14)
L1738018-03A	Vial HCl preserved	B	NA		3.2	Y	Absent		MCP-8260-10(14)
L1738018-03B	Vial HCl preserved	B	NA		3.2	Y	Absent		MCP-8260-10(14)
L1738018-03C	Vial HCl preserved	B	NA		3.2	Y	Absent		MCP-8260-10(14)
L1738018-03D	Vial HCl preserved	B	NA		3.2	Y	Absent		VPH-10(14)
L1738018-03E	Vial HCl preserved	B	NA		3.2	Y	Absent		VPH-10(14)
L1738018-03F	Vial HCl preserved	B	NA		3.2	Y	Absent		VPH-10(14)
L1738018-03G	Plastic 250ml HNO3 preserved	B	<2	<2	3.2	Y	Absent		MCP-BE-6020S-10(180),MCP-CD-6010S-10(180),MCP-7470S-10(28),MCP-AG-6010S-10(180),MCP-SB-6020S-10(180),MCP-ZN-6010S-10(180),MCP-AS-6010S-10(180),MCP-CR-6010S-10(180),MCP-TL-6020S-10(180),MCP-BA-6010S-10(180),MCP-PB-6010S-10(180),MCP-NI-6010S-10(180),MCP-SE-6010S-10(180),MCP-V-6010S-10(180)
L1738018-03H	Amber 1000ml HCl preserved	B	<2	<2	3.2	Y	Absent		EPH-10(14)
L1738018-03I	Amber 1000ml HCl preserved	B	<2	<2	3.2	Y	Absent		EPH-10(14)

*Values in parentheses indicate holding time in days

Project Name:	60 CAMBRIDGEPARK DRIVE	**Lab Number:**	L1738018
Project Number:	131188-002	**Report Date:**	10/23/17

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: Data Usability Report

Project Name:	60 CAMBRIDGEPARK DRIVE	**Lab Number:**	L1738018
Project Number:	131188-002	**Report Date:**	10/23/17

Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the reporting limit (RL) for the sample.

Report Format: Data Usability Report

Project Name:	60 CAMBRIDGEPARK DRIVE	**Lab Number:**	L1738018
Project Number:	131188-002	**Report Date:**	10/23/17

REFERENCES

97 EPA Test Methods (SW-846) with QC Requirements & Performance Standards for the Analysis of EPA SW-846 Methods under the Massachusetts Contingency Plan, WSC-CAM-IIA, IIB, IIIA, IIIB, IIIC, IIID, VA, VB, VC, VIA, VIB, VIIIA and VIIIB, July 2010.

98 Method for the Determination of Extractable Petroleum Hydrocarbons (EPH), MassDEP, May 2004, Revision 1.1 with QC Requirements & Performance Standards for the Analysis of EPH under the Massachusetts Contingency Plan, WSC-CAM-IVB, July 2010.

100 Method for the Determination of Volatile Petroleum Hydrocarbons (VPH), MassDEP, May 2004, Revision 1.1 with QC Requirements & Performance Standards for the Analysis of VPH under the Massachusetts Contingency Plan, WSC-CAM-IVA, July 2010.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E.**

Mansfield Facility:

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581 — 8 Walkup Dr. — TEL: 508-898-9220 — FAX: 508-898-9193

Mansfield, MA 02048 — 320 Forbes Blvd — TEL: 508-822-9300 — FAX: 508-822-3288

Service Centers
Brewer, ME 04412 Portsmouth, NH 03801 Mahwah, NJ 07430 Albany, NY 12205
Tonawanda, NY 14150 Holmes, PA 19043

Page 1 of 1

Date Rec'd in Lab: 10/19/17

ALPHA Job #: L1738018

H&A Information
- H&A Client: Hanover R.S. Limited Partnersh
- H&A Address: 465 Medford Street
- Boston, MA 02129
- H&A Phone: 617-886-7380
- H&A Fax: 617-886-7680
- H&A Email: cmckenzie@haleyaldrich.com

Project Information
- Project Name: 60 Cambridgepark Drive
- Project Location: Cambridge, MA
- Project #: 131188-002
- (Use Project name as Project #) ☐
- Project Manager: L. Vanzler/C. McKenzie
- ALPHAQuote #:

Turn-Around Time
- Standard ☐ Due Date:
- Rush (only if pre approved) ☑ # of Days: 2 DAY

Deliverables
- ☑ Email ☐ Fax
- ☐ EQuIS (1 File) ☑ EQuIS (4 File)
- ☐ Other:

Billing Information
- ☐ Same as Client Info
- PO #

Regulatory Requirements (Program/Criteria)
MA MCP RCS-1

Note: Select State from menu & identify criteria.

Disposal Site Information
Please identify below location of applicable disposal facilities.
Disposal Facility:
☐ NJ ☐ NY ☐ Other:

These samples have been previously analyzed by Alpha ☐

Other project specific requirements/comments:

Please specify Metals or TAL.

ANALYSIS

Sample Filtration
☑ Done
☐ Lab to do
Preservation
☐ Lab to do
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	Depth	1. VOCs	2. EPH Carbon Ranges	3. VPH Carbon Ranges	4. Dissolved MCP 14 Metals	Sample Specific Comments	Total Bottles
38018-01	HA17-GP4(ow)	10/19/17	1000	Aq	MJD	—	X	X	X	X		9
02	HA17-GP6(ow)	"	1135	Aq	MJD	—	X	X	X	X		9
03	HA17-GP1(ow)	"	1425	Aq	MJD	—	X	X	X	X		9

27 TOTAL

Container Type	V	A	V	P							
Preservative	B	B	B	C							

Preservative Code: A = None; B = HCl; C = HNO_3; D = H_2SO_4; E = NaOH; F = MeOH; G = $NaHSO_4$; H = $Na_2S_2O_3$; K/E = Zn Ac/NaOH; O = Other

Container Code: P = Plastic; A = Amber Glass; V = Vial; G = Glass; B = Bacteria Cup; C = Cube; O = Other; E = Encore; D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Relinquished By:	Date/Time	Received By:	Date/Time
	10/19/17	RA Driver	10/19/17 16:40
RA Driver	10/19/17 16:40	AAL	10/19/17 1640
AAL	10/19/17 1830		10/19/17 1830

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. Alpha Analytical's services under this Chain of Custody shall be performed in accordance with terms and conditions within Blanket Service Agreement# 2015-18-Alpha Analytical by and between Haley & Aldrich, Inc., its subsidiaries and affiliates and Alpha Analytical.

Document ID: 20455 Rev 2 (8/9/2016)

Method Blank Summary
Form 4

Client	: Haley & Aldrich, Inc.	**Lab Number**	: L1738018
Project Name	: 60 CAMBRIDGEPARK DRIVE	**Project Number**	: 131188-002
Lab Sample ID	: WG1054501-5	**Lab File ID**	: VQ171020A05
Instrument ID	: QUIMBY		
Matrix	: WATER	**Analysis Date**	: 10/20/17 05:14

Client Sample No.	Lab Sample ID	Analysis Date
WG1054501-3LCS	WG1054501-3	10/20/17 03:40
WG1054501-4LCSD	WG1054501-4	10/20/17 04:11
HA17-GP1(OW)	L1738018-03	10/20/17 12:34
HA17-GP6(OW)	L1738018-02	10/20/17 13:05
HA17-GP4(OW)	L1738018-01	10/20/17 13:37

Continuing Calibration
Form 7

Client	: Haley & Aldrich, Inc.	**Lab Number**	: L1738018		
Project Name	: 60 CAMBRIDGEPARK DRIVE	**Project Number**	: 131188-002		
Instrument ID	: QUIMBY	**Calibration Date**	: 10/20/17 03:40		
Lab File ID	: VQ171020A02	**Init. Calib. Date(s)**	: 09/28/17	09/28/17	
Sample No	: WG1054501-2	**Init. Calib. Times**	: 11:49	15:29	
Channel	:				

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
Fluorobenzene	1	1	-	0	20	55	0
Dichlorodifluoromethane	0.559	0.283	-	49.4*	20	27	0
Chloromethane	0.847	0.718	-	15.2	20	46	0
Vinyl chloride	0.662	0.823	-	-24.3*	20	63	0
Bromomethane	0.411	0.356	-	13.4	20	50	-.01
Chloroethane	0.432	0.496	-	-14.8	20	65	-.01
Trichlorofluoromethane	0.703	0.626	-	11	20	46	0
Ethyl ether	0.163	0.172	-	-5.5	20	59	0
1,1-Dichloroethene	0.361	0.347	-	3.9	20	54	0
Carbon disulfide	1.159	0.984	-	15.1	20	49	0
Methylene chloride	0.488	0.475	-	2.7	20	56	0
Acetone	10	10.775	-	-7.8	20	59	0
trans-1,2-Dichloroethene	0.429	0.428	-	0.2	20	55	0
Methyl tert-butyl ether	0.805	0.724	-	10.1	20	50	0
Diisopropyl ether	1.338	1.493	-	-11.6	20	62	0
1,1-Dichloroethane	0.821	0.875	-	-6.6	20	59	0
Ethyl tert-butyl ether	1.075	0.995	-	7.4	20	52	0
cis-1,2-Dichloroethene	0.463	0.468	-	-1.1	20	57	0
2,2-Dichloropropane	0.76	0.583	-	23.3*	20	42	0
Bromochloromethane	0.163	0.156	-	4.3	20	55	0
Chloroform	0.776	0.818	-	-5.4	20	58	0
Carbon tetrachloride	0.61	0.477	-	21.8*	20	44	0
Tetrahydrofuran	10	10.564	-	-5.6	20	60	0
Dibromofluoromethane	0.196	0.196	-	0	20	54	0
1,1,1-Trichloroethane	0.739	0.656	-	11.2	20	48	0
2-Butanone	10	10.988	-	-9.9	20	65	0
1,1-Dichloropropene	0.678	0.704	-	-3.8	20	57	0
Benzene	2.019	2.106	-	-4.3	20	59	0
tert-Amyl methyl ether	0.909	0.762	-	16.2	20	48	0
1,2-Dichloroethane-d4	0.242	0.247	-	-2.1	20	55	0
1,2-Dichloroethane	0.54	0.587	-	-8.7	20	59	0
Trichloroethene	0.517	0.498	-	3.7	20	56	0
Dibromomethane	0.198	0.204	-	-3	20	59	0
1,2-Dichloropropane	0.459	0.496	-	-8.1	20	61	0
Bromodichloromethane	0.571	0.554	-	3	20	55	0
1,4-Dioxane	0.00136	0.00118*	-	13.2	20	50	0
cis-1,3-Dichloropropene	0.724	0.633	-	12.6	20	51	0
Chlorobenzene-d5	1	1	-	0	20	56	0
Toluene-d8	1.281	1.3	-	-1.5	20	56	0
Toluene	1.694	1.748	-	-3.2	20	58	0
4-Methyl-2-pentanone	0.101	0.095*	-	5.9	20	56	0
Tetrachloroethene	0.626	0.602	-	3.8	20	55	0
trans-1,3-Dichloropropene	0.714	0.598	-	16.2	20	49	0
1,1,2-Trichloroethane	0.293	0.313	-	-6.8	20	61	0
Chlorodibromomethane	0.376	0.315	-	16.2	20	49	0

* Value outside of QC limits.

Continuing Calibration
Form 7

Client	: Haley & Aldrich, Inc.	**Lab Number**	: L1738018		
Project Name	: 60 CAMBRIDGEPARK DRIVE	**Project Number**	: 131188-002		
Instrument ID	: QUIMBY	**Calibration Date**	: 10/20/17 03:40		
Lab File ID	: VQ171020A02	**Init. Calib. Date(s)**	: 09/28/17	09/28/17	
Sample No	: WG1054501-2	**Init. Calib. Times**	: 11:49	15:29	
Channel	:				

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
1,3-Dichloropropane	0.654	0.684	-	-4.6	20	59	0
1,2-Dibromoethane	0.333	0.314	-	5.7	20	55	0
2-Hexanone	0.2	0.187	-	6.5	20	57	0
Chlorobenzene	1.801	1.781	-	1.1	20	57	0
Ethylbenzene	3.333	3.41	-	-2.3	20	56	0
1,1,1,2-Tetrachloroethane	0.551	0.46	-	16.5	20	51	0
p/m Xylene	1.169	1.104	-	5.6	20	53	0
o Xylene	1.076	1.003	-	6.8	20	52	0
Styrene	1.7	1.685	-	0.9	20	54	0
1,4-Dichlorobenzene-d4	1	1	-	0	20	54	0
Bromoform	10	7.358	-	26.4*	20	47	0
Isopropylbenzene	7.825	7.721	-	1.3	20	53	0
4-Bromofluorobenzene	1.258	1.172	-	6.8	20	52	0
Bromobenzene	1.557	1.521	-	2.3	20	56	0
n-Propylbenzene	8.7	8.661	-	0.4	20	52	0
1,1,2,2-Tetrachloroethane	0.939	1.003	-	-6.8	20	61	0
2-Chlorotoluene	5.721	5.693	-	0.5	20	55	0
1,3,5-Trimethylbenzene	4.991	5.1	-	-2.2	20	54	0
1,2,3-Trichloropropane	0.817	0.846	-	-3.5	20	61	0
4-Chlorotoluene	5.185	4.956	-	4.4	20	53	0
tert-Butylbenzene	5.102	4.816	-	5.6	20	50	0
1,2,4-Trimethylbenzene	4.773	5.086	-	-6.6	20	55	0
sec-Butylbenzene	7.164	7.213	-	-0.7	20	52	0
p-Isopropyltoluene	5.416	5.577	-	-3	20	52	0
1,3-Dichlorobenzene	2.88	2.833	-	1.6	20	54	0
1,4-Dichlorobenzene	2.704	2.636	-	2.5	20	53	0
n-Butylbenzene	5.826	6.621	-	-13.6	20	56	0
1,2-Dichlorobenzene	2.436	2.41	-	1.1	20	54	0
1,2-Dibromo-3-chloropropan	0.118	0.095	-	19.5	20	46	0
Hexachlorobutadiene	0.602	0.566	-	6	20	53	0
1,2,4-Trichlorobenzene	1.003	1.093	-	-9	20	57	0
Naphthalene	1.786	1.925	-	-7.8	20	57	0
1,2,3-Trichlorobenzene	0.799	0.884	-	-10.6	20	57	0

* Value outside of QC limits.

ANALYTICAL REPORT

Lab Number:	L1810684
Client:	Haley & Aldrich, Inc. 465 Medford Street, Suite 2200 Charlestown, MA 02129-1400
ATTN:	Corinne McKenzie
Phone:	(617) 886-7380
Project Name:	60 CAMBRIDGEPARK DRIVE
Project Number:	131188-002
Report Date:	04/02/18

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), NJ NELAP (MA935), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-14-00197).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: 60 CAMBRIDGEPARK DRIVE
Project Number: 131188-002

Lab Number: L1810684
Report Date: 04/02/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1810684-01	HA17-GP6(OW)-20180328	WATER	CAMBRIDGE, MA	03/28/18 13:20	03/28/18

Project Name:	60 CAMBRIDGEPARK DRIVE	**Lab Number:**	L1810684
Project Number:	131188-002	**Report Date:**	04/02/18

MADEP MCP Response Action Analytical Report Certification

This form provides certifications for all samples performed by MCP methods. Please refer to the Sample Results and Container Information sections of this report for specification of MCP methods used for each analysis. The following questions pertain only to MCP Analytical Methods.

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

A response to questions G, H and I is required for "Presumptive Certainty" status		
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	YES
H	Were all QC performance standards specified in the CAM protocol(s) achieved?	YES
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	NO

For any questions answered "No", please refer to the case narrative section on the following page(s).

Please note that sample matrix information is located in the Sample Results section of this report.

Project Name: 60 CAMBRIDGEPARK DRIVE **Lab Number:** L1810684
Project Number: 131188-002 **Report Date:** 04/02/18

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name:	60 CAMBRIDGEPARK DRIVE	**Lab Number:**	L1810684
Project Number:	131188-002	**Report Date:**	04/02/18

Case Narrative (continued)

MCP Related Narratives

Dissolved Metals

In reference to question I:

All samples were analyzed for a subset of MCP analytes per the Chain of Custody.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Michelle M. Morris

Title: Technical Director/Representative Date: 04/02/18

METALS

Project Name: 60 CAMBRIDGEPARK DRIVE
Lab Number: L1810684
Project Number: 131188-002
Report Date: 04/02/18

SAMPLE RESULTS

Lab ID: L1810684-01
Client ID: HA17-GP6(OW)-20180328
Sample Location: CAMBRIDGE, MA
Sample Depth:
Matrix: Water

Date Collected: 03/28/18 13:20
Date Received: 03/28/18
Field Prep: Field Filtered (Dissolved Metals)

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Dissolved Metals - Mansfield Lab											
Zinc, Dissolved	1.90		mg/l	0.050	--	1	03/30/18 13:20	03/30/18 19:01	EPA 3005A	97,6010C	AB

Project Name: 60 CAMBRIDGEPARK DRIVE
Lab Number: L1810684
Project Number: 131188-002
Report Date: 04/02/18

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
MCP Dissolved Metals - Mansfield Lab for sample(s): 01 Batch: WG1102064-1										
Zinc, Dissolved	ND		mg/l	0.050	--	1	03/30/18 13:20	03/30/18 16:41	97,6010C	AB

Prep Information

Digestion Method: EPA 3005A

Lab Control Sample Analysis

Batch Quality Control

Project Name: 60 CAMBRIDGEPARK DRIVE

Project Number: 131188-002

Lab Number: L1810684

Report Date: 04/02/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Dissolved Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1102064-2 WG1102064-3								
Zinc, Dissolved	102		102		80-120	0		20

Project Name: 60 CAMBRIDGEPARK DRIVE
Project Number: 131188-002

Lab Number: L1810684
Report Date: 04/02/18

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1810684-01A	Plastic 250ml HNO3 preserved	A	<2	<2	4.8	Y	Absent		MCP-ZN-6010S-10(180)

*Values in parentheses indicate holding time in days

Project Name:	60 CAMBRIDGEPARK DRIVE	**Lab Number:**	L1810684
Project Number:	131188-002	**Report Date:**	04/02/18

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: Data Usability Report

Project Name:	60 CAMBRIDGEPARK DRIVE	**Lab Number:**	L1810684
Project Number:	131188-002	**Report Date:**	04/02/18

Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the reporting limit (RL) for the sample.

Report Format: Data Usability Report

Project Name:	60 CAMBRIDGEPARK DRIVE	**Lab Number:**	L1810684
Project Number:	131188-002	**Report Date:**	04/02/18

REFERENCES

97 EPA Test Methods (SW-846) with QC Requirements & Performance Standards for the Analysis of EPA SW-846 Methods under the Massachusetts Contingency Plan, WSC-CAM-IIA, IIB, IIIA, IIIB, IIIC, IIID, VA, VB, VC, VIA, VIB, VIIIA and VIIIB, July 2010.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Be, Cd, Cr, Cu, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Service Centers
Brewer, ME 04412 Portsmouth, NH 03801 Mahwah, NJ 07430 Albany, NY 12205
Tonawanda, NY 14150 Holmes, PA 19043

Page 1 of 1

Date Rec'd in Lab: 3/28/18

ALPHA Job #: L1810684

H&A Information

H&A Client: Hanover R.S. Limited Partnersh
H&A Address: 465 Medford Street
Boston, MA 02129
H&A Phone: 617-886-7380
H&A Fax: 617-886-7680
H&A Email: cmckenzie@haleyaldrich.com

Project Information

Project Name: 60 Cambridgepark Drive
Project Location: Cambridge, MA
Project #: 131188-002
(Use Project name as Project #) ☐
Project Manager: C. McKenzie
ALPHAQuote #:

Turn-Around Time

Standard ☑ Due Date:
Rush (only if pre approved) ☐ # of Days:

Deliverables

☑ Email ☐ Fax
☐ EQuIS (1 File) ☑ EQuIS (4 File)
☐ Other:

Regulatory Requirements (Program/Criteria)

MA MCP RCGW-2

Note: Select State from menu & identify criteria.

Billing Information

☐ Same as Client Info
PO #

Disposal Site Information

Please identify below location of applicable disposal facilities.
Disposal Facility:
☐ NJ ☐ NY
☐ Other:

These samples have been previously analyzed by Alpha ☐

Other project specific requirements/comments:

Please specify Metals or TAL.

ANALYSIS

Sample Filtration
☑ Done
☐ Lab to do
Preservation
☐ Lab to do
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	Depth	1. Dissolved Zinc	Sample Specific Comments	Total Bottles
10684-01	HA17-GP6(OW)-20180328	3/28/18	1320	AQ	LCN	NA	X		1

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Container Type	P	
Preservative	C	

Relinquished By:	Date/Time	Received By:	Date/Time
	3-24-18 / 1:00		3/28/18 1630
	3/28/18 1630		3/28/18 1630
	3/28/18 1830		3/28/18 1830

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. Alpha Analytical's services under this Chain of Custody shall be performed in accordance with terms and conditions within Blanket Service Agreement# 2015-18-Alpha Analytical by and between Haley & Aldrich, Inc., its subsidiaries and affiliates and Alpha Analytical.

Document ID: 20455 Rev 2 (8/9/2016)

ANALYTICAL REPORT

Lab Number:	L1826894
Client:	Haley & Aldrich, Inc. 465 Medford Street, Suite 2200 Charlestown, MA 02129-1400
ATTN:	Lee Vanzler
Phone:	(617) 886-7561
Project Name:	50 CAMBRIDGE PARK DRIVE
Project Number:	131188-004
Report Date:	07/19/18

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: 50 CAMBRIDGE PARK DRIVE
Project Number: 131188-004

Lab Number: L1826894
Report Date: 07/19/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1826894-01	HA18-GP-D1 (OW)-20180713	WATER	CAMBRIDGE, MA	07/13/18 08:25	07/13/18
L1826894-02	HA18-GP-D1N (OW)-20180713	WATER	CAMBRIDGE, MA	07/13/18 09:10	07/13/18
L1826894-03	HA18-GP-D1S (OW)-20180713	WATER	CAMBRIDGE, MA	07/13/18 10:20	07/13/18

Project Name: 50 CAMBRIDGE PARK DRIVE **Lab Number:** L1826894

Project Number: 131188-004 **Report Date:** 07/19/18

MADEP MCP Response Action Analytical Report Certification

This form provides certifications for all samples performed by MCP methods. Please refer to the Sample Results and Container Information sections of this report for specification of MCP methods used for each analysis. The following questions pertain only to MCP Analytical Methods.

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

A response to questions G, H and I is required for "Presumptive Certainty" status		
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	YES
H	Were all QC performance standards specified in the CAM protocol(s) achieved?	YES
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	NO

For any questions answered "No", please refer to the case narrative section on the following page(s).

Please note that sample matrix information is located in the Sample Results section of this report.

Project Name: 50 CAMBRIDGE PARK DRIVE **Lab Number:** L1826894
Project Number: 131188-004 **Report Date:** 07/19/18

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

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In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

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For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name:	50 CAMBRIDGE PARK DRIVE	**Lab Number:**	L1826894
Project Number:	131188-004	**Report Date:**	07/19/18

Case Narrative (continued)

MCP Related Narratives

Dissolved Metals

In reference to question I:

All samples were analyzed for a subset of MCP analytes per client request.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Kelly Stenstrom

Title: Technical Director/Representative Date: 07/19/18

METALS

Project Name: 50 CAMBRIDGE PARK DRIVE
Lab Number: L1826894
Project Number: 131188-004
Report Date: 07/19/18

SAMPLE RESULTS

Lab ID: L1826894-01
Client ID: HA18-GP-D1 (OW)-20180713
Sample Location: CAMBRIDGE, MA
Date Collected: 07/13/18 08:25
Date Received: 07/13/18
Field Prep: Refer to COC

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Dissolved Metals - Mansfield Lab											
Zinc, Dissolved	ND		mg/l	0.050	--	1	07/17/18 10:30	07/18/18 01:33	EPA 3005A	97,6010D	MC

Project Name: 50 CAMBRIDGE PARK DRIVE
Lab Number: L1826894
Project Number: 131188-004
Report Date: 07/19/18

SAMPLE RESULTS

Lab ID: L1826894-02
Client ID: HA18-GP-D1N (OW)-20180713
Sample Location: CAMBRIDGE, MA
Date Collected: 07/13/18 09:10
Date Received: 07/13/18
Field Prep: Refer to COC

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Dissolved Metals - Mansfield Lab											
Zinc, Dissolved	0.419		mg/l	0.050	--	1	07/17/18 10:30	07/18/18 01:38	EPA 3005A	97,6010D	MC

Project Name: 50 CAMBRIDGE PARK DRIVE
Lab Number: L1826894
Project Number: 131188-004
Report Date: 07/19/18

SAMPLE RESULTS

Lab ID: L1826894-03
Client ID: HA18-GP-D1S (OW)-20180713
Sample Location: CAMBRIDGE, MA
Date Collected: 07/13/18 10:20
Date Received: 07/13/18
Field Prep: Refer to COC

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Dissolved Metals - Mansfield Lab											
Zinc, Dissolved	0.114		mg/l	0.050	--	1	07/17/18 10:30	07/18/18 01:51	EPA 3005A	97,6010D	MC

Project Name: 50 CAMBRIDGE PARK DRIVE
Lab Number: L1826894
Project Number: 131188-004
Report Date: 07/19/18

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
MCP Dissolved Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1136440-1										
Zinc, Dissolved	ND		mg/l	0.050	--	1	07/17/18 10:30	07/18/18 00:46	97,6010D	MC

Prep Information

Digestion Method: EPA 3005A

Lab Control Sample Analysis

Batch Quality Control

Project Name: 50 CAMBRIDGE PARK DRIVE

Project Number: 131188-004

Lab Number: L1826894

Report Date: 07/19/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Dissolved Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1136440-2 WG1136440-3								
Zinc, Dissolved	108		108		80-120	0		20

Project Name: 50 CAMBRIDGE PARK DRIVE
Project Number: 131188-004

Lab Number: L1826894
Report Date: 07/19/18

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	*Custody Seal*
A	Absent

Container Information

Container ID	*Container Type*	*Cooler*	*Initial pH*	*Final pH*	*Temp deg C*	*Pres*	*Seal*	*Frozen Date/Time*	*Analysis(*)*
L1826894-01A	Plastic 120ml HNO3 preserved	A	<2	<2	2.1	Y	Absent		MCP-ZN-6010S-10(180)
L1826894-02A	Plastic 120ml HNO3 preserved	A	<2	<2	2.1	Y	Absent		MCP-ZN-6010S-10(180)
L1826894-03A	Plastic 120ml HNO3 preserved	A	<2	<2	2.1	Y	Absent		MCP-ZN-6010S-10(180)

*Values in parentheses indicate holding time in days

Project Name:	50 CAMBRIDGE PARK DRIVE	**Lab Number:**	L1826894
Project Number:	131188-004	**Report Date:**	07/19/18

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample¿s toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Report Format: Data Usability Report

Project Name:	50 CAMBRIDGE PARK DRIVE	**Lab Number:**	L1826894
Project Number:	131188-004	**Report Date:**	07/19/18

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the reporting limit (RL) for the sample.

Report Format: Data Usability Report

Project Name:	50 CAMBRIDGE PARK DRIVE	**Lab Number:**	L1826894
Project Number:	131188-004	**Report Date:**	07/19/18

REFERENCES

97 EPA Test Methods (SW-846) with QC Requirements & Performance Standards for the Analysis of EPA SW-846 Methods under the Massachusetts Contingency Plan, WSC-CAM-IIA, IIB, IIIA, IIIB, IIIC, IIID, VA, VB, VC, VIA, VIB, VIIIA and VIIIB, July 2010.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Be, Cd, Cr, Cu, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581 — 8 Walkup Dr. — TEL: 508-898-9220 — FAX: 508-898-9193
Mansfield, MA 02048 — 320 Forbes Blvd — TEL: 508-822-9300 — FAX: 508-822-3288

Service Centers
Brewer, ME 04412 Portsmouth, NH 03801 Mahwah, NJ 07430 Albany, NY 12205
Tonawanda, NY 14150 Holmes, PA 19043

Page 1 of 1

Date Rec'd in Lab: 7/13/18

ALPHA Job #: L1826894

H&A Information
H&A Client: Hanover R.S. Limited Partnersh
H&A Address: 465 Medford Street
Boston, MA 02129
H&A Phone: 617-886-7380
H&A Fax: 617-886-7680
H&A Email: cmckenzie@haleyaldrich.com

Project Information
Project Name: 50 Cambridgepark Drive
Project Location: Cambridge, MA
Project #: 131188-004
(Use Project name as Project #) ☐
Project Manager: L. Vanzler/C. McKenzie
ALPHAQuote #:

Turn-Around Time
Standard ☑ Due Date:
Rush (only if pre approved) ☐ # of Days:

Deliverables
☑ Email ☐ Fax
☐ EQuIS (1 File) ☑ EQuIS (4 File)
☐ Other:

Billing Information
☐ Same as Client Info
PO #

Regulatory Requirements (Program/Criteria)
MA MCP RCGW-2

Note: Select State from menu & identify criteria.

Disposal Site Information
Please identify below location of applicable disposal facilities.
Disposal Facility:
☐ NJ ☐ NY
☐ Other:

These samples have been previously analyzed by Alpha ☐

Other project specific requirements/comments:

Please specify Metals or TAL.

ANALYSIS

Sample Filtration
☑ Done
☐ Lab to do
Preservation
☐ Lab to do
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	Depth	1. Dissolved Zinc	Total Bottles	Sample Specific Comments
26894-01	HA18-GP-D1(OW)-20180713	7/13/2018	825	AQ	DOS	-	X	1	
-02	HA18-GP-D1N(OW)-20180713	7/13/2018	910	AQ	DOS	-	X	1	
-03	HA18-GP-D1S(OW)-20180713	7/13/2018	1020	AQ	DOS	-	X	1	

Container Type: P
Preservative: AC

Preservative Code: A = None; B = HCl; C = HNO_3; D = H_2SO_4; E = NaOH; F = MeOH; G = $NaHSO_4$; H = $Na_2S_2O_3$; K/E = Zn Ac/NaOH; O = Other

Container Code: P = Plastic; A = Amber Glass; V = Vial; G = Glass; B = Bacteria Cup; C = Cube; O = Other; E = Encore; D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Relinquished By:	Date/Time	Received By:	Date/Time
	7/13/18 1210		7/13/18 1613
	7/13/18 1613		7/13/18 1630
	7/13 1800		7/13/18 1800

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. Alpha Analytical's services under this Chain of Custody shall be performed in accordance with terms and conditions within Blanket Service Agreement# 2015-18-Alpha Analytical by and between Haley & Aldrich, Inc., its subsidiaries and affiliates and Alpha Analytical.

Document ID: 20455 Rev 2 (8/9/2016)