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April 26, 2019
File No. 01.0173611.00

United States Environmental Protection Agency – Region 1
5 Post Office Square, Mail Code OEP06-4
Boston, Massachusetts 02109-3912

Re: Submittal of Notice of Intent (NOI)
Remedial General Permit (RGP)
College of the Holy Cross
1 College Street
Worcester, Massachusetts

To Whom it May Concern:

GZA GeoEnvironmental, Inc. (GZA), on behalf of The College of the Holy Cross, is submitting the attached Notice of Intent (NOI) form (Attachment 1) for the Remedial General Permit (RGP) for the renovation of the campus recreational center located at 1 College Street in Worcester, Massachusetts.

BACKGROUND

The existing recreation center (The Fieldhouse) is a rectangular-shaped structure that was constructed in 1947. The Fieldhouse is located approximately 1,600 feet south of the Middle River in Worcester, and is abutted to the west by College Street, to the south by Boyden Street, to the east by the campus of the College of the Holy Cross (Attachment 2). Existing ground surface at the Site ranges from approximately elevation 650 to 610 feet.

PROPOSED RENOVATIONS

The proposed renovations involve demolition of The Fieldhouse and construction of a new 2- to 3-story recreation and wellness complex located within the existing building's footprint and extending approximately 100 feet north. Based on the available plans, the proposed structure will have two slab levels separated by a foundation/retaining wall; the lower (north) and upper (south) slabs are proposed at approximately elevations 607 and 622 feet, respectively. The construction of the proposed lower walk-out basement level will require approximately 12 to 16 feet of excavation from existing grade.

During proposed development work, as necessary, excavations will be dewatered using dug sumps and submersible pumps. GZA is submitting this NOI to request authorization for discharge of generated and treated groundwater to the Middle River (Attachment 3). A Process Flow Diagram for the proposed treatment system is available in Attachment 4.

NOTICE OF INTENT

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

- Review of Appendix I "Areas of Critical Environmental Concern" (June 2009) indicated that the proposed discharge is not to an ACEC.
- Review of Appendix II "Federally Listed Endangered and Threatened Species in Massachusetts" (January 2015) indicated that the Northern Long-eared Bat is located state-wide. However, this species is not likely to be present at the 1 College Street address located in the City of Worcester, Massachusetts, due to the densely developed nature of the Site and the surrounding area.
- A dilution factor for metals was calculated for the discharge. The documentation of this calculation can be found in Attachment 5.
- Review of the Massachusetts Geographic Information Systems (MassGIS) DEP Priority Resources Map of Worcester shows that there are no ACECs and no habitats of Species of Special Concern or Threatened or Endangered Species within 500 feet of the subject site. Therefore, permit eligibility meets "Criterion A." As shown on the map generated by the MassGIS online viewer (Attachment 6), no ACECs or Estimated Habitats of Rare Wildlife areas are located within a half mile downstream of the discharge location.
- Review of the electronic Massachusetts Cultural Resource Information System database, made available through Massachusetts Historical Commission, found that there are no properties listed or eligible for listing on the National Registry of Historic Places under the National Historic Preservation Act. Therefore, there will be no impact associated with this discharge to such properties. The documentation of this review can be found in Attachment 7.
- Laboratory analytical results for groundwater and surface water are presented in Attachment 8 and summarized in Attachment 9. Groundwater was collected on February 12 and 14, 2019 and submitted to Alpha Analytical Laboratory for analysis. Groundwater samples were collected from monitoring well GZ-1 and the surface water sample was collected from the location of proposed discharge. See Figure 2 (Attachment 3) for locations of sample collection.

Please do not hesitate to contact the undersigned at (781) 278-3700 if you have any questions or require further information.

Sincerely,

GZA GEOENVIRONMENTAL, INC.

William A. Davis
Assistant Project Manager

John A. Colbert, P.E.
Consultant/Reviewer

Bruce W. Fairless, P.E.
Principal

Attachments: Attachment 1: Notice of Intent Form
Attachment 2: Figure 1 – Site Locus Map
Attachment 3: Figure 2 – Site Plan and Discharge Outfall Location
Attachment 4: Figure 3 – Process Flow Diagram

Attachment 5: Dilution Factor Calculation
Attachment 6: MassGIS DEP Priority Resources Map and ACEC Documentation
Attachment 7: Massachusetts Cultural Resource Information System Report
Attachment 8: Laboratory Analytical Results
Attachment 9: Summaries of Groundwater and Surface Water Analytical Results
Attachment 10: WM15 Fee Transmittal Form

cc: MassDEP – Central Region
Department of Public Works – City of Worcester
Jahan Khalili, GZA GeoEnvironmental, Inc.
Brad McCord, Cannon Design

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ATTACHMENT 1

NOTICE OF INTENT FORM

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

A. General site information:

<table>
<tr><td rowspan="4">1. Name of site:
College of the Holy Cross</td><td colspan="3">Site address: 1 College Street
Street:</td></tr>
<tr><td>City: Worcester</td><td>State: MA</td><td>Zip: 01610</td></tr>
<tr><td colspan="3">Contact Person: Leonard Raymond</td></tr>
<tr><td colspan="3">Telephone: 508-793-2483 Email: lraymond@holycross.edu</td></tr>
<tr><td rowspan="4">2. Site owner
College of the Holy Cross

Owner is (check one): ☐ Federal ☐ State/Tribal ■ Private
☐ Other; if so, specify:</td><td colspan="3">Mailing address: 1 College Street
Street:</td></tr>
<tr><td>City: Worcester</td><td>State: Ma</td><td>Zip: 01610</td></tr>
<tr><td colspan="3">Contact Person: Jeff White</td></tr>
<tr><td colspan="3">Telephone: 508-328-6750 Email: jeffwhite@hotmail.com</td></tr>
<tr><td rowspan="4">3. Site operator, if different than owner
Marois Brothers Inc.</td><td colspan="3">Mailing address:
Street: 115 Blackstone River Road</td></tr>
<tr><td>City: Worcester</td><td>State: MA</td><td>Zip: 01607</td></tr>
<tr><td>4. NPDES permit number assigned by EPA:

NPDES permit is (check all that apply: ■ RGP ☐ DGP ☐ CGP
☐ MSGP ☐ Individual NPDES permit ☐ Other; if so, specify:</td><td colspan="3">5. Other regulatory program(s) that apply to the site (check all that apply):
☐ MA Chapter 21e; list RTN(s):
☐ 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):
Middle River	MA51-02	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.

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.	1.89 MGD
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.	14.125

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: 4/12/2019

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: Chloride, TSS, arsenic, cadmium, copper, iron, lead, nickel, silver, zinc, cyanide, total phthalates, benzo(a)anthracene, benzo(a	
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): 24 inch storm sewer, discharging to Middle River	Outfall location(s): (Latitude, Longitude) 42.14.27N 71.48.44W
Discharges enter the receiving water(s) via (check any that apply): ☐ Direct discharge to the receiving water ■ Indirect discharge, if so, specify: Existing storm water catch basin located on College Street, discharging to Middle River. ☐ A private storm sewer system ■ A municipal storm sewer system If the discharge enters the receiving water via a private or municipal storm sewer system: Has notification been provided to the owner of this system? (check one): ■ Yes ☐ No Has the operator has received permission from the owner to use such system for discharges? (check one): ■ Yes ☐ No, if so, explain, with an estimated timeframe for obtaining permission: Has the operator attached a summary of any additional requirements the owner of this system has specified? (check one): ☐ Yes ■ No	
Provide the expected start and end dates of discharge(s) (month/year): 5/2019 through 9/2019 Indicate if the discharge is expected to occur over a duration of: ■ less than 12 months ☐ 12 months or more ☐ is an emergency discharge	
Has the operator attached a site plan in accordance with the instructions in D, above? (check one): ■ Yes ☐ No	

<table>
<tr><td>2. Activity Category: (check all that apply)</td><td colspan="2">3. Contamination Type Category: (check all that apply)</td></tr>
<tr><td rowspan="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	4500NH3	0.02	<0.02		Report mg/L	---
Chloride		✔	1	44, 300.0	250000	5260000		Report µg/l	---
Total Residual Chlorine	✔		1	4500CL-D	0.02	<0.02		0.2 mg/L	155
Total Suspended Solids		✔	1	2540D	2000	310000		30 mg/L	---
Antimony	✔		1	200.8	0.004	<0.004		206 µg/L	
Arsenic		✔	1	200.8	0.001	6.02		104 µg/L	
Cadmium		✔	1	200.8	0.0020	1.77		10.2 µg/L	
Chromium III	✔		1	200.8	0.01	<0.01		323 µg/L	
Chromium VI	✔		1	7196A	0.01	<0.01		323 µg/L	
Copper		✔	1	200.8	0.001	5.55		242 µg/L	
Iron		✔	1	200.7	0.05	5460		5,000 µg/L	
Lead		✔	1	200.8	0.001	2.68		160 µg/L	
Mercury	✔		1	245.1	0.0002	<0.0002		0.739 µg/L	
Nickel		✔	1	200.8	0.002	25.74		1,450 µg/L	
Selenium	✔		1	200.8	0.005	<0.005		235.8 µg/L	
Silver		✔	1	200.8	0.0004	5.48		35.1 µg/L	
Zinc		✔	1	200.8	0.01	15.7		420 µg/L	
Cyanide		✔	1	4500CN-C	5	6		178 mg/L	
B. Non-Halogenated VOCs									
Total BTEX	✔		1	624.1	1	<1		100 µg/L	---
Benzene	✔		1	624.1	1	<1		5.0 µg/L	---
1,4 Dioxane	✔		1	624.1SIM	50	<50		200 µg/L	---
Acetone	✔		1	624.1	10	<10		7.97 mg/L	---
Phenol	✔		1	625.1	0.03	<0.03		1,080 µg/L	

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	✔		1	624.1	1.0	<1.0		4.4 µg/L	
1,2 Dichlorobenzene	✔		1	624.1	5.0	<5.0		600 µg/L	---
1,3 Dichlorobenzene	✔		1	624.1	5.0	<5.0		320 µg/L	---
1,4 Dichlorobenzene	✔		1	624.1	5.0	<5.0		5.0 µg/L	---
Total dichlorobenzene	✔		1	624.1	5.0	<5.0		763 µg/L in NH	---
1,1 Dichloroethane	✔		1	624.1	1.5	<1.5		70 µg/L	---
1,2 Dichloroethane	✔		1	624.1	1.0	<1.0		5.0 µg/L	---
1,1 Dichloroethylene	✔		1	624.1	1.0	<1.0		3.2 µg/L	---
Ethylene Dibromide	✔		1	14, 504.1	0.01	<0.01		0.05 µg/L	---
Methylene Chloride	✔		1	624.1	1.0	<1.0		4.6 µg/L	---
1,1,1 Trichloroethane	✔		1	624.1	2.0	<2.0		200 µg/L	---
1,1,2 Trichloroethane	✔		1	624.1	1.5	<1.5		5.0 µg/L	---
Trichloroethylene	✔		1	624.1	1.0	<1.0		5.0 µg/L	---
Tetrachloroethylene	✔		1	624.1	1.0	<1.0		5.0 µg/L	
cis-1,2 Dichloroethylene	✔		1	624.1	1.0	<1.0		70 µg/L	---
Vinyl Chloride	✔		1	624.1	1.0	<1.0		2.0 µg/L	---
D. Non-Halogenated SVOCs									
Total Phthalates		✔	1	625.1	2.2	2.3		190 µg/L	
Diethylhexyl phthalate	✔		1	625.1	5.0	<5.0		101 µg/L	
Total Group I PAHs		✔	1	625.1	0.1	4.35		1.0 µg/L	---
Benzo(a)anthracene		✔	1	625.1SIM	0.1	0.94		As Total PAHs	0.0537
Benzo(a)pyrene		✔	1	625.1SIM	0.1	0.46			0.0537
Benzo(b)fluoranthene		✔	1	625.1SIM	0.1	1.3			0.0537
Benzo(k)fluoranthene		✔	1	625.1SIM	0.1	0.45			0.0537
Chrysene		✔	1	625.1SIM	0.1	1			0.0537
Dibenzo(a,h)anthracene	✔		1	625.1SIM	0.1	<0.1			
Indeno(1,2,3-cd)pyrene		✔	1	625.1SIM	0.1	0.2			

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	625.1SIM	0.2	4.93		100 µg/L	---
Naphthalene	✔		1	625.1SIM	0.2	<0.2		20 µg/L	---
E. Halogenated SVOCs									
Total PCBs	✔		1	608.3	0.25	<0.25		0.000064 µg/L	---
Pentachlorophenol	✔		1	625.1SIM	1	<1		1.0 µg/L	---
F. Fuels Parameters									
Total Petroleum Hydrocarbons	✔		1	74, 1664A	4400	<4400		5.0 mg/L	---
Ethanol								Report mg/L	---
Methyl-tert-Butyl Ether	✔		1	624.1	10	<10		70 µg/L	
tert-Butyl Alcohol	✔		1	624.1	100	<100		120 µg/L in MA 40 µg/L in NH	---
tert-Amyl Methyl Ether	✔		1	624.1	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:									
HARDNESS	✔		1	2340B	0.66	40.8			

E. Treatment system information

1. Indicate the type(s) of treatment that will be applied to effluent prior to discharge: (check all that apply)

☐ Adsorption/Absorption ☐ Advanced Oxidation Processes ☐ Air Stripping ☐ Granulated Activated Carbon ("GAC")/Liquid Phase Carbon Adsorption
☐ Ion Exchange ☐ Precipitation/Coagulation/Flocculation ■ Separation/Filtration ☐ Other; if so, specify:

2. Provide a written description of all treatment system(s) or processes that will be applied to the effluent prior to discharge.
The proposed treatment system will consist of one 10,000 gallon settling (fractionation) tank, and two bag filters in series and a totalizing flow meter.

Identify each major treatment component (check any that apply):
■ Fractionation tanks☐ Equalization tank ☐ Oil/water separator ☐ Mechanical filter ☐ Media filter
☐ Chemical feed tank ☐ Air stripping unit ■ Bag filter ☐ Other; if so, specify:

Indicate if either of the following will occur (check any that apply):
☐ Chlorination ☐ De-chlorination

3. Provide the **design flow capacity** in gallons per minute (gpm) of the most limiting component. Indicate the most limiting component: Is use of a flow meter feasible? (check one): ■ Yes ☐ No, if so, provide justification:	100 gpm
Provide the proposed maximum effluent flow in gpm.	100 gpm
Provide the average effluent flow in gpm.	30 gpm
If Activity Category IV applies, indicate the estimated total volume of water that will be discharged:	

4. Has the operator attached a schematic of flow in accordance with the instructions in E, above? (check one): ■ Yes ☐ No

F. Chemical and additive information

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

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

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

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

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

G. Endangered Species Act eligibility determination

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

■ **FWS Criterion A**: No endangered or threatened species or critical habitat are in proximity to the discharges or related activities or come in contact with the "action area".

☐ **FWS Criterion B**: Formal or informal consultation with the FWS under section 7 of the ESA resulted in either a no jeopardy opinion (formal consultation) or a written concurrence by FWS on a finding that the discharges and related activities are "not likely to adversely affect" listed species or critical habitat (informal consultation). Has the operator completed consultation with FWS? (check one): ☐ Yes ☐ No; if no, is consultation underway? (check one): ☐ Yes ☐ No

☐ **FWS Criterion C**: Using the best scientific and commercial data available, the effect of the discharges and related activities on listed species and critical habitat have been evaluated. Based on those evaluations, a determination is made by EPA, or by the operator and affirmed by EPA, that the discharges and related activities will have "no effect" on any federally threatened or endangered listed species or designated critical habitat under the jurisdiction of the FWS. This determination was made by: (check one) ☐ the operator ☐ EPA ☐ Other; if so, specify:

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

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

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

H. National Historic Preservation Act eligibility determination

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

■ **Criterion A**: No historic properties are present. The discharges and discharge-related activities (e.g., BMPs) do not have the potential to cause effects on historic properties.

☐ **Criterion B**: Historic properties are present. Discharges and discharge related activities do not have the potential to cause effects on historic properties.

☐ **Criterion C**: Historic properties are present. The discharges and discharge-related activities have the potential to have an effect or will have an adverse effect on historic properties.

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

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

I. Supplemental information

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

Attachment 2 Site Locus Map; Attachment 3 Site Plan and Discharge Outfall Location; Attachment 4 Process Flow Diagram; Attachment 5 Dilution Factor Calculations; Attachment 6 MassGIS DEP Priority Resources Map and ACEC Documentation; Attachment 7 Massachusetts Cultural Resource Information System Report; Attachment 8 Laboratory Analytical Results; Attachment 9 Summaries of Groundwater and Surface Water Analytical Results

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

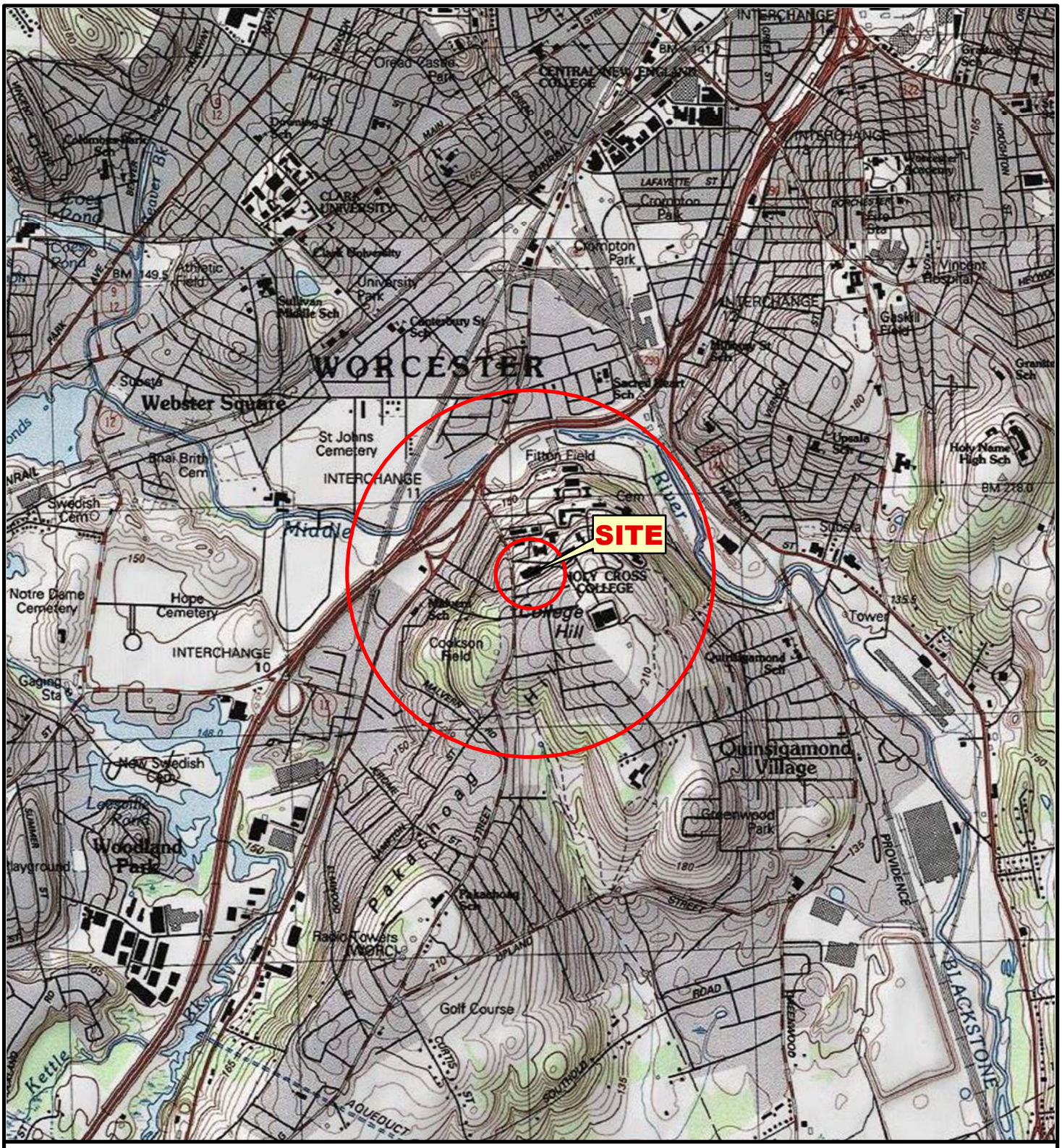
J. Certification requirement

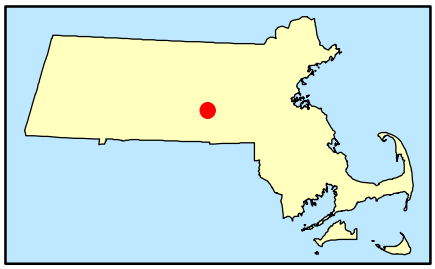
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage 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 the discharge.	
Notification provided to the appropriate State, including a copy of this NOI, if required.	Check one: Yes ■ No ☐
Notification provided to the municipality in which the discharge is located, including a copy of this NOI, if requested.	Check one: Yes ■ No ☐
Notification provided to the owner of a private or municipal storm sewer system, if such system is used for site discharges, including a copy of this NOI, if requested.	Check one: Yes ■ No ☐ NA ☐
Permission obtained from the owner of a private or municipal storm sewer system, if such system is used for site discharges. If yes, attach additional conditions. If no, attach explanation and timeframe for obtaining permission.	Check one: Yes ■ No ☐ NA ☐
Notification provided to the owner/opcrator 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: [signature]	Date: 4/25/19
Print Name and Title: JEFFREY C WHITE JR / Supervisor	

ATTACHMENT 2

SITE LOCUS MAP





SOURCE : USGS TOPOGRAPHIC QUADRANGLES SCANNED BY THE NATIONAL GEOGRAPHIC SOCIETY & I-CUBED, COPYRIGHT 2011

Data Supplied by : esri

0 1,000 2,000 4,000 6,000

SCALE IN FEET

N W E S

GZA

PROJ. MGR.: JAK
DESIGNED BY: JAK
REVIEWED BY: BWF
OPERATOR: JAK

DATE: 04-01-2019

SITE LOCUS
SHOWING 500 FOOT & 1/2 MILE OFFSETS

JOB NO. 01.0173611.00

PROPOSED HOLY CROSS RECREATION FACILITY
1 COLLEGE ST
WORCESTER, MASSACHUSETTS

FIGURE NO. **1**

ATTACHMENT 3

SITE PLAN AND DISCHARGE OUTFALL LOCATION

SOURCE

1) THIS MAP CONTAINS THE ESRI ArcGIS ONLINE BING MAPS AERIAL LAYER PACKAGE, PUBLISHED DECEMBER 1, 2010 BY ESRI ARCIMS SERVICES AND UPDATED MONTHLY. THIS SERVICE USES UNIFORM NATIONALLY RECOGNIZED DATUM AND CARTOGRAPHY STANDARDS AND A VARIETY OF AVAILABLE SOURCES FROM SEVERAL DATA PROVIDERS.

0 100 200 400
SCALE IN FEET

DISCHARGE TO MIDDLE RIVER
MA 51-02

GZ-1

TEMPORARY GROUNDWATER TREATMENT SYSTEM

DISCHARGE TO STORM DRAIN CATCH BASIN

REMEDIAL GENERAL PERMIT - NOTICE OF INTENT
1 COLLEGE STREET
WORCESTER, MASSACHUSETTS

SITE PLAN AND DISCHARGE OUTFALL LOCATION

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

PREPARED FOR:
COLLEGE OF THE HOLY CROSS

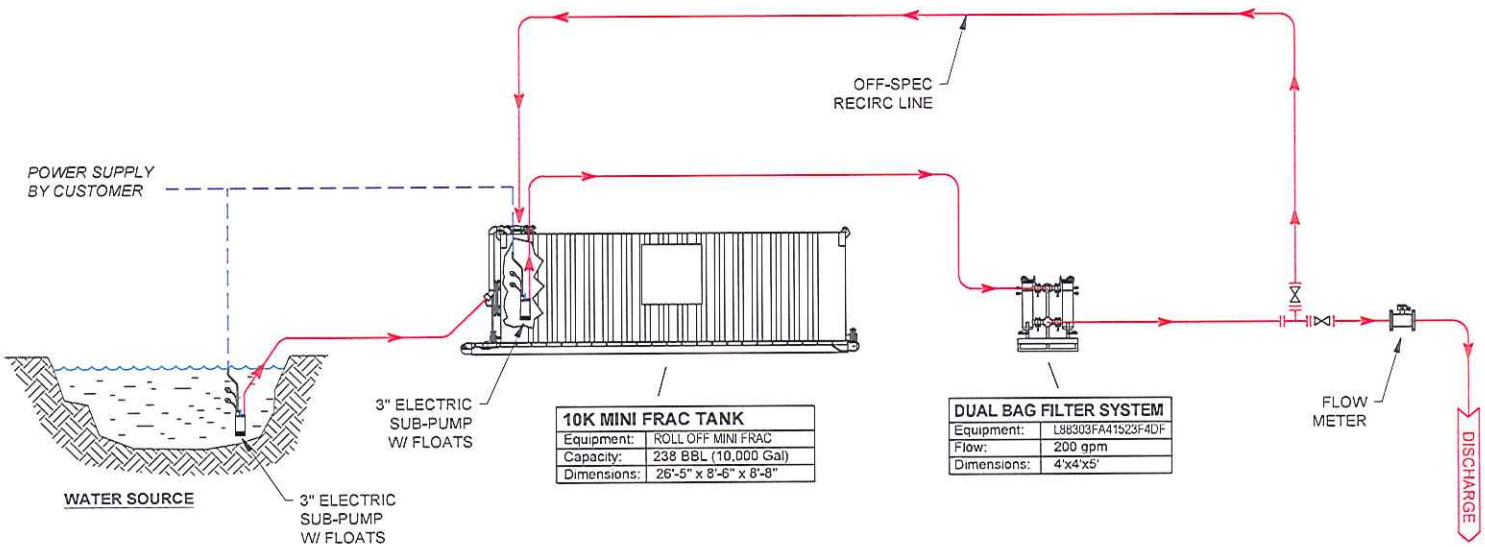
PROJ MGR: JAK	REVIEWED BY: BWF	CHECKED BY: WAD	FIGURE 2
DESIGNED BY: WAD	DRAWN BY: SMW	SCALE: 1 " = 200 FEET	
DATE: 04/19/2019	PROJECT NO. 01.0015522.17	REVISION NO.	

ATTACHMENT 4

PROCESS FLOW DIAGRAM

CONFIDENTIAL

PROPRIETARY



REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
C	REVISED FOR NEW LAYOUT	04-23-19	W. GUITE
B	REMOVE CATION AN ANIONIC RESIN VESSELS	04-08-19	W. GUITE
A	VESSEL MEDIA CHANGES AND REMOVE REVERSE OSMOSIS UNIT	04-03-19	W. GUITE

The information presented on this drawing is for informational purposes only. Use of this drawing is not a replacement for a professional engineering evaluation of the application. This drawing is intended to show preliminary equipment requirements and arrangement and is in no way a replacement for a thorough engineering review of the application at hand. A representative of the customer or end user should always conduct the final evaluation of the application. That representative, and not United Rentals, or its employees and representatives, is responsible for the final engineering design and performance of the application.

No warranty is provided or implied, including any warranty of fitness for a particular purpose. As such, the customer agrees that by using the suggestions shown on this drawing, you assume the risk of all loss or injury resulting from any information found within. In no event shall United Rentals, or any representative or agent thereof, be liable under any theory based in contract, negligence or strict liability or any other legal or equitable theory to any party for amounts including, without limitation, lost revenues, lost profits, lost business or indirect, consequential, incidental, special or punitive damages. This disclaimer shall survive any and all notices advising of the possibility that any user may suffer harm from any inaccuracies contained herein.

United Rentals Fluid Solutions

7800 N. DALLAS PARKWAY, SUITE 500
PLANO, TX 75024-4087

TITLE: HOLY CROSS - WORCESTER MA - 100 GPM SYSTEM
PROCESS FLOW DIAGRAM

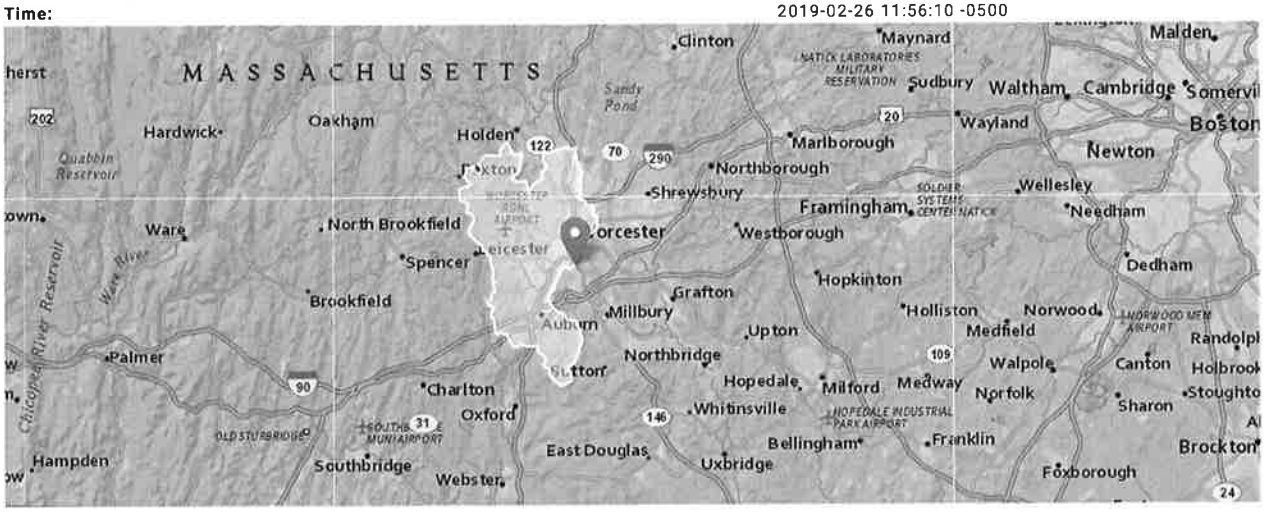
SHEET SIZE: B 11" x 17"	MATERIAL	CUSTOMER: MAROIS BROTHERS			BRANCH: BOS
	FINISH	DWG BY: M. BROOKS	DATE: 03-19-19	SCALE: -	SHEET: 1 OF: 1
		CKD BY: W. GUITE	DATE: 03-19-19	DWG No: SKF4880	REV: C

ATTACHMENT 5

DILUTION FACTOR CALCULATION

StreamStats Report

Region ID:	MA
Workspace ID:	MA20190226165555938000
Clicked Point (Latitude, Longitude):	42.23573, -71.79746
Time:	2019-02-26 11:56:10 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	62.6	square miles
BSLDEM250	Mean basin slope computed from 1:250K DEM	4.384	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0.0832	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	62.6	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	4.384	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0.0832	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

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

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

Statistic	Value	Unit	PII	PIu	SE	SEp
7 Day 2 Year Low Flow	6.46	ft^3/s	1.86	21.6	49.5	49.5
7 Day 10 Year Low Flow	2.92	ft^3/s	0.69	11.5	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/)

File No. 173611.00
March 7, 2019

DILUTION FACTOR CALCULATIONS
NOTICE OF INTENT FOR THE REMEDIATION GENERAL PERMIT
College of the Holy Cross, Worcester, Massachusetts

$$DF = \frac{Q_d + Q_s}{Q_d}$$

Where,

DF = Dilution Factor

Q_d = Maximum Flow Rate of the Discharge in million gallons per day (MGD)

Q_s = Receiving Water 7Q10 Flow (MGD) where,

7Q10 = Minimum Flow (MGD) for 7 Consecutive Days with a Recurrence Interval of 10 Years.

Q_d = 100 gpm = 0.144 MGD

Q_s = 2.92 cfs = 1.89 MGD (7Q10 on attached USGS Streamstats Report)

$$\therefore DF = \frac{Q_d + Q_s}{Q_d} = \frac{0.144 + 1.89}{0.144} = 14.125$$

Enter number values in green boxes below

Enter values in the units specified

↓

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

Enter a dilution factor, if other than zero

↓

14.125

Enter values in the units specified

↓

828	C_d = Enter influent hardness in **mg/L** $CaCO_3$
40.8	C_s = Enter receiving water hardness in **mg/L** $CaCO_3$

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

↓

7.14	pH in **Standard Units**
10.9	Temperature in **^oC**
0.114	Ammonia in **mg/L**
40.8	Hardness in **mg/L** $CaCO_3$
0	Salinity in **ppt**
0	Antimony in **µg/L**
2.51	Arsenic in **µg/L**
0	Cadmium in **µg/L**
0	Chromium III in **µg/L**
0	Chromium VI in **µg/L**
2.76	Copper in **µg/L**
581	Iron in **µg/L**
1.21	Lead in **µg/L**
0	Mercury in **µg/L**
0	Nickel in **µg/L**
0	Selenium in **µg/L**
0	Silver in **µg/L**
14.9	Zinc in **µg/L**

Enter **influent** concentrations in the units specified

↓

0	TRC in **µg/L**
0	Ammonia in **mg/L**
0	Antimony in **µg/L**
6.02	Arsenic in **µg/L**
1.77	Cadmium in **µg/L**
0	Chromium III in **µg/L**
0	Chromium VI in **µg/L**
5.55	Copper in **µg/L**
5460	Iron in **µg/L**
2.68	Lead in **µg/L**
0	Mercury in **µg/L**
25.74	Nickel in **µg/L**
0	Selenium in **µg/L**
5.48	Silver in **µg/L**
15.7	Zinc in **µg/L**
6	Cyanide in **µg/L**
0	Phenol in **µg/L**
0	Carbon Tetrachloride in **µg/L**
0	Tetrachloroethylene in **µg/L**
2.3	Total Phthalates in **µg/L**
0	Diethylhexylphthalate in **µg/L**
0.94	Benzo(a)anthracene in **µg/L**
0.46	Benzo(a)pyrene in **µg/L**
1.3	Benzo(b)fluoranthene in **µg/L**
0.45	Benzo(k)fluoranthene in **µg/L**
1	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: critical low flow equal to the 7Q10; enter alternate low flow if approved by the State
Saltwater (estuarine and marine): enter critical low flow if approved by the State; enter 0 if no entry
Discharge flow is equal to the design flow or 1 MGD, whichever is less
Optional entry for Q_r; leave 0 if no entry

Saltwater (estuarine and marine): only if approved by the State
Leave 0 if no entry

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	14.1			
	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	**155**	µg/L
Total Suspended Solids	**30**	mg/L	---	
Antimony	**206**	µg/L	9040	µg/L
Arsenic	**104**	µg/L	108	µg/L
Cadmium	**10.2**	µg/L	0.2636	µg/L
Chromium III	**323**	µg/L	1182.6	µg/L
Chromium VI	**323**	µg/L	161.5	µg/L
Copper	**242**	µg/L	91.6	µg/L
Iron	**5000**	µg/L	6499	µg/L
Lead	**160**	µg/L	27.08	µg/L
Mercury	**0.739**	µg/L	12.80	µg/L
Nickel	**1450**	µg/L	715.1	µg/L
Selenium	**235.8**	µg/L	70.6	µg/L
Silver	**35.1**	µg/L	50.3	µg/L
Zinc	**420**	µg/L	1447.0	µg/L
Cyanide	**178**	mg/L	73.5	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	4238	µg/L
C. Halogenated VOCs				
Carbon Tetrachloride	**4.4**	µg/L	22.6	µg/L
1,2 Dichlorobenzene	**600**	µg/L	---	
1,3 Dichlorobenzene	**320**	µg/L	---	
1,4 Dichlorobenzene	**5.0**	µg/L	---	
Total dichlorobenzene	**---**	µg/L	---	
1,1 Dichloroethane	**70**	µg/L	---	
1,2 Dichloroethane	**5.0**	µg/L	---	
1,1 Dichloroethylene	**3.2**	µg/L	---	
Ethylene Dibromide	**0.05**	µg/L	---	
Methylene Chloride	**4.6**	µg/L	---	
1,1,1 Trichloroethane	**200**	µg/L	---	
1,1,2 Trichloroethane	**5.0**	µg/L	---	
Trichloroethylene	**5.0**	µg/L	---	
Tetrachloroethylene	**5.0**	µg/L	46.6	µg/L
cis-1,2 Dichloroethylene	**70**	µg/L	---	

Vinyl Chloride	**2.0**	µg/L	---	
D. Non-Halogenated SVOCs				
Total Phthalates	190	µg/L	---	µg/L
Diethylhexyl phthalate	**101**	µg/L	31.1	µg/L
Total Group I Polycyclic Aromatic Hydrocarbons	**1.0**	µg/L	---	
Benzo(a)anthracene	1.0	µg/L	**0.0537**	µg/L
Benzo(a)pyrene	1.0	µg/L	**0.0537**	µg/L
Benzo(b)fluoranthene	1.0	µg/L	**0.0537**	µg/L
Benzo(k)fluoranthene	1.0	µg/L	**0.0537**	µg/L
Chrysene	1.0	µg/L	**0.0537**	µg/L
Dibenzo(a,h)anthracene	**1.0**	µg/L	0.0537	µg/L
Indeno(1,2,3-cd)pyrene	**1.0**	µg/L	0.0537	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	283	µg/L
tert-Butyl Alcohol	**120**	µg/L	---	
tert-Amyl Methyl Ether	**90**	µg/L	---	

ATTACHMENT 6

MASSGIS DEP PRIORITY RESOURCES MAP AND ACEC DOCUMENTATION

MassDEP - Bureau of Waste Site Cleanup

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

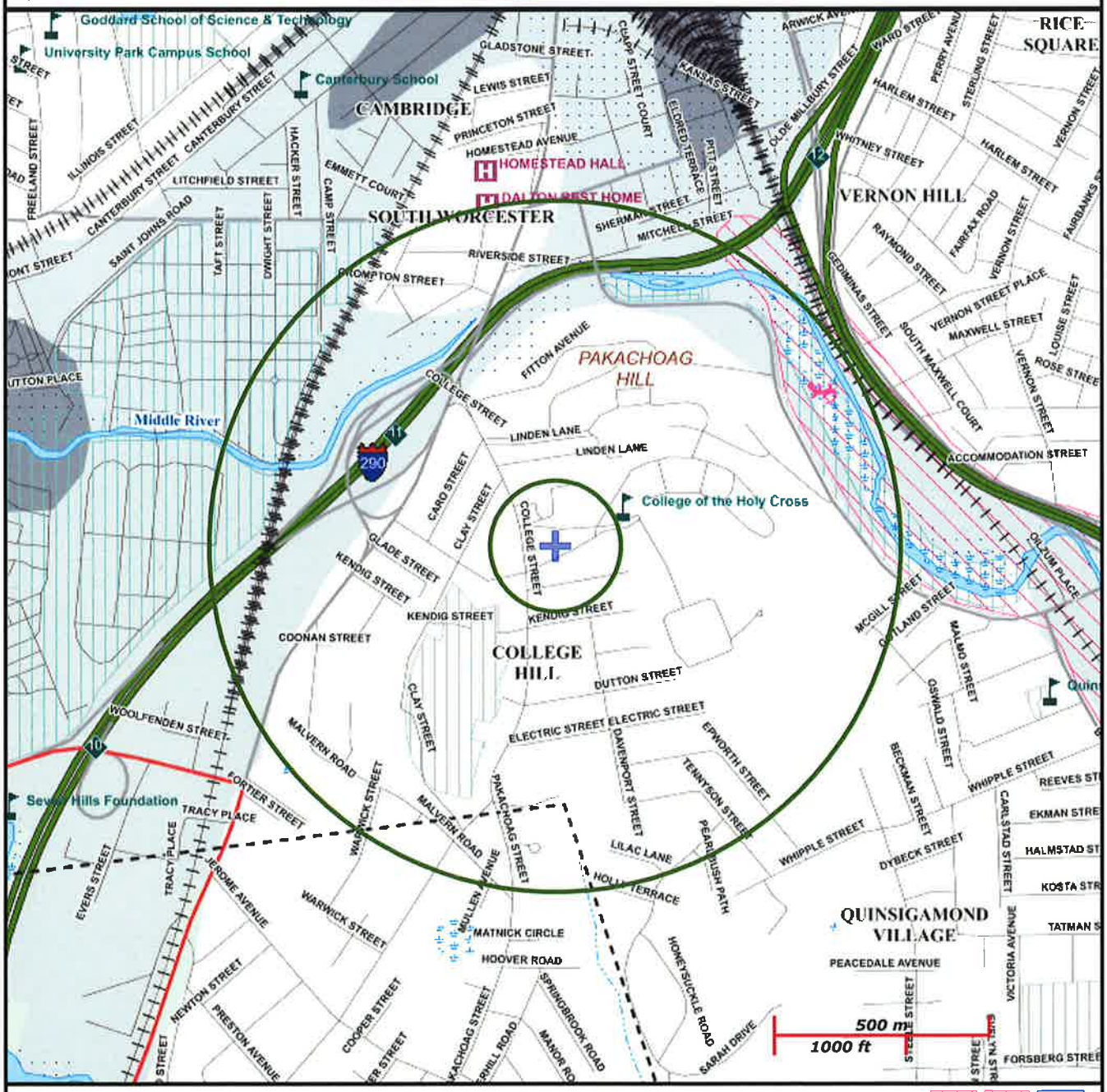
Site Information:

COLLEGE STREET WORCESTER, MA

NAD83 UTM Meters:
4679884mN , 268118mE (Zone: 19)
April 1, 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

ATTACHMENT 6

Evaluation of Long-Eared Bat Habitat

1 College Street

Worcester, Massachusetts

The northern long-eared bat (*Myotis septentrionalis*) has a federal status of Threatened and a state status of Endangered within Massachusetts.

The northern long-eared bat is a migratory species which utilizes a variety of habitats during the year depending on the season. Between early November and April, this species hibernates in crevices in portions of caves and abandoned mine shafts which have high humidity, constant temperatures, and little air flow. Individuals tend to return to the same hibernaculum from year to year although they are also known to sometimes use other hibernacula. Hibernacula are generally located within approximately 35 miles of summer foraging habitat. Between April and October, northern long-eared bats roost and forage in forested areas. Preferred roost sites include clusters of large, live or dead, hardwood trees with cavities or peeling bark. Preferred foraging sites include wooded areas around vernal pools or small ponds or along streams. Thus, transitional zones between forested uplands and wetlands represent prime summer roosting and foraging habitat.

The parcel at 1 College Street, Worcester, Massachusetts is located within a busy and densely developed area. The Site is a predominantly open area with trees and no ponds, vernal pools, caves, or mine shafts. Additionally, there are active city streets along the boundaries of the Site. The lack of forested areas for roosting and the regular disturbances from noise from traffic along city streets make this area a poor habitat for northern long-eared bats. It is unlikely that this species utilizes this area.

United States Department of the Interior

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

IPaC Record Locator: 679-16175186 April 12, 2019

Subject: Consistency letter for the 'College of the Holy Cross' project indicating that any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o).

Dear Bill Davis:

The U.S. Fish and Wildlife Service (Service) received on April 12, 2019 your effects determination for the 'College of the Holy Cross' (the Action) using the northern long-eared bat (*Myotis septentrionalis*) key within the Information for Planning and Consultation (IPaC) system. You indicated that no Federal agencies are involved in funding or authorizing this Action. This IPaC key assists users in determining whether a non-Federal action may cause "take"[1] of the northern long-eared bat that is prohibited under the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.).

Based upon your IPaC submission, any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o). Unless the Service advises you within 30 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that the Action is not likely to result in unauthorized take of the northern long-eared bat.

Please report to our office any changes to the information about the Action that you entered into IPaC, the results of any bat surveys conducted in the Action area, and any dead, injured, or sick northern long-eared bats that are found during Action implementation.

If your Action proceeds as described and no additional information about the Action's effects on species protected under the ESA becomes available, no further coordination with the Service is required with respect to the northern long-eared bat.

[1]Take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct [ESA Section 3(19)].

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

College of the Holy Cross

2. Description

The following description was provided for the project 'College of the Holy Cross':

> Renovation of the existing field house. Species list required for Remedial General Permit, Notice of Intent for construction site dewatering of excavation.

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/42.236783937600904N71.81014293192118W

Determination Key Result

This non-Federal Action may affect the northern long-eared bat; however, any take of this species that may occur incidental to this Action is not prohibited under the final 4(d) rule at 50 CFR §17.40(o).

Determination Key Description: Northern Long-eared Bat 4(d) Rule
This key was last updated in IPaC on **May 15, 2017**. Keys are subject to periodic revision.

This key is intended for actions that may affect the threatened northern long-eared bat.

The purpose of the key for non-Federal actions is to assist determinations as to whether proposed actions are excepted from take prohibitions under the northern long-eared bat 4(d) rule.

If a non-Federal action may cause prohibited take of northern long-eared bats or other ESA-listed animal species, we recommend that you coordinate with the Service.

Determination Key Result

Based upon your IPaC submission, any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o).

Qualification Interview

1. Is the action authorized, funded, or being carried out by a Federal agency?

   No

2. Will your activity purposefully **Take** northern long-eared bats?

   No

3. Is the project action area located wholly outside the White-nose Syndrome Zone?

   Automatically answered
   No

4. Have you contacted the appropriate agency to determine if your project is near a known hibernaculum or maternity roost tree?

   Location information for northern long-eared bat hibernacula is generally kept in state Natural Heritage Inventory databases – the availability of this data varies state-by-state. Many states provide online access to their data, either directly by providing maps or by providing the opportunity to make a data request. In some cases, to protect those resources, access to the information may be limited. A web page with links to state Natural Heritage Inventory databases is available at www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html.

   Yes

5. Will the action affect a cave or mine where northern long-eared bats are known to hibernate (i.e., hibernaculum) or could it alter the entrance or the environment (physical or other alteration) of a hibernaculum?

   No

6. Will the action involve Tree Removal?

   No

Project Questionnaire

If the project includes forest conversion, report the appropriate acreages below. Otherwise, type '0' in questions 1-3.

1. Estimated total acres of forest conversion:

0

2. If known, estimated acres of forest conversion from April 1 to October 31

0

3. If known, estimated acres of forest conversion from June 1 to July 31

0

If the project includes timber harvest, report the appropriate acreages below. Otherwise, type '0' in questions 4-6.

4. Estimated total acres of timber harvest

0

5. If known, estimated acres of timber harvest from April 1 to October 31

0

6. If known, estimated acres of timber harvest from June 1 to July 31

0

If the project includes prescribed fire, report the appropriate acreages below. Otherwise, type '0' in questions 7-9.

7. Estimated total acres of prescribed fire

0

8. If known, estimated acres of prescribed fire from April 1 to October 31

0

9. If known, estimated acres of prescribed fire from June 1 to July 31

0

If the project includes new wind turbines, report the megawatts of wind capacity below. Otherwise, type '0' in question 10.

10. What is the estimated wind capacity (in megawatts) of the new turbine(s)?
0

MASSACHUSETTS AREAS OF CRITICAL ENVIRONMENTAL CONCERN
November 2010

Total Approximate Acreage: 268,000 acres
Approximate acreage and designation date follow ACEC names below.

Bourne Back River
(1,850 acres, 1989) Bourne

Canoe River Aquifer and Associated Areas (17,200 acres, 1991) Easton, Foxborough, Mansfield, Norton, Sharon, and Taunton

Cedar Swamp
(1,650 acres, 1975) Hopkinton and Westborough

Central Nashua River Valley
(12,900 acres, 1996) Bolton, Harvard, Lancaster, and Leominster

Cranberry Brook Watershed
(1,050 acres, 1983) Braintree and Holbrook

Ellisville Harbor
(600 acres, 1980) Plymouth

Fowl Meadow and Ponkapoag Bog
(8,350 acres, 1992) Boston, Canton, Dedham, Milton, Norwood, Randolph, Sharon, and Westwood

Golden Hills
(500 acres, 1987) Melrose, Saugus, and Wakefield

Great Marsh (originally designated as Parker River/Essex Bay)
(25,500 acres, 1979) Essex, Gloucester, Ipswich, Newbury, and Rowley

Herring River Watershed
(4,450 acres, 1991) Bourne and Plymouth

Hinsdale Flats Watershed
(14,500 acres, 1992) Dalton, Hinsdale, Peru, and Washington

Hockomock Swamp
(16,950 acres, 1990) Bridgewater, Easton, Norton, Raynham, Taunton, and West Bridgewater

Inner Cape Cod Bay
(2,600 acres, 1985) Brewster, Eastham, and Orleans

Kampoosa Bog Drainage Basin
(1,350 acres, 1995) Lee and Stockbridge

Karner Brook Watershed
(7,000 acres, 1992) Egremont and Mount Washington

Miscoe, Warren, and Whitehall Watersheds
(8,700 acres, 2000) Grafton, Hopkinton, and Upton

Neponset River Estuary
(1,300 acres, 1995) Boston, Milton, and Quincy

Petapawag
(25,680 acres, 2002) Ayer, Dunstable, Groton, Pepperell, and Tyngsborough

Pleasant Bay
(9,240 acres, 1987) Brewster, Chatham, Harwich, and Orleans

Pocasset River
(160 acres, 1980) Bourne

Rumney Marshes
(2,800 acres, 1988) Boston, Lynn, Revere, Saugus, and Winthrop

Sandy Neck Barrier Beach System
(9,130 acres, 1978) Barnstable and Sandwich

Schenob Brook Drainage Basin
(13,750 acres, 1990) Mount Washington and Sheffield

Squannassit
(37,420 acres, 2002) Ashby, Ayer, Groton, Harvard, Lancaster, Lunenburg, Pepperell, Shirley, and Townsend

Three Mile River Watershed
(14,280 acres, 2008) Dighton, Norton, Taunton

Upper Housatonic River
(12,280 acres, 2009) Lee, Lenox, Pittsfield, Washington

Waquoit Bay
(2,580 acres, 1979) Falmouth and Mashpee

Weir River
(950 acres, 1986) Cohasset, Hingham, and Hull

Wellfleet Harbor
(12,480 acres, 1989) Eastham, Truro, and Wellfleet

Weymouth Back River
(800 acres, 1982) Hingham and Weymouth

ACEC acreages above are based on MassGIS calculations and may differ from numbers originally presented in designation documents and other ACEC publications due to improvements in accuracy of GIS data and boundary clarifications. Listed acreages have been rounded to the nearest 50 or 10 depending on whether boundary clarification has occurred. For more information please see, http://www.mass.gov/dcr/stewardship/acec/aboutMaps.htm.

Towns with ACECs within their Boundaries November 2010

TOWN	ACEC
Ashby	Squannassit
Ayer	Petapawag
	Squannassit
Barnstable	Sandy Neck Barrier Beach System
Bolton	Central Nashua River Valley
Boston	Rumney Marshes
	Fowl Meadow and Ponkapoag Bog
	Neponset River Estuary
Bourne	Pocasset River
	Bourne Back River
	Herring River Watershed
Braintree	Cranberry Brook Watershed
Brewster	Pleasant Bay
	Inner Cape Cod Bay
Bridgewater	Hockomock Swamp
Canton	Fowl Meadow and Ponkapoag Bog
Chatham	Pleasant Bay
Cohasset	Weir River
Dalton	Hinsdale Flats Watershed
Dedham	Fowl Meadow and Ponkapoag Bog
Dighton	Three Mile River Watershed
Dunstable	Petapawag
Eastham	Inner Cape Cod Bay
	Wellfleet Harbor
Easton	Canoe River Aquifer
	Hockomock Swamp
Egremont	Karner Brook Watershed
Essex	Great Marsh
Falmouth	Waquoit Bay
Foxborough	Canoe River Aquifer
Gloucester	Great Marsh
Grafton	Miscoe-Warren-Whitehall Watersheds
Groton	Petapawag
	Squannassit
Harvard	Central Nashua River Valley
	Squannassit
Harwich	Pleasant Bay
Hingham	Weir River
	Weymouth Back River
Hinsdale	Hinsdale Flats Watershed
Holbrook	Cranberry Brook Watershed
Hopkinton	Miscoe-Warren-Whitehall Watersheds
	Cedar Swamp
Hull	Weir River
Ipswich	Great Marsh
Lancaster	Central Nashua River Valley
	Squannassit
Lee	Kampoosa Bog Drainage Basin
	Upper Housatonic River
Lenox	Upper Housatonic River
Leominster	Central Nashua River Valley
Lunenburg	Squannassit
Lynn	Rumney Marshes
Mansfield	Canoe River Aquifer
Mashpee	Waquoit Bay
Melrose	Golden Hills
Milton	Fowl Meadow and Ponkapoag Bog
	Neponset River Estuary
Mt. Washington	Karner Brook Watershed
	Schenob Brook
Newbury	Great Marsh
Norton	Hockomock Swamp
	Canoe River Aquifer
	Three Mile River Watershed
Norwood	Fowl Meadow and Ponkapoag Bog
Orleans	Inner Cape Cod Bay
	Pleasant Bay
Pepperell	Petapawag
	Squannassit
Peru	Hinsdale Flats Watershed
Pittsfield	Upper Housatonic River
Plymouth	Herring River Watershed
	Ellisville Harbor
Quincy	Neponset River Estuary
Randolph	Fowl Meadow and Ponkapoag Bog
Raynham	Hockomock Swamp
Revere	Rumney Marshes
Rowley	Great Marsh
Sandwich	Sandy Neck Barrier Beach System
Saugus	Rumney Marshes
	Golden Hills
Sharon	Canoe River Aquifer
	Fowl Meadow and Ponkapoag Bog
Sheffield	Schenob Brook
Shirley	Squannassit
Stockbridge	Kampoosa Bog Drainage Basin
Taunton	Hockomock Swamp
	Canoe River Aquifer
	Three Mile River Watershed
Truro	Wellfleet Harbor
Townsend	Squannassit
Tyngsborough	Petapawag
Upton	Miscoe-Warren-Whitehall Watersheds
Wakefield	Golden Hills
Washington	Hinsdale Flats Watershed
	Upper Housatonic River
Wellfleet	Wellfleet Harbor
W Bridgewater	Hockomock Swamp
Westborough	Cedar Swamp
Westwood	Fowl Meadow and Ponkapoag Bog
Weymouth	Weymouth Back River
Winthrop	Rumney Marshes

.

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

ATTACHMENT 7

MASSACHUSETTS CULTURAL RESOURCE INFORMATION SYSTEM REPORT

Massachusetts Cultural Resource Information System

MACRIS

MACRIS Search Results

Search Criteria: Town(s): Worcester; Street No: 1; Street Name: college St; Resource Type(s): Area;

Inv. No.	Property Name	Street	Town	Year

ATTACHMENT 8

LABORATORY ANALYTICAL RESULTS
GROUNDWATER AND SURFACE WATER

ANALYTICAL REPORT

Lab Number:	L1905575
Client:	GZA GeoEnvironmental, Inc. 249 Vanderbilt Ave Norwood, MA 02062
ATTN:	Bill Davis
Phone:	(781) 278-5769
Project Name:	HOLY CROSS
Project Number:	01.0173611.00
Report Date:	02/19/19

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: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1905575-01	SW-1	WATER	WORCESTER, MA	02/12/19 10:55	02/12/19
L1905575-02	GZ-1	WATER	WORCESTER, MA	02/12/19 10:00	02/12/19

Project Name:	HOLY CROSS	**Lab Number:**	L1905575
Project Number:	01.0173611.00	**Report Date:**	02/19/19

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: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

Case Narrative (continued)

Sample Receipt

The analyses performed were specified by the client.

Chlorine, Total Residual

The WG1206221-4 MS recovery (0%), performed on L1905575-02, is outside the acceptance criteria; however, the associated LCS recovery is within criteria. No further action was taken.

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: Cristin Walker

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

ORGANICS

VOLATILES

Project Name: HOLY CROSS
Project Number: 01.0173611.00
Lab Number: L1905575
Report Date: 02/19/19

SAMPLE RESULTS

Lab ID: L1905575-02
Client ID: GZ-1
Sample Location: WORCESTER, MA
Date Collected: 02/12/19 10:00
Date Received: 02/12/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1
Analytical Date: 02/14/19 19:42
Analyst: NLK

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: HOLY CROSS
Project Number: 01.0173611.00
Lab Number: L1905575
Report Date: 02/19/19

SAMPLE RESULTS

Lab ID: L1905575-02
Client ID: GZ-1
Sample Location: WORCESTER, MA
Date Collected: 02/12/19 10:00
Date Received: 02/12/19
Field Prep: Not Specified

Sample Depth:

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

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	96		60-140
Fluorobenzene	98		60-140
4-Bromofluorobenzene	103		60-140

Project Name: HOLY CROSS
Project Number: 01.0173611.00
Lab Number: L1905575
Report Date: 02/19/19

SAMPLE RESULTS

Lab ID: L1905575-02
Client ID: GZ-1
Sample Location: WORCESTER, MA

Date Collected: 02/12/19 10:00
Date Received: 02/12/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1-SIM
Analytical Date: 02/14/19 19:42
Analyst: NLK

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	113		60-140
4-Bromofluorobenzene	76		60-140

Project Name: HOLY CROSS
Project Number: 01.0173611.00
Lab Number: L1905575
Report Date: 02/19/19

SAMPLE RESULTS

Lab ID: L1905575-02
Client ID: GZ-1
Sample Location: WORCESTER, MA

Date Collected: 02/12/19 10:00
Date Received: 02/12/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 14,504.1
Analytical Date: 02/18/19 18:54
Analyst: AWS

Extraction Method: EPA 504.1
Extraction Date: 02/18/19 15:24

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: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 02/14/19 13:38
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 02 Batch: WG1207046-4					
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: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 02/14/19 13:38
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 02 Batch: WG1207046-4					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	96		60-140
Fluorobenzene	99		60-140
4-Bromofluorobenzene	99		60-140

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1-SIM
Analytical Date: 02/14/19 13:38
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 02 Batch: WG1207097-4					
1,4-Dioxane	ND		ug/l	50	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Fluorobenzene	115		60-140
4-Bromofluorobenzene	76		60-140

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 14,504.1
Analytical Date: 02/18/19 18:26
Analyst: AWS

Extraction Method: EPA 504.1
Extraction Date: 02/18/19 15:24

Parameter	Result	Qualifier	Units	RL	MDL	
Microextractables by GC - Westborough Lab for sample(s): 02 Batch: WG1207852-1						
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: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 02 Batch: WG1207046-3								
Methylene chloride	90		-		60-140	-		28
1,1-Dichloroethane	85		-		50-150	-		49
Carbon tetrachloride	85		-		70-130	-		41
1,1,2-Trichloroethane	90		-		70-130	-		45
Tetrachloroethene	90		-		70-130	-		39
1,2-Dichloroethane	85		-		70-130	-		49
1,1,1-Trichloroethane	90		-		70-130	-		36
Benzene	90		-		65-135	-		61
Toluene	95		-		70-130	-		41
Ethylbenzene	100		-		60-140	-		63
Vinyl chloride	100		-		5-195	-		66
1,1-Dichloroethene	90		-		50-150	-		32
cis-1,2-Dichloroethene	80		-		60-140	-		30
Trichloroethene	85		-		65-135	-		48
1,2-Dichlorobenzene	95		-		65-135	-		57
1,3-Dichlorobenzene	95		-		70-130	-		43
1,4-Dichlorobenzene	100		-		65-135	-		57
p/m-Xylene	95		-		60-140	-		30
o-xylene	95		-		60-140	-		30
Acetone	88		-		40-160	-		30
Methyl tert butyl ether	85		-		60-140	-		30
Tert-Butyl Alcohol	85		-		60-140	-		30
Tertiary-Amyl Methyl Ether	85		-		60-140	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 02 Batch: WG1207046-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Pentafluorobenzene	96				60-140
Fluorobenzene	98				60-140
4-Bromofluorobenzene	103				60-140

Lab Control Sample Analysis

Batch Quality Control

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 02 Batch: WG1207097-3								
1,4-Dioxane	85		-		60-140	-		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Fluorobenzene	99				60-140
4-Bromofluorobenzene	76				60-140

Lab Control Sample Analysis

Batch Quality Control

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Microextractables by GC - Westborough Lab Associated sample(s): 02 Batch: WG1207852-2									
1,2-Dibromoethane	93		-		80-120	-			A
1,2-Dibromo-3-chloropropane	92		-		80-120	-			A

Matrix Spike Analysis

Batch Quality Control

Project Name: HOLY CROSS

Project Number: 01.0173611.00

Lab Number: L1905575

Report Date: 02/19/19

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): 02	QC Batch ID: WG1207852-3	QC Sample: L1905575-02	Client ID: GZ-1									
1,2-Dibromoethane	ND	0.249	0.283	114		-	-		80-120	-		20	A
1,2-Dibromo-3-chloropropane	ND	0.249	0.260	104		-	-		80-120	-		20	A

METALS

Project Name: HOLY CROSS
Project Number: 01.0173611.00
Lab Number: L1905575
Report Date: 02/19/19

SAMPLE RESULTS

Lab ID: L1905575-01
Client ID: SW-1
Sample Location: WORCESTER, MA
Sample Depth:
Matrix: Water

Date Collected: 02/12/19 10:55
Date Received: 02/12/19
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Hardness by SM 2340B - Mansfield Lab											
Hardness	40.8		mg/l	0.660	NA	1	02/13/19 13:20	02/14/19 01:05	EPA 3005A	19,200.7	AB

Project Name: HOLY CROSS
Lab Number: L1905575
Project Number: 01.0173611.00
Report Date: 02/19/19

SAMPLE RESULTS

Lab ID: L1905575-02
Client ID: GZ-1
Sample Location: WORCESTER, MA
Date Collected: 02/12/19 10:00
Date Received: 02/12/19
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	02/13/19 13:20	02/14/19 16:15	EPA 3005A	3,200.8	AM
Arsenic, Total	0.00602		mg/l	0.00100	--	1	02/13/19 13:20	02/14/19 16:15	EPA 3005A	3,200.8	AM
Cadmium, Total	0.00177		mg/l	0.00020	--	1	02/13/19 13:20	02/14/19 16:15	EPA 3005A	3,200.8	AM
Chromium, Total	0.00988		mg/l	0.00100	--	1	02/13/19 13:20	02/14/19 16:15	EPA 3005A	3,200.8	AM
Copper, Total	0.00555		mg/l	0.00100	--	1	02/13/19 13:20	02/14/19 16:15	EPA 3005A	3,200.8	AM
Iron, Total	5.46		mg/l	0.050	--	1	02/13/19 13:20	02/14/19 01:10	EPA 3005A	19,200.7	AB
Lead, Total	0.00268		mg/l	0.00100	--	1	02/13/19 13:20	02/14/19 16:15	EPA 3005A	3,200.8	AM
Mercury, Total	ND		mg/l	0.00020	--	1	02/13/19 14:17	02/13/19 20:06	EPA 245.1	3,245.1	EA
Nickel, Total	0.02574		mg/l	0.00200	--	1	02/13/19 13:20	02/14/19 16:15	EPA 3005A	3,200.8	AM
Selenium, Total	ND		mg/l	0.00500	--	1	02/13/19 13:20	02/14/19 16:15	EPA 3005A	3,200.8	AM
Silver, Total	0.00548		mg/l	0.00040	--	1	02/13/19 13:20	02/14/19 16:15	EPA 3005A	3,200.8	AM
Zinc, Total	0.01570		mg/l	0.01000	--	1	02/13/19 13:20	02/14/19 16:15	EPA 3005A	3,200.8	AM
General Chemistry - Mansfield Lab											
Chromium, Trivalent	ND		mg/l	0.010	--	1		02/14/19 16:15	NA	107,-	

Project Name: HOLY CROSS
Project Number: 01.0173611.00
Lab Number: L1905575
Report Date: 02/19/19

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: WG1206317-1										
Iron, Total	ND		mg/l	0.050	--	1	02/13/19 13:20	02/14/19 00:08	19,200.7	AB

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: WG1206317-1										
Hardness	ND		mg/l	0.660	NA	1	02/13/19 13:20	02/14/19 00:08	19,200.7	AB

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): 02 Batch: WG1206320-1										
Antimony, Total	ND		mg/l	0.00400	--	1	02/13/19 13:20	02/14/19 14:04	3,200.8	AM
Arsenic, Total	ND		mg/l	0.00100	--	1	02/13/19 13:20	02/14/19 14:04	3,200.8	AM
Cadmium, Total	ND		mg/l	0.00020	--	1	02/13/19 13:20	02/14/19 14:04	3,200.8	AM
Chromium, Total	ND		mg/l	0.00100	--	1	02/13/19 13:20	02/14/19 14:04	3,200.8	AM
Copper, Total	ND		mg/l	0.00100	--	1	02/13/19 13:20	02/14/19 14:04	3,200.8	AM
Lead, Total	ND		mg/l	0.00100	--	1	02/13/19 13:20	02/14/19 14:04	3,200.8	AM
Nickel, Total	ND		mg/l	0.00200	--	1	02/13/19 13:20	02/14/19 14:04	3,200.8	AM
Selenium, Total	ND		mg/l	0.00500	--	1	02/13/19 13:20	02/14/19 14:04	3,200.8	AM
Silver, Total	ND		mg/l	0.00040	--	1	02/13/19 13:20	02/14/19 14:04	3,200.8	AM
Zinc, Total	ND		mg/l	0.01000	--	1	02/13/19 13:20	02/14/19 14:04	3,200.8	AM

Prep Information

Digestion Method: EPA 3005A

Project Name: HOLY CROSS
Project Number: 01.0173611.00
Lab Number: L1905575
Report Date: 02/19/19

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): 02 Batch: WG1206346-1										
Mercury, Total	ND		mg/l	0.0002	--	1	02/13/19 14:17	02/13/19 19:55	3,245.1	EA

Prep Information

Digestion Method: EPA 245.1

Lab Control Sample Analysis

Batch Quality Control

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1206317-2								
Iron, Total	97		-		85-115	-		
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-02 Batch: WG1206317-2								
Hardness	98		-		85-115	-		
Total Metals - Mansfield Lab Associated sample(s): 02 Batch: WG1206320-2								
Antimony, Total	92		-		85-115	-		
Arsenic, Total	96		-		85-115	-		
Cadmium, Total	102		-		85-115	-		
Chromium, Total	96		-		85-115	-		
Copper, Total	91		-		85-115	-		
Lead, Total	102		-		85-115	-		
Nickel, Total	95		-		85-115	-		
Selenium, Total	110		-		85-115	-		
Silver, Total	96		-		85-115	-		
Zinc, Total	101		-		85-115	-		
Total Metals - Mansfield Lab Associated sample(s): 02 Batch: WG1206346-2								
Mercury, Total	102		-		85-115	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

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: WG1206317-3 QC Sample: L1905505-01 Client ID: MS Sample												
Iron, Total	2.43	2	4.29	93		-	-		75-125	-		20
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1206317-3 QC Sample: L1905505-01 Client ID: MS Sample												
Hardness	150	132	245	**72**	Q	-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1206317-7 QC Sample: L1905586-01 Client ID: MS Sample												
Iron, Total	4.89	1	5.84	95		-	-		75-125	-		20
Total Hardness by SM 2340B - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1206317-7 QC Sample: L1905586-01 Client ID: MS Sample												
Hardness	202	66.2	264	94		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 02 QC Batch ID: WG1206320-3 QC Sample: L1905586-01 Client ID: MS Sample												
Antimony, Total	ND	0.5	0.5694	114		-	-		70-130	-		20
Arsenic, Total	0.00224	0.12	0.1194	98		-	-		70-130	-		20
Cadmium, Total	ND	0.051	0.05242	103		-	-		70-130	-		20
Chromium, Total	ND	0.2	0.1897	95		-	-		70-130	-		20
Copper, Total	0.00155	0.25	0.2334	93		-	-		70-130	-		20
Lead, Total	ND	0.51	0.5171	101		-	-		70-130	-		20
Nickel, Total	ND	0.5	0.4742	95		-	-		70-130	-		20
Selenium, Total	ND	0.12	0.1169	97		-	-		70-130	-		20
Silver, Total	ND	0.05	0.04796	96		-	-		70-130	-		20
Zinc, Total	ND	0.5	0.4992	100		-	-		70-130	-		20
Total Metals - Mansfield Lab Associated sample(s): 02 QC Batch ID: WG1206346-3 QC Sample: L1905526-01 Client ID: MS Sample												
Mercury, Total	ND	0.005	0.0030	**60**	Q	-	-		70-130	-		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1206317-8 QC Sample: L1905586-01 Client ID: DUP Sample						
Iron, Total	4.89	5.10	mg/l	4		20
Total Metals - Mansfield Lab Associated sample(s): 02 QC Batch ID: WG1206320-4 QC Sample: L1905586-01 Client ID: DUP Sample						
Antimony, Total	ND	ND	mg/l	NC		20
Arsenic, Total	0.00224	0.00230	mg/l	3		20
Cadmium, Total	ND	ND	mg/l	NC		20
Chromium, Total	ND	ND	mg/l	NC		20
Copper, Total	0.00155	0.00171	mg/l	10		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	ND	ND	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 02 QC Batch ID: WG1206346-4 QC Sample: L1905526-01 Client ID: DUP Sample						
Mercury, Total	ND	ND	mg/l	NC		20

INORGANICS
&
MISCELLANEOUS

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

SAMPLE RESULTS

Lab ID: L1905575-01
Client ID: SW-1
Sample Location: WORCESTER, MA

Date Collected: 02/12/19 10:55
Date Received: 02/12/19
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										
Nitrogen, Ammonia	0.114		mg/l	0.075	--	1	02/13/19 14:25	02/13/19 21:07	121,4500NH3-BH	AT
Nitrogen, Nitrate/Nitrite	0.45		mg/l	0.10	--	1	-	02/13/19 23:17	121,4500NO3-F	MR
Total Nitrogen	0.86		mg/l	0.30	--	1	-	02/19/19 11:54	107,-	JO
Nitrogen, Total Kjeldahl	0.408		mg/l	0.300	--	1	02/14/19 15:15	02/15/19 21:31	121,4500NH3-H	AT

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

SAMPLE RESULTS

Lab ID: L1905575-02
Client ID: GZ-1
Sample Location: WORCESTER, MA

Date Collected: 02/12/19 10:00
Date Received: 02/12/19
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										
Solids, Total Suspended	310		mg/l	20	NA	4	-	02/13/19 13:40	121,2540D	DR
Cyanide, Total	0.006		mg/l	0.005	--	1	02/13/19 02:32	02/13/19 11:12	121,4500CN-CE	LH
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	02/13/19 08:30	121,4500CL-D	MA
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	02/13/19 14:25	02/13/19 21:06	121,4500NH3-BH	AT
TPH, SGT-HEM	ND		mg/l	4.40	--	1.1	02/14/19 16:30	02/14/19 22:16	74,1664A	ML
Phenolics, Total	ND		mg/l	0.030	--	1	02/15/19 06:00	02/19/19 12:59	4,420.1	BR
Chromium, Hexavalent	ND		mg/l	0.010	--	1	02/13/19 07:30	02/13/19 08:16	1,7196A	MA
Anions by Ion Chromatography - Westborough Lab										
Chloride	5260		mg/l	250	--	500	-	02/13/19 22:19	44,300.0	AU

Project Name: HOLY CROSS
Project Number: 01.0173611.00
Lab Number: L1905575
Report Date: 02/19/19

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): 02 Batch: WG1206104-1										
Cyanide, Total	ND		mg/l	0.005	--	1	02/13/19 02:32	02/13/19 11:08	121,4500CN-CE	LH
General Chemistry - Westborough Lab for sample(s): 02 Batch: WG1206176-1										
Chromium, Hexavalent	ND		mg/l	0.010	--	1	02/13/19 07:30	02/13/19 08:12	1,7196A	MA
General Chemistry - Westborough Lab for sample(s): 02 Batch: WG1206179-1										
Solids, Total Suspended	ND		mg/l	5.0	NA	1	-	02/13/19 13:40	121,2540D	DR
General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1206182-1										
Nitrogen, Ammonia	ND		mg/l	0.075	--	1	02/13/19 14:25	02/13/19 20:46	121,4500NH3-BH	AT
General Chemistry - Westborough Lab for sample(s): 02 Batch: WG1206221-1										
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	02/13/19 08:30	121,4500CL-D	MA
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1206446-1										
Nitrogen, Nitrate/Nitrite	ND		mg/l	0.10	--	1	-	02/13/19 21:11	121,4500NO3-F	MR
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1206759-1										
Nitrogen, Total Kjeldahl	ND		mg/l	0.300	--	1	02/14/19 15:15	02/15/19 21:22	121,4500NH3-H	AT
General Chemistry - Westborough Lab for sample(s): 02 Batch: WG1206829-1										
TPH, SGT-HEM	ND		mg/l	4.00	--	1	02/14/19 16:30	02/14/19 22:16	74,1664A	ML
Anions by Ion Chromatography - Westborough Lab for sample(s): 02 Batch: WG1206866-1										
Chloride	ND		mg/l	0.500	--	1	-	02/13/19 17:43	44,300.0	AU
General Chemistry - Westborough Lab for sample(s): 02 Batch: WG1206962-1										
Phenolics, Total	ND		mg/l	0.030	--	1	02/15/19 06:00	02/19/19 12:57	4,420.1	BR

Lab Control Sample Analysis

Batch Quality Control

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 02 Batch: WG1206104-2								
Cyanide, Total	94		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 02 Batch: WG1206176-2								
Chromium, Hexavalent	95		-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1206182-2								
Nitrogen, Ammonia	102		-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 02 Batch: WG1206221-2								
Chlorine, Total Residual	96		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1206446-2								
Nitrogen, Nitrate/Nitrite	102		-		90-110	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1206759-2								
Nitrogen, Total Kjeldahl	96		-		78-122	-		
General Chemistry - Westborough Lab Associated sample(s): 02 Batch: WG1206829-2								
TPH	90		-		64-132	-		34

Lab Control Sample Analysis

Batch Quality Control

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 02 Batch: WG1206866-2					
Chloride	100	-	90-110	-	
General Chemistry - Westborough Lab Associated sample(s): 02 Batch: WG1206962-2					
Phenolics, Total	94	-	70-130	-	

Matrix Spike Analysis
Batch Quality Control

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

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): 02 QC Batch ID: WG1206104-4 QC Sample: L1905586-02 Client ID: MS Sample												
Cyanide, Total	ND	0.2	0.203	102		-	-		90-110	-		30
General Chemistry - Westborough Lab Associated sample(s): 02 QC Batch ID: WG1206176-4 QC Sample: L1905575-02 Client ID: GZ-1												
Chromium, Hexavalent	ND	0.1	0.097	97		-	-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1206182-4 QC Sample: L1905563-01 Client ID: MS Sample												
Nitrogen, Ammonia	0.818	4	4.47	91		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 02 QC Batch ID: WG1206221-4 QC Sample: L1905575-02 Client ID: GZ-1												
Chlorine, Total Residual	ND	0.25	ND	**0**	Q	-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1206446-4 QC Sample: L1905740-01 Client ID: MS Sample												
Nitrogen, Nitrate/Nitrite	0.18	4	4.3	103		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1206759-4 QC Sample: L1905740-01 Client ID: MS Sample												
Nitrogen, Total Kjeldahl	ND	8	7.19	90		-	-		77-111	-		24
General Chemistry - Westborough Lab Associated sample(s): 02 QC Batch ID: WG1206829-4 QC Sample: L1900002-58 Client ID: MS Sample												
TPH	ND	20	16.2	81		-	-		64-132	-		34
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 02 QC Batch ID: WG1206866-3 QC Sample: L1905680-02 Client ID: MS Sample												
Chloride	54.0	20	75.7	109		-	-		90-110	-		18
General Chemistry - Westborough Lab Associated sample(s): 02 QC Batch ID: WG1206962-4 QC Sample: L1906007-01 Client ID: MS Sample												
Phenolics, Total	ND	0.4	0.40	100		-	-		70-130	-		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 02 QC Batch ID: WG1206104-3 QC Sample: L1905586-01 Client ID: DUP Sample						
Cyanide, Total	ND	ND	mg/l	NC		30
General Chemistry - Westborough Lab Associated sample(s): 02 QC Batch ID: WG1206176-3 QC Sample: L1905575-02 Client ID: GZ-1						
Chromium, Hexavalent	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 02 QC Batch ID: WG1206179-2 QC Sample: L1905575-02 Client ID: GZ-1						
Solids, Total Suspended	310	340	mg/l	9		29
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1206182-3 QC Sample: L1905563-01 Client ID: DUP Sample						
Nitrogen, Ammonia	0.818	0.855	mg/l	4		20
General Chemistry - Westborough Lab Associated sample(s): 02 QC Batch ID: WG1206221-3 QC Sample: L1905614-02 Client ID: DUP Sample						
Chlorine, Total Residual	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1206446-3 QC Sample: L1905740-01 Client ID: DUP Sample						
Nitrogen, Nitrate/Nitrite	0.18	0.19	mg/l	5		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1206759-3 QC Sample: L1905740-01 Client ID: DUP Sample						
Nitrogen, Total Kjeldahl	ND	ND	mg/l	NC		24
General Chemistry - Westborough Lab Associated sample(s): 02 QC Batch ID: WG1206829-3 QC Sample: L1900002-58 Client ID: DUP Sample						
TPH	ND	ND	mg/l	NC		34
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 02 QC Batch ID: WG1206866-4 QC Sample: L1905680-02 Client ID: DUP Sample						
Chloride	54.0	54.0	mg/l	0		18

Lab Duplicate Analysis

Batch Quality Control

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 02 QC Batch ID: WG1206962-3 QC Sample: L1906007-01 Client ID: DUP Sample					
Phenolics, Total	ND	ND	mg/l	NC	20

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

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(*)
L1905575-01A	Plastic 250ml HNO3 preserved	A	<2	<2	3.0	Y	Absent		HARDU(180)
L1905575-01B	Plastic 500ml H2SO4 preserved	A	<2	<2	3.0	Y	Absent		TKN-4500(28),NO3/NO2-4500(28),TNITROGEN(28),NH3-4500(28)
L1905575-02A	Plastic 250ml HNO3 preserved	A	<2	<2	3.0	Y	Absent		CD-2008T(180),NI-2008T(180),ZN-2008T(180),CU-2008T(180),FE-UI(180),AG-2008T(180),AS-2008T(180),HG-U(28),SE-2008T(180),CR-2008T(180),PB-2008T(180),SB-2008T(180)
L1905575-02B	Vial Na2S2O3 preserved	A	NA		3.0	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1905575-02C	Vial Na2S2O3 preserved	A	NA		3.0	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1905575-02D	Vial Na2S2O3 preserved	A	NA		3.0	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1905575-02E	Vial Na2S2O3 preserved	A	NA		3.0	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1905575-02F	Vial Na2S2O3 preserved	A	NA		3.0	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1905575-02G	Vial Na2S2O3 preserved	A	NA		3.0	Y	Absent		624.1-RGP(7),624.1-SIM-RGP(7)
L1905575-02H	Vial Na2S2O3 preserved	A	NA		3.0	Y	Absent		504(14)
L1905575-02I	Vial Na2S2O3 preserved	A	NA		3.0	Y	Absent		504(14)
L1905575-02J	Plastic 950ml unpreserved	A	7	7	3.0	Y	Absent		CL-300(28),HEXCR-7196(1),TRC-4500(1)
L1905575-02K	Plastic 500ml H2SO4 preserved	A	<2	<2	3.0	Y	Absent		NH3-4500(28)
L1905575-02L	Plastic 250ml NaOH preserved	A	>12	>12	3.0	Y	Absent		TCN-4500(14)
L1905575-02M	Amber 1000ml HCl preserved	A	NA		3.0	Y	Absent		TPH-1664(28)
L1905575-02N	Amber 1000ml HCl preserved	A	NA		3.0	Y	Absent		TPH-1664(28)
L1905575-02O	Amber 950ml H2SO4 preserved	A	<2	<2	3.0	Y	Absent		TPHENOL-420(28)
L1905575-02P	Plastic 950ml unpreserved	A	7	7	3.0	Y	Absent		TSS-2540(7)
L1905575-02X	Vial HCl preserved	A	NA		3.0	Y	Absent		ARCHIVE()
L1905575-02Y	Vial HCl preserved	A	NA		3.0	Y	Absent		ARCHIVE()
L1905575-02Z	Vial HCl preserved	A	NA		3.0	Y	Absent		ARCHIVE()

*Values in parentheses indicate holding time in days

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905575
Report Date: 02/19/19

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)

*Values in parentheses indicate holding time in days

Project Name:	HOLY CROSS	**Lab Number:**	L1905575
Project Number:	01.0173611.00	**Report Date:**	02/19/19

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:	HOLY CROSS	**Lab Number:**	L1905575
Project Number:	01.0173611.00	**Report Date:**	02/19/19

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.

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

* Refer to attached RGP list

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 2/12/19

ALPHA Job #: L1905575

ALPHA ANALYTICAL
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Client Information

Client: GZA

Address: 249 Vanderbilt Ave
Norwood Ma. 02062

Phone: 781-983-1357

Email: wdavis@gza.com

Project Information

Project Name: Holy Cross

Project Location: Worcester Ma.

Project #: 01.0173611.00

Project Manager: JAK

ALPHA Quote #:

Report Information - Data Deliverables

☒ ADEx ☒ EMAIL

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved)

Date Due:

Additional Project Information:

(1) See attached RGP list.
(2) Surface water @ outfall in Middle River
(3) HexCr has short hold time.

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	VOC: [redacted]	624.1 [redacted]	624.1 [redacted] 504 NH3	METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15 ☐ RCRA 8 ☐ PP13	METALS: [redacted]	EPH: ☐ Ranges & Targets ☐ Ranges Only	VPH: ☐ Ranges & Targets ☐ Ranges Only	TPH: [redacted] SUB-Ethanol	Total Hardness	Ammonia + Nitrogen-Stress	TSS	HexCr (3) TRC - 4500 Cl	TPhenol	TCN	Sample Comments	TOTAL # BOTTLES
05575-01	SW-1	2/12/19	1055am	SW	BD									X	X					Surface water (2)	2
02	GZ-1	2/12/19	1000am	GW	BD	X	X		X			X	X			X	X	X	X	(1)	19

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

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H= $Na_2S_2O_3$
I= Ascorbic Acid
J = NH_4Cl
K= Zn Acetate
O= Other

Container Type	V		P		V	A	P	P	P	P	A	P
Preservative	$Na_2S_2O_3$	H_2SO_4	HNO_3		HCL	HCL	HNO_3	H_2SO_4	/	/	H_2SO_4	NAOH

Relinquished By:	Date/Time	Received By:	Date/Time
[redacted]	2/12/19 1145pm	[redacted]	1343
[redacted] 2-12-19	1615		2/12/19 1614

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

ANALYTICAL REPORT

Lab Number:	L1905960
Client:	GZA GeoEnvironmental, Inc. 249 Vanderbilt Ave Norwood, MA 02062
ATTN:	Bill Davis
Phone:	(781) 278-5769
Project Name:	HOLY CROSS
Project Number:	01.0173611.00
Report Date:	02/21/19

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: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905960
Report Date: 02/21/19

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1905960-01	GZ-1	WATER	WORCESTER, MA	02/14/19 09:30	02/14/19

Project Name:	HOLY CROSS	**Lab Number:**	L1905960
Project Number:	01.0173611.00	**Report Date:**	02/21/19

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.

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:  Cristin Walker

Title: Technical Director/Representative Date: 02/21/19

ORGANICS

SEMIVOLATILES

Project Name: HOLY CROSS
Project Number: 01.0173611.00
Lab Number: L1905960
Report Date: 02/21/19

SAMPLE RESULTS

Lab ID: L1905960-01
Client ID: GZ-1
Sample Location: WORCESTER, MA

Date Collected: 02/14/19 09:30
Date Received: 02/14/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1
Analytical Date: 02/19/19 12:32
Analyst: SZ

Extraction Method: EPA 625.1
Extraction Date: 02/17/19 12:18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Bis(2-ethylhexyl)phthalate	2.3		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	65		42-122
2-Fluorobiphenyl	62		46-121
4-Terphenyl-d14	62		47-138

Project Name: HOLY CROSS
Project Number: 01.0173611.00
Lab Number: L1905960
Report Date: 02/21/19

SAMPLE RESULTS

Lab ID: L1905960-01
Client ID: GZ-1
Sample Location: WORCESTER, MA

Date Collected: 02/14/19 09:30
Date Received: 02/14/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1-SIM
Analytical Date: 02/20/19 16:58
Analyst: DV

Extraction Method: EPA 625.1
Extraction Date: 02/17/19 12:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Acenaphthene	0.10		ug/l	0.10	--	1
Fluoranthene	1.5		ug/l	0.10	--	1
Naphthalene	ND		ug/l	0.10	--	1
Benzo(a)anthracene	0.94		ug/l	0.10	--	1
Benzo(a)pyrene	0.46		ug/l	0.10	--	1
Benzo(b)fluoranthene	1.3		ug/l	0.10	--	1
Benzo(k)fluoranthene	0.45		ug/l	0.10	--	1
Chrysene	1.0		ug/l	0.10	--	1
Acenaphthylene	ND		ug/l	0.10	--	1
Anthracene	0.33		ug/l	0.10	--	1
Benzo(ghi)perylene	0.16		ug/l	0.10	--	1
Fluorene	0.54		ug/l	0.10	--	1
Phenanthrene	1.3		ug/l	0.10	--	1
Dibenzo(a,h)anthracene	ND		ug/l	0.10	--	1
Indeno(1,2,3-cd)pyrene	0.20		ug/l	0.10	--	1
Pyrene	1.0		ug/l	0.10	--	1
Pentachlorophenol	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	42		25-87
Phenol-d6	29		16-65
Nitrobenzene-d5	83		42-122
2-Fluorobiphenyl	61		46-121
2,4,6-Tribromophenol	66		45-128
4-Terphenyl-d14	59		47-138

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905960
Report Date: 02/21/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1
Analytical Date: 02/19/19 08:20
Analyst: SZ

Extraction Method: EPA 625.1
Extraction Date: 02/17/19 12:18

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1207584-1					
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	69		42-122
2-Fluorobiphenyl	67		46-121
4-Terphenyl-d14	71		47-138

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905960
Report Date: 02/21/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1-SIM
Analytical Date: 02/19/19 12:46
Analyst: DV

Extraction Method: EPA 625.1
Extraction Date: 02/17/19 12:20

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01 Batch: WG1207585-1					
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	49		25-87
Phenol-d6	34		16-65
Nitrobenzene-d5	92		42-122
2-Fluorobiphenyl	68		46-121
2,4,6-Tribromophenol	79		45-128
4-Terphenyl-d14	74		47-138

Lab Control Sample Analysis

Batch Quality Control

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905960
Report Date: 02/21/19

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: WG1207584-3								
Bis(2-ethylhexyl)phthalate	94		-		29-137	-		30
Butyl benzyl phthalate	106		-		1-140	-		30
Di-n-butylphthalate	96		-		8-120	-		30
Di-n-octylphthalate	107		-		19-132	-		30
Diethyl phthalate	82		-		1-120	-		30
Dimethyl phthalate	89		-		1-120	-		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Nitrobenzene-d5	81				42-122
2-Fluorobiphenyl	85				46-121
4-Terphenyl-d14	86				47-138

Lab Control Sample Analysis
Batch Quality Control

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905960
Report Date: 02/21/19

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: WG1207585-2								
Acenaphthene	74		-		60-132	-		30
Fluoranthene	73		-		43-121	-		30
Naphthalene	66		-		36-120	-		30
Benzo(a)anthracene	77		-		42-133	-		30
Benzo(a)pyrene	79		-		32-148	-		30
Benzo(b)fluoranthene	80		-		42-140	-		30
Benzo(k)fluoranthene	79		-		25-146	-		30
Chrysene	76		-		44-140	-		30
Acenaphthylene	73		-		54-126	-		30
Anthracene	72		-		43-120	-		30
Benzo(ghi)perylene	61		-		1-195	-		30
Fluorene	78		-		70-120	-		30
Phenanthrene	68		-		65-120	-		30
Dibenzo(a,h)anthracene	67		-		1-200	-		30
Indeno(1,2,3-cd)pyrene	68		-		1-151	-		30
Pyrene	72		-		70-120	-		30
Pentachlorophenol	66		-		38-152	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905960
Report Date: 02/21/19

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: WG1207585-2								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	45				25-87
Phenol-d6	31				16-65
Nitrobenzene-d5	80				42-122
2-Fluorobiphenyl	61				46-121
2,4,6-Tribromophenol	70				45-128
4-Terphenyl-d14	66				47-138

PCBS

Project Name: HOLY CROSS
Project Number: 01.0173611.00
Lab Number: L1905960
Report Date: 02/21/19

SAMPLE RESULTS

Lab ID: L1905960-01
Client ID: GZ-1
Sample Location: WORCESTER, MA

Date Collected: 02/14/19 09:30
Date Received: 02/14/19
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 127,608.3
Analytical Date: 02/20/19 19:24
Analyst: WR

Extraction Method: EPA 608.3
Extraction Date: 02/16/19 17:07
Cleanup Method: EPA 3665A
Cleanup Date: 02/16/19
Cleanup Method: EPA 3660B
Cleanup Date: 02/17/19

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	88		37-123	B
Decachlorobiphenyl	66		38-114	B
2,4,5,6-Tetrachloro-m-xylene	91		37-123	A
Decachlorobiphenyl	60		38-114	A

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905960
Report Date: 02/21/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 127,608.3
Analytical Date: 02/18/19 10:45
Analyst: HT

Extraction Method: EPA 608.3
Extraction Date: 02/16/19 00:16
Cleanup Method: EPA 3665A
Cleanup Date: 02/16/19
Cleanup Method: EPA 3660B
Cleanup Date: 02/16/19

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 01 Batch: WG1207301-1						
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	88		37-123	B
Decachlorobiphenyl	80		38-114	B
2,4,5,6-Tetrachloro-m-xylene	96		37-123	A
Decachlorobiphenyl	111		38-114	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905960
Report Date: 02/21/19

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: WG1207301-2									
Aroclor 1016	106		-		50-140	-		36	A
Aroclor 1260	108		-		8-140	-		38	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	90				37-123	B
Decachlorobiphenyl	82				38-114	B
2,4,5,6-Tetrachloro-m-xylene	95				37-123	A
Decachlorobiphenyl	110				38-114	A

Project Name: HOLY CROSS
Project Number: 01.0173611.00

Lab Number: L1905960
Report Date: 02/21/19

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(*)
L1905960-01A	Amber 1000ml Na2S2O3	A	7	7	3.8	Y	Absent		PCB-608.3(7)
L1905960-01B	Amber 1000ml Na2S2O3	A	7	7	3.8	Y	Absent		PCB-608.3(7)
L1905960-01C	Amber 1000ml Na2S2O3	A	7	7	3.8	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L1905960-01D	Amber 1000ml Na2S2O3	A	7	7	3.8	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L1905960-01E	Amber 1000ml Na2S2O3	A	7	7	3.8	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L1905960-01F	Amber 1000ml Na2S2O3	A	7	7	3.8	Y	Absent		625.1-RGP(7),625.1-SIM-RGP(7)
L1905960-01G	Amber 1000ml HCl preserved	A	<2	<2	3.8	Y	Absent		HOLD-WETCHEM()
L1905960-01H	Amber 1000ml HCl preserved	A	<2	<2	3.8	Y	Absent		HOLD-WETCHEM()

*Values in parentheses indicate holding time in days

Project Name:	HOLY CROSS	**Lab Number:**	L1905960
Project Number:	01.0173611.00	**Report Date:**	02/21/19

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:	HOLY CROSS	**Lab Number:**	L1905960
Project Number:	01.0173611.00	**Report Date:**	02/21/19

REFERENCES

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

Serial_No:02211914:08

* Refer to RGP list submitted 2/12/19

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab:

ALPHA Job #: L1905960

ALPHA ANALYTICAL

8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Project Information

Project Name: Holy Cross
Project Location: Worcester Ma.
Project #: 01.0173611.00
Project Manager: JAK
ALPHA Quote #:

Report Information - Data Deliverables

☒ ADEx ☒ EMAIL

Billing Information

☐ Same as Client info PO #:

Client Information

Client: GZA
Address: 249 Vanderbilt Av Norwood Ma. 02062
Phone: 781-983-1357
Email: wdavis@gza.com

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☐ Other State /Fed Program ____ Criteria ____

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due:

Additional Project Information:
① Hold TPH
② See RGP list submitted 2/12/19.

ANALYSIS: VOC: ☐ 8260 ☐ 624 ☐ 524.2; SVOC: ☐ ABN ☐ PAH; METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15; METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13; EPH: ☐ Ranges & Targets ☐ Ranges Only; VPH: ☐ Ranges & Targets ☐ Ranges Only; ☒ PCB -608.3; TPH: ☐ Quant Only ☐ Fingerprint; TPH-1664 ①; SVOCs-625.1 RGP (625.1 SIM RGP)

SAMPLE INFO: Filtration ☐ Field ☐ Lab to do; Preservation ☐ Lab to do

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	PCB -608.3	TPH-1664 ①	SVOCs-625.1 RGP	Sample Comments	Total # Bottles
05960-01	GZ-1	2/14/19	930am	GW	BD	X	X	X	①②	8
Container Type						A	A	A		
Preservative						H	HCl	H		

Container Type: P= Plastic, A= Amber glass, V= Vial, G= Glass, B= Bacteria cup, C= Cube, O= Other, E= Encore, D= BOD Bottle

Preservative: A= None, B= HCl, C= HNO_3, D= H_2SO_4, E= NaOH, F= MeOH, G= $NaHSO_4$, H = $Na_2S_2O_3$, I= Ascorbic Acid, J = NH_4Cl, K= Zn Acetate, O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	2/14/19 1245pm	[signature] AAL	2/14/19 14:13
[signature]	2/14/19 1720	[signature] AAL	2/14/19 17:20

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

ANALYTICAL REPORT

Lab Number:	L1908303
Client:	GZA GeoEnvironmental, Inc. 249 Vanderbilt Ave Norwood, MA 02062
ATTN:	Bill Davis
Phone:	(781) 278-5769
Project Name:	HOLY CROSS
Project Number:	173611.00
Report Date:	03/07/19

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: HOLY CROSS
Project Number: 173611.00

Lab Number: L1908303
Report Date: 03/07/19

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1908303-01	SW-1_3-14-19	WATER	WORCESTER, MA	03/04/19 14:41	03/04/19

Project Name:	HOLY CROSS	**Lab Number:**	L1908303
Project Number:	173611.00	**Report Date:**	03/07/19

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.

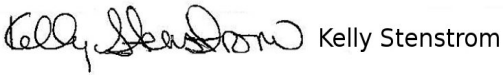
When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded 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.

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: 03/07/19

METALS

Project Name: HOLY CROSS
Lab Number: L1908303
Project Number: 173611.00
Report Date: 03/07/19

SAMPLE RESULTS

Lab ID: L1908303-01
Client ID: SW-1_3-14-19
Sample Location: WORCESTER, MA
Date Collected: 03/04/19 14:41
Date Received: 03/04/19
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	03/05/19 12:18	03/06/19 00:50	EPA 3005A	3,200.8	MG
Arsenic, Total	0.00251		mg/l	0.00100	--	1	03/05/19 12:18	03/06/19 00:50	EPA 3005A	3,200.8	MG
Cadmium, Total	ND		mg/l	0.00020	--	1	03/05/19 12:18	03/06/19 00:50	EPA 3005A	3,200.8	MG
Chromium, Total	ND		mg/l	0.00100	--	1	03/05/19 12:18	03/06/19 00:50	EPA 3005A	3,200.8	MG
Copper, Total	0.00276		mg/l	0.00100	--	1	03/05/19 12:18	03/06/19 00:50	EPA 3005A	3,200.8	MG
Iron, Total	0.581		mg/l	0.050	--	1	03/05/19 12:18	03/05/19 18:29	EPA 3005A	19,200.7	MC
Lead, Total	0.00121		mg/l	0.00100	--	1	03/05/19 12:18	03/06/19 00:50	EPA 3005A	3,200.8	MG
Mercury, Total	ND		mg/l	0.00020	--	1	03/05/19 09:30	03/05/19 22:43	EPA 245.1	3,245.1	EA
Nickel, Total	ND		mg/l	0.00200	--	1	03/05/19 12:18	03/06/19 00:50	EPA 3005A	3,200.8	MG
Selenium, Total	ND		mg/l	0.00500	--	1	03/05/19 12:18	03/06/19 00:50	EPA 3005A	3,200.8	MG
Silver, Total	ND		mg/l	0.00040	--	1	03/05/19 12:18	03/06/19 00:50	EPA 3005A	3,200.8	MG
Zinc, Total	0.01490		mg/l	0.01000	--	1	03/05/19 12:18	03/06/19 00:50	EPA 3005A	3,200.8	MG
General Chemistry - Mansfield Lab											
Chromium, Trivalent	ND		mg/l	0.010	--	1		03/06/19 00:50	NA	107,-	

Project Name: HOLY CROSS
Project Number: 173611.00
Lab Number: L1908303
Report Date: 03/07/19

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 Batch: WG1212351-1										
Iron, Total	ND		mg/l	0.050	--	1	03/05/19 12:18	03/05/19 17:11	19,200.7	MC

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 Batch: WG1212352-1										
Antimony, Total	ND		mg/l	0.00400	--	1	03/05/19 12:18	03/06/19 00:34	3,200.8	MG
Arsenic, Total	ND		mg/l	0.00100	--	1	03/05/19 12:18	03/06/19 00:34	3,200.8	MG
Cadmium, Total	ND		mg/l	0.00020	--	1	03/05/19 12:18	03/06/19 00:34	3,200.8	MG
Chromium, Total	ND		mg/l	0.00100	--	1	03/05/19 12:18	03/06/19 00:34	3,200.8	MG
Copper, Total	ND		mg/l	0.00100	--	1	03/05/19 12:18	03/06/19 00:34	3,200.8	MG
Lead, Total	ND		mg/l	0.00100	--	1	03/05/19 12:18	03/06/19 00:34	3,200.8	MG
Nickel, Total	ND		mg/l	0.00200	--	1	03/05/19 12:18	03/06/19 00:34	3,200.8	MG
Selenium, Total	ND		mg/l	0.00500	--	1	03/05/19 12:18	03/06/19 00:34	3,200.8	MG
Silver, Total	ND		mg/l	0.00040	--	1	03/05/19 12:18	03/06/19 00:34	3,200.8	MG
Zinc, Total	ND		mg/l	0.01000	--	1	03/05/19 12:18	03/06/19 00:34	3,200.8	MG

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 Batch: WG1212504-1										
Mercury, Total	ND		mg/l	0.00020	--	1	03/05/19 09:30	03/05/19 22:04	3,245.1	EA

Prep Information

Digestion Method: EPA 245.1

Lab Control Sample Analysis

Batch Quality Control

Project Name: HOLY CROSS
Project Number: 173611.00

Lab Number: L1908303
Report Date: 03/07/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1212351-2								
Iron, Total	100		-		85-115	-		
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1212352-2								
Antimony, Total	99		-		85-115	-		
Arsenic, Total	105		-		85-115	-		
Cadmium, Total	105		-		85-115	-		
Chromium, Total	101		-		85-115	-		
Copper, Total	99		-		85-115	-		
Lead, Total	106		-		85-115	-		
Nickel, Total	104		-		85-115	-		
Selenium, Total	112		-		85-115	-		
Silver, Total	108		-		85-115	-		
Zinc, Total	112		-		85-115	-		
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1212504-2								
Mercury, Total	111		-		85-115	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: HOLY CROSS
Project Number: 173611.00

Lab Number: L1908303
Report Date: 03/07/19

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 QC Batch ID: WG1212351-3 QC Sample: L1908303-01 Client ID: SW-1_3-14-19												
Iron, Total	0.581	1	1.56	98		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1212352-3 QC Sample: L1908303-01 Client ID: SW-1_3-14-19												
Antimony, Total	ND	0.5	0.5481	110		-	-		70-130	-		20
Arsenic, Total	0.00251	0.12	0.1316	108		-	-		70-130	-		20
Cadmium, Total	ND	0.051	0.05468	107		-	-		70-130	-		20
Chromium, Total	ND	0.2	0.1940	97		-	-		70-130	-		20
Copper, Total	0.00276	0.25	0.2364	93		-	-		70-130	-		20
Lead, Total	0.00121	0.51	0.5516	108		-	-		70-130	-		20
Nickel, Total	ND	0.5	0.4866	97		-	-		70-130	-		20
Selenium, Total	ND	0.12	0.1357	113		-	-		70-130	-		20
Silver, Total	ND	0.05	0.05103	102		-	-		70-130	-		20
Zinc, Total	0.01490	0.5	0.5464	106		-	-		70-130	-		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1212504-3 QC Sample: L1907771-01 Client ID: MS Sample												
Mercury, Total	ND	0.005	0.00602	120		-	-		70-130	-		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1212504-5 QC Sample: L1907727-02 Client ID: MS Sample												
Mercury, Total	ND	0.005	0.00518	104		-	-		70-130	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: HOLY CROSS
Project Number: 173611.00

Lab Number: L1908303
Report Date: 03/07/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1212351-4 QC Sample: L1908303-01 Client ID: SW-1_3-14-19						
Iron, Total	0.581	0.556	mg/l	4		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1212352-4 QC Sample: L1908303-01 Client ID: SW-1_3-14-19						
Antimony, Total	ND	ND	mg/l	NC		20
Arsenic, Total	0.00251	0.00242	mg/l	4		20
Cadmium, Total	ND	ND	mg/l	NC		20
Chromium, Total	ND	ND	mg/l	NC		20
Copper, Total	0.00276	0.00248	mg/l	11		20
Lead, Total	0.00121	0.00109	mg/l	10		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	0.01490	0.01391	mg/l	7		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1212504-4 QC Sample: L1907771-01 Client ID: DUP Sample						
Mercury, Total	ND	ND	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1212504-6 QC Sample: L1907727-02 Client ID: DUP Sample						
Mercury, Total	ND	ND	mg/l	NC		20

INORGANICS
&
MISCELLANEOUS

Project Name: HOLY CROSS
Project Number: 173611.00

Lab Number: L1908303
Report Date: 03/07/19

SAMPLE RESULTS

Lab ID: L1908303-01
Client ID: SW-1_3-14-19
Sample Location: WORCESTER, MA

Date Collected: 03/04/19 14:41
Date Received: 03/04/19
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										
Chromium, Hexavalent	ND		mg/l	0.010	--	1	03/04/19 18:55	03/04/19 19:11	1,7196A	AS

Project Name: HOLY CROSS
Project Number: 173611.00
Lab Number: L1908303
Report Date: 03/07/19

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 Batch: WG1212364-1										
Chromium, Hexavalent	ND		mg/l	0.010	--	1	03/04/19 18:55	03/04/19 19:10	1,7196A	AS

Lab Control Sample Analysis

Batch Quality Control

Project Name: HOLY CROSS

Project Number: 173611.00

Lab Number: L1908303

Report Date: 03/07/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1212364-2								
Chromium, Hexavalent	103		-		85-115	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: HOLY CROSS
Project Number: 173611.00

Lab Number: L1908303
Report Date: 03/07/19

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 QC Batch ID: WG1212364-4 QC Sample: L1908303-01 Client ID: SW-1_3-14-19												
Chromium, Hexavalent	ND	0.1	0.093	93		-	-		85-115	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: HOLY CROSS
Project Number: 173611.00

Lab Number: L1908303
Report Date: 03/07/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1212364-3 QC Sample: L1908303-01 Client ID: SW-1_3-14-19						
Chromium, Hexavalent	ND	ND	mg/l	NC		20

Project Name: HOLY CROSS
Project Number: 173611.00

Lab Number: L1908303
Report Date: 03/07/19

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(*)
L1908303-01A	Plastic 250ml unpreserved	A	7	7	2.8	Y	Absent		HEXCR-7196(1)
L1908303-01B	Plastic 250ml HNO3 preserved	A	<2	<2	2.8	Y	Absent		CD-2008T(180),NI-2008T(180),ZN-2008T(180),CU-2008T(180),FE-UI(180),AG-2008T(180),AS-2008T(180),HG-U(28),SE-2008T(180),CR-2008T(180),PB-2008T(180),SB-2008T(180)

*Values in parentheses indicate holding time in days

Project Name:	HOLY CROSS	**Lab Number:**	L1908303
Project Number:	173611.00	**Report Date:**	03/07/19

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:	HOLY CROSS	**Lab Number:**	L1908303
Project Number:	173611.00	**Report Date:**	03/07/19

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.

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.

107 Alpha Analytical - In-house calculation method.

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 COUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 3/4/19

ALPHA Job #: L1908303

ALPHA ANALYTICAL
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Project Information

Project Name:
Project Location: WORCESTER, MA
Project #: 173611.00
Project Manager: BILL DAVIS
ALPHA Quote #:

Report Information - Data Deliverables

☒ ADEx ☒ EMAIL

Billing Information

☒ Same as Client info PO #:

Client Information

Client: GZA GeoEnvironmental, Inc
Address: 249 VANDERBILT AVE. NORWOOD, MA 02062
Phone: 781-278-5815
Email: william.davis@gza.com

Regulatory Requirements & Project Information Requirements

☐ Yes ☒ No MA MCP Analytical Methods
☐ Yes ☒ No CT RCP Analytical Methods
☐ Yes ☒ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☒ No GW1 Standards (Info Required for Metals & EPH with Targets)
☒ Yes ☐ No NPDES RGP
☐ Other State /Fed Program ______ Criteria ______

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due:

Additional Project Information:

1. TEST FOR FOLLOWING METALS: HEXAVALENT CHROMIUM, ANTIMONY, ARSENIC, CADMIUM, CHROMIUM, COPPER, IRON, LEAD, MERCURY, NICKEL, SELENIUM, SILVER, AND ZINC.
2. 24-HOUR HOLD TIME ON HEX CHROME.

ANALYSIS

Columns: VOC: ☐ 8260 ☐ 624 ☐ 524.2 | SVOC: ☐ ABN ☐ PAH | METALS: ☒ MCP 13 ☐ MCP 14 ☐ RCP 15 | METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13 | EPH: ☐ Ranges & Targets ☐ Ranges Only | VPH: ☐ Ranges & Targets ☐ Ranges Only | ☐ PCB ☐ PEST | TPH: ☐ Quant Only ☐ Fingerprint | [illegible] | HARDNESS

SAMPLE INFO
Filtration: ☐ Field ☐ Lab to do
Preservation: ☐ Lab to do

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	METALS	[illegible]	HARDNESS	Sample Comments	TOTAL # BOTTLES
08303-01	SW-1_3-4-19	3/4/19	1441	SW	KFM	X	X	X	1,2.	2 3

	METALS	[illegible]	HARDNESS
Container Type	P	P	P
Preservative	C/A	[illegible]	C

Container Type: P= Plastic, A= Amber glass, V= Vial, G= Glass, B= Bacteria cup, C= Cube, O= Other, E= Encore, D= BOD Bottle

Preservative: A= None, B= HCl, C= HNO_3, D= H_2SO_4, E= NaOH, F= MeOH, G= $NaHSO_4$, H = $Na_2S_2O_3$, I= Ascorbic Acid, J = NH_4Cl, K= Zn Acetate, O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	3/4/19 1605	[signature] AAL	3/4/19 16:05

FORM NO: 01-01 (rev. 12-Mar-2012)

ATTACHMENT 9

SUMMARIES OF GROUNDWATER AND SURFACE WATER ANALYTICAL RESULTS

APPENDIX VIII

Summary of Groundwater Analytical Data

College of the Holy Cross

College Street, Worcester, Massachusetts

Sample ID	Chemical Name	Concentration	Units
GZ-1	Chlorine, Total Residual	<0.02	mg/L
GZ-1	Chloride	*5260*	mg/L
GZ-1	Iron, Total	*5.46*	mg/L
GZ-1	Nitrogen, Ammonia	<0.075	mg/L
GZ-1	Phenolics, Total	<0.03	mg/L
GZ-1	1,2-Dibromoethane	<0.01	ug/L
GZ-1	1,2-Dibromo-3-chloropropane	<0.01	ug/L
GZ-1	Antimony, Total	<0.004	mg/L
GZ-1	Arsenic, Total	*0.00602*	mg/L
GZ-1	Cadmium, Total	*0.00177*	mg/L
GZ-1	Chromium, Total	*0.00988*	mg/L
GZ-1	Copper, Total	*0.00555*	mg/L
GZ-1	Lead, Total	*0.00268*	mg/L
GZ-1	Nickel, Total	*0.02574*	mg/L
GZ-1	Selenium, Total	<0.005	mg/L
GZ-1	Silver, Total	*0.00548*	mg/L
GZ-1	Zinc, Total	*0.0157*	mg/L
GZ-1	Mercury, Total	<0.0002	mg/L
GZ-1	Chromium, Hexavalent	<0.01	mg/L
GZ-1	Chromium, Trivalent	<0.01	mg/L
GZ-1	1,4-Dioxane	<50	ug/L
GZ-1	Methylene chloride	<1	ug/L
GZ-1	1,1-Dichloroethane	<1.5	ug/L
GZ-1	Carbon tetrachloride	<1	ug/L
GZ-1	1,1,2-Trichloroethane	<1.5	ug/L
GZ-1	Tetrachloroethene	<1	ug/L
GZ-1	1,2-Dichloroethane	<1.5	ug/L
GZ-1	1,1,1-Trichloroethane	<2	ug/L
GZ-1	Benzene	<1	ug/L
GZ-1	Toluene	<1	ug/L
GZ-1	Ethylbenzene	<1	ug/L
GZ-1	Vinyl chloride	<1	ug/L
GZ-1	1,1-Dichloroethene	<1	ug/L
GZ-1	cis-1,2-Dichloroethene	<1	ug/L
GZ-1	Trichloroethene	<1	ug/L
GZ-1	1,2-Dichlorobenzene	<5	ug/L
GZ-1	1,3-Dichlorobenzene	<5	ug/L
GZ-1	1,4-Dichlorobenzene	<5	ug/L
GZ-1	p/m-Xylene	<2	ug/L
GZ-1	o-xylene	<1	ug/L
GZ-1	Xylenes, Total	<1	ug/L

APPENDIX VIII

Summary of Groundwater Analytical Data

College of the Holy Cross

College Street, Worcester, Massachusetts

Sample ID	Chemical Name	Concentration	Units
GZ-1	Acetone	<10	ug/L
GZ-1	Methyl tert butyl ether	<10	ug/L
GZ-1	Tert-Butyl Alcohol	<100	ug/L
GZ-1	Tertiary-Amyl Methyl Ether	<20	ug/L
GZ-1	TPH, SGT-HEM	<4.4	mg/L
GZ-1	Solids, Total Suspended	*310*	mg/L
GZ-1	Cyanide, Total	*0.006*	mg/L
GZ-1	Bis(2-ethylhexyl)phthalate	2.3	ug/L
GZ-1	Butyl benzyl phthalate	<5	ug/L
GZ-1	Di-n-butylphthalate	<5	ug/L
GZ-1	Di-n-octylphthalate	<5	ug/L
GZ-1	Diethyl phthalate	<5	ug/L
GZ-1	Dimethyl phthalate	<5	ug/L
GZ-1	Acenaphthene	0.1	ug/L
GZ-1	Fluoranthene	1.5	ug/L
GZ-1	Naphthalene	<0.1	ug/L
GZ-1	Benzo(a)anthracene	0.94	ug/L
GZ-1	Benzo(a)pyrene	0.46	ug/L
GZ-1	Benzo(b)fluoranthene	1.3	ug/L
GZ-1	Benzo(k)fluoranthene	0.45	ug/L
GZ-1	Chrysene	1	ug/L
GZ-1	Acenaphthylene	<0.1	ug/L
GZ-1	Anthracene	0.33	ug/L
GZ-1	Benzo(ghi)perylene	0.16	ug/L
GZ-1	Fluorene	0.54	ug/L
GZ-1	Phenanthrene	1.3	ug/L
GZ-1	Dibenzo(a,h)anthracene	<0.1	ug/L
GZ-1	Indeno(1,2,3-cd)pyrene	0.2	ug/L
GZ-1	Pyrene	1	ug/L
GZ-1	Pentachlorophenol	<1	ug/L
GZ-1	Aroclor 1016	<0.25	ug/L
GZ-1	Aroclor 1221	<0.25	ug/L
GZ-1	Aroclor 1232	<0.25	ug/L
GZ-1	Aroclor 1242	<0.25	ug/L
GZ-1	Aroclor 1248	<0.25	ug/L
GZ-1	Aroclor 1254	<0.25	ug/L
GZ-1	Aroclor 1260	<0.2	ug/L

APPENDIX VIII

Summary of Surface Water Analytical Data

College of the Holy Cross

College Street, Worcester, Massachusetts

Sample ID	Chemical Name	Concentration	Units
SW-1	Total Nitrogen	0.86	mg/L
SW-1	Nitrogen, Ammonia	0.114	mg/L
SW-1	Nitrogen, Total Kjeldahl	0.408	mg/L
SW-1	Nitrogen, Nitrate/Nitrite	0.45	mg/L
SW-1	Hardness	40.8	mg/L
SW-1	Chromium, Hexavalent	<0.01	mg/L
SW-1	Chromium, Trivalent	<0.01	mg/L
SW-1	Iron, Total	0.581	mg/L
SW-1	Antimony, Total	<0.004	mg/L
SW-1	Arsenic, Total	0.00251	mg/L
SW-1	Cadmium, Total	<0.0002	mg/L
SW-1	Chromium, Total	<0.001	mg/L
SW-1	Copper, Total	0.00276	mg/L
SW-1	Lead, Total	0.00121	mg/L
SW-1	Nickel, Total	<0.002	mg/L
SW-1	Selenium, Total	<0.005	mg/L
SW-1	Silver, Total	<0.0004	mg/L
SW-1	Zinc, Total	0.0149	mg/L
SW-1	Mercury, Total	<0.0002	mg/L

ATTACHMENT 10

WM15 FEE TRANSMITTAL FORM

Enter your transmittal number → X283375 (Transmittal Number)

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

Massachusetts Department of Environmental Protection

Transmittal Form for Permit Application and Payment

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

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

3. Three copies of this form will be needed.

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

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

MassDEP
P.O. Box 4062
Boston, MA
02211

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

A. Permit Information

1. Permit Code: 4 to 7 character code from permit instructions	2. Name of Permit Category
WM15	NPDES Remediation General Permit

3. Type of Project or Activity: Temporary Construction Site Dewatering

B. Applicant Information – Firm or Individual

1. Name of Firm - Or, if party needing this approval is an individual enter name below: College of the Holy Cross

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

5. Street Address: 1 College Street

6. City/Town	7. State	8. Zip Code	9. Telephone #	10. Ext. #
Worcester	MA	01610	508-793-2483	

11. Contact Person	12. e-mail address
Leonard Raymond	lraymond@holycross.edu

C. Facility, Site or Individual Requiring Approval

1. Name of Facility, Site Or Individual: College of the Holy Cross

2. Street Address: 1 College Street

3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #
Worcester	MA	01610	508-793-2483	

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

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

1. Name of Firm Or Individual: GZA GeoEnvironmental Inc.

2. Address: 249 Vanderbilt Avenue

3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #
Norwood	MA	02062	781-278-3700	

8. Contact Person	9. LSP Number (BWSC Permits only)
Jahan Khalili	

E. Permit - Project Coordination

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

EOEA File Number

F. Amount Due

DEP Use Only

Permit No:

Rec'd Date:

Reviewer:

Special Provisions:

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

Check Number	Dollar Amount	Date
273550	500.00	4/26/2019